

# Klemsan®



**AUTOMATION**  
CATALOGUE



## KLEMSAN Automation



Klemsan Automation, supported by an experienced sales and technical team and an easy-to-use software, is the adaptable alternative for any automation solution.

Klemsan Automation is the perfect solution for any customized or demanding need.

These products are specifically suited for integration in a wide range of applications such as waste and water treatment, access control, renewable energies, building equipment, industrial machines and transportation.

## Made in Turkey



We build the best automation products on the market right here in the Turkey and we stand behind them. We will outlast and outperform anyone on the market, and support to improve your system.

# 100%

## Customer *Satisfaction*



Save your time  
and energy with  
fast response



Maximum  
dependability



Simple and effective  
functions suitable for  
your application



Analysis of  
**customer**  
requirements



Behind every project  
**technologies**  
and **expertise**



OHSAS 18001-2007  
**ISO 9001**  
**ISO 50001**  
ISO 14001



**Time & Control**  
Management Solutions — 09



**Protection**  
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## Time & Control Management Solutions



*Timing is everything*



## Defining a timer in simple terms

A timer is an automation device that either keeps track of how much time has been spent doing something or that counts down a specified duration of time. After a predefined time has elapsed, the timer closes or opens its contact.

## Which actions are executed?

Starting  
Stopping  
Delaying  
Triggering

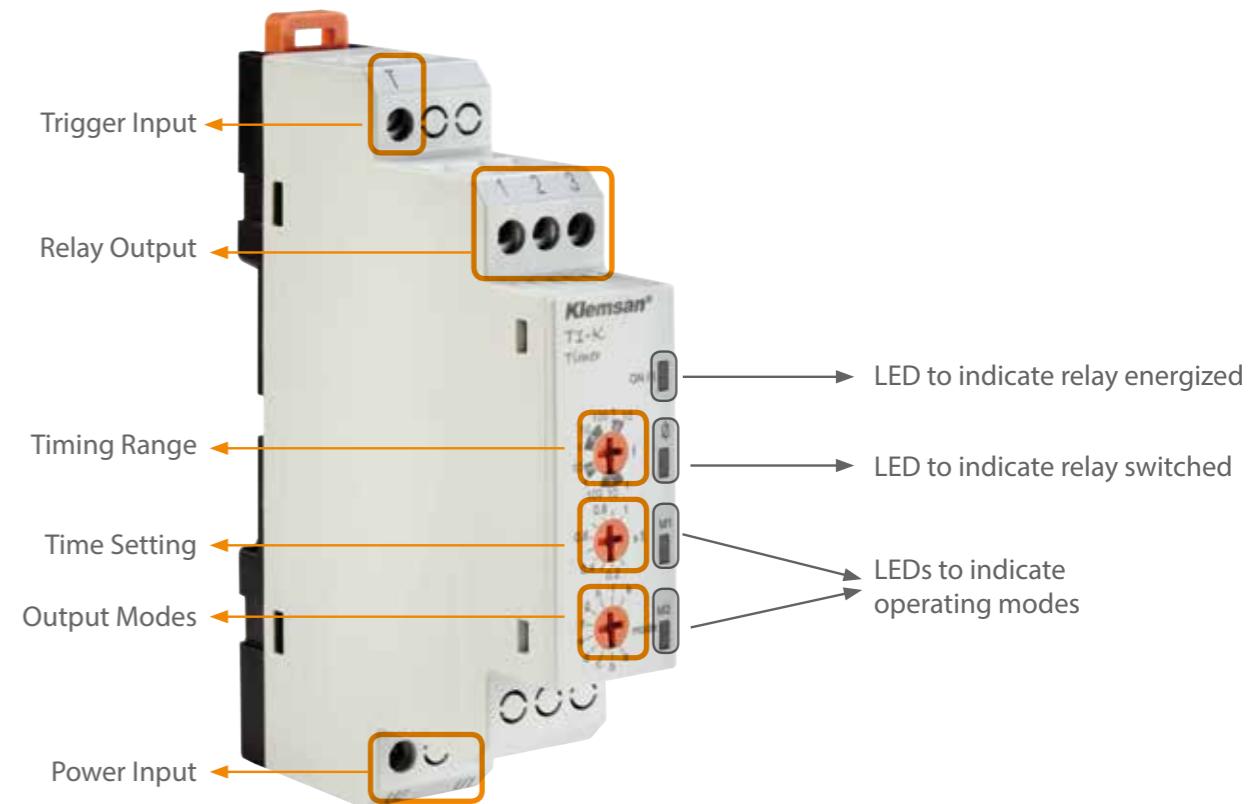
A timer can be used to **start** an action according to a predefined time or **stop** an action over a period of time. It can also add **delay** an action. It allows to control applications with its **trigger input** as well.

## Benefits and Advantages

- High accuracy and switching reliability
- Sensitive timing range from 0.1sec to 10days
- High mechanical endurance
- Multifunctional operating modes
- Trigger input
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences.
- A wide range of power supply from (24 to 300VAC/DC)
- Sleek 17.5mm wide housing and compact design saves panel space.
- Perfect to fit in Modular Enclosure
- Protection against over voltage and reverse polarity
- Self-Extinguishing plastic housing

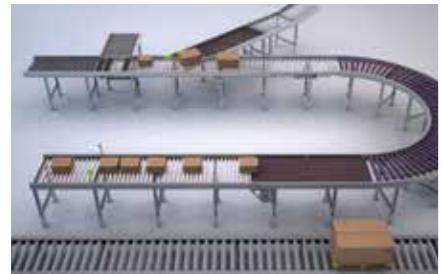
## Layout & Mounting

Klemsan electronic timers are suitable for snap mounting onto 35 mm standards DIN rails.





## Conveyor Control



Managing the operation of a conveyor belt based on the time interval between products on the belt.



## Direction Control of Industrial Motor



Controls the direction of the motor's rotation.



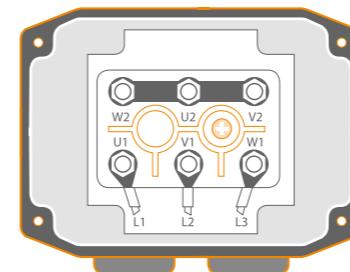
## Smart Lighting



Controlling flashing on lighted signs.



## Star-Delta Starter



Successful run-up for industrial motors with star-delta relay.



## Remote Machinery Control



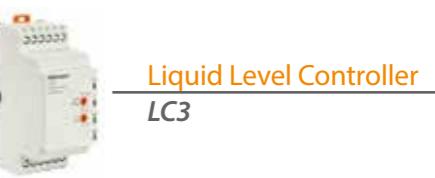
Managing maintenance of the power supply in the event of a mains power failure, switching on an external backup power source for a given time.



## Controlling Liquid Level in a Tank



It can be used to control the liquid level in a tank. Sensitivity resistance can be adjusted thus there is no need to change models to match different liquid types and concentrations.



## Vending Machines



Automatic management of vending machines.



## Billboard and Street Lighting



Controlling billboards and street lights with the accurate and precise time thanks to photocell relay.



## Packing Machine / System



Controlling heat sealing times on blister packs, packaging bags, etc.





## Meastro astronomical relay

MEASTRO is an astonomic time relay which calculates sunrise and sunset times for the given coordinates or city selections and turns the relay contacts on and off to control connected systems without any need of photocells or external sensors. Meastro can be used as digital time relay as well.

## Which actions are executed?

Thanks to the MAESTRO infrared port and remote control, the program, time, location and prayer information prepared by the computer is transferred within seconds.

**Infrared energy savings**  
100 programming memories  
user interface software prayer times

MAESTRO controls devices connected to relay outputs according to user-programmed hours, sunrise and sunset times.

Street lighting, mosque lighting and air conditioning by controlling the astronomical time clock provides energy savings.

It has a total of 100 programming memories for 2 contacts

With the user interface software you can program your program much faster. You can also

double your speed with the control that provides infrared data transfer from the device to the controller or from the controller to the device bidirectionally.

It calculates prayer times according to the province-district or coordinate information you have set.

## Benefits and Advantages

- Fast programming with user interface program and infrared control
- 7 year battery reserve time
- 100 programming memories
- High electromagnetic compatibility (EMC) and maximum resistance to electromagnetic noise
- User-friendly menu structure
- Perfect fit with the modular panel
- High mechanical strength
- Self-extinguishing plastic outer structure

## Layout & Mounting

Klemsan astronomic timers are suitable for snap mounting onto 35 mm standards DIN rails.



MEASTRO 321

## Which markets are they used frequently?

- Street lighting
- Site lighting
- University and college
- Mosque lighting and conditioning systems.
- Parks, gardens and farm irrigation
- ATM's, shop windows, advertising boards, lighting



## Street Lighting



In open areas such as streets, streets, parks and gardens, in closed areas such as universities, schools and buildings where lighting elements need to be turned on and off in certain periods, astronomical time relay is used independent of human power. Meastro, which calculates the change of the sunrise and sunset time over the next 100 years, saves energy. In addition, different programs according to the days of the week, the lighting system provides periodic control.



Astronomical Timer  
MEASTRO 221  
MEASTRO 321

## ATM, Store Showcase, Billboards Lighting



ATMs, showcase, billboards and many more areas are used MEASTRO with the aim of saving energy.



Astronomical Timer  
MEASTRO 221  
MEASTRO 321

## Mosque, Site Lighting and Air Conditioning



Control panels must be monitored carefully otherwise the effects of a power outage or voltage drop can be highly harmful for equipments.



Astronomical Timer  
MEASTRO 321

## Park, Garden and Field Irrigation



The control of the water pumps to be operated in agricultural areas, park or garden irrigation systems before one or more times a day is determined easily by the programming of the MEASTRO 110 astronomical time relay.



Astronomical Timer  
MEASTRO 110  
MEASTRO 120  
MEASTRO 121  
MEASTRO 221  
MEASTRO 321

## Digital Timer



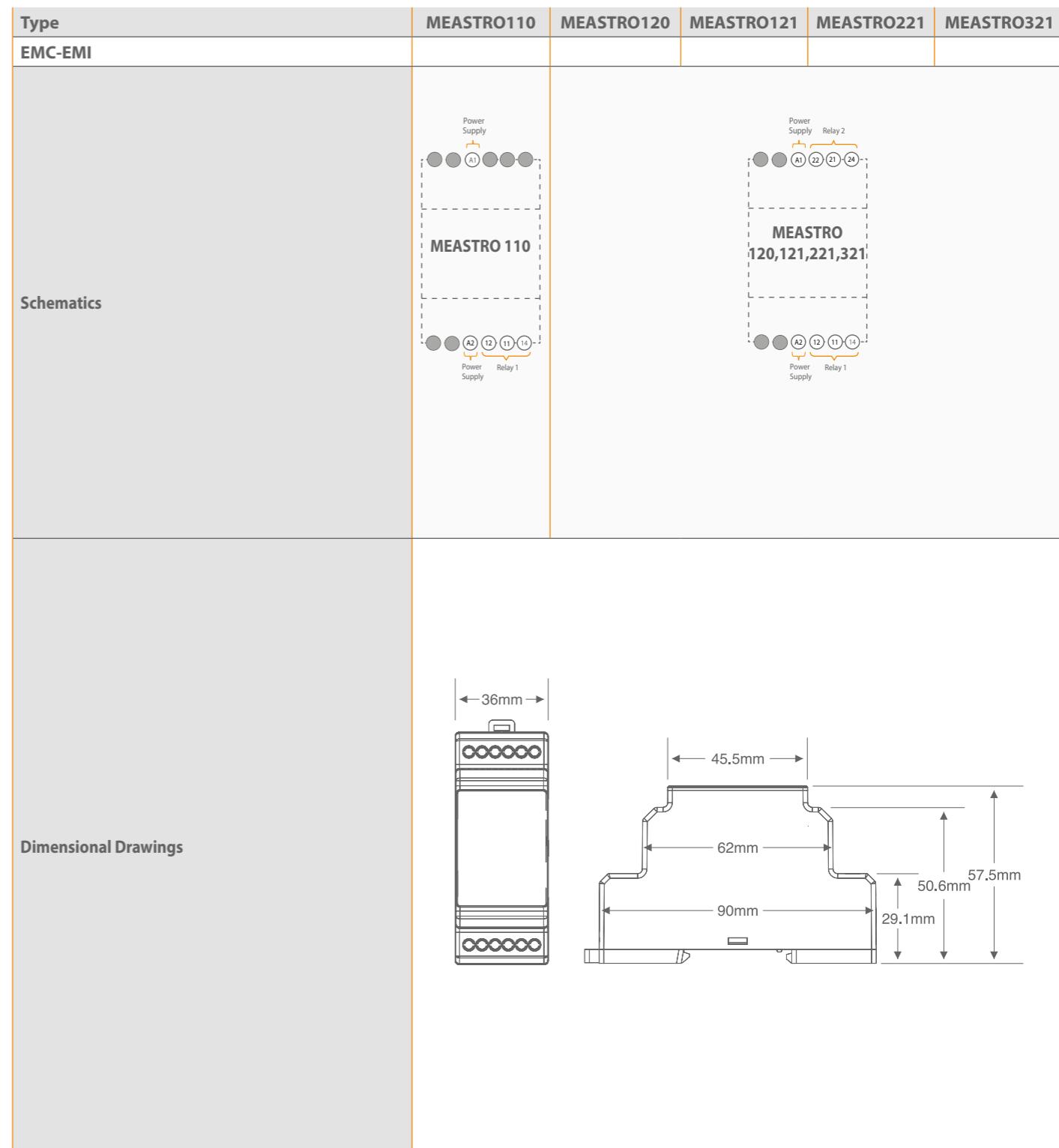
MAESTRO also has models that are independent of the astronomical time, and can only be used as digital time relays on the days and times set by the user.



Digital Timer  
MEASTRO 110  
MEASTRO 210



MEASTRO-R Infrared Controller		MEASTRO110	MEASTRO120	MEASTRO121	MEASTRO221	MEASTRO321
	Order Number: 270 720					
Type	MEASTRO110	MEASTRO120	MEASTRO121	MEASTRO221	MEASTRO321	
Definition	Digital Timer	Digital Timer	Astronomical Timer	Astronomical Timer	Astronomical Timer	
Order Number	270 700	270 701	270 702	270 703	270 704	
Casing Width(mm)	36mm	36mm	36mm	36mm	36mm	
Connections	Screw Terminal	Screw Terminal	Screw Terminal	Screw Terminal	Screw Terminal	
Mounting	Rail Mount	Rail Mount	Rail Mount	Rail Mount	Rail Mount	
Functions	Digital time clock	✓	✓	✓	✓	✓
	Astronomical time clock	-	-	-	✓	✓
	Prayer program	-	-	-	-	✓
	Infrared	-	-	✓	✓	✓
	Programming with controller	-	-	✓	✓	✓
Display	Type	LCD	LCD	LCD	LCD	LCD
	Dimensions	1.5	1.5	1.5	1.5	1.5
	Renewal time	0.5sec	0.5sec	0.5sec	0.5sec	0.5sec
Number of Program	100	100	100	100	100	
Infrared Distance	550 mm	550 mm	550 mm	550 mm	550 mm	
Accuracy	±1sec/day	±1sec/day	±1sec/day	±1sec/day	±1sec/day	
Battery Life	7 years	7 years	7 years	7 years	7 years	
Type of Output	Relay	Relay	Relay	Relay	Relay	
Relay Outputs	Number of Contacts	1	2	2	2	2
	Type	1 C/O (SPDT)	2 C/O (SPDT)	2 C/O (SPDT)	2 C/O (SPDT)	2 C/O (SPDT)
	Max. Ratings -AC	16A / 250VAC	16A / 250VAC	16A / 250VAC	16A / 250VAC	16A / 250VAC
	Max. Switching Power	1250VA	1250VA	1250VA	1250VA	1250VA
	Mechanical Life Time	≥ 10^7	≥ 10^7	≥ 10^7	≥ 10^7	≥ 10^7
	Electrical Life Time	5x10^4	5x10^4	5x10^4	5x10^4	5x10^4
Supply Volt-age	Supply Voltage	DC	-	-	-	-
	AC	165...265 V AC	165...265 V AC	165...265 V AC	165...265 V AC	165...265 V AC
	Supply Frequency	35-70Hz	35-70Hz	35-70Hz	35-70Hz	35-70Hz
Permissible Ambient Temperature	During Operation	-20°C..+70°C	-20°C..+70°C	-20°C..+70°C	-20°C..+70°C	-20°C..+70°C
	During Storage	-30°C..+80°C	-30°C..+80°C	-30°C..+80°C	-30°C..+80°C	-30°C..+80°C
Relative Humidity	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	
Operating Frequency	35-70Hz	35-70Hz	35-70Hz	35-70Hz	35-70Hz	
Degree of Protection	IP20	IP20	IP20	IP20	IP20	
Power Consumption	DC	-	-	-	-	
	AC	<11VA	<11VA	<11VA	<11VA	<11VA





Type	T1-30S	T1-60S	T1-60S2	T1-100S	T1-XS	T1-FLASH	T1-M4
<b>Timing Function</b>	Single-functional	Single-functional	Single-functional	Single-functional	Single-functional	Single-functional	Multifunctional
<b>Definition</b>	On delay timer	On delay timer	2C/O On delay timer	On delay timer	On delay timer	Off flasher timer	Multimode timer
<b>Order Number</b>	270 363	270350	270 352	270359	270357	270351	270355
<b>Casing Width(mm)</b>	17,5	17.5	17,5	17.5	17.5	17.5	17.5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
<b>Functions</b>	ND	ND	ND	ND	XS	Foff	ND, FD, Fon, Foff
<b>Type of Output</b>	Relay	Relay	Relay	Relay	Relay	Relay	Relay
<b>Auxiliary contacts</b>	Type	1 C/O (SPDT)	1 C/O (SPDT)	2 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
	Max ratings-AC (for NO side)	10A/250V; 1250 VA	5A/250V; 1250 VA	10A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA
	Max ratings-DC (for NO side)	5A/30VDC; 150W					
	Mechanical life time	$\geq 10^7$ operations					
	Electrical life time operations (for NO side)	$5 \times 10^4$ (5A@250VAC) $1 \times 10^5$ (5A@30VDC)					
<b>Adjustment of Timing-1 &amp; Timing-2</b>	-	-	-	-	-	independent	independent
<b>Time Range</b>	Timing-1	1sec=>30sec	1sec=>60sec	1sec=>60sec	1sec=>100sec	1sec=>2559sec	0.1sec=>10days
	Timing-2	-	-	-	-	-	0.1sec=>10days
<b>Lux adjustment range</b>	-	-	-	-	-	-	-
<b>Sensitivity adjustment range</b>	-	-	-	-	-	-	-
<b>Supply Voltage</b>	DC	24-300 VDC	24-300 VDC	24-300 VDC	24VDC	24-300 VDC	24-300 VDC
	AC	24-300 VAC	24-300 VAC	24-300 VAC	24VAC or 180-265 VAC	24-300 VAC	24-300 VAC
<b>Supply Frequency</b>	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz
<b>Trigger Input Voltage</b>	-	-	-	-	-	-	-
<b>Permissible ambient temperature</b>	During operation	-20 to +60 °C					
	During storage	-40 to +75 °C					
<b>Relative Humidity</b>	Max. 95% no condensation	Max. 95% no condensation	Max. 95% no condensation	Max. 95% no condensation	Max. 95% no condensation	Max. 95% no condensation	Max. 95% no condensation
<b>Recovery time</b>	Max. 100msec	Max. 100msec	Max. 100msec	Max. 100msec	Max. 100msec	Max. 100msec	Max. 100msec
<b>Degree of protection</b>	IP20	IP20	IP20	IP20	IP20	IP20	IP20



T1-M5	T1-K	T1-LR	SD1	SD1-24	PH1-20L	LC3	LC3-T
Multifunctional	Multifunctional	Single-functional	Single-functional	Single-functional	Single-functional	Single-functional	Single-functional
Multimode timer	Multimode timer with trigger input	Left-right timer	Star-delta timer	Star-delta timer	Photocell relay with an external photocell sensor	Liquid level controller	Liquid level controller
270353	270354	270356	270358	270362	270050	270001	270 002
17.5	17.5	17.5	17.5	17.5	17.5	36	36
Screw terminal							
ND, FD, NFD, Fon, Foff	a, b, c, d, e, f, g, h, i, k	LR	SD	SD	PHL	LC	LC
Relay	Relay	Two Relays	Two Relays	Relay	Relay	Relay	Relay
1 C/O (SPDT)	1 C/O (SPDT)	2 x C/O	2 x C/O	2 x C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	10A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	10A/250V; 1250 VA
5A/30VDC; 150W							
$\geq 10^7$ operations							
$5 \times 10^4$ (5A@250VAC) $1 \times 10^5$ (5A@30VDC)							
dependent	-	independent	independent	independent	independent	-	-
0.1sec=>10days	0.1sec=>10days	0.1sec=>10days	1sec=>30sec	1sec=>30sec	1sec=>45sec	0.1sec=>1sec	-
0.1sec=>10days	-	0.1sec=>10days	20msec=>500msec	20msec=>500msec	20msec1sec=>45sec	-	-
-	-	-	-	-	1-20Lux	-	-
-	-	-	-	-	-	5-100kΩ	2.5 .. 50kΩ
24-300 VDC	24-300 VDC	24-300 VDC	-	24-300 VDC	24-300 VDC	-	-
24-300 VAC	24-300 VAC	24-300 VAC	150-500 VAC	24-300 VAC	24-300 VAC	150-500 VAC	185 .. 265V AC
35-70 Hz	50-60Hz						
-	24-300 VAC/DC	-	-	-	-	-	-
-20 to +60 °C							
-40 to +75 °C							
Max. 95% no condensation							
Max. 100msec							
IP20							



Type	T1-30S	T1-60S	T1-60S2	T1-100S	T1-XS	T1-FLASH	T1-M4
Power consumption	DC <2W	<1.25W	<2W	<1W	<1.25W	<1.25W	<1.25W
	AC <3.5VA	<2.5VA	<3.5VA	<13VA	<2.5VA	<2.5VA	<2.5VA
Weight(gr)	66	57	66	57	62	60	60
Permissible mounting position	any	any	any	any	any	any	any
EMC-EMI	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11	OK	OK	OK	OK	OK	OK
Accessories	Definiton	-	-	-	-	-	-
	Order Number	-	-	-	-	-	-
	Packaging unit	-	-	-	-	-	-
Schematics							
Dimensional Drawings							

T1-M5	T1-K	T1-LR	SD1	SD1-24	PH1-20L	LC3	LC3-T
<1.25W	<1.25W	<1.25W	<1.25W	<1.25W	<1.25W	-	-
<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<7VA	<7VA
60	66	70	70	70	63	82	82
any	any						
OK	-						
-	-	-	-	-	-	Liquid Level probe for LC3	Liquid Level probe for LC3
-	-	-	-	-	-	280610	280610
-	-	-	-	-	-	1 pc.	1 pc.
Supply Voltage	Supply Voltage						

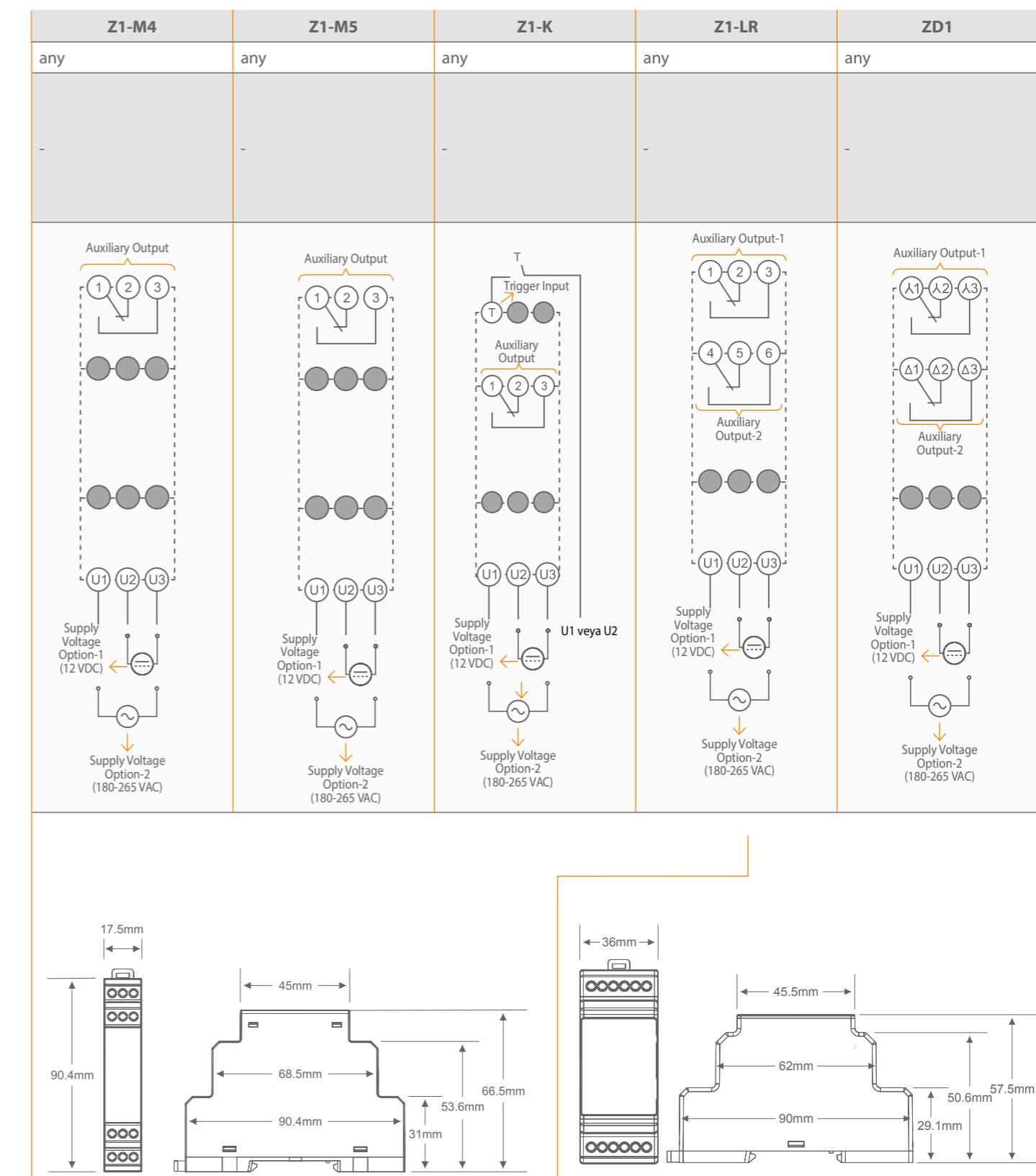


Type	Z1-60S	Z1-100S	Z1-XS	Z1-FLASH
<b>Timing Function</b>	Single-functional	Single-functional	Single-functional	Single-functional
<b>Def initon</b>	On delay timer	On delay timer	On delay timer	Off flasher timer
<b>Order Number</b>	270 370	270 379	270 377	270 371
<b>Casing Width(mm)</b>	17,5	17,5	17,5	17,5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal	Screw terminal
<b>Functions</b>	ND	ND	XS	Foff
<b>Type of Output</b>	Relay	Relay	Relay	Relay
<b>Auxiliary contacts</b>	Type	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
	Max ratings-AC	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA
	Max ratings-DC	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
	Mechanical life	$\geq 10^7$	$\geq 10^7$	$\geq 10^7$
<b>Electrical life</b>	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)
<b>Adjustment of Timing-1 &amp; Timing-2</b>	-	-	-	independent
<b>Time Range</b>	Timing-1	1sec=>60sec	1sec=>100sec	1sec =>2559sec
	Timing-2	-	-	0.1sec =>10days
<b>Lux adjustment range</b>	-	-	-	-
<b>Sensitivity adjustment range</b>	-	-	-	-
<b>Supply Voltage</b>	DC	12VDC	24VDC	12VDC
	AC	12VAC or 180..265V AC	24VAC or 180..265V AC	12VAC or 180..265V AC
<b>Supply Frequency</b>	50-60Hz	50-60Hz	50-60Hz	50-60Hz
<b>Trigger Input Voltage</b>	-	-	-	-
<b>Permissible Ambient Temperature</b>	During Operation	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
	During Storage	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
<b>Relative Humidity</b>	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
<b>Recovery time</b>	Max. 100msec	Max. 100msec	Max. 100msec	Max. 100msec
<b>Degree of protection</b>	IP20	IP20	IP20	IP20
<b>Power consumption</b>	DC	<1.25W	<1.25W	<1.25W
	AC	<2.5VA	<2.5VA	<2.5VA
<b>Weight(gr)</b>	60	60	60	60

Z1-M4	Z1-M5	Z1-K	Z1-LR	ZD1
Multifunctional	Multifunctional	Multifunctional	Multifunctional	Single-functional
Multimode timer	Multimode timer	Multimode timer with trigger input	Left-right timer	Star-delta timer
270 375	270 373	270 374	270 376	270 378
17,5	17,5	17,5	17,5	17,5
Screw terminal				
ND,FD,Fon,Foff	ND,FD,NFD,Fon,Foff	a,b,c,d,e,f,g,h,i,k	LR	SD
Relay	Relay	Relay	Relay	Relay
1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	2 x C/O (SPDT)	2 x C/O (SPDT)
10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250VA	10A/250V; 1250VA	10A/250V; 1250VA
5A/30VDC; 150W				
$\geq 10^7$				
5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)
independent	independent	independent	independent	independent
0.1sec =>10days	0.1sec =>10days	0.1sec =>10days	0.1sec =>10days	1sec =>30sec
0.1sec =>10days	0.1sec =>10days	-	0.1sec =>10days	20msec=>500msec
-	-	-	-	-
12VDC	12VDC	12VDC	12VDC	12VDC
12VAC or 180..265V AC				
50-60Hz	50-60Hz	50-60Hz	50-60Hz	50-60Hz
-	-	12VAC/DC veya 180..265V AC	-	-
-20 to +60 °C				
-40 to +75 °C				
Max.95% (no condensation)				
Max. 100msec				
IP20	IP20	IP20	IP20	IP20
<1.25W	<1.25W	<1.25W	<1.25W	<1.25W
<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA
60	60	60	60	60

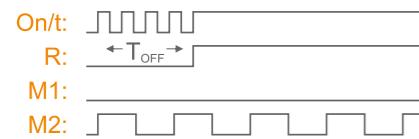


Type	Z1-60S	Z1-100S	Z1-XS	Z1-FLASH
Permissible mounting position	any	any	any	any
<b>EMC-EMI</b>	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11	-	-	-
<b>Schematics</b>				
<b>Dimensional Drawings</b>				



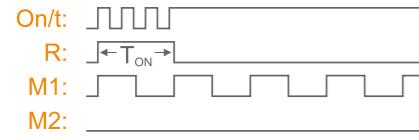


## a & ND functions / On delay operation



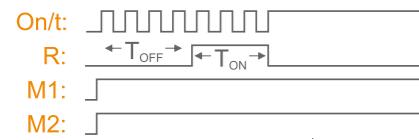
The output relay is initially de-energized and energized after an adjustable time delay,  $t_{off}$ .

## b & FD functions / Off delay operation



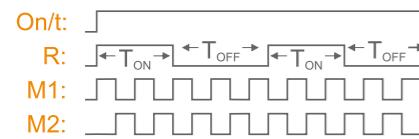
The output relay is initially energized and de-energized after an adjustable time delay,  $t_{on}$ .

## NFD function / On-Off delay operation



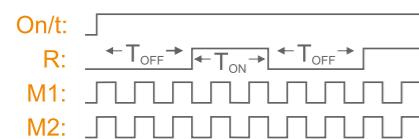
The output relay is initially de-energized and energized after an adjustable time delay,  $t_{off}$  and stays energized for an adjustable period,  $t_{on}$  and then de-energized.

## Fon function / On flasher operation



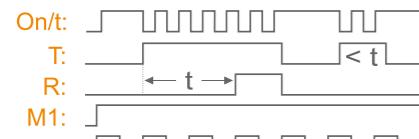
The output relay is initially energized and de-energized after an adjustable time delay,  $t_{on}$  and stays de-energized for an adjustable period,  $t_{off}$  and then energized. This loop is repeated until the device is powered off. "On/t" led flashes at Fon and Foff mode for "T1-M4" product.

## g and Foff functions / Off flasher operation



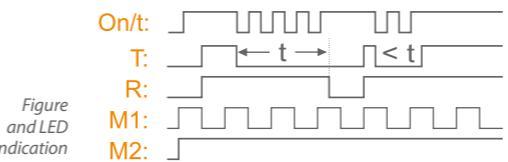
The output relay is initially de-energized and energized after an adjustable time delay,  $t_{off}$  and stays energized for an adjustable period,  $t_{on}$  and then de-energized. This loop is repeated until the device is powered off. "On/t" led flashes at Fon and Foff mode for "T1-M4" product.

## c function / On delay with control input



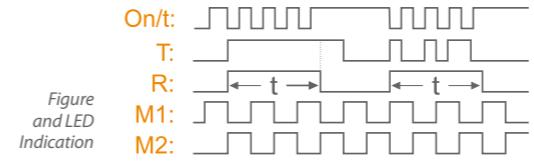
The output relay is initially de-energized. A contact closure on T contact triggers an adjustable time delay,  $t$ , which energizes the output relay when expired. The output relay stays energized as long as the T contact is active. Delay time,  $t$ , is cleared when the contact on T contact opens.

## d function / Off delay with control input



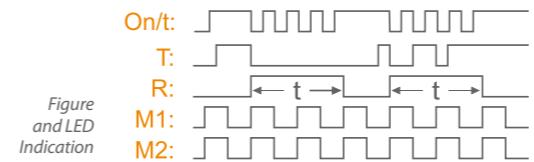
The output relay is initially de-energized and energized when a contact closure on T contact is detected. A contact triggers an adjustable time delay,  $t$ , which de-energizes the output relay when expired. Reclosure of the contact on T contact before the time delay is expired restarts time delay,  $t$ , and keeps the output relay energized.

## e function / Rising edge triggered off delay



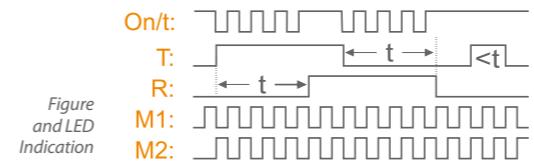
The output relay is initially de-energized. A contact closure on T contact both energizes the output relay and triggers an adjustable time delay,  $t$ , which de-energizes the output relay when expired. During the time delay, T contact is insensitive to state changes and becomes sensitive when time delay,  $t$ , expired.

## f function / Falling edge triggered off delay



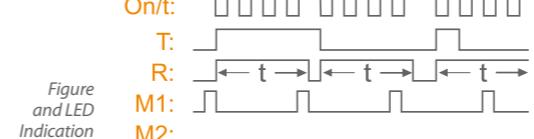
The output relay is initially de-energized. A state change of the T contact from closed to open both energizes the output relay and triggers an adjustable time delay,  $t$ , which de-energizes the output relay when expired. During the time delay, T contact is insensitive to state changes and becomes sensitive when time delay,  $t$ , expired.

## h function / On and off delay with control input



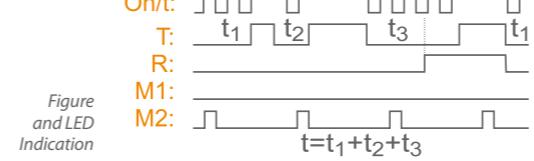
The output relay is initially de-energized. A contact closure on T contact triggers an adjustable time delay,  $t$ , which energizes the output relay when expired. Similarly contact release of T contact triggers the time delay,  $t$ , which de-energizes the output relay when expired. Delay time,  $t$ , is cleared when the contact state of T contact changes.

## i function / Adjustable pulse output with control input



The output relay is initially de-energized. A state change on T contact both energizes the output relay and triggers an adjustable time delay,  $t$ , which de-energizes the output relay when expired. During the time delay, T contact is insensitive to state changes and becomes sensitive when time delay,  $t$ , expired.

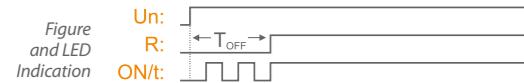
## k function / On delay with memory



The output relay is initially de-energized. If T contact is open, adjustable time delay,  $t$ , counts down and output relay energizes when  $t$  is expired. Any contact closure on T contact pauses the count down process and the process continues when the contact release on T contact occurs. A contact release is needed to restart the cycle, after the output relay is energized.

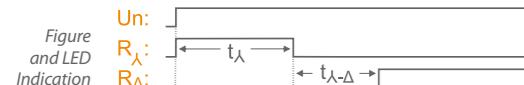


## XS function / On delay adjustment for each second



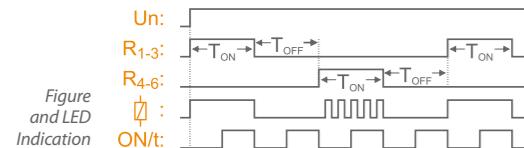
T1-XS is an ON delay timer that allows a sensitive time setting from 1 to 2559 seconds with 1 second increments. The output relay is initially de-energized and energized after the time delay  $t$  is expired.

## SD function / Star-Delta operation



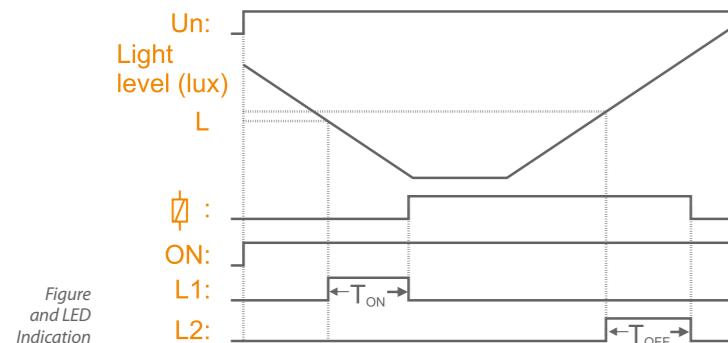
When the energy applied to device, star relay is energized until the end of the adjustable  $t_A$  time. At the end of the adjusted delay time  $t_{A-\Delta}$ , delta relay is energized until the device is powered off.

## LR function / Left-Right operation



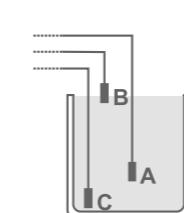
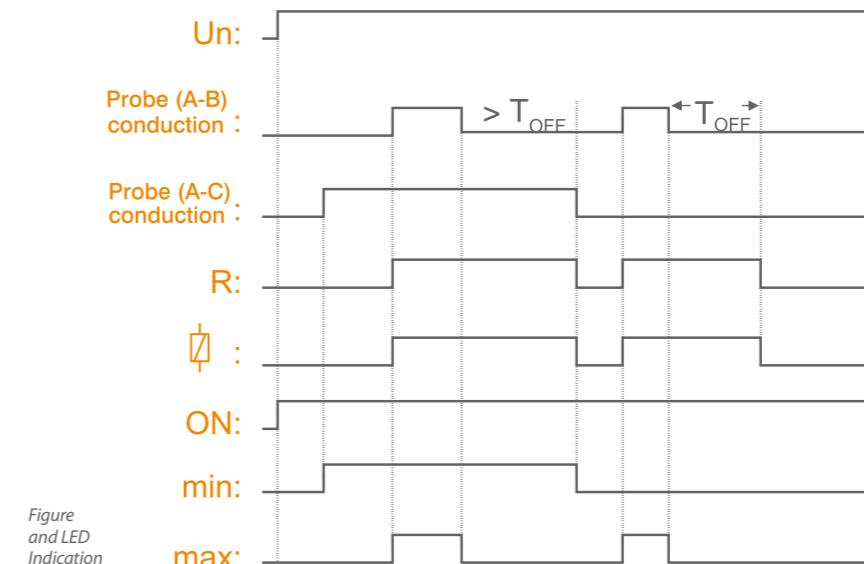
Initially first relay is energized. After the adjustable time delay  $t_{on}$ , relay is de-energized. Both relays are de-energized during the adjustable time delay  $t_{off}$ . At the end of  $t_{off}$ , second relay energizes. Second relay stays in this position during  $t_{on}$ . When  $t_{on}$  finished both relays are de-energized. This cycle is repeated continuously.

## PHL function / Photocell operation



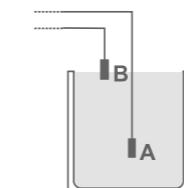
PH1-20L photocell relay measures the luminous intensity by means of a photocell sensor. On-off threshold value is adjusted in the range of 1-20 lux, via the front adjustment dial. The output relay is energized when the ambient light level is below the adjusted limit. On and off delays are adjustable between 1 and 45 seconds, via the front panel knobs. On delay is adjusted by  $t_{on}$  knob, and off delay is adjusted by  $t_{off}$  knob.

## LC function / Liquid Level Operation



### 3 electrodes mode:

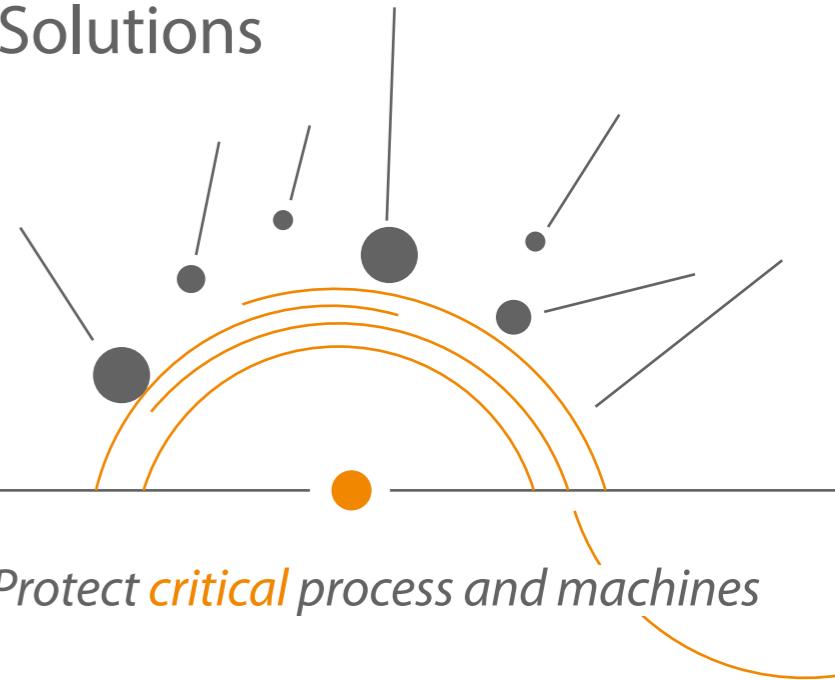
When the level of liquid in the tank reaches to electrode B, the output relay is activated and stays in this position even if the level drops below the electrode B level. The output relay is deactivated when the liquid level drops below the electrode A level. Re-activation occurs when the level reaches to the electrode B level.



### 2 electrodes mode:

For 2 electrodes mode of operation, A and B electrodes are used. When level of liquid in the tank reaches to electrode B, output relay is activated. When the liquid level drops below electrode B and continually stays there for the adjustable time delay (adjusted on the front panel knob); output relay will be de-energized.

## Protection Management Solutions





## Defining a protection relay in simple terms

A protection relay is an automation device that measures electrical values and detects electrical faults.

## Which actions are executed?

A protection relay measures electrical values such as current, voltage, frequency etc. in order to **protect** your machines.

It can stop your engine from overheating with external PTC **sensor**.

Electrical network which is connected to your machines is examined continuously. If a fault is **detected**, the machine is stopped immediately or with time **delay** by output contacts. After that, any malfunctions can be fixed. This avoids expensive breakdowns, synonymous with production delays and loss of profitability.

## Sensing Detection Delaying Protection

## Which markets are they used frequently?

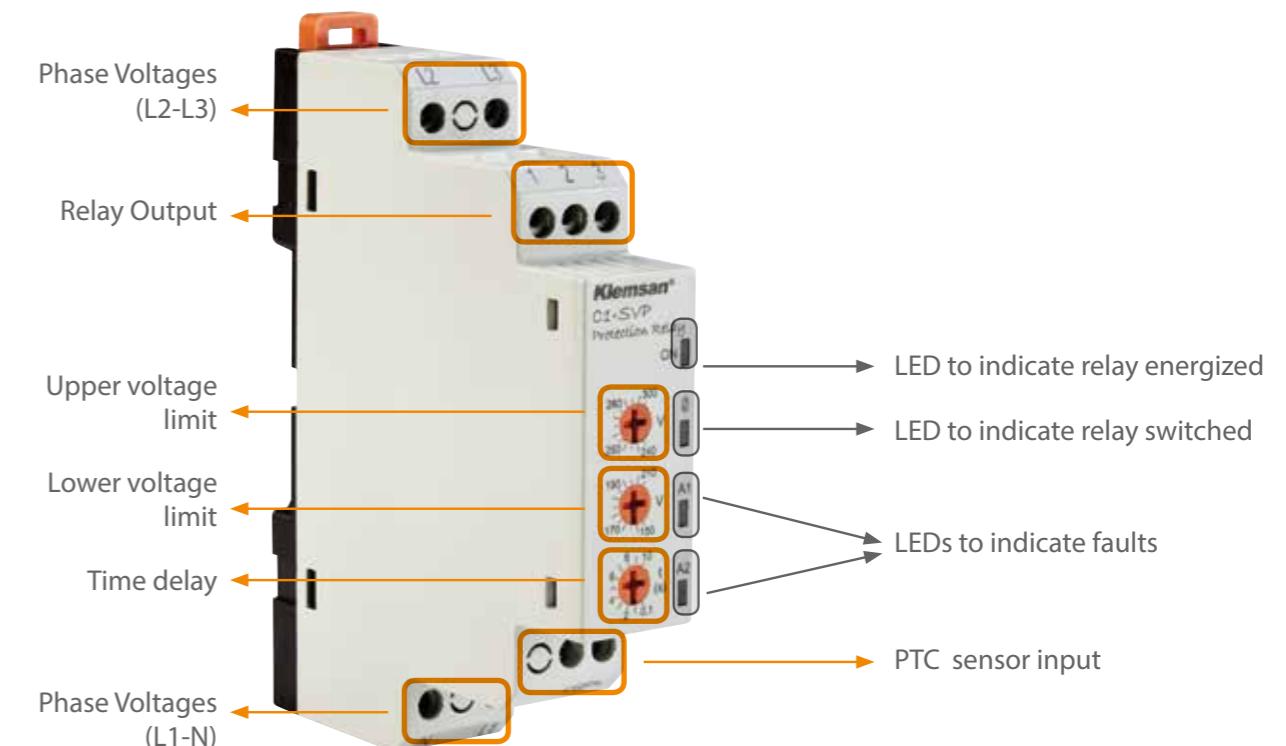
- Industrial machines
- Construction industry
- Stone pits
- Food and agriculture industry
- Water treatment system
- Moving stairs & elevators

## Benefits and Advantages

- First Class quality to fulfill all your monitoring needs
- Quick view of status with LEDs
- Easy configuration with knobs
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences.
- Sleek 17.5mm wide housing and compact design saves panel space.
- Perfect to fit in modular enclosure
- Self-Extinguishing plastic housing
- No auxiliary supply needed
- Preventing overheating thanks to PTC input
- High mechanical endurance
- High accuracy and switching reliability

## Layout & Mounting

Klemsan protection relays are suitable for snap mounting onto 35mm standards DIN rails.



C1-SVP Protection Relay



## Overcurrent Protection with Smart MCB



Detect a fault condition and interrupt current flow with adjustable time delay. After the fault is gone, unlike a circuit breaker, smart MCB turns its normal position automatically.



CURRENT PROTECTION  
CPR-16

## Control Panel



Control panels must be monitored carefully otherwise the effects of a power outage or voltage drop can be highly harmful for equipments.



VOLTAGE PROTECTION  
V1-S, C1-SVP, ...  
G1-SA, G1-SAP, G1-A,  
DPR3

## Escalators



Detection of unbalanced voltage on motors.



MOTOR PROTECTION  
C1D-SA, P1-SA, ...  
D-SA, G1D-SAL  
M1-SA, M1D-SA, DPR3

## Temperature Control of Motors



Preventing overheating with external PTC sensor.



OVERHEAT PROTECTION  
C1D-SVP, P1-SAP...  
M1-SAP, DPR3

## Conveyor Application



Detection of overcurrent when conveyor is jammed.



CURRENT PROTECTION  
CPR-16

## Generators



Frequency control for generators.



FREQUENCY PROTECTION  
F1, DPR3

## Machine Line



Providing phase loss, phase sequence and asymmetry protection for 3 phase applications.



MOTOR PROTECTION  
P1D-SA, C1-SA ...  
M1D-S, M1D-SA, DPR3

## Cranes



Adjustments of over and under voltage limit in order for cranes to operate correctly.



VOLTAGE PROTECTION  
V1, V1D, C1-SVP,  
G1-SA...  
G1D-SA, DPR3

## Compressors



Detection of phase-loss and sequence in order compressors to work correctly.



MOTOR PROTECTION  
P1-S, C1-SA, ...  
DPR3



## DPR3 Digital Protection Relay

DPR31xx series is a digital protection and monitoring relay designed for three-phase systems measure voltage, frequency and monitors these parameters below:

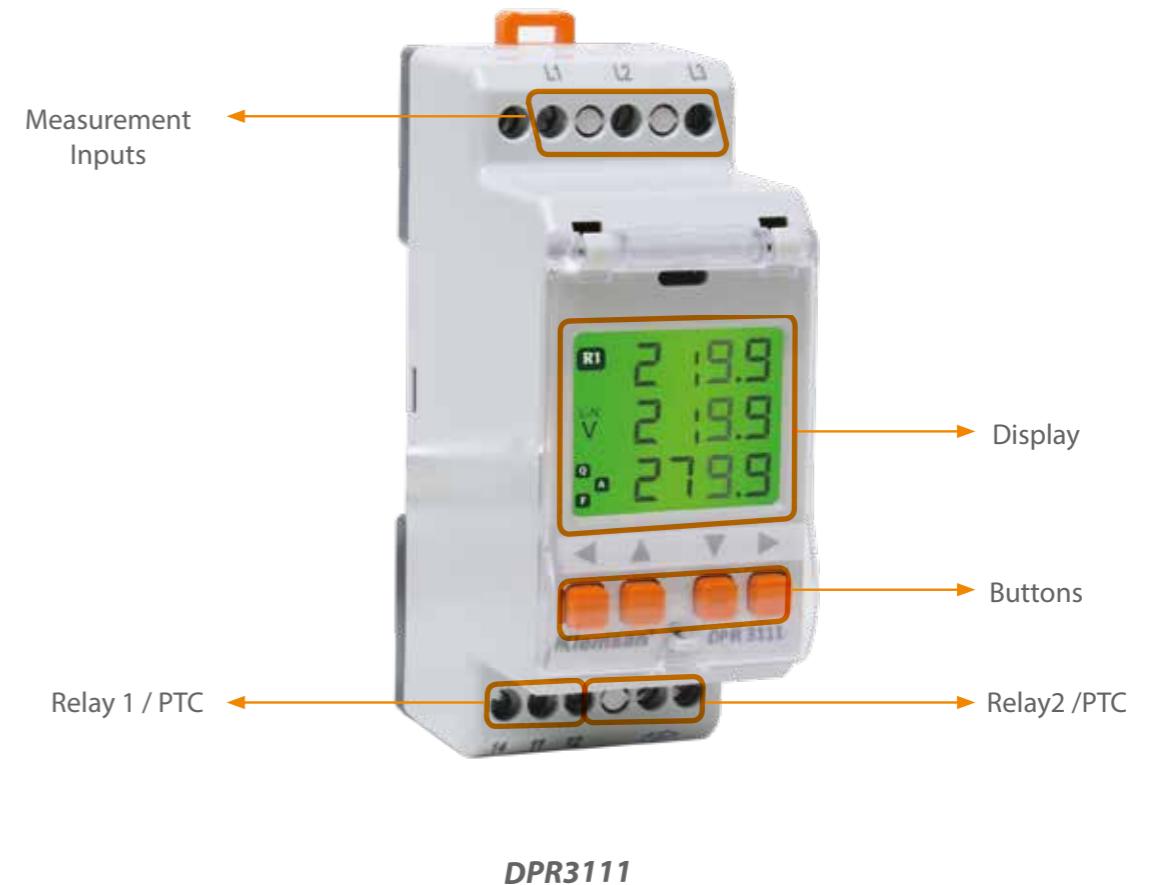
- Over voltage
- Under voltage
- Over Frequency
- Under Frequency
- Asymmetry
- Sequence
- Phase loss
- PTC error

### DPR31xx has many features;

- Undervoltage, overvoltage and frequency monitoring in three-phase AC systems 0...500 V
- Asymmetry, phase sequence, and phase loss monitoring
- Powered by external supply voltage
- Various alarms may be individually enabled/disabled and assigned to separate output contacts
- Start-up delay, response delay, delay on release
- Adjustable switching hysteresis
- RMS measurement (AC)
- Digital LCD display with real-time readings and onboard menu
- Automatic preset function available when first connecting device
- Memory stores last 4 alarm values
- Non-volatile memory for settings
- Continuous self monitoring
- Internal test/reset button
- Two separate SPDT alarm relays
- Normally energized or normally de-energized operation
- Latching or non-latching operation
- Password protection for device setting
- Sealable transparent cover
- Two-module enclosure (36 mm)

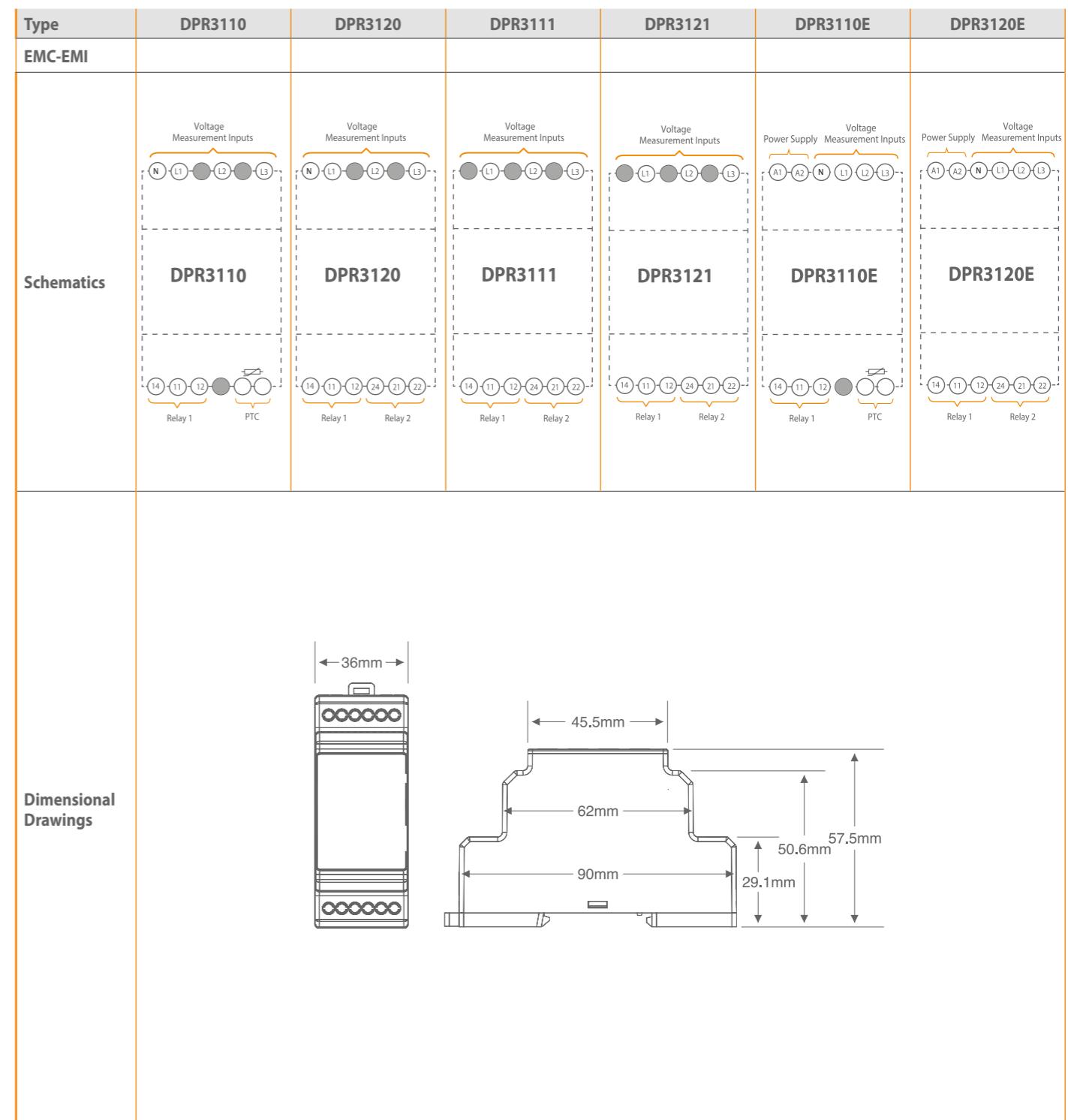
## Layout & Mounting

Klemsan digital protection relays are suitable for snap mounting onto 35 mm standards DIN rails.





Type	DPR3110	DPR3120	DPR3111	DPR3121	DPR3110E	DPR3120E
Definition	Digital Protection Relay	Digital Protection Relay	Digital Protection Relay	Digital Protection Relay	Digital Protection Relay	Digital Protection Relay
Order Number	270 600	270 601	270 602	270 603	270 604	270 605
Casing Width(mm)	36mm	36mm	36mm	36mm	36mm	36mm
Connections	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Network	3Ø with neutral	3Ø with neutral	3Ø without neutral	3Ø without neutral	3Ø with neutral	3Ø with neutral
Monitoring Functions	Phase Failure	Delay Time	0 - 999 sec			
	Phase Sequence	Delay Time	0 - 999 sec			
Adjustable Unbalanced Protection	Range	0 - 30%	0 - 30%	0 - 30%	0 - 30%	0 - 30%
	Hysteresis	0 - 30%	0 - 30%	0 - 30%	0 - 30%	0 - 30%
	Delay Time	0 - 999 sec				
Adjustable Voltage Protection	Range	0 - 999 V				
	Hysteresis	0 - 999 V				
	Delay Time	0 - 999 sec				
Adjustable Frequency Protection	Range	0 - 999 V				
	Hysteresis	0 - 999 V				
	Delay Time	0 - 999 sec				
PTC Protection	Threshold	1100Ω	-	1100Ω	-	1100Ω
	Delay Time	0 - 999 sec	-	0 - 999 sec	-	0 - 999 sec
Type of Output	Relay	Relay	Relay	Relay	Relay	Relay
Auxiliary Contacts	Number of Contacts	1	2	1	2	1
	Type	1 C/O (SPDT)	2 C/O (SPDT)	1 C/O (SPDT)	2 C/O (SPDT)	1 C/O (SPDT)
	Max Ratings-AC	10A / 250VAC				
	Max. Switching Power	1250VA	1250VA	1250VA	1250VA	1250VA
	Mechanical Life Time	$\geq 10^7$				
	Electrical Life Time	$5 \times 10^4$				
Supply Voltage	External Supply	-	-	-	Available	Available
	Supply Voltage	DC	-	-	-	-
		AC	85..300 V AC	85..300 V AC	85..300 V AC	85..300 V AC
	Supply Frequency	35-70Hz	35-70Hz	35-70Hz	35-70Hz	35-70Hz
Permissible Ambient Temperature	During Operation	-20°C..+70°C	-20°C..+70°C	-20°C..+70°C	-20°C..+70°C	-20°C..+70°C
	During Storage	-30°C..+80°C	-30°C..+80°C	-30°C..+80°C	-30°C..+80°C	-30°C..+80°C
Relative Humidity		Max.95% (no condensation)				
Operating Frequency		35-70Hz	35-70Hz	35-70Hz	35-70Hz	35-70Hz
Degree of Protection		IP20	IP20	IP20	IP20	IP20
Power Consumption	DC	-	-	-	-	-
	AC	<4VA	<4VA	<4VA	<4VA	<4VA

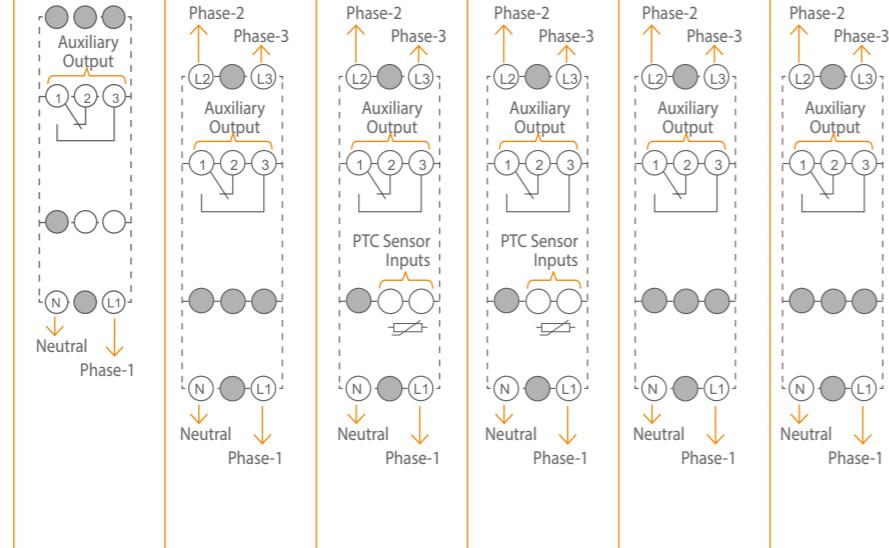




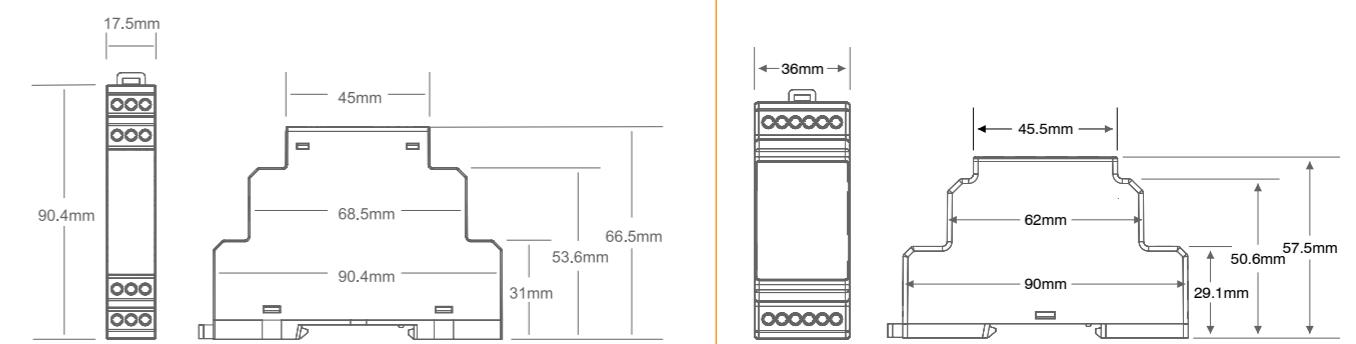
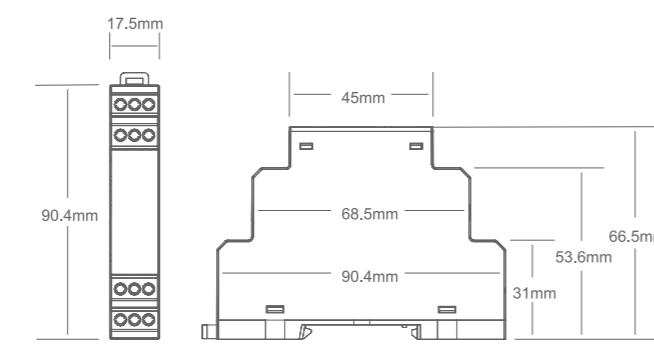
Type	F1	C1-SA	C1-SAP	C1-SVP	V1	V1-S
<b>Definition</b>	Frequency monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay
<b>Order Number</b>	270161	270156	270157	270158	270159	270160
<b>Casing Width(mm)</b>	17.5	17.5	17.5	17.5	17.5	17.5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
<b>Network</b>	-	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral
<b>Monitoring Functions</b>	Phase Failure	Fixed delay time	-	500msec	500msec	500msec
	Phase Sequence	Fixed delay time	-	500msec	500msec	500msec
	Adjustable Unbalanced Protection	Range	-	± (5% => 20%)	± (5% => 20%)	-
		Hysteresis	-	6,9VAC	6,9VAC	-
		Delay time	-	0.1=>10sec	0.1=>10sec	-
	Adjustable Voltage Protection	Upper limit	-	-	240=>300VAC (L-N)	240=>300VAC (L-N)
		Lower limit	-	-	150=>210VAC (L-N)	150=>210VAC (L-N)
		Hysteresis	-	-	6 VAC	6 VAC
		Delay time	-	-	0.1=>10sec for off delay operation	0.1=>10sec for off delay operation
	Adjustable Current Protection	Upper limit	-	-	-	-
		Lower limit	-	-	-	-
		Hysteresis	-	-	-	-
		Delay time	-	-	-	-
<b>Adjustable Frequency Protection</b>	Upper limit	42.5 => 65Hz	-	-	-	-
	Lower limit	40 => 62.5Hz	-	-	-	-
	Hysteresis	0.4Hz	-	-	-	-
	Delay time	1=>10sec	-	-	-	-
<b>Extremely High-Low Voltage Protection</b>	Upper limit	-	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)
	Lower limit	-	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)
	Hysteresis	-	6 VAC	6 VAC	6 VAC	6 VAC
	Delay time	-	100msec	100msec	100msec	100msec
<b>PTC Protection</b>	Fixed delay time	-	-	2000msec	2000msec	-
	Threshold	-	-	1100Ω	1100Ω	-
<b>Response time for monitoring any function</b>	Max. 250msec	Max. 250msec	Max. 250msec	Max. 250msec	Max. 250msec	Max. 250msec
<b>Type of Output</b>	Relay	Relay	Relay	Relay	Relay	Relay
<b>Auxiliary contacts</b>	Type	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
	Max ratings-AC (for NO side)	10A/250V;1250VA	10A/250V;1250VA	10A/250V;1250VA	10A/250V;1250VA	10A/250V;1250VA
	Max ratings-DC (for NO side)	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
	Mechanical life time	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations			

Type	V1-M	V1-T	C1D-SA	C1D-SAP	C1D-SVP	V1D	V1D-S	CPR-16
<b>Definition</b>	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Current monitoring relay
<b>Order Number</b>	270170	270162	270256	270257	270258	270259	270260	270270
<b>Casing Width(mm)</b>	17.5	17.5	17.5	17.5	17.5	17.5	17.5	36
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
<b>Network</b>	1Ø with neutral	3Ø with neutral	3Ø without neutral	3Ø without neutral	3Ø without neutral	3Ø without neutral	3Ø without neutral	-
<b>Monitoring Functions</b>	500msec	500msec	500msec	500msec	500msec	500msec	500msec	-
	-	-	500msec	500msec	500msec	-	500msec	-
	-	-	± (5% => 20%)	± (5% => 20%)	-	-	-	-
	-	-	12 VAC	12 VAC	-	-	-	-
	-	-	0.1=>10sec	0.1=>10sec	-	-	-	-
	240=>300VAC (L-N)	240=>300VAC (L-N)	-	-	270=>370VAC (L-L)	270=>370VAC (L-L)	270=>370VAC (L-L)	-
	150=>210VAC (L-N)	150=>210VAC (L-N)	-	-	400=>500VAC (L-L)	400=>500VAC (L-L)	400=>500VAC (L-L)	-
	6 VAC	6 VAC	-	-	6 VAC	6 VAC	6 VAC	-
	0.1=>10sec for off delay operation & 0.1=>10sec for off delay operation	-	-	-	0.1=>10sec for off delay operation	0.1=>10sec for off delay operation	0.1=>10sec for off delay operation	-
	-	-	-	-	-	-	-	1=>16AAC
<b>Adjustable Current Protection</b>	Upper limit	-	-	-	-	-	-	-
	Lower limit	-	-	-	-	-	-	-
	Hysteresis	-	-	-	-	-	-	5=>20% x Upper limit
	Delay time	-	-	-	-	-	-	0.1=>10sec
<b>Adjustable Frequency Protection</b>	Upper limit	42.5 => 65Hz	-	-	-	-	-	-
	Lower limit	40 => 62.5Hz	-	-	-	-	-	-
	Hysteresis	0.4Hz	-	-	-	-	-	-
	Delay time	1=>10sec	-	-	-	-	-	-
<b>Extremely High-Low Voltage Protection</b>	Upper limit	-	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	-
	Lower limit	-	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	-
	Hysteresis	-	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	-
	Delay time	-	100msec	100msec	100msec	100msec	100msec	-
<b>PTC Protection</b>	Fixed delay time	-	-	2000msec	2000msec	-	-	-
	Threshold	-	-	-	1100Ω	1100Ω	-	-
<b>Response time for monitoring any function</b>	Max. 250msec	Max. 250msec	Max. 250msec	Max. 250msec	Max. 250msec	Max. 250msec	Max. 250msec	Max. 100msec
<b>Type of Output</b>	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay
<b>Auxiliary contacts</b>	Type	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
	Max ratings-AC (for NO side)	10A/250V;1250VA	10A/250V;1250VA	10A/250V;1250VA	10A/250V;1250VA	10A/250V;1250VA	10A/250V;1250VA	10A/250V;4000VA
	Max ratings-DC (for NO side)	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	-
	Mechanical life time	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations			

Type		F1	C1-SA	C1-SAP	C1-SVP	V1	V1-S
Auxiliary contacts	Electrical life time operations (for NO side)	5x10 <sup>4</sup> (5A@250VAC) 1x10 <sup>5</sup> (5A@30VDC)					
Supply Voltage	DC	-	-	-	-	-	-
	AC	85-320VAC from L1-N	85-320VAC from L1-N				
Supply Frequency	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz
Control Input Voltage Range	-	-	-	-	-	-	-
Permissible ambient temperature	During operation	-20 to +60 °C	-20 to +60 °C				
	During storage	-40 to +75 °C	-40 to +75 °C				
Relative Humidity	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
Operating frequency	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Power consumption	DC	-	-	-	-	-	<1W
	AC	<3VA	<3VA	<3VA	<3VA	<3VA	<3VA
Weight(gr)	62	66	70	71	66	66	
Permissible mounting position	any	any	any	any	any	any	any
EMC-EMI	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-6, 61000-4-8	OK	OK	OK	OK	OK	OK



V1-M	V1-T	C1D-SA	C1D-SAP	C1D-SVP	V1D	V1D-S	CPR-16
5x10 <sup>4</sup> (5A@250VAC) 1x10 <sup>5</sup> (5A@30VDC)	1x10 <sup>5</sup>						
-	-	-	-	-	-	-	24-300 VDC
85-320VAC from L1-N	85-320VAC from L1-N	150-500VAC from L2-L3	36 -300VAC				
35-70 Hz	35-70 Hz						
-	-	-	-	-	-	-	Same with supply voltage
-20 to +60 °C	-20 to +60 °C						
-40 to +75 °C	-40 to +75 °C						
Max.95% (no condensation)	Max.95% (no condensation)						
35-70 Hz	35-70 Hz						
IP20	IP20						
-	-	-	-	-	-	-	<1W
<3VA	<3VA	<4VA	<4VA	<4VA	<4VA	<4VA	<3VA
62	66	70	75	75	70	70	95
any	any						
OK	OK						

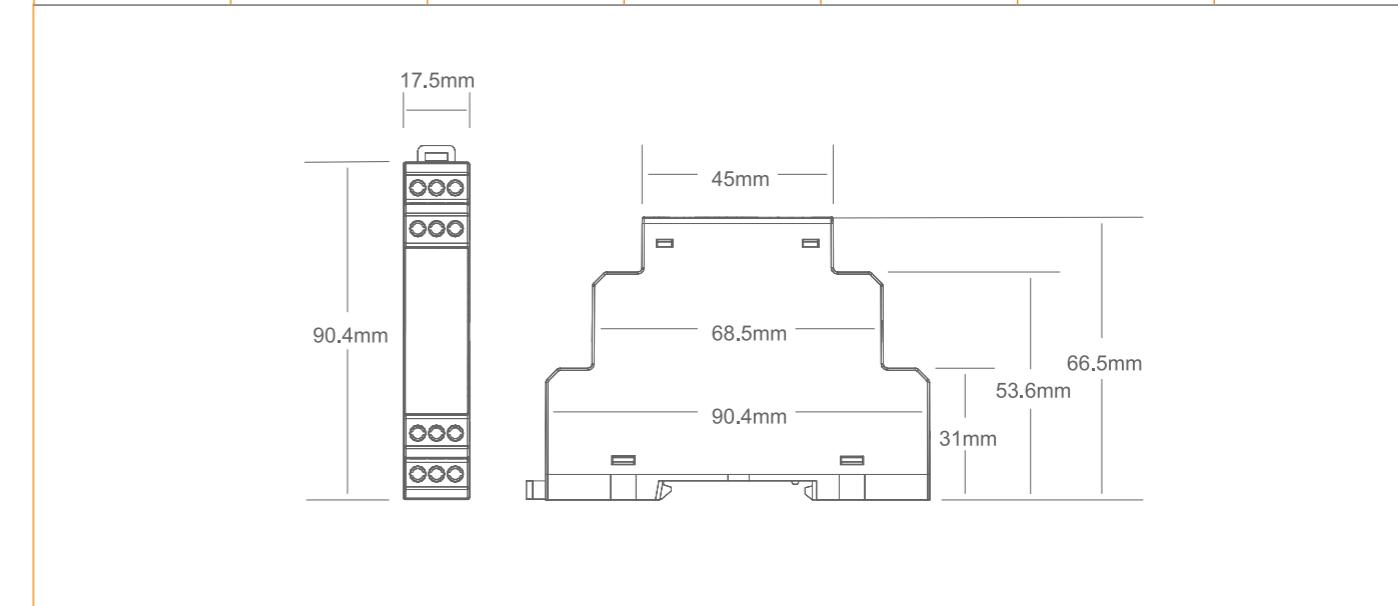
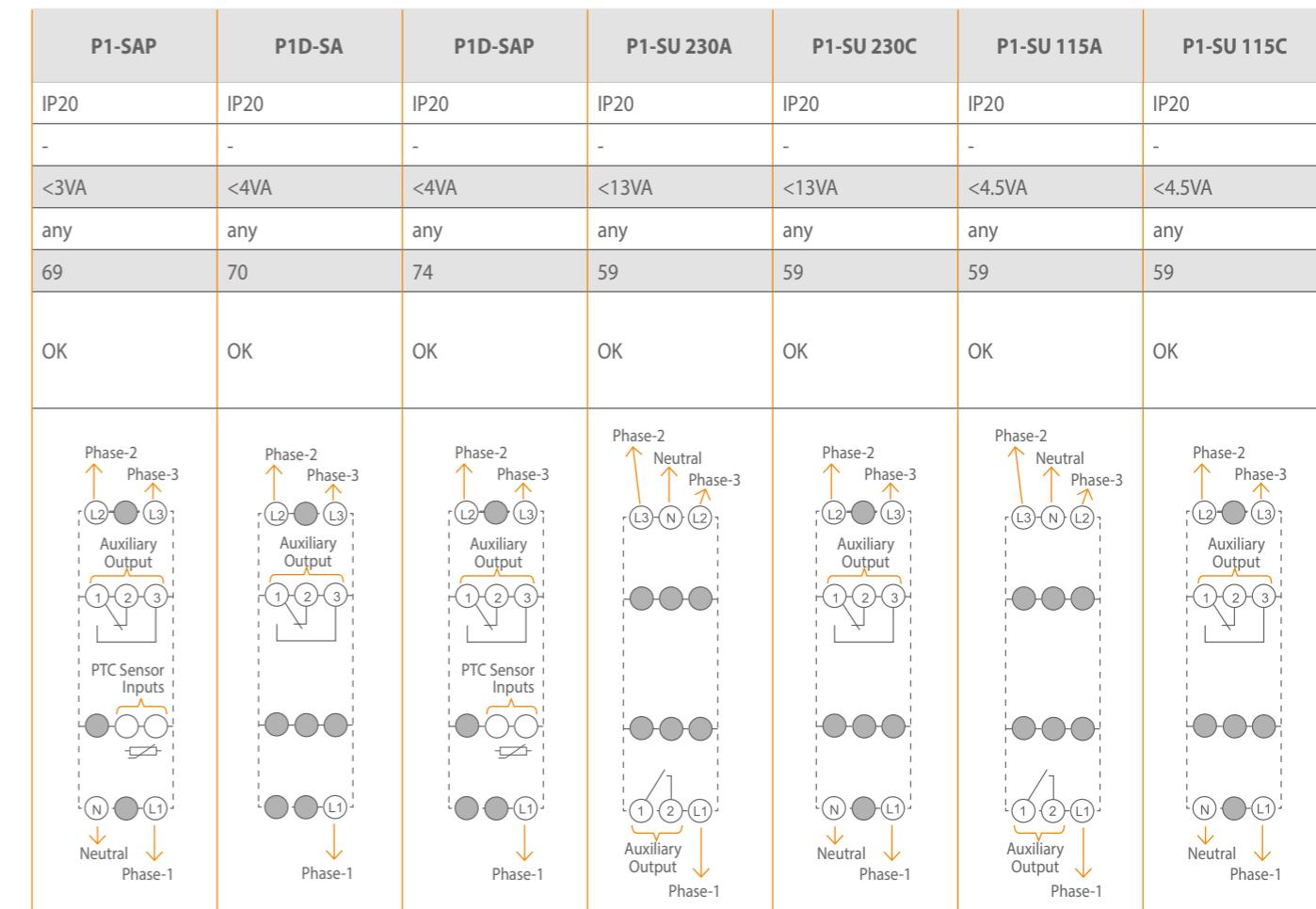
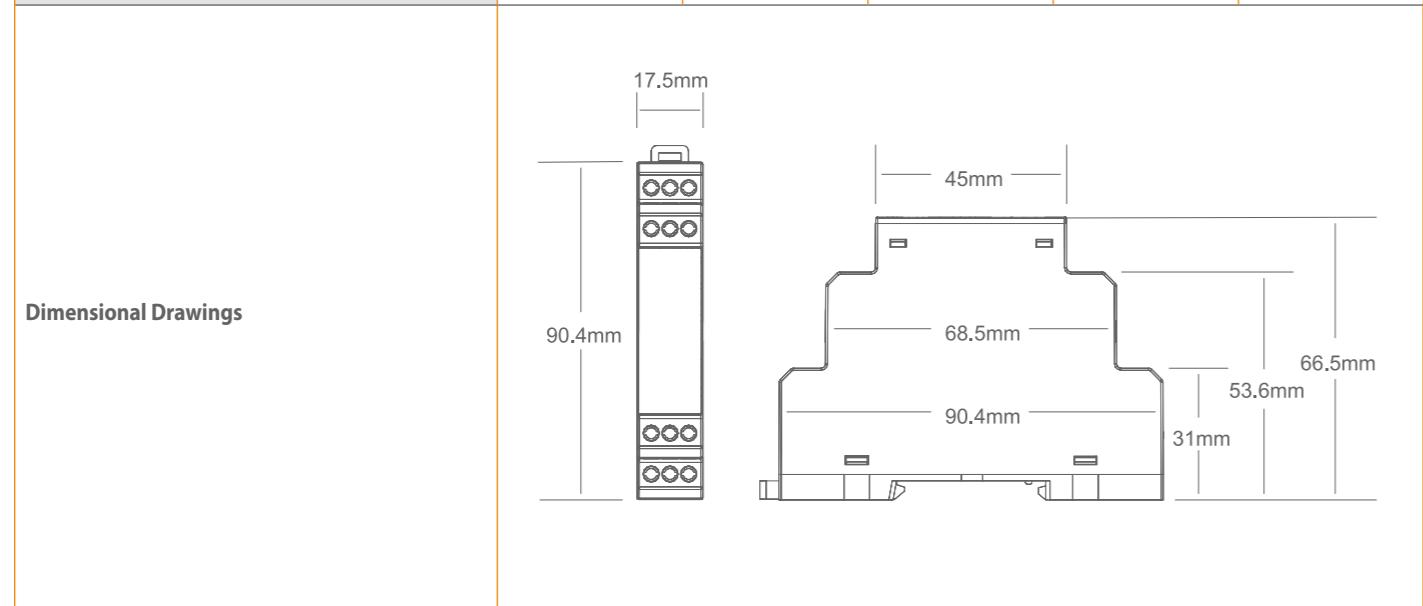
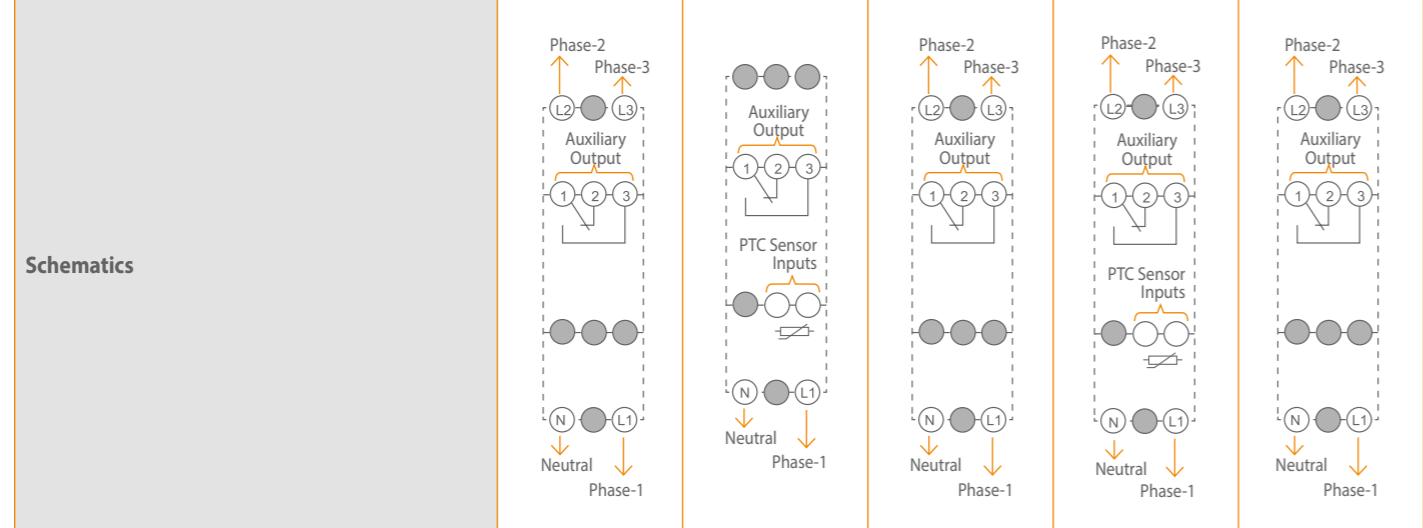




Type	P1-A	P1-P	P1-S	P1-SP	P1-SA
<b>Definiton</b>	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay
<b>Order Number</b>	270150	270151	270152	270153	270154
<b>Casing Width(mm)</b>	17.5	17.5	17.5	17.5	17.5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
<b>Network</b>	3Ø with neutral	1Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral
<b>Monitoring Functions</b>	Phase Failure	Fixed delay time	500msec	-	500msec
	Phase Sequence	Fixed delay time	-	-	500msec
	Fixed Unbalanced Protection	Limit	± 20%	-	-
		Hysteresis	3% x Un ≈ 6,9VAC	-	-
		Delay time	500msec	-	500msec
	Extremely High-Low Voltage Protection	Upper limit	310 VAC (L-N)	-	310 VAC (L-N)
		Lower limit	140 VAC (L-N)	-	140 VAC (L-N)
		Hysteresis	6 VAC	6 VAC	6 VAC
		Delay time	100msec	-	100msec
	PTC Protection	Fixed delay time	-	2000msec	-
		Threshold	-	1100Ω	-
<b>Response time for monitoring any function</b>	Max.250msec	Max.250msec	Max.250msec	Max.250msec	Max.250msec
<b>Type of Output</b>	Relay	Relay	Relay	Relay	Relay
<b>Auxiliary contacts</b>	Type	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
	Max ratings-AC (for NO side)	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA
	Max ratings-DC (for NO side)	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
	Mechanical life time	≥ 10 <sup>7</sup> operations			
	Electrical life time operations (for NO side)	5x10 <sup>4</sup> (5A@250VAC) 1x10 <sup>5</sup> (5A@30VDC)			
	Supply Voltage	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N
<b>Supply Frequency</b>	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz
<b>Permissible ambient temperature</b>	During operation	-20 to +60 °C			
	During storage	-40 to +75 °C			
<b>Relative Humidity</b>	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)
<b>Operating frequency</b>	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz

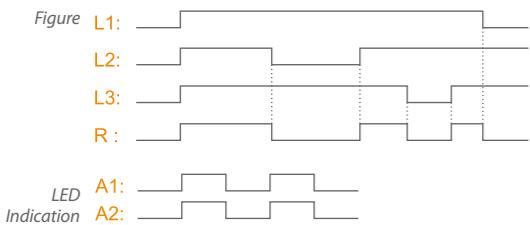
P1-SAP	P1D-SA	P1D-SAP	P1-SU 230A	P1-SU 230C	P1-SU 115A	P1-SU 115C
Motor protection relay						
270155	270254	270255	270400	270401	270402	270403
17.5	17.5	17.5	17.5	17.5	17.5	17.5
Screw terminal						
3Ø with neutral	3Ø without neutral	3Ø without neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral
500msec	500msec	500msec	<1sec	<1sec	<1sec	<1sec
500msec	-	500msec	<1sec	<1sec	<1sec	<1sec
± 20%	± 20%	± 20%	-40%	-40%	-40%	-40%
3% x Un ≈ 6,9VAC	3% x Un ≈ 12VAC					
500msec	500msec	500msec	<1sec	<1sec	<1sec	<1sec
310 VAC (L-N)	510 VAC (L-L)	510 VAC (L-L)	-	-	-	-
140 VAC (L-N)	240 VAC (L-L)	240 VAC (L-L)	-	-	-	-
6 VAC	6 VAC	6 VAC	-	-	-	-
100msec	100msec	100msec	-	-	-	-
2000msec	-	2000msec	-	-	-	-
1100Ω	-	1100Ω	-	-	-	-
Max.250msec						
Relay						
1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 NO (SPST)	1 C/O (SPDT)	1 NO (SPST)	1 C/O (SPDT)
10A/250V; 1250 VA						
5A/30VDC; 150W						
≥ 10 <sup>7</sup> operations						
5x10 <sup>4</sup> (5A@250VAC) 1x10 <sup>5</sup> (5A@30VDC)						
85-320VAC from L1-N	150-500VAC from L2-L3	150-500VAC from L2-L3	180-265VAC from L3-N	180-265VAC from L3-N	90-150VAC from L3-N	90-150VAC from L3-N
35-70 Hz	35-70 Hz	35-70 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
-20 to +60 °C						
-40 to +75 °C						
Max. 95% (no condensation)						
35-70 Hz	35-70 Hz	35-70 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz

Type	P1-A	P1-P	P1-S	P1-SP	P1-SA
Degree of protection	IP20	IP20	IP20	IP20	IP20
Power consumption	DC	-	-	-	-
	AC	<3VA	<3VA	<3VA	<3VA
Permissible mounting position	any	any	any	any	any
Weight(gr)	66	65	65	69	65
EMC-EMI	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-6, 61000-4-8	OK	OK	OK	OK



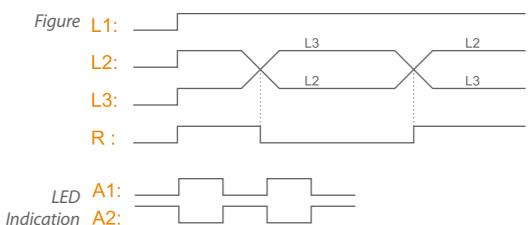


### Phase Failure / Off delay operation



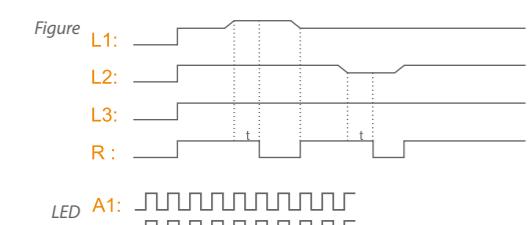
If a phase failure occurs the output relay de-energizes in 500msec. The fault is indicated by flashing LED A1 and LED A2 simultaneously. The output relay re-energizes automatically as soon as the voltage returns to the tolerance range.

### Phase Sequence Error / Off delay operation



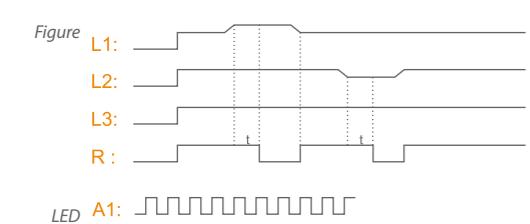
If a phase sequence error occurs the output relay de-energizes in 500msec. The fault is displayed by alternated flashing of the LEDs A1 and A2. The output relay re-energizes automatically as soon as the phase sequence is correct again.

### Adjustable Unbalance Protection / Off delay operation



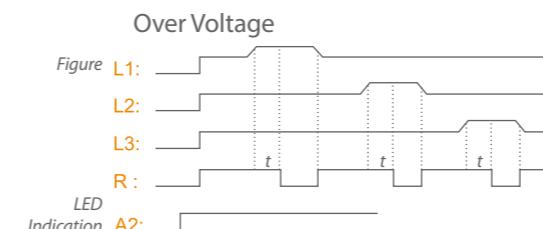
If the voltage to be monitored exceeds or falls below the set phase unbalance threshold percentage(%5=>%20), the output relay de-energizes after time delay(0.1-10s). The fault is indicated by flashing LED A1 and LED A2 quickly and simultaneously. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 3% $\times$ Un the output relay re-energizes automatically.

### Fixed Unbalance Protection / Off delay operation

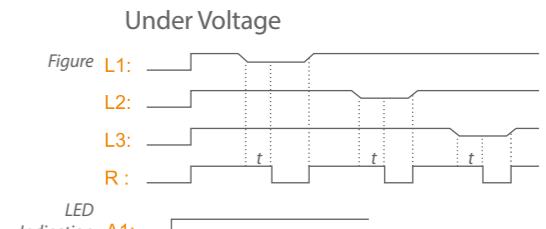


If the voltage to be monitored exceeds or falls below the set phase unbalance threshold percentage (%20), the output relay de-energizes after time delay(2sec). The fault is indicated by flashing LED A1 and LED A2 quickly and simultaneously. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 3% $\times$ Un the output relay re-energizes automatically.

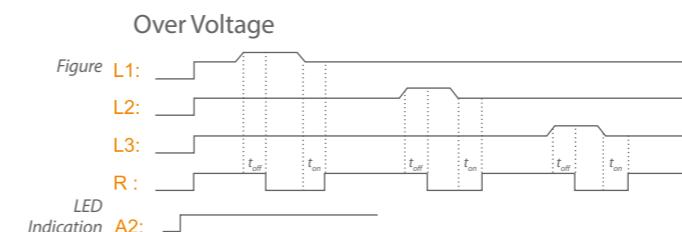
### Adjustable Voltage Protection / Off delay operation



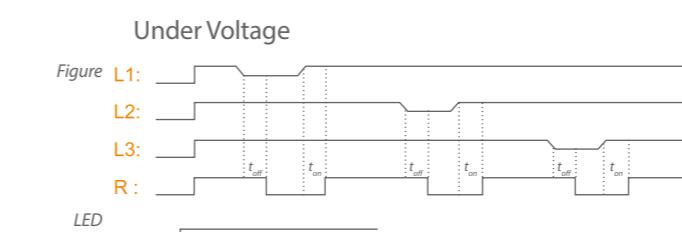
If the voltage to be monitored exceeds or falls below adjusted high limit or low limit value, the output relay de-energizes after time delay(0.1-10s). The fault type is indicated by LEDs A1 or A2 with constant light. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes automatically.



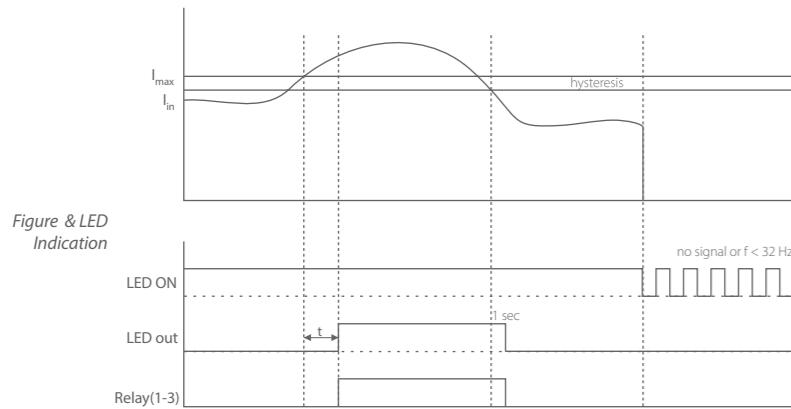
### Adjustable Voltage Protection / On-Off delay operation (Available only for V1-T)



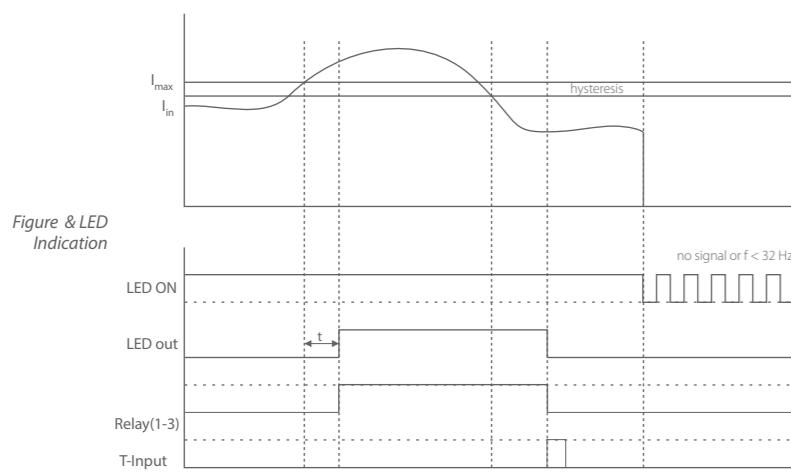
If the voltage to be monitored exceeds or falls below adjusted high limit or low limit value, the output relay de-energizes after  $t_{off}$  time delay(0.1-10s). The fault type is indicated by LEDs A1 or A2 with constant light. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes after  $t_{on}$  time delay(0.1-10s).



## Adjustable Current Protection / On delay operation

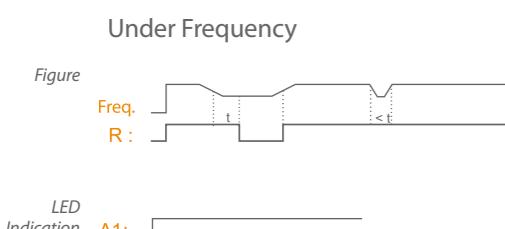
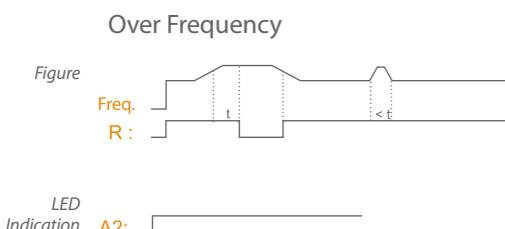
**AUTOMATIC MODE**

If the current to be monitored exceeds adjusted high limit value, the output relay de-energizes after time delay(0.1-10s). As soon as the current returns to the tolerance range, taking into account adjusted hysteresis (5-20%) and 1 second safety time, the output relay re-energizes automatically.

**MANUAL MODE**

If the current to be monitored exceeds adjusted high limit value, the output relay de-energizes after time delay(0.1-10s). After the current returns to the tolerance range, taking into account adjusted hysteresis (5-20%) and 1 second safety time, the output relay waits till trigger input is applied. After that it re-energizes automatically.

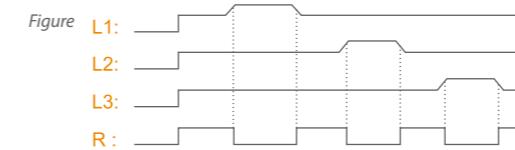
## Adjustable Frequency Protection / Off delay operation



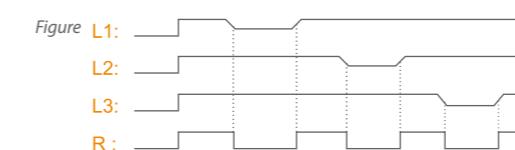
If the frequency to be monitored exceeds or falls below adjusted high limit or low limit value, the output relays de-energizes after time delay(1-10s). The fault type is indicated by LEDs A1 or A2 with constant light. As soon as the frequency returns to the tolerance range, taking into account a fixed hysteresis of 0.4kHz, the output relay re-energizes automatically.

## Extremely High-Low Voltage Protection / Off delay operation

## Over Over Voltage



## Under Under Voltage

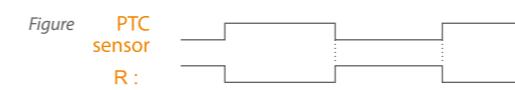


If the voltage to be monitored exceeds 310VAC for star connection device or 510VAC for delta connection device, output relay de-energizes immediately.

If the voltage to be monitored falls below 140VAC for star connection device or 240VAC for delta connection device, output relay de-energizes immediately.

The fault type is indicated by LEDs A1 or A2 with blinking. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes automatically.

## PTC Protection / Off delay operation



In order to use this function, PTC temperature sensors must be connected to the relay's PTC input. Under normal operating conditions the PTC resistance is below the response threshold. If the motor heats up excessively, it means resistance value is increased, the output relay de-energizes after 2 seconds delay.

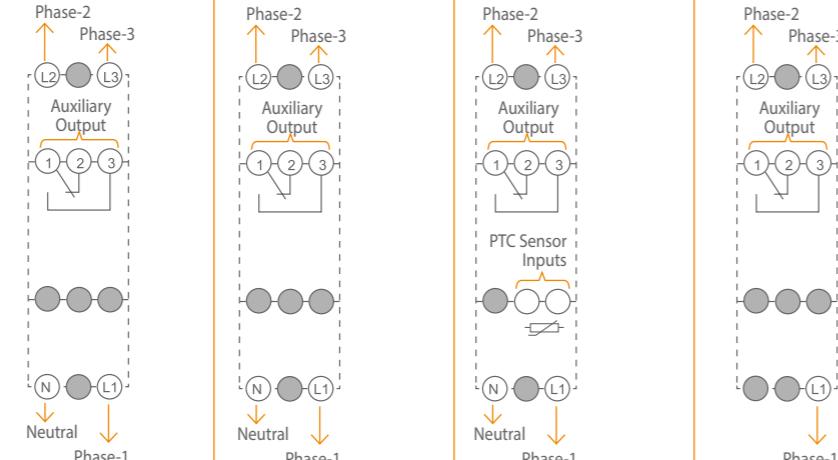
The output relay re-energizes automatically as soon as the motor heat turns back to its normal operating conditions.



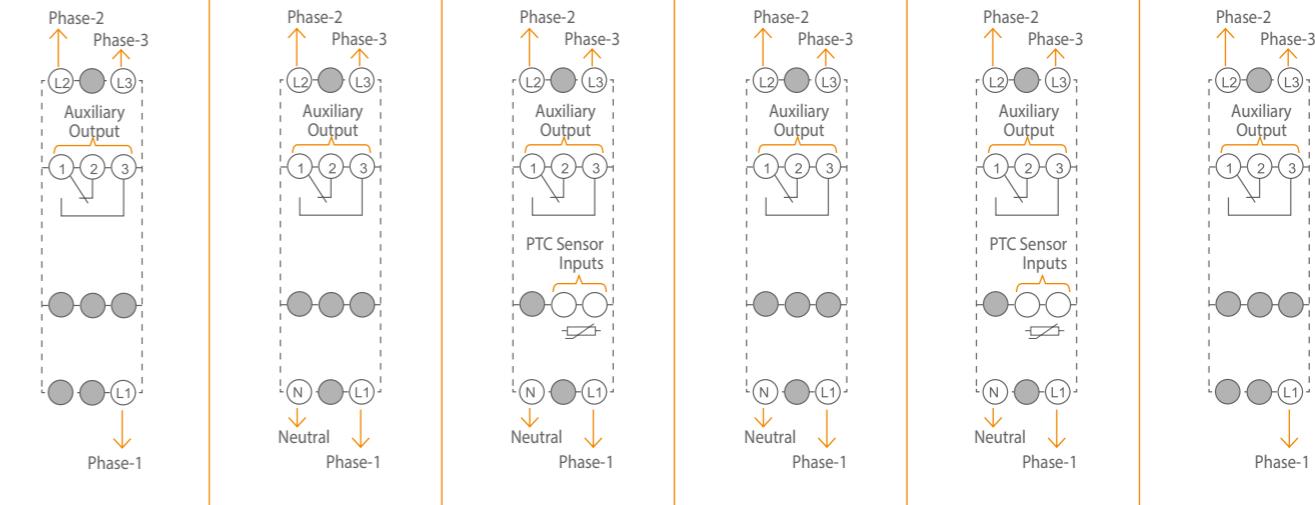
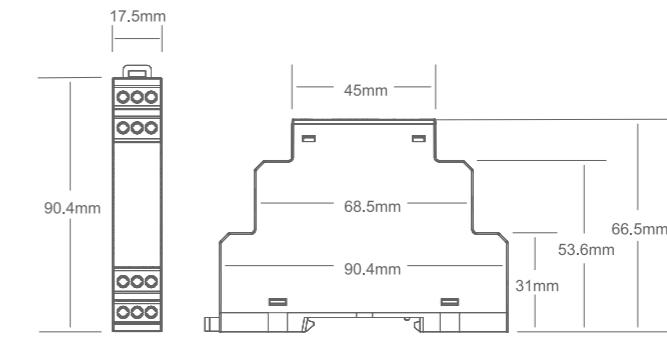
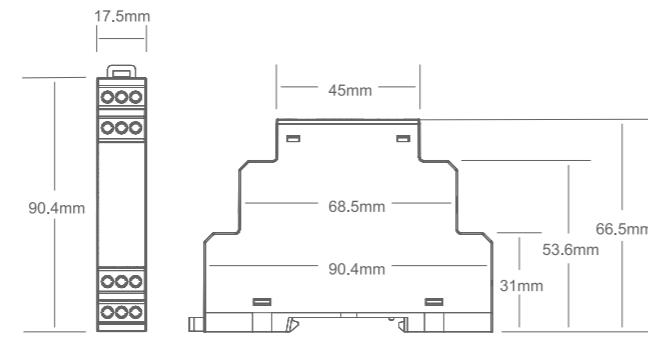
Type	G1-A	G1-SA	G1-SAP	G1D-SA
<b>Definition</b>	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay
<b>Order Number</b>	270136	270130	270131	270140
<b>Casing Width(mm)</b>	17.5	17.5	17.5	17.5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal	Screw terminal
<b>Network</b>	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø without neutral
Phase Failure	Fixed delay time	500msec	500msec	500msec
Phase Sequence	Fixed delay time	-	500msec	500msec
Adjustable Unbalanced Protection	Range	±(5% => 20%)/ OFF	±(5% => 20%)/ OFF	±(5% => 20%)/ OFF
	Hysteresis	3% x Un ≈ 6,9VAC	3% x Un ≈ 6,9VAC	3% x Un ≈ 6,9VAC
	Delay time	0.1=>10sec	0.1=>10sec	0.1=>10sec
	Upper limit	+ (5% => 20%)/OFF	+ (5% => 20%)/OFF	+ (5% => 20%)/OFF
Adjustable Voltage Protection	Lower limit	- (5% => 20%)/OFF	- (5% => 20%)/OFF	- (5% => 20%)/OFF
	Hysteresis	6 VAC	6 VAC	6 VAC
	Delay time	0.1=>10sec for off delay operation	0.1=>10sec for off delay operation	0.1=>10sec for off delay operation
	PTC Protection	Fixed delay time	-	2000msec
Auxiliary contacts	Threshold	-	-	1100Ω
	<b>Response time for monitoring any function</b>	Max. 250msec	Max. 250msec	Max. 250msec
	<b>Type of Output</b>	Relay	Relay	Relay
	Number of relay			
	Type	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
	Max. Ratings -AC	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA
	Max. Switching Power	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
Mechanical Life Time	≥ 10 <sup>7</sup> operations			
Electrical Life Time	5x10 <sup>4</sup> (5A@250VAC) 1x10 <sup>5</sup> (5A@30VDC)			

Type	G1D-SA-L	G1-TU	G1-SV	G1-SAT	G1-SVP	G1D-SV
<b>Definition</b>	Voltage monitoring relay					
<b>Order Number</b>	270141	270138	270139	270137	270180	270145
<b>Casing Width(mm)</b>	17,5	17,5	17,5	17,5	17,5	17,5
<b>Connections</b>	Screw terminal					
<b>Network</b>	3Ø without neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø without neutral
Phase Failure	500msec	500msec	500msec	500msec	500msec	500msec
Phase Sequence	500msec	-	500msec	500msec	500msec	500msec
Adjustable Unbalanced Protection	± (5% => 20%)/ OFF	-	-	± (5% => 20%)/ OFF	-	-
	3% x Un ≈ 6,9VAC	-	-	3% x Un ≈ 6,9VAC	-	-
	0.1=>10sec	-	-	ton: 1=>15min, toff: 0.1=>10sec	-	-
	+ (5% => 20%)/OFF	-	240V..300V	+ (5% => 20%)/OFF	240V..300V	400V..500V
Adjustable Voltage Protection	- (5% => 20%)/OFF	< Un X 0,75	150V..210V	- (5% => 20%)/OFF	150V..210V	270V..370V
	6 VAC					
	0.1=>10sec for off delay operation	ton: 1=>15min, toff=0.5sec	toff: 0.1=>10sec	ton: 1=>15min, toff: 0.1=>10sec	toff: 0.1=>10sec	toff: 0.1=>10sec
	-	-	-	-	2000msec	-
Auxiliary contacts	-	-	-	-	1100Ω	-
	Max. 250msec					
	Relay	Relay	Relay	Relay	Relay	Relay
	1	1	1	1	1	1
	1 C/O (SPDT)					
	10A/250V; 1250 VA					
	5A/30VDC; 150W					
Mechanical Life Time	≥ 10 <sup>7</sup> operations					
Electrical Life Time	5x10 <sup>4</sup> (5A@250VAC) 1x10 <sup>5</sup> (5A@30VDC)					

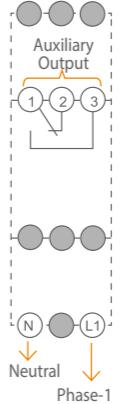
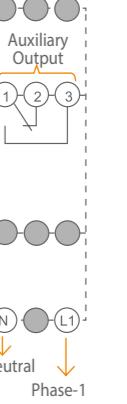
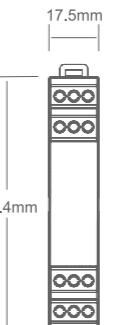
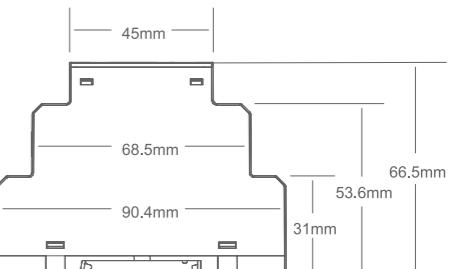
Type	G1-A	G1-SA	G1-SAP	G1D-SA
<b>Supply Voltage</b>	DC	-	-	-
	AC	230VAC ±25% from L3-N	230VAC ±25% from L3-N	230VAC ±25% from L3-N
<b>Supply Frequency</b>	50-60Hz	50-60Hz	50-60Hz	50-60Hz
<b>Control Input Voltage Range</b>	-	-	-	-
<b>Permissible ambient temperature</b>	During operation	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
	During storage	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
<b>Relative Humidity</b>	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
<b>Operating frequency</b>	50-60Hz	50-60Hz	50-60Hz	50-60Hz
<b>Degree of protection</b>	IP20	IP20	IP20	IP20
<b>Power consumption</b>	DC	-	-	-
	AC	<3VA	<3VA	<4VA
<b>Weight(gr)</b>	66	66	70	70
<b>Permissible mounting position</b>	any	any	any	any
<b>EMC-EMI</b>	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-6, 61000-4-8	OK	OK	OK

**Schematics**

G1D-SA-L	G1-TU	G1-SV	G1-SAT	G1-SVP	G1D-SV
-	-	-	-	-	-
190-230VAC ±25% from L1-L3	230VAC ±25% from L3-N	380 .. 480V AC, ±%25			
50-60Hz	50-60Hz	50-60Hz	50-60Hz	50-60Hz	50-60Hz
-	-	-	-	-	-
-20 to +60 °C	-20 to +60 °C	-20°C..+70°C	-20 to +60 °C	-20°C..+70°C	-20°C..+70°C
-40 to +75 °C	-40 to +75 °C	-30°C..+80°C	-40 to +75 °C	-30°C..+80°C	-30°C..+80°C
Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
50-60Hz	50-60Hz	50-60Hz	50-60Hz	50-60Hz	50-60Hz
IP20	IP20	IP20	IP20	IP20	IP20
-	-	-	-	-	-
<4VA	<3VA	<3VA	<3VA	<3VA	<4VA
75	66	66	66	70	66
any	any	any	any	any	any
OK	OK	OK	OK	OK	OK

**Dimensional Drawings**

				
<b>Type</b>	G1-VM	G1-TUM		
<b>Definition</b>	Voltage monitoring relay	Voltage monitoring relay		
<b>Order Number</b>	270 146	270 147		
<b>Casing Width(mm)</b>	17,5	17,5		
<b>Connections</b>	Screw terminal	Screw terminal		
<b>Network</b>	1Ø with neutral	1Ø with neutral		
<b>Monitoring Functions</b>	Phase Failure	Fixed delay time	500msec	500msec
	Phase Sequence	Fixed delay time	-	-
	Adjustable Unbalanced Protection	Range	-	-
		Hysteresis	-	-
		Delay time	-	-
	Adjustable Voltage Protection	Upper limit	240V..300V	-
		Lower limit	150V..210V	Umeasured < 0.75xUn
		Hysteresis	6 VAC	6 VAC
		Delay time	toff: 0. ec	ton: 1=>15min, toff=0.5sec
	PTC Protection	Fixed delay time	-	-
<b>Response time for monitoring any function</b>	Max. 250msec			
	Max. 250msec			
<b>Type of Output</b>	Relay	Relay		
<b>Auxiliary contacts</b>	Number of relay	1	1	
	Type	1 C/O (SPDT)	1 C/O (SPDT)	
	Max. Ratings -AC	10A/250V; 1250 VA	10A/250V; 1250 VA	
	Max. Switching Power	5A/30VDC; 150W	5A/30VDC; 150W	
	Mechanical Life Time	$\geq 10^7$	$\geq 10^7$	
	Electrical Life Time	5x10^4(5A@250VAC) 1x10^4(5A@30VDC)	5x10^4(5A@250VAC) 1x10^4(5A@30VDC)	

Type	G1-VM		G1-TUM	
<b>Supply Voltage</b>	DC	-	-	-
	AC	230V AC, ±%25	230V AC, ±%25	230V AC, ±%25
<b>Supply Frequency</b>		50-60Hz	50-60Hz	
<b>Control Input Voltage Range</b>		-	-	
<b>Permissible ambient temperature</b>	During operation	-20°C..+70°C	-20°C..+70°C	-20°C..+70°C
	During storage	-30°C..+80°C	-30°C..+80°C	-30°C..+80°C
<b>Relative Humidity</b>		Max.95% (no condensation)	Max.95% (no condensation)	
<b>Operating frequency</b>		50-60Hz	50-60Hz	
<b>Degree of protection</b>		IP20	IP20	
<b>Power consumption</b>	DC	-	-	-
	AC	<4VA	<4VA	<4VA
<b>Weight(gr)</b>		66	66	
<b>Permissible mounting position</b>		any	any	
<b>EMC-EMI</b>	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-6, 61000-4-8	OK	OK	
<b>Schematics</b>				
<b>Dimensional Drawings</b>				

## Fixed Versions

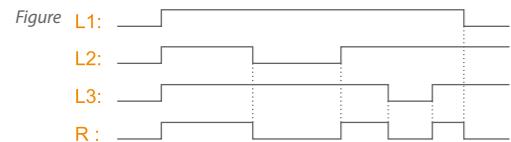


Type	M1-A	M1-SP	M1-SA	M1-SAP	M1D-SA	M1D-S
Definition	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay
Order Number	270134	270135	270132	270133	270144	270142
Casing Width(mm)	17.5	17.5	17.5	17.5	17.5	17.5
Connections	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Network	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø without neutral	3Ø without neutral
Monitoring Functions	Phase Failure	Fixed delay time	500msec	500msec	500msec	500msec
	Phase Sequence	Fixed delay time	-	500msec	500msec	500msec
	Limit	± 20%	-	± 20%	± 20%	-
	Fixed Unbalanced Protection	3% x Un ≈ 6,9VAC	-	3% x Un ≈ 6,9VAC	3% x Un ≈ 12VAC	-
	Hysteresis	3% x Un ≈ 6,9VAC	-	3% x Un ≈ 6,9VAC	3% x Un ≈ 12VAC	-
	Delay time	2000msec	-	2000msec	2000msec	-
	PTC Protection	Fixed delay time	-	2000msec	-	-
Response time for monitoring any function	Max.250msec	Max.250msec	Max.250msec	Max.250msec	Max.250msec	Max.250msec
Type of Output	Relay	Relay	Relay	Relay	Relay	Relay
Auxiliary contacts	Number of relay	1 C/O (SPDT)				
	Type	10A/250V; 1250 VA				
	Max. Ratings -AC	5A/30VDC; 150W				
	Max. Switching Power	≥ 10 <sup>7</sup> operations				
	Mechanical Life Time	5x10 <sup>6</sup> (5A@250VAC) 1x10 <sup>6</sup> (5A@30VDC)				
Supply Voltage	230VAC ±25% from L3-N	230VAC ±25% from L3-N	230VAC ±25% from L3-N	230VAC ±25% from L3-N	380-480±25% from L3-N	380-480±25% from L3-N
Supply Frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Permissible ambient temperature	During operation	-20 to +60 °C				
	During storage	-40 to +75 °C				
Relative Humidity	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)
Operating frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz

Type	M1-A	M1-SP	M1-SA	M1-SAP	M1D-SA	M1D-S
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20
Power consumption	DC - AC <3VA	- AC <3VA	- AC <3VA	- AC <3VA	- AC <4VA	- AC <4VA
Permissible mounting position	any	any	any	any	any	any
Weight(gr)	66	69	65	69	70	74
EMC-EMI	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-6, 61000-4-8	OK	OK	OK	OK	OK
Schematics						
Dimensional Drawings						

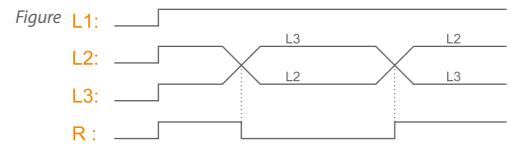


### Phase Failure / Off delay operation



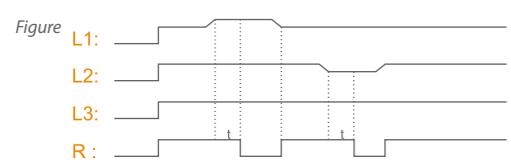
If a phase failure occurs the output relay de-energizes in 500msec. The output relay re-energizes automatically as soon as the voltage returns to the tolerance range.

### Phase Sequence Error / Off delay operation



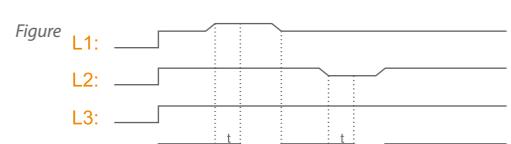
If a phase sequence error occurs the output relay de-energizes in 500msec. The output relay re-energizes automatically as soon as the phase sequence is correct again.

### Adjustable Unbalance Protection / Off delay operation



If the voltage to be monitored exceeds or falls below the set phase unbalance threshold percentage(%5--%20), the output relay de-energizes after time delay(0.1-10s). As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 3% $\times$ Un the output relay re-energizes automatically.

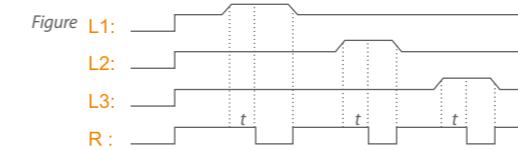
### Fixed Unbalance Protection / Off delay operation



If the voltage to be monitored exceeds or falls below the set phase unbalance threshold percentage (%20), the output relay de-energizes after time delay(2sec). As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 3% $\times$ Un the output relay re-energizes automatically.

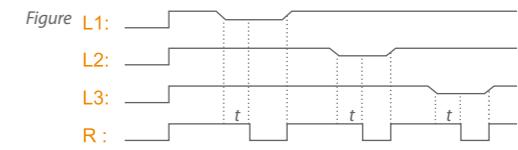
### Adjustable Voltage Protection / Off delay operation

#### Over Voltage

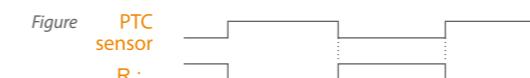


If the voltage to be monitored exceeds or falls below adjusted high limit or low limit value, the output relay de-energizes after time delay (0.1=>10sec). As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes automatically.

#### Under Voltage



### PTC Protection / Off delay operation



In order to use this function, PTC temperature sensors must be connected to the relay's PTC input. Under normal operating conditions the PTC resistance is below the response threshold. If the motor heats up excessively, it means resistance value is increased, the output relay de-energizes after 2 seconds delay.

The output relay re-energizes automatically as soon as the motor heat turns back to its normal operating conditions.

## Alarm Management Solutions



Ensure Your *Electrical* Safety



## Defining an alarm annunciator in simple terms

An alarm annunciator is an automation device that provides immediate fault recognition, fault identification, visual and audible alarm for an abnormal process situation.

## Which actions are executed?

**Monitoring**  
**Controlling**  
**Communication**  
**Data Logging**  
**Visualizing**

An alarm annunciator **monitors** input parameters continuously.

When a faulty condition occurs, it **visualizes** alarm status immediately or with adjustable time delay.

It provides to **control** your process through relay outputs and modbus **communication**.

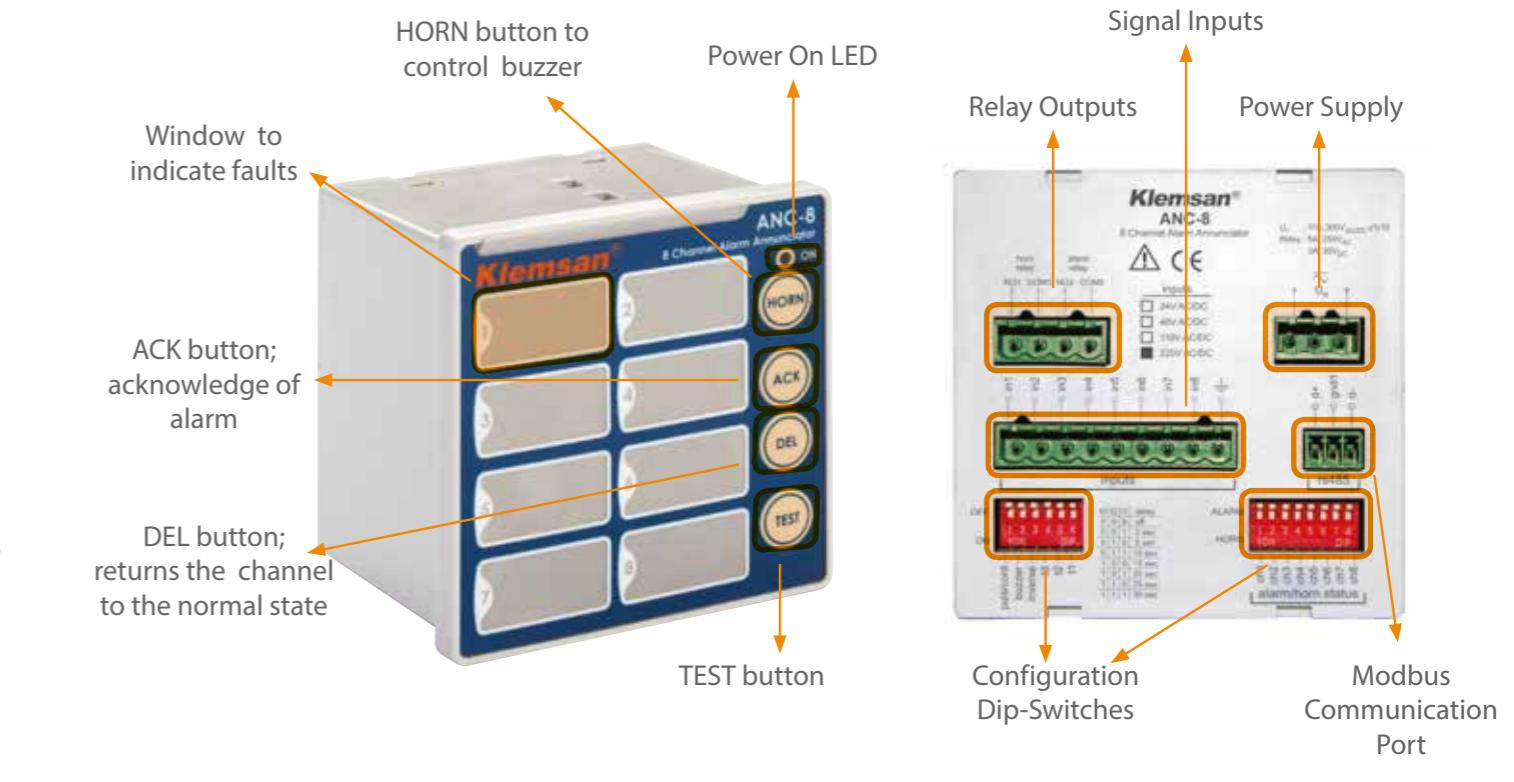
**Data logging** with real time gives you opportunity to analyze your system.

## Benefits and Advantages

- Adjustable 2 color options
- Four integrated push buttons for buzzer, alarm accept, alarm clear and led test.
- Three flashing rates indicate different types of faults
- Easy configuration with dip-switches
- DC or AC supply/input voltage.
- Super bright LEDs for long distance visibility
- Various sizes & fonts for window inscription.
- Highly compact and light weight
- Modbus communication
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences.
- Self-Extinguishing plastic housing.

## Layout & Mounting

Klemsan alarm annunciators are suitable for panel mounting for 96x96mm or 144x144m standards.



ANC-8 Alarm Annunicator



## Alarm Monitoring for Steel Plants



Alarm points for various parameters such as pressures, flow temperatures, speeds for different turbines.

**ALARM MANAGEMENT**  
ANC series



## Alarm Status of Battery-Backup System



Backup batteries power can be checked automatically with their internal alarm system. When their alarm status wants to be monitored over PC, ANC series present best solution thanks to its modbus communication.

**ALARM MONITORING over MODBUS**  
ANC series



## Facility Monitoring



When power, UPS, generator, temperature/humidity, Fire/Smoke, MVAC, Leak Detection etc. problems are existed, they all can be monitored over PC with modbus communication.

**SIGNAL MONITORING over PC**  
ANC series



## Natural Gas Power Stations



Faults of gas turbine, steam turbine, cooling water supply, power lines, generator etc. can be monitored instantaneously with signal inputs.

**SIGNAL MONITORING**  
LSK Series



## Pumping Stations



Monitoring pump position and controlling by means of output relays

**CONTROLLING PUMP POSITION**  
ALRC-6



## Electrical Control Room



Providing an immediate fault recognition, fault identification and a visual/audible alarm in order to call attention to an abnormal process condition.

**CONTROL MANAGEMENT**  
ANC series



## Panel Indicator Lights



Instead of using separate alarm indicator lights, using signal modules gives you opportunity to save space and installation time with monitoring all signals in same window.

**SIGNAL MONITORING**  
LSK Series



## Level Monitoring with Level Switches



Immediately monitoring over PC when certain levels are reached with using liquid level switches.

**MONITORING and CONTROLLING**  
ALRC-6



## Fault Detection



Monitoring process faults with alarm relay controller provides you to stop them rapidly in order to prevent much worse condition thanks to alarm relay outputs.

**ALARM MANAGEMENT**  
ALRC-6



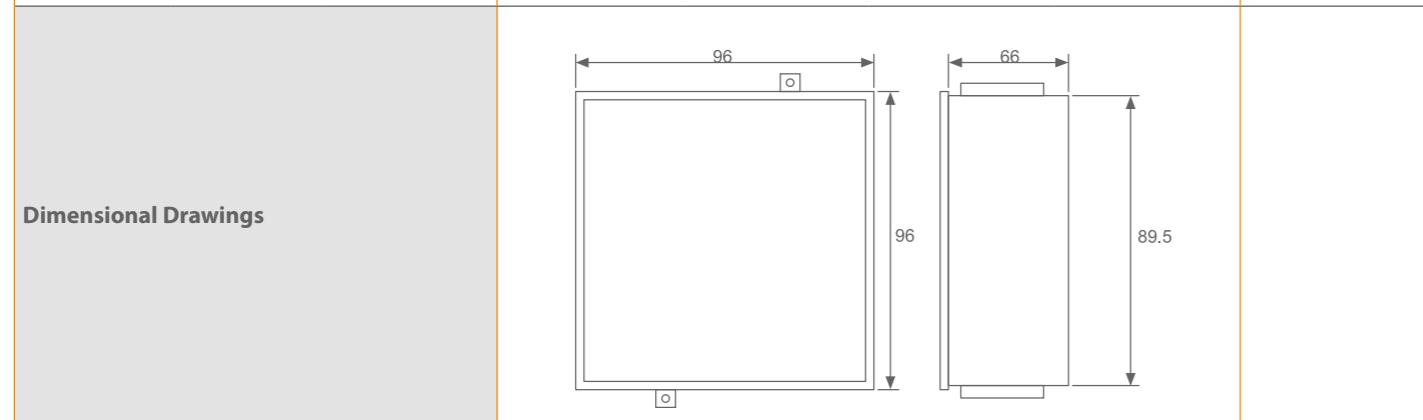
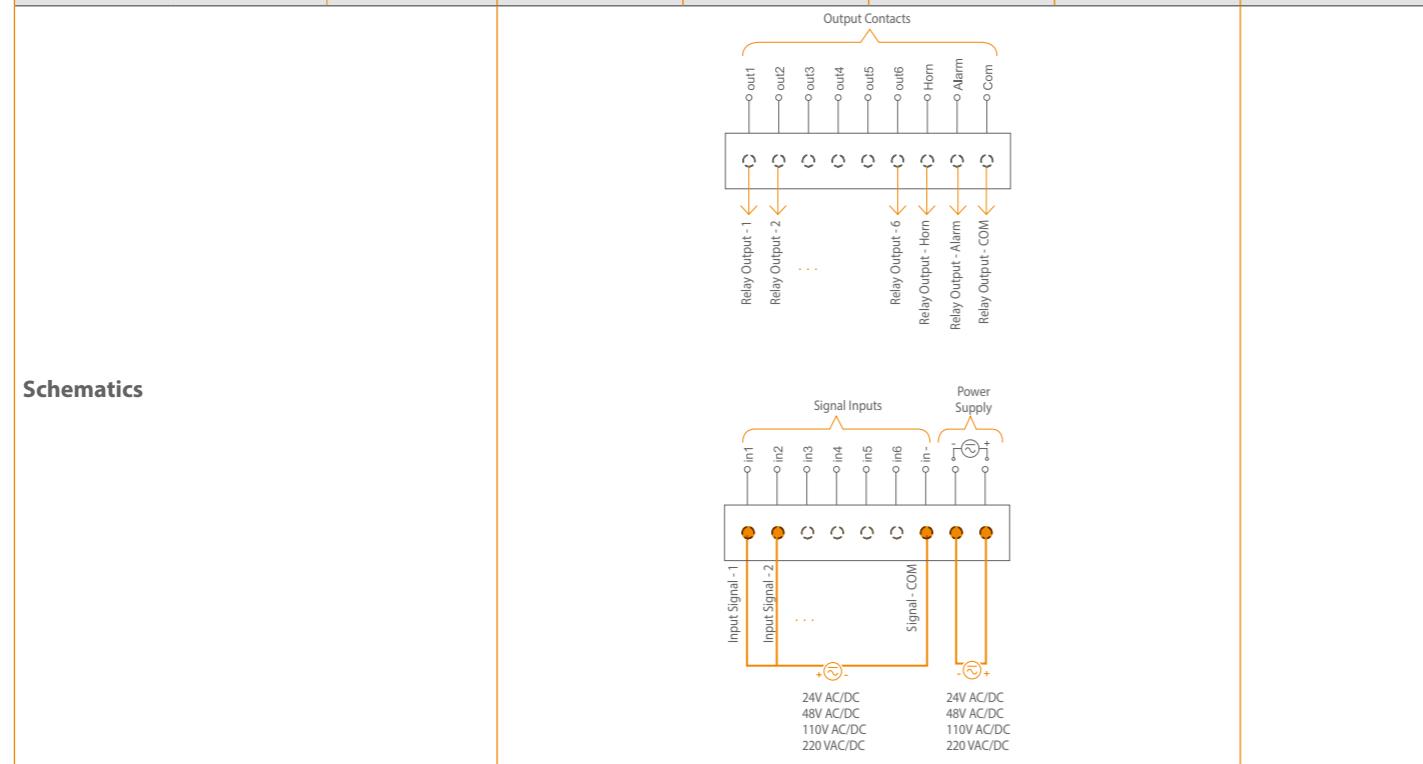


Type	ALRC-6 (24VAC/DC)	ALRC-6 (48VAC/DC)	ALRC-6 (110VAC/DC)	ALRC-6 (220VAC/DC)	ANC-8 (24VAC/DC)
Definiton	Alarm relay controller	Alarm relay controller	Alarm relay controller	Alarm relay controller	Alarm annunciator
Order Number	604610	604611	604612	604613	604620
Voltage	AC 24V DC 24V	48V 48V	110V 110V	220V 220V	24V 24V
Input Signal	Frequency 45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
Numbers	6	6	6	6	8
Response Time	25 ± 10 msec				
Type of Output	Relay	Relay	Relay	Relay	Relay
Number of contacts	8	8	8	8	2
Type	1 NO (SPST)				
Max ratings-AC	5A/277V; 1385 VA				
Max ratings-DC	5A/30VDC; 150W				
Mechanical Life Time	≥ 10 <sup>8</sup> operations				
Electrical Life Time Operations (for NO side)	1x10 <sup>5</sup> (5A@250VAC)				
Window	Numbers 6	6	6	6	8
Colours	Red	Red	Red	Red	Red/Green selectable
Sizes(mm)	30.5x21.6	30.5x21.6	30.5x21.6	30.5x21.6	30.5x15.5
Illuminating for Each Window	With 4 pcs. red leds	With 4 pcs. red leds	With 4 pcs. red leds	With 4 pcs. red leds or 4 pcs. green leds	With 4 pcs. red leds or 4 pcs. green leds
Flash rate	Slow -	-	-	-	60 Flash/Min
Legends	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
Mod	ANC	-	-	-	Available
	LSK	-	-	-	-
Time Range(sec)	-	-	-	-	0, 2, 5, 10, 15, 20, 25, 30 adjustable
Inbuilt Push Buttons	3 nos.(Horn, Delete, Test)	3 nos.(Horn, Delete, Test)	3 nos.(Horn, Delete, Test)	3 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)
Buzzer	-	-	-	-	Available
Communication	Protocol	-	-	-	Modbus-RTU
	Baud Rate	-	-	-	1200-57600
	Isolation	-	-	-	2500 Vrms
Real Time Event Recording	-	-	-	-	6080 logs
Battery Life	-	-	-	-	> 5years
Supply	Voltage	AC 24V ±%30	48V ±%30	110V ±%30	220V ±%30
	DC	24V ±%30	48V ±%30	110V ±%30	220V ±%30
	Frequency	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
Power consumption	DC	<3W	<3W	<1W	<5.5W
	AC	<10VA	<10VA	<4.3VA	<7.2VA
				<5VA	<5VA

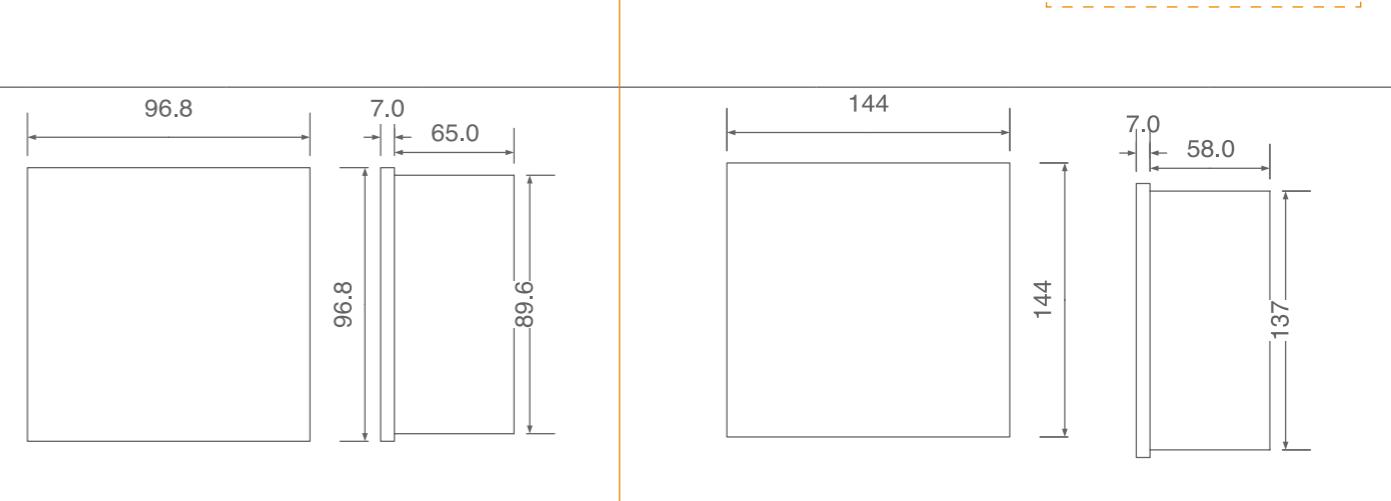
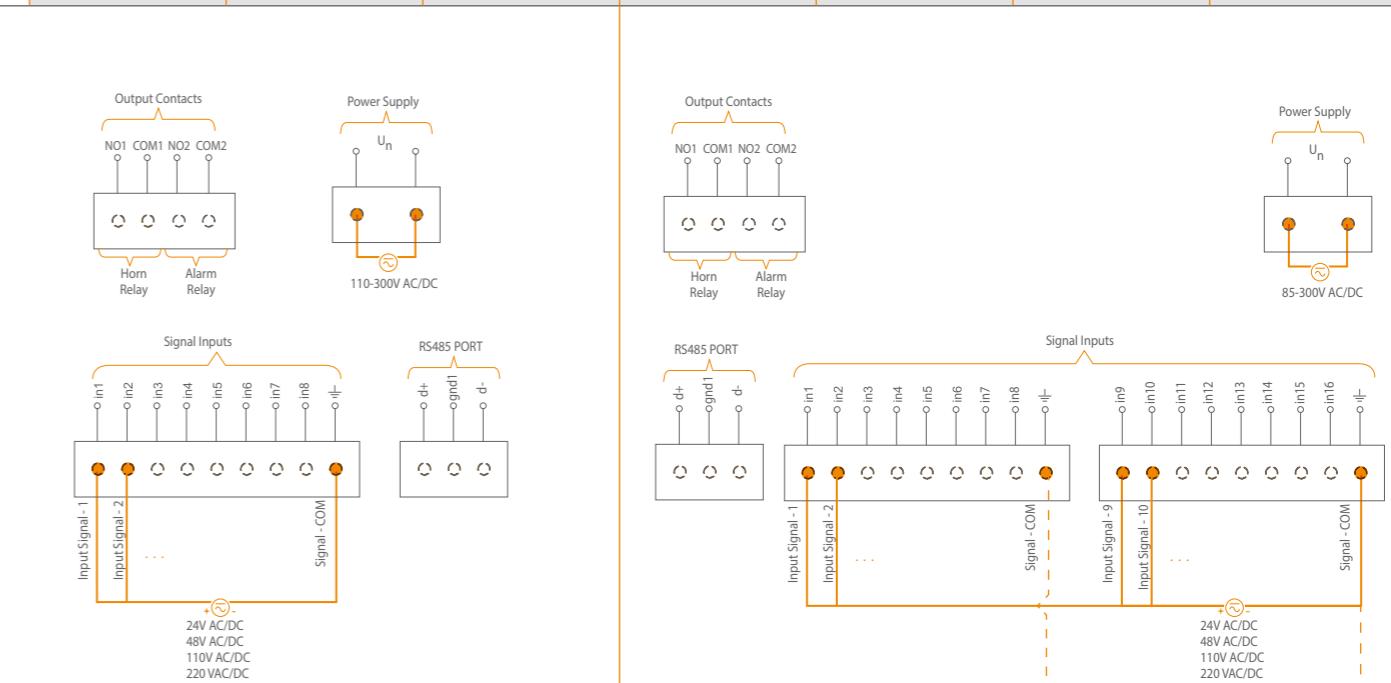
ANC-8 (48VAC/DC)	ANC-8 (110VAC/DC)	ANC-8 (220VAC/DC)	ANC-16 (24VAC/DC)	ANC-16 (48VAC/DC)	ANC-16 (110VAC/DC)	ANC-16 (220VAC/DC)
Alarm annunciator						
604621	604622	604623	604630	604631	604632	604633
48V 110V	220V	24V	48V	110V	220V	24V
48V 110V	220V	24V	48V	110V	220V	24V
45-65 Hz						
8	8	8	16	16	16	16
25 ± 10 msec						
Relay						
2	2	2	2	2	2	2
1 NO (SPST)						
5A/277V; 1385 VA						
5A/30VDC; 150W						
≥ 10 <sup>8</sup> operations						
1x10 <sup>5</sup> (5A@250VAC)						
8	8	8	16	16	16	16
Red/Green selectable						
30.5x15.5	30.5x15.5	30.5x15.5	44.8x11.9	44.8x11.9	44.8x11.9	44.8x11.9
With 4 pcs. red leds or 4 pcs. green leds	With 4 pcs. red leds or 4 pcs. green leds	With 4 pcs. red leds or 4 pcs. green leds	With 4 pcs. red leds or 4 pcs. green leds	With 4 pcs. red leds or 4 pcs. green leds	With 4 pcs. red leds or 4 pcs. green leds	With 4 pcs. red leds or 4 pcs. green leds
60 Flash/Min						
180 Flash/Min						
Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
Available						
-	-	-	-	-	-	-
0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable
4 nos.(Horn, Ack, Delete, Test)						
Available						
Modbus-RTU						
1200-57600	1200-57600	1200-57600	1200-57600	1200-57600	1200-57600	1200-57600
2500 Vrms						
6080 logs						
> 5years						
110-300V ±%10	110-300V ±%10	110-300V ±%10	85-300V	85-300V	85-300V	85-300V
110-300V ±%10	110-300V ±%10	110-300V ±%10	85-300V	85-300V	85-300V	85-300V
45-65 Hz						
<3W	<3W	<3W	<5W	<5W	<5W	<5W
<5VA	<5VA	<5VA	<7.5VA	<7.5VA	<7.5VA	<7.5VA



Type		ALRC-6 (24VAC/DC)	ALRC-6 (48VAC/DC)	ALRC-6 (110VAC/DC)	ALRC-6 (220VAC/DC)	ANC-8 (24VAC/DC)
Permissible ambient temperature	During operation	-20 to +60 °C	-20 to +70 °C			
	During storage	-40 to +75 °C	-30 to +80 °C			
Relative Humidity		Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.90% (no condensation)
Degree of protection		IP50(front), IP20(back) (IP66 with accessory)				
Connections		Screw terminal				
Dimensions (mm)	Bezel/Overall	Height(mm)	96	96	96	96.8
		Width(mm)	96	96	96	96.8
	Panel Cutout	Height(mm)	89.6	89.6	89.6	89.6
		Width(mm)	89.6	89.6	89.6	89.6
		Depth(mm)	66	66	66	65
Weight(gr)		274	274	274	274	280
EMC-EMI	61000-6-2, 61000-6-4	-	-	-	OK	OK



ANC-8 (48VAC/DC)	ANC-8 (110VAC/DC)	ANC-8 (220VAC/DC)	ANC-16 (24VAC/DC)	ANC-16 (48VAC/DC)	ANC-16 (110VAC/DC)	ANC-16 (220VAC/DC)
-20 to +70 °C						
-30 to +80 °C						
Max.90% (no condensation)						
IP50(front), IP20(back) (IP66 with accessory)						
Screw terminal						
96.8	96.8	96.8	144	144	144	144
96.8	96.8	96.8	144	144	144	144
89.6	89.6	89.6	137	137	137	137
89.6	89.6	89.6	137	137	137	137
65	65	65	58	58	58	58
280	280	280	517	517	517	517
OK						



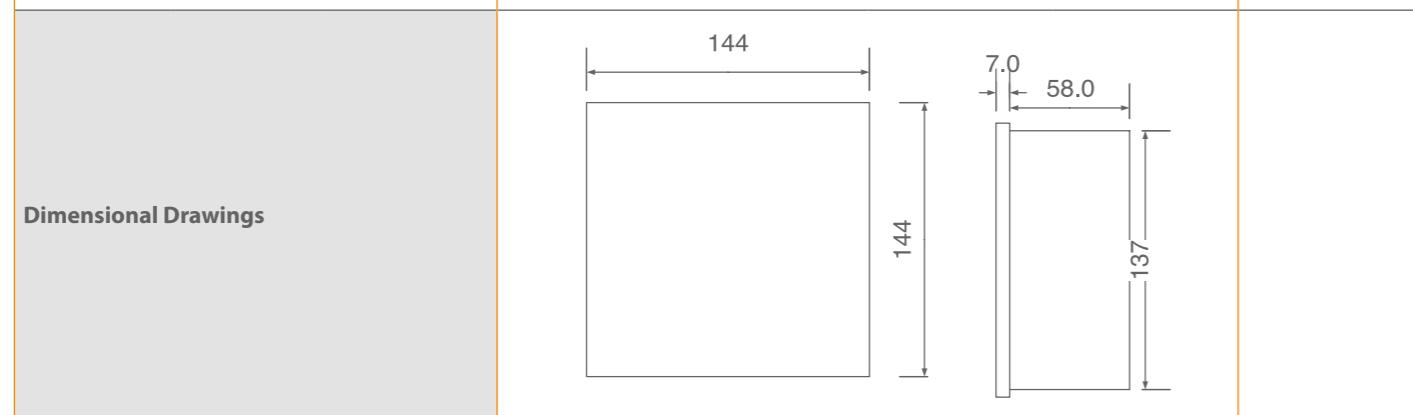
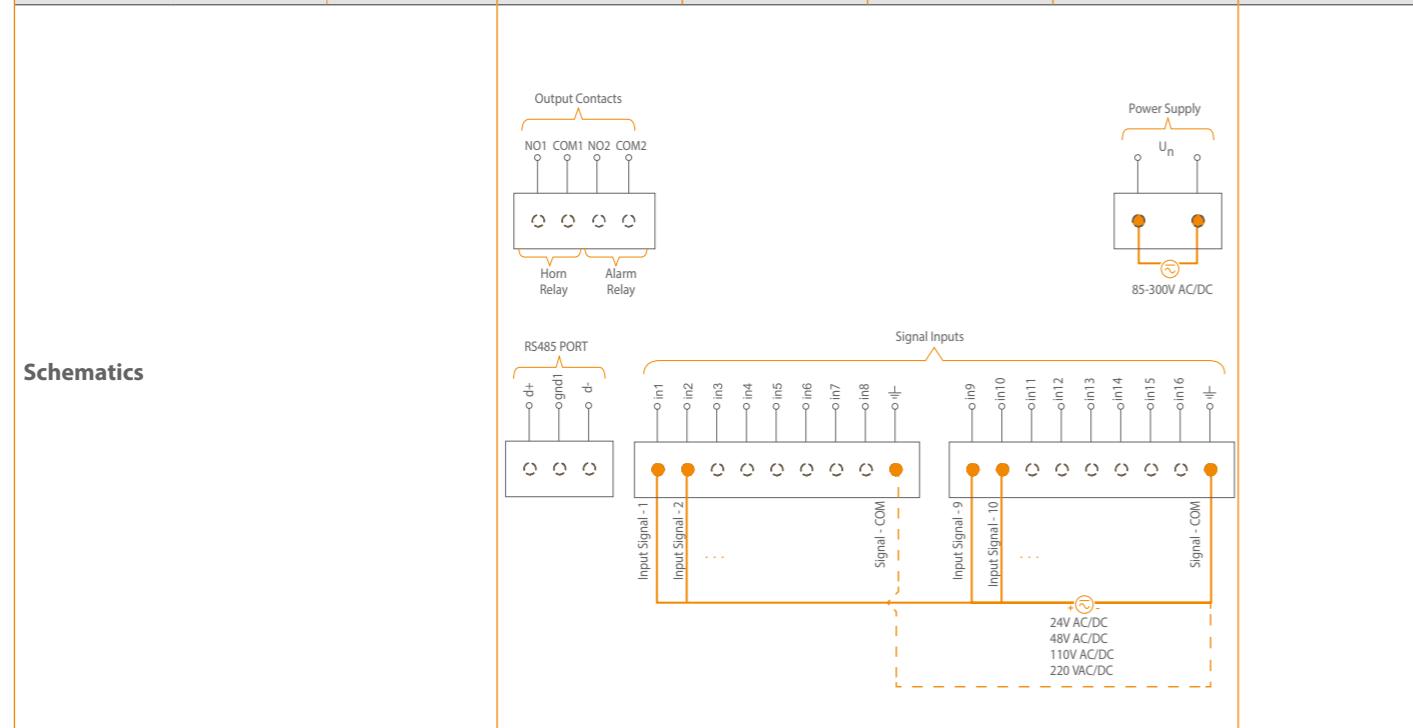


Type	ANC-16 (24VAC/DC)	ANC-16 (48VAC/DC)	ANC-16 (110VAC/DC)	ANC-16 (220VAC/DC)	ANC-24 (24V AC/DC, 85-300V AC/DC p.s.)	
Definition	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator	
Order Number	604650	604651	604652	604653	604660	
Input Signal	Voltage	AC 24V	48V	110V	220V	24V
		DC 24V	48V	110V	220V	24V
	Frequency	45-65 Hz				
	Numbers	16	16	16	16	24
Output Contacts	Response Time	25 ± 10 msec				
	Type of Output	Relay	Relay	Relay	Relay	Relay
	Number of contacts	2	2	2	2	2
	Type	1 NO (SPST)				
	Max ratings-AC	5A/277V; 1385 VA				
	Max ratings-DC	5A/30VDC; 150W				
	Mechanical Life Time	≥ 10^8 operations				
	Electrical Life Time Operations (for NO side)	1x10^5(5A@250VAC)	1x10^5(5A@250VAC)	1x10^5(5A@250VAC)	1x10^5(5A@250VAC)	1x10^5(5A@250VAC)
	Numbers	16	16	16	16	24
Window	Colours	Red/Green selectable				
	Sizes(mm)	44,8x11,9	44,8x11,9	44,8x11,9	44,8x11,9	24,4x11,9
	Illuminating for Each Window	With 4 pcs. leds or 4 pcs. green led	With 4 pcs. leds or 4 pcs. green led	With 4 pcs. leds or 4 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led
	Flash rate	Slow 60 Flash/Min				
		Fast 180 Flash/Min				
	Legends	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
	Mod	ANC	Available	Available	Available	Available
Time Range(sec)	LSK	Available	Available	Available	Available	Available
	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable
	4 nos.(Horn, Ack, Delete, Test)	5 nos.(Horn, Ack, Delete, Test)	6 nos.(Horn, Ack, Delete, Test)	7 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)
Inbuilt Push Buttons	Buzzer	Available	Available	Available	Available	Available
	Protocol	Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU
	Baud Rate	1200-57600	1200-57600	1200-57600	1200-57600	1200-57600
Communication	Isolation	2500 Vrms				
	Real Time Event Recording	6080 logs	6081 logs	6082 logs	6083 logs	6080 logs
	Battery Life	> 5 years				
Supply	Voltage	AC 24-50V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10
		DC 24-50V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10
	Frequency	45-65 Hz				
Power consumption	AC	< 10VA				
	DC	<5W	<5W	<5W	<5W	<5W

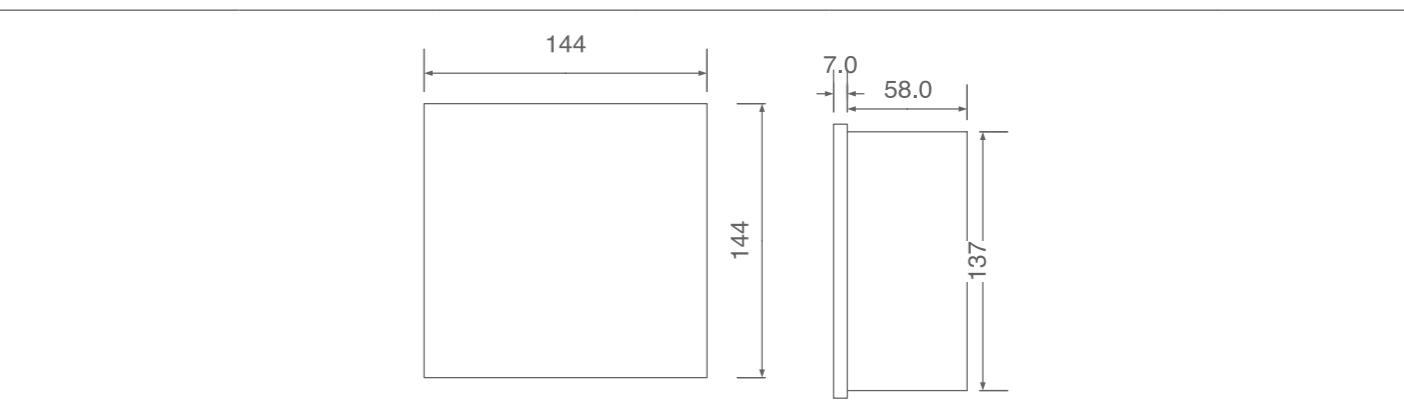
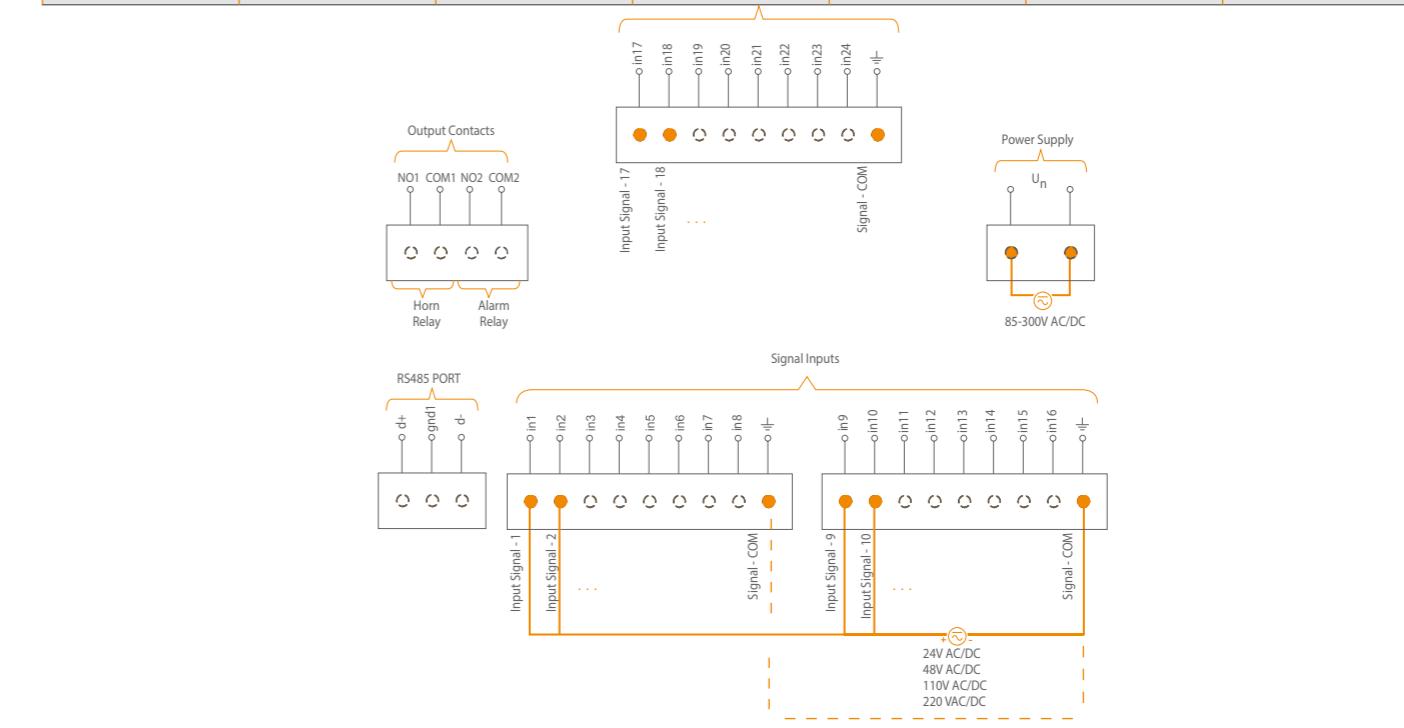
Type	ANC-24 (48V AC/DC, 85-300V AC/DC p.s.)	ANC-24 (110V AC/DC, 85-300V AC/DC p.s.)	ANC-24 (220V AC/DC, 85-300V AC/DC p.s.)	ANC-24 (24V AC/DC, 24-50VAC/DC p.s.)	ANC-24 (48V AC/DC, 24-50VAC/DC p.s.)	ANC-24 (110V AC/DC, 24-50VAC/DC p.s.)	ANC-24 (220V AC/DC, 24-50VAC/DC p.s.)
Definition	Alarm annunciator						
Order Number	604661	604662	604663	604665	604666	604667	604668
Voltage	24V	110V	220V	24V	48V	110V	220V
Frequency	45-65 Hz						
Numbers	24	24	24	24	24	24	24
Response Time	25 ± 10 msec						
Type of Output	Relay						
Number of contacts	2	2	2	2	2	2	2
Type	1 NO (SPST)						
Max ratings-AC	5A/277V; 1385 VA						
Max ratings-DC	5A/30VDC; 150W						
Mechanical Life Time	≥ 10^8 operations						
Electrical Life Time Operations (for NO side)	1x10^5(5A@250VAC)						
Numbers	24	24	24	24	24	24	24
Colours	Red/Green selectable						
Sizes(mm)	24,4x11,9						
Illuminating for Each Window	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led
Flash rate	60 Flash/Min						
	180 Flash/Min						
Legends	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
Mod	Available						
Time Range(sec)	Available						
	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable
	4 nos.(Horn, Ack, Delete, Test)	5 nos.(Horn, Ack, Delete, Test)	6 nos.(Horn, Ack, Delete, Test)	7 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)
Inbuilt Push Buttons	Buzzer	Available	Available	Available	Available	Available	Available
	Protocol	Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU
	Baud Rate	1200-57600	1200-57600	1200-57600	1200-57600	1200-57600	1200-57600
Communication	Isolation	2500 Vrms					
	Real Time Event Recording	6080 logs	6081 logs	6082 logs	6083 logs	6080 logs	6080 logs
	Battery Life	> 5 years					
Supply	Voltage	85-300V ±%10	85-300V ±%10	85-300V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10
		85-300V ±%10	85-300V ±%10	85-300V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10
	Frequency	45-65 Hz	4				



Type		ANC-16 (24VAC/DC)	ANC-16 (48VAC/DC)	ANC-16 (110VAC/DC)	ANC-16 (220VAC/DC)	ANC-24 (24V AC/DC, 85-300V AC/DC p.s.)
Permissible ambient temperature	During operation	-20 to +60 °C				
	During storage	-40 to +75 °C				
Relative Humidity		Max.95% (no condensation)				
Degree of protection		IP50(front), IP20(back) (IP66 with accessory)				
Connections		Screw terminal				
Dimensions (mm)	Bezel/Overall	Height(mm)	144	144	144	144
		Width(mm)	144	144	144	144
Panel Cutout		Height(mm)	137	137	137	137
		Width(mm)	137	137	137	137
		Depth(mm)	58	58	58	58
Weight(gr)		540	540	540	540	540
EMC-EMI	61000-6-2, 61000-6-4	OK	OK	OK	OK	OK



ANC-24 (48V AC/DC, 85-300V AC/DC p.s.)	ANC-24 (110V AC/DC, 85-300V AC/DC p.s.)	ANC-24 (220V AC/DC, 85-300V AC/DC p.s.)	ANC-24 (24V AC/DC, 24-50VAC/DC p.s.)	ANC-24 (48V AC/DC, 24-50VAC/DC p.s.)	ANC-24 (110V AC/DC, 24-50VAC/DC p.s.)	ANC-24 (220V AC/DC, 24-50VAC/DC p.s.)
-20 to +60 °C						
-40 to +75 °C						
Max.95% (no condensation)						
IP50(front), IP20(back) (IP66 with accessory)						
Screw terminal						
144	144	144	144	144	144	144
144	144	144	144	144	144	144
137	137	137	137	137	137	137
137	137	137	137	137	137	137
58	58	58	58	58	58	58
540	540	540	540	540	540	540
OK						

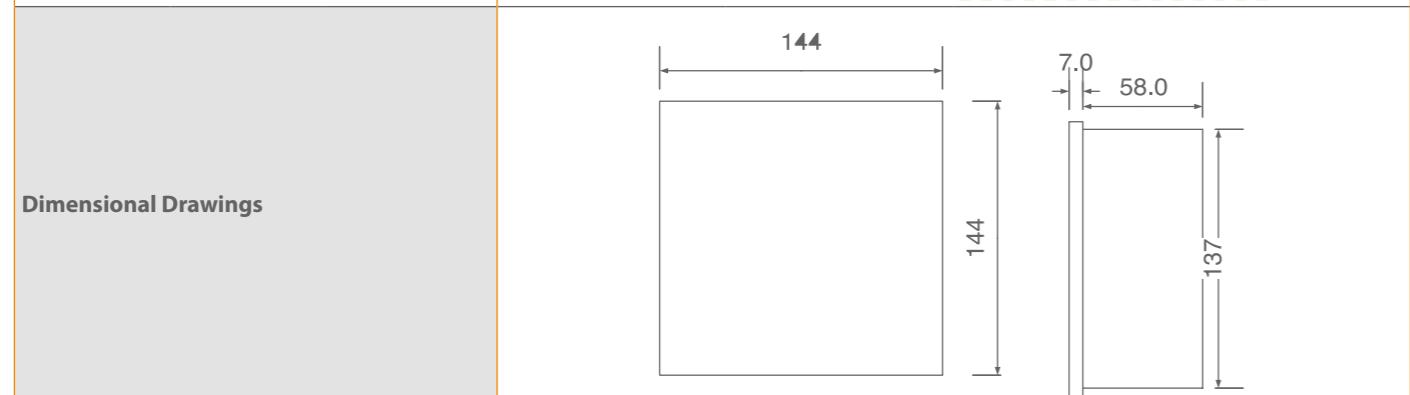
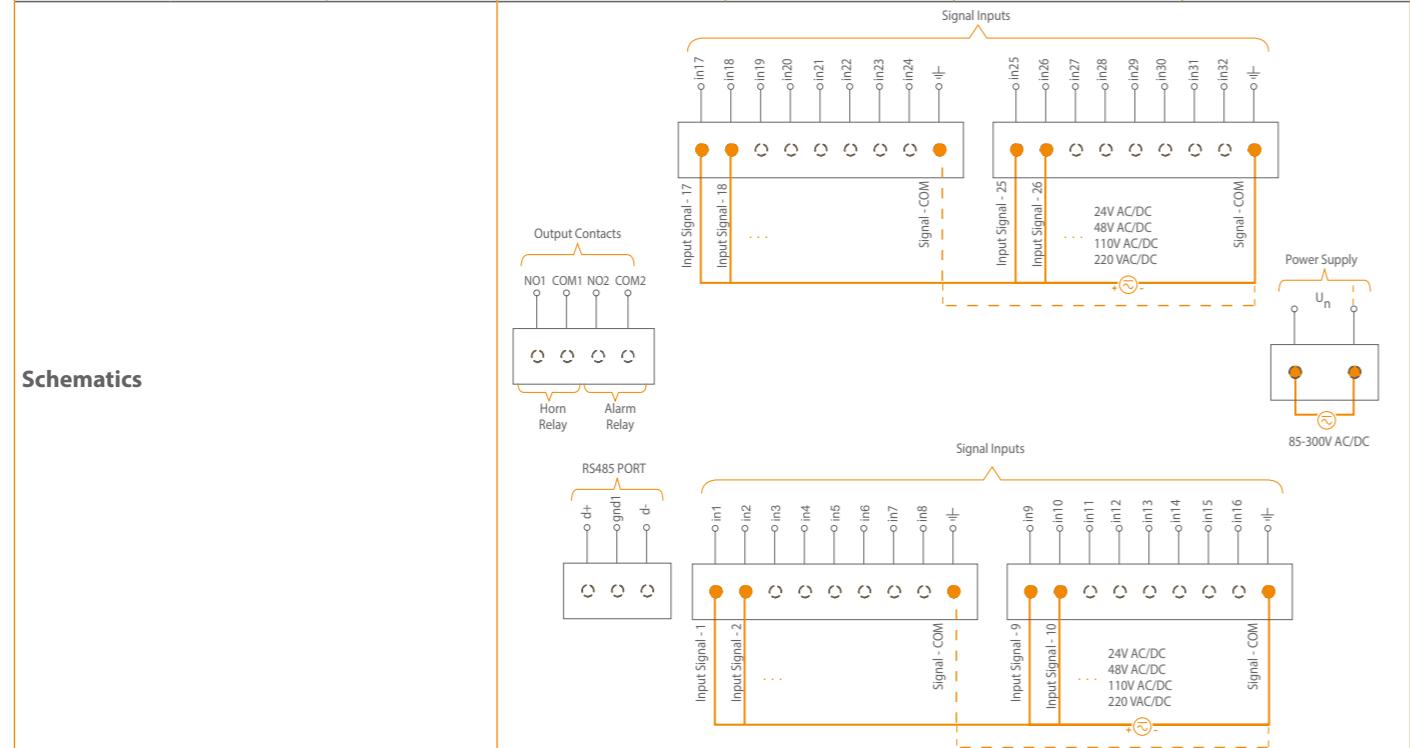




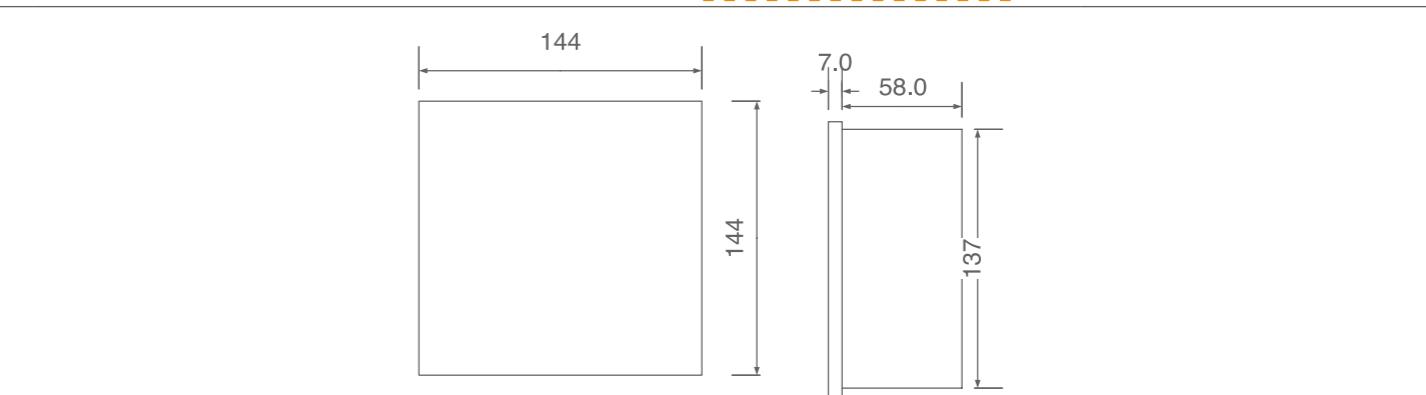
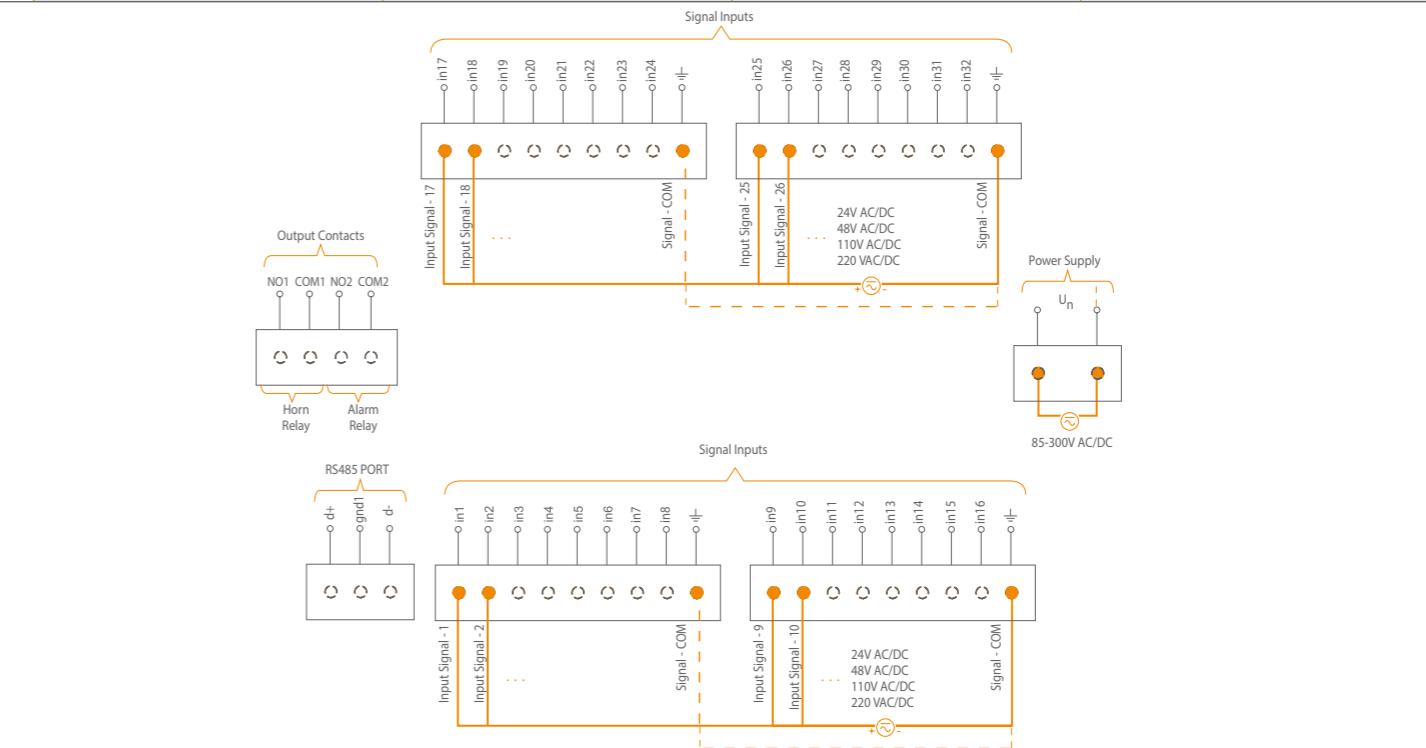
<b>Type</b>	<b>ANC-32 (24V AC/DC, 85-300V AC/DC p.s.)</b>	<b>ANC-32 (48V AC/DC, 85-300V AC/ DC p.s.)</b>	<b>ANC-32 (110V AC/DC, 85-300V AC/ DC p.s.)</b>	<b>ANC-32 (220V AC/DC, 85-300V AC/ DC p.s.)</b>	
<b>Definiton</b>	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator	
<b>Order Number</b>	604670	604671	604672	604673	
<b>Input Signal</b>	Voltage	AC 24V	48V	110V	220V
		DC 24V	48V	110V	220V
	Frequency	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
	Numbers	32	32	32	32
<b>Output Contacts</b>	Response Time	25 ± 10 msec			
	Type of Output	Relay	Relay	Relay	Relay
	Number of contacts	2	2	2	2
	Type	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)
	Max ratings-AC	5A/277V; 1385 VA	5A/277V; 1385 VA	5A/277V; 1385 VA	5A/277V; 1385 VA
	Max ratings-DC	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
	Mechanical Life Time	≥ 10^8 operations	≥ 10^8 operations	≥ 10^8 operations	≥ 10^8 operations
<b>Window</b>	Electrical Life Time Operations (for NO side)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)
	Numbers	32	32	32	32
	Colours	Red/Green selectable	Red/Green selectable	Red/Green selectable	Red/Green selectable
	Sizes(mm)	15,3x11,9	15,3x11,9	15,3x11,9	15,3x11,9
	Iluminating for Each Window	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led
	Flash rate	Slow 60 Flash/Min	60 Flash/Min	60 Flash/Min	60 Flash/Min
	Fast	180 Flash/Min	180 Flash/Min	180 Flash/Min	180 Flash/Min
<b>Mod</b>	Legends	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
	ANC	Available	Available	Available	Available
<b>LSK</b>	Available	Available	Available	Available	Available
	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable
<b>Inbuilt Push Buttons</b>		4 nos.(Horn, Ack, Delete, Test)			
<b>Buzzer</b>		Available	Available	Available	Available
<b>Communication</b>	Protocol	Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU
	Baud Rate	1200-57600	1200-57600	1200-57600	1200-57600
	Isolation	2500 Vrms	2500 Vrms	2500 Vrms	2500 Vrms
<b>Real Time Event Recording</b>		6080 logs	6080 logs	6080 logs	6080 logs
<b>Battery Life</b>		> 5 years	> 5 years	> 5 years	> 5 years
<b>Voltage Supply</b>	Voltage	AC 85-300V ±%10	85-300V ±%10	85-300V ±%10	85-300V ±%10
		DC 85-300V ±%10	85-300V ±%10	85-300V ±%10	85-300V ±%10
	Frequency	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz

<b>ANC-32 (24V AC/DC, 24-50VAC/DC p.s.)</b>	<b>ANC-32 (48V AC/DC, 24-50VAC/DC p.s.)</b>	<b>ANC-32 (110V AC/DC, 24-50VAC/DC p.s.)</b>	<b>ANC-32 (220V AC/DC, 24-50VAC/DC p.s.)</b>
Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator
604675	604676	604677	604678
24V	48V	110V	220V
24V	48V	110V	220V
45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
32	32	32	32
25 ± 10 msec			
Relay	Relay	Relay	Relay
2	2	2	2
1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)
5A/277V; 1385 VA	5A/277V; 1385 VA	5A/277V; 1385 VA	5A/277V; 1385 VA
5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
≥ 10^8 operations	≥ 10^8 operations	≥ 10^8 operations	≥ 10^8 operations
1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)
32	32	32	32
Red/Green selectable	Red/Green selectable	Red/Green selectable	Red/Green selectable
15,3x11,9	15,3x11,9	15,3x11,9	15,3x11,9
With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led	With 2pcs. leds or 2 pcs. green led
60 Flash/Min	60 Flash/Min	60 Flash/Min	60 Flash/Min
180 Flash/Min	180 Flash/Min	180 Flash/Min	180 Flash/Min
Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
Available	Available	Available	Available
Available	Available	Available	Available
0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable	0, 2, 5, 10, 15, 20, 25, 30 adjustable
4 nos.(Horn, Ack, Delete, Test)			
Available	Available	Available	Available
Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU
1200-57600	1200-57600	1200-57600	1200-57600
2500 Vrms	2500 Vrms	2500 Vrms	2500 Vrms
6080 logs	6080 logs	6080 logs	6080 logs
> 5 years	> 5 years	> 5 years	> 5 years
24-50V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10
24-50V ±%10	24-50V ±%10	24-50V ±%10	24-50V ±%10
45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz

Type		ANC-32 (24V AC/DC, 85-300V AC/DC p.s.)	ANC-32 (48V AC/DC, 85-300V AC/ DC p.s.)	ANC-32 (110V AC/DC, 85-300V AC/ DC p.s.)	ANC-32 (220V AC/DC, 85-300V AC/ DC p.s.)
Power consumption	DC	< 10VA	< 10VA	< 10VA	< 10VA
	AC	<5W	<5W	<5W	<5W
Permissible ambient temperature	During operation	-20 to +60 °C			
	During storage	-40 to +75 °C			
Relative Humidity		Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
Degree of protection		IP50(front), IP20(back) (IP66 with accessory)	IP50(front), IP20(back) (IP66 with accessory)	IP50(front), IP20(back) (IP66 with accessory)	IP50(front), IP20(back) (IP66 with accessory)
Connections		Screw terminal	Screw terminal	Screw terminal	Screw terminal
Dimensions (mm)	Bezel/Overall	Height(mm)	144	144	144
		Width(mm)	144	144	144
	Panel Cutout	Height(mm)	137	137	137
		Width(mm)	137	137	137
Depth(mm)		58	58	58	58
Weight(gr)		540	540	540	540
EMC-EMI	61000-6-2, 61000-6-4	OK	OK	OK	OK



	ANC-32 (24V AC/DC, 24-50VAC/DC p.s.)	ANC-32 (48V AC/DC, 24-50VAC/DC p.s.)	ANC-32 (110V AC/DC, 24-50VAC/DC p.s.)	ANC-32 (220V AC/DC, 24-50VAC/DC p.s.)
< 10VA				
<5W	<5W	<5W	<5W	<5W
-20 to +60 °C				
-40 to +75 °C				
Max.95% (no condensation)				
IP50(front), IP20(back) (IP66 with accessory)				
Screw terminal				
144	144	144	144	144
144	144	144	144	144
137	137	137	137	137
137	137	137	137	137
58	58	58	58	58
540	540	540	540	540
OK	OK	OK	OK	OK



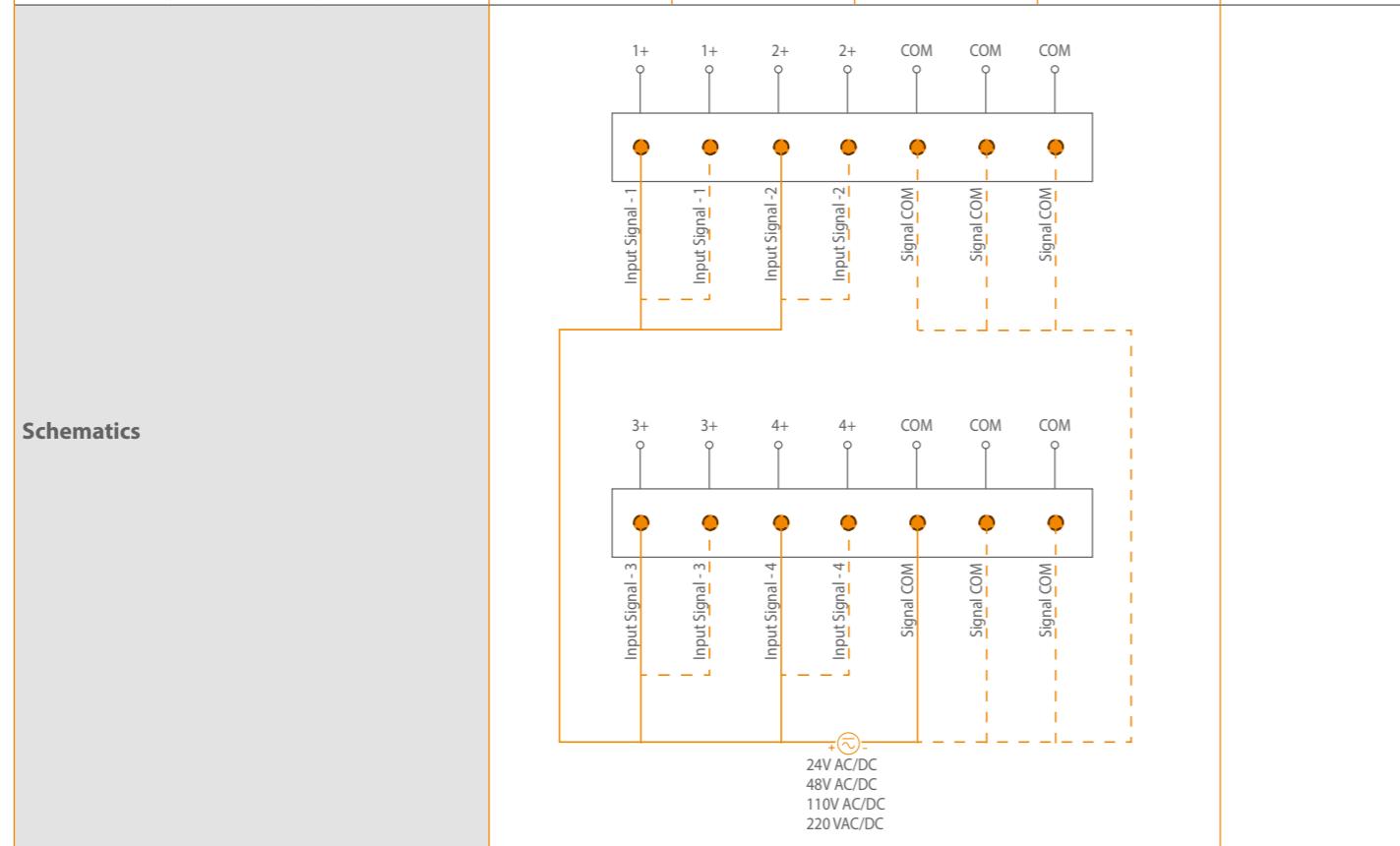


Type	LSK-4 (24VAC/DC)	LSK-4 (48VAC/DC)	LSK-4 (110VAC/DC)	LSK-4 (220VAC/DC)	LSK-6 (24VAC/DC)
Definiton	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module
Order Number	583041	583042	583043	583045	583061
Input Signal	Voltage	AC 24V	48V	110V	220V
		DC 24V	48V	110V	24V
	Frequency	Min. 45Hz (for AC signal input)			
	Numbers	4	4	4	6
Output Contacts	Response Time:	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms
	Numbers	-	-	-	-
	Colours	Red	Red	Red	Red
	Sizes(mm)	34,85 x 30	34,85 x 30	34,85 x 30	34,85 x 18,70
Window	Illuminating for each window	With 9 pcs. red leds	With 9 pcs. red leds	With 9 pcs. red leds	With 6 pcs. red leds
	Legends	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
Time Range(sec)	-	-	-	-	-
Inbuilt Push Buttons	-	-	-	-	-
Buzzer	-	-	-	-	-
Communication	-	-	-	-	-
Real Time Event Recording	-	-	-	-	-
Battery Life	-	-	-	-	-
Permissible ambient temperature	During operation	-20 to +70 °C			
	During storage	-30 to +80 °C			
Relative Humidity	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
Degree of protection	IP50(front), IP20(back) (IP66 with accessory)	IP50(front), IP20(back) (IP66 with accessory)	IP50(front), IP20(back) (IP66 with accessory)	IP50(front), IP20(back) (IP66 with accessory)	IP50(front), IP20(back) (IP66 with accessory)
Connections	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal

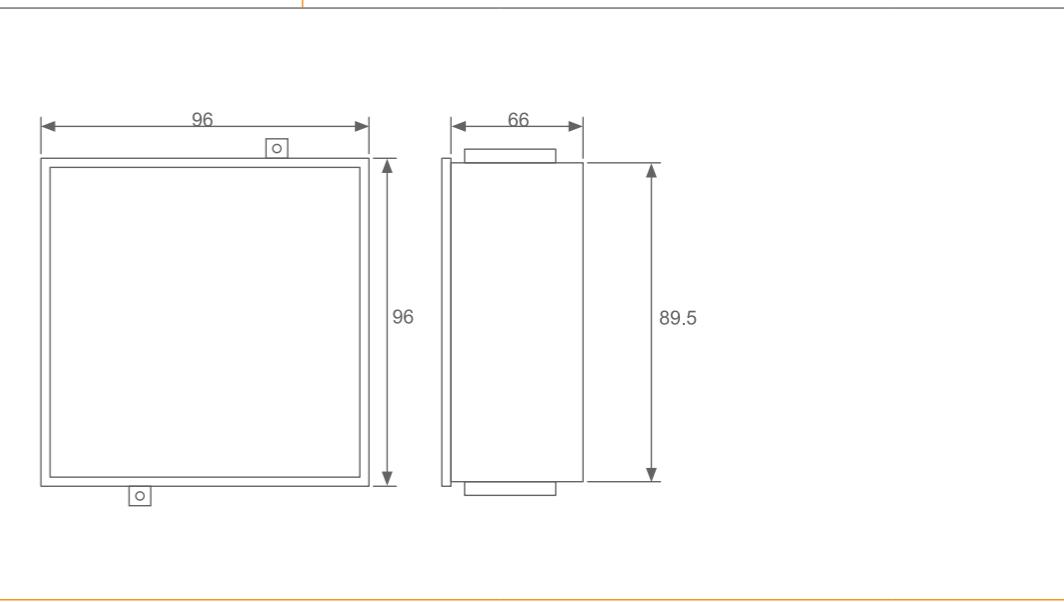
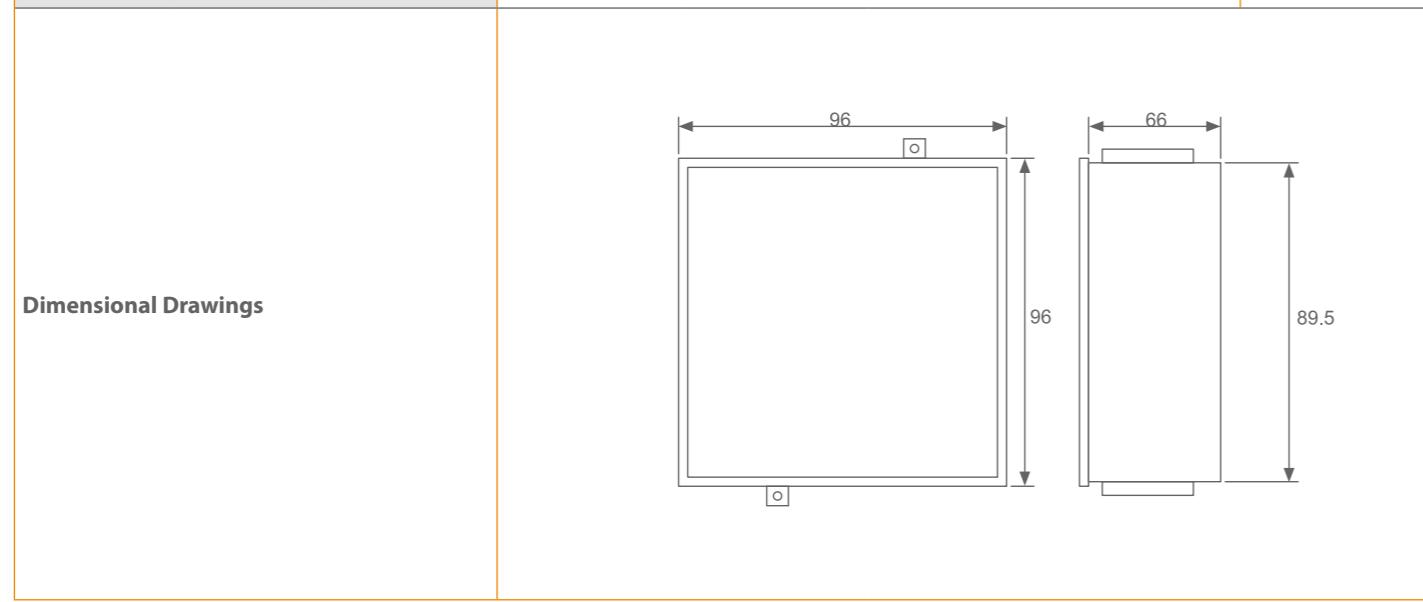
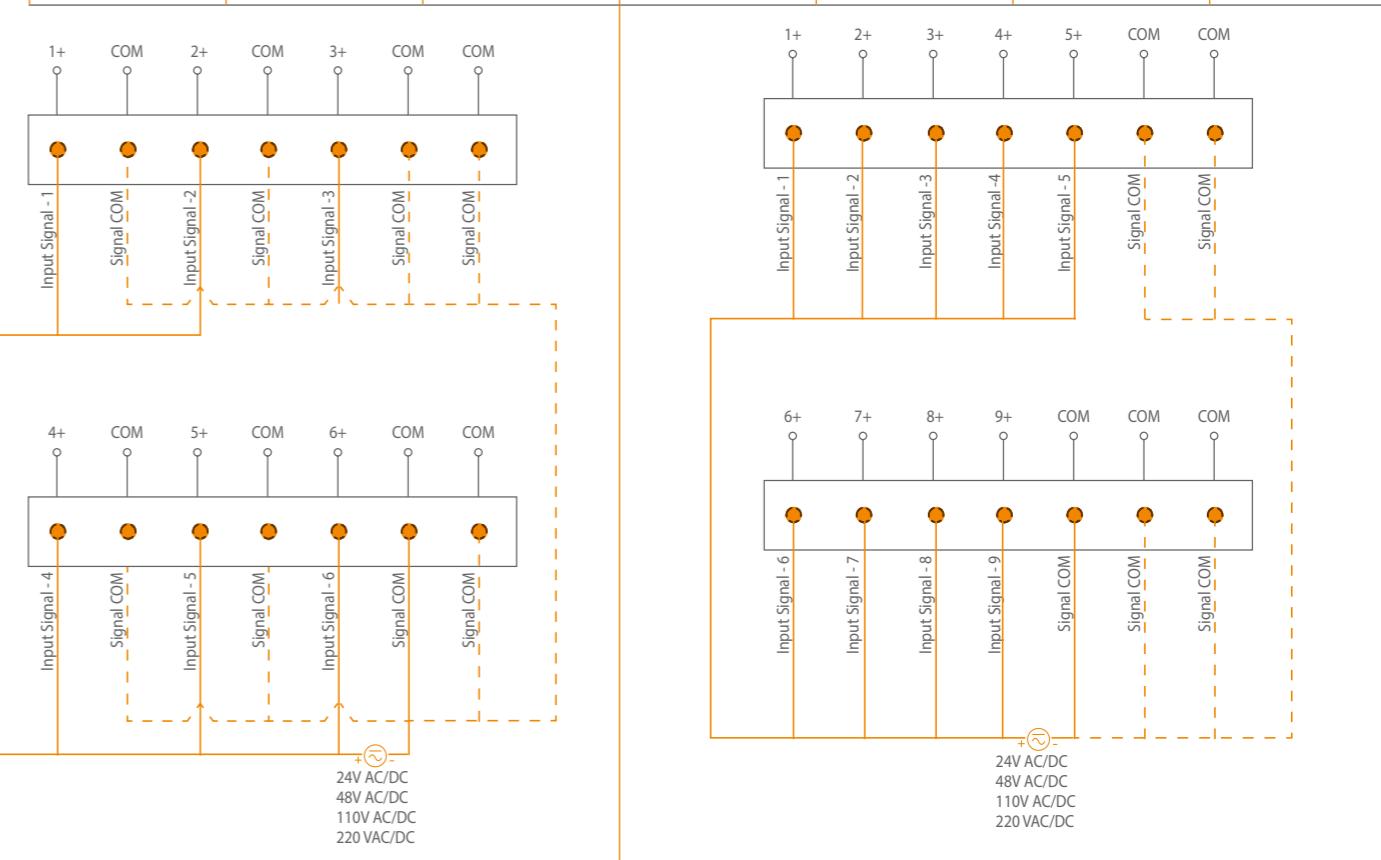
LSK-6 (48VAC/DC)	LSK-6 (110VAC/DC)	LSK-6 (220VAC/DC)	LSK-9 (24VAC/DC)	LSK-9 (48VAC/DC)	LSK-9 (110VAC/DC)	LSK-9 (220VAC/DC)
Signal Indicator Module						
583062	583063	583065	583091	583092	583093	583095
48V	110V	220V	24V	48V	110V	220V
48V	110V	220V	24V	48V	110V	220V
Min. 45Hz (for AC signal input)						
6	6	6	9	9	9	9
Max. 10ms						
-	-	-	-	-	-	-
6	6	6	9	9	9	9
Red						
34,85 x 18,70	34,85 x 18,70	34,85 x 18,70	20,9 x 18,7	20,9 x 18,7	20,9 x 18,7	20,9 x 18,7
With 6 pcs. red leds	With 6 pcs. red leds	With 6 pcs. red leds	With 4 pcs. red leds			
Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.	Laser printed onto standart tracing paper, using templates provided by Klemsan Inc.
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-20 to +70 °C						
-30 to +80 °C						
Max.95% (no condensation)						
IP50(front), IP20(back) (IP66 with accessory)						
Screw terminal						



Type		LSK-4 (24VAC/DC)	LSK-4 (48VAC/DC)	LSK-4 (110VAC/DC)	LSK-4 (220VAC/DC)	LSK-6 (24VAC/DC)
Dimensions (mm)	Bezel/Overall	Height(mm)	96	96	96	96
		Width(mm)	96	96	96	96
	Panel Cutout	Height(mm)	89.5	89.5	89.5	89.5
		Width(mm)	89.5	89.5	89.5	89.5
Depth(mm)		66	66	66	66	66
Weight(gr)		218	218	218	218	220
EMC-EMI		-	-	-	-	-



LSK-6 (48VAC/DC)	LSK-6 (110VAC/DC)	LSK-6 (220VAC/DC)	LSK-9 (24VAC/DC)	LSK-9 (48VAC/DC)	LSK-9 (110VAC/DC)	LSK-9 (220VAC/DC)
96	96	96	96	96	96	96
96	96	96	96	96	96	96
89.5	89.5	89.5	89.5	89.5	89.5	89.5
89.5	89.5	89.5	89.5	89.5	89.5	89.5
66	66	66	66	66	66	66
220	220	220	222	222	222	222
-	-	-	-	-	-	-





## ANC series / Signal Control

There are 4 kinds of flashing of LED displays; fast blinking, slow blinking, continuously flashing (turn on continuously) and turn off.

For ANC8 the first alarm / for ANC16 the first or the last alarm (depending on setting) display blinks faster than the remaining channel displays which also have an alarm condition.

Assume there is an alarm in the 3rd channel. Third channel's display will blink fast. After a while, assume that there appear alarms in 7th, 8th and 9th channels. Then third channel will blink fast; seventh, eighth and ninth displays will blink slowly.

When the operator presses on the "Ack" button, all the channels (only the 3rd channel other channels already blink slowly) will blink slowly and also the related relay(s) deactivate(s) (horn and/or alarm relay – depending on the setting). After that; if alarm conditions disappeared, slow blinking channels will flash continuously (LEDs turn on continuously). In the above condition, when the operator presses "Del" button; all the continuously flashing displays will turn off.

**e.g.**

Input-1 is adjusted as horn(green) window and input-2 is adjusted as alarm(red) window in below figure.

when related signal is applied to first input channel, it will blink fastly in green colour in order to indicate first alarm. When related signal is applied to second channel, it blinks slowly in red colour.

If ACK(acknowledge) button is pressed, Horn and Alarm relay are de-activated. After pressing ACK button, if one of input signal is gone; it will blink constantly, otherwise it blinks slowly.

If Horn button is pressed, the buzzer will stop. Functional diagram is shown in below figure.



## ALRC-6 series / Signal Control

Whenever any ALRC-6 input is excited, relay of that channel and horn relay are activated. If the related dip-switch (Alarm Relay Enable switch on the rear cover) is adjusted as ON, "alarm relay" will also be activated. If input signal is continued, display of the related channel blinks. If input signal is disconnected, display will be turned on continuously.

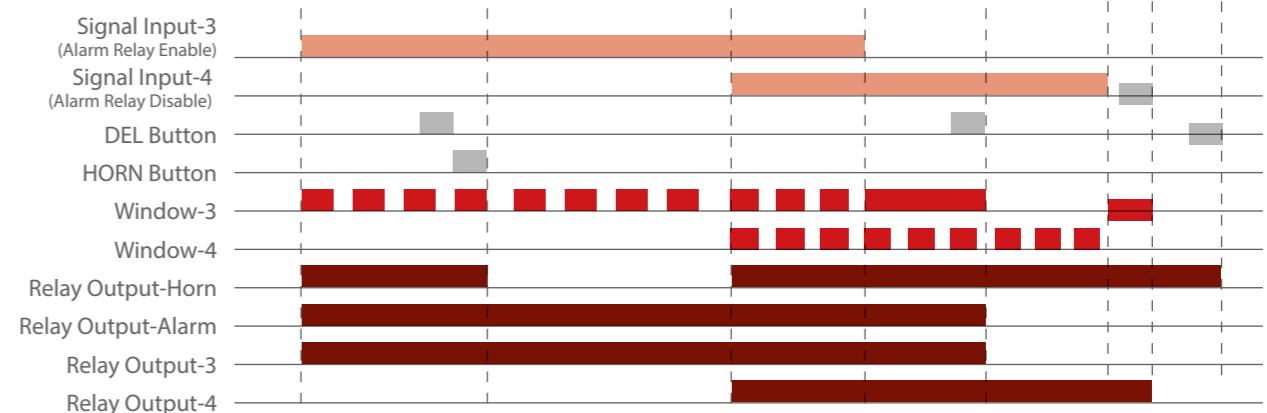
When HORN button is pressed, the HORN relay will be inactive. When a 'new' input signal is applied to any of the inputs, HORN relay will again be active.

When DEL button is pressed, relays of the channels whose input signals are interrupted will be inactive and displays of these channels will turn-off. For the channels whose input signals are continued, displays and relays maintain their initial state, as described above (relay active, display blinking). When TEST button is pressed, displays of all channels will flash. This button has no effect on channel relays.

**e.g.**

Dip switch-3 is adjusted as "ON" and Dip switch-4 is adjusted as "OFF" in below figure.

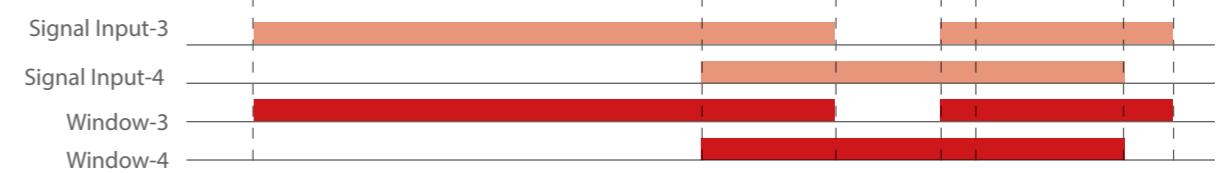
## FUNCTIONAL INDICATION



## LSK series/ Signal Visualizing

When input signal is applied to input channel of LSK series, related window is turned on constantly in red colour. When the signal is gone, related window is turned off.

## FUNCTIONAL INDICATION



## Analog Signal Management Solutions

*Isolation with  
accurate  
conversion*



## Defining a transducer in simple terms

A transducer is an electronic device that changes one form of energy into another.

It provides conversion of main electrical parameters into a voltage or mA output and isolation between inputs and outputs.

## Benefits and Advantages

- Extended measuring range
- Excellent linearity
- High system safety and reliability
- Electrical isolation with a high test voltage
- No insertion losses
- Low residual noise
- Good overall accuracy
- High quality, long useful life
- Easy configuration with knobs
- Without power supply option
- Extended temperature input range
- Multiplying analog signal (1 in-2 outs)
- DC and AC supply voltage options
- Highly compact and light weight
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences.
- Self-Extinguishing plastic housing.

## Which actions are executed?

### Measuring Converting Protection Isolation Configuration

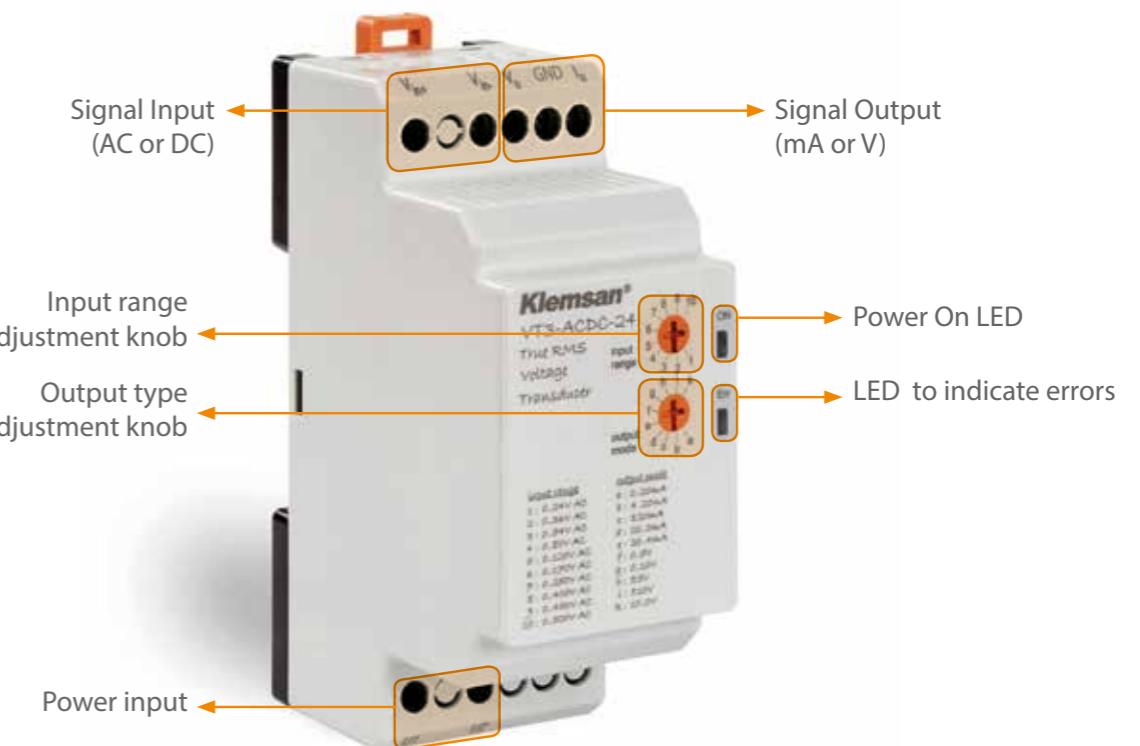
A transducer **measures** input parameters and **converts** them to another signal form continuously.

Input, output and power supply(optional) are electrically isolated from one another in order to provide **protective isolation**.

It is possible to **configure** different input ranges and output types by means of adjustment knobs.

## Layout & Mounting

Klemsan transducers are suitable for snap mounting onto 35mm standards DIN rails.



**VT3-ACDC-24 Transducer**

## Which markets are they used frequently?

- Renewable Energy
- Medium motors
- Electric power plants and substations
- Telecontrol systems
- Industrial Process
- Energy management systems
- Medium voltage modular cabinets
- Control and safety systems
- Telecontrol systems



## Renewable Energies



Measuring current and voltage in order to help the windmills and solar installations to work at their maximum efficiency.



**SIGNAL  
CONVERTING**  
VT3-ACDC-24

## Substation Automation



Conversion voltage and current of measurands, integration them with SCADA and RTU system.



**SIGNAL  
CONVERTING**  
CT3 & VT3 series  
Ascon 311

## Petrochemical processing



The measurement of temperature is a vital part of instrumentation in petrochemical industries. RTD sensors are often used for their excellent temperature response. They are used in order to combine sensors with PLC/Scada system.



**SIGNAL  
CONVERTING**  
TT-RTD series  
Ascon series

## Refrigeration applications



Food products, fresh meats and produce, and stored items require strict environmental conditions for storage. That's why it is required reliable low temperature measurements. Providing down to minus 50 degree provides appropriate scale for any operation.



**SIGNAL  
CONVERTING**  
TT-RTD series  
Ascon 321-Ascon 331

## UPS Voltage Control



Inverter output voltage for UPS systems can be monitored by scada system via voltage transducers.



**SIGNAL  
CONVERTING**  
VT3-ACDC-24

## Elevators



With higher accuracy and speed, the feedback signal from transducers enables smoother control and energy consumption reduction of many electrical systems.



**SIGNAL  
CONVERTING**  
CT3 series

## I/O applications



Passive isolators are used for the electrical isolation and converting of analog 0(4) to 20 mA standard current signals to 0-20mA, 4-20mA, 0-5V and 0-10V signals. They provide electrical isolation between the control electronics and process I/O and eliminate measurement errors caused by differences in earth potentials.



**SIGNAL  
ISOLATING**  
PISO-DC series



The electrical power is supplied to the trains via the catenaries. So, depending on the train type such as subway, trolleybuses, high speed train, heavy traction etc. the locomotives can operate at different voltage levels. In order to monitor them in main panel, voltage transducers are used.



**SIGNAL  
CONVERTING**  
VT3 series  
Ascon 311

## Scada System



The rms value of the input AC voltage or current can be converted to a DC output which is connected to analog input of PLC module. So it is possible to monitor them by Scada System.



**SIGNAL  
CONVERTING**  
CT3 & VT3 series  
Ascon series



### Air conditioning and liquid temperature measurement

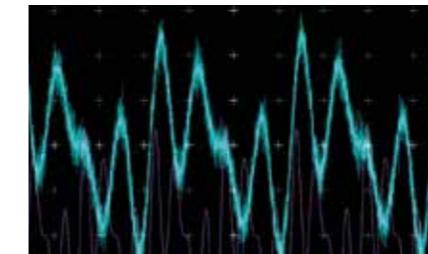


RTDs provide wide temperature input range from -50°C to +300°C in order to keep an industrial process in desired degree with accuracy and stability.



**SIGNAL  
CONVERTING**  
*TT-RTD series*

### Space-critical multi-channel applications



Providing two signal outputs for different control units thanks to 1-in 2-out converting feature. No auxiliary power supply is required for PISO series therefore cost savings are made.



**SIGNAL  
MULTIPLYING**  
*PISO-DC-DUO series*

### Air Conditioning System



Monitoring of lower voltage levels and heavy load control with PLC modules.



**PROTECTION**  
*CT3 & VT3 series*

### Tele-Control System



Providing an intelligent analog output module for the direct measurement of alternating variables for the use in station control applications.



**SIGNAL  
CONVERTING**  
*CT3 & VT3 series*

### Motor Traction Control



Traction is provided by electric motors driven by inverters that are relying on transducers to measure, optimize and adjust the current and voltage that are sent to the motors, improving both performance and reliability.



**PROTECTION**  
*CT3 & VT3 series*



Type	ASCON 311	ASCON 321
Definiton	Configurable Signal Converter	Configurable PT100 Converter
Order Number	602300	602310
Casing Width(mm)	17,5	17,5
Connections	Screw terminal	Screw terminal
Sensor Type	DC Current and Voltage(mV,V,mA)	PT100 (2,3,4 wire)
PT100 connection Type	-	2, 3 or 4 wire
Measuring Range	0...60mV -6...60mV 0...5mA 0...100mV -100...100mV 0...10mA 0...250mV -250...250mV 0...20mA 0...500mV -500...500mV -5...5mA 0...1V -1...1V -10...10mA 0...2V -2...2V -20...20mA 0...2,5V -2,5...2,5V 4...20mA 0...5V -5...5V 0...24mA 0...10v -10...10V 4...24mA 0...20V -20...20V 0...12mA	-150°C...800 °C Configurable
Sensor excitation current	-	<0.5mA
Maximum input signal	30V DC or 50mA DC	-
Output Signal	0...5V 0...20mA 5...0V 20...0mA 0...10V 4...20mA 10...0V 20...4mA -5...5V -20...20mA	0...5V 0...20mA 5...0V 20...0mA 0...10V 4...20mA 10...0V 20...4mA -5...5V -20...20mA
Measurement Error	<%0.2 Full scale	<%0.2 Full scale
Max. Load	≤ 600Ω (Current Output) ≥ 10kΩ (Voltage Output)	≤ 600Ω (Current Output) ≥ 10kΩ (Voltage Output)
Max. Output Signal	12V (Voltage Output) 24mV (Current Output)	12V (Voltage Output) 24mV (Current output)
Supply	Voltage DC	11-30V DC
Isolation	3 way-1,5kV RMS	3 way-1,5kV RMS
Power Consumptionr	≤ 25mA @ 24V (ILOAD =0mA, I =0mA)	≤ 25mA @ 24V (ILOAD =0mA, I =0mA)
Temperature coefficient	≤ %0.004/°C	≤ %0.02/°C

Type	ASCON 331	ASCON 341	ASCON 352
Configurable Thermocouple Converter	Configurable Frequency Converter	Signal-Temperature Converter with RS485	
602320	602 330	602400	
17,5	17,5	17,5	
Screw terminal	Screw terminal	Screw terminal	
Thermocouple( J,K,E,R,S)	2-3 wire PNP/NPN, Namur, Push-Pull, Dry contact	mV/V,mA PT100(2,3,4wire) Thermocouple(J,K,E,R,S)	
-	-	2,, 3 or 4 wire	
J: -200°C ... 1200°C configurable K: -200°C ... 1350°C configurable E: -200°C ... 950°C configurable R: -50°C ... 1750°C configurable S: -50°C ... 1750°C configurable	0 .. 100 kHz configurable via knobs 0...150 kHz can be learned from input signal	<b>Signal</b> -30 signal combinations; 4-20mA,0-10V,etc.  <b>PT100</b> -150°C...800 °C Configurable  <b>Thermocouple</b> J: -200°C ... 1200°C configurable K: -200°C ... 1350°C configurable E: -200°C ... 950°C configurable R: -50°C ... 1750°C configurable S: -50°C ... 1750°C configurable	
-	-	<0.5mA	
-	Namur: 1.7 mA NPN: 6.5 V PNP: 6,7 V	30V DC or 50mA DC	
0...5V 0...20mA 5...0V 20...0mA 0...10V 4...20mA 10...0V 20...4mA -5...5V -20...20mA	0 .. 5V, 0 .. 10V, -10 .. 10V, 0 .. 20mA, 4 .. 20mA, -20 .. 20mA	RS485	
3.6mA .. 23.6mA	<%0.2 Full scale	3.6mA .. 23.6mA	
<%0.2 Full scale	≤ 600Ω (Current Output) ≥ 10kΩ (Voltage Output)	<%0.1 Full scale	
≤ 600Ω (Current Output) ≥ 10kΩ (Voltage Output)	12V (Voltage output), 24mA (Current output)	-	
11-30V DC	18 .. 30V DC	11-30V DC	
3 way-1,5kV RMS	1,5kVRMS	3 way-1,5kV RMS	
≤ 25mA @ 24V (I LOAD AUX =0mA, I =0mA)	≤ 30mA @ 24V (I LOAD AUX =0mA, I =0mA)	≤ 15mA @ 24V (I LOAD =0mA)	
≤ %0.004/°C	≤ %0.004/°C	≤ %0.02/°C	



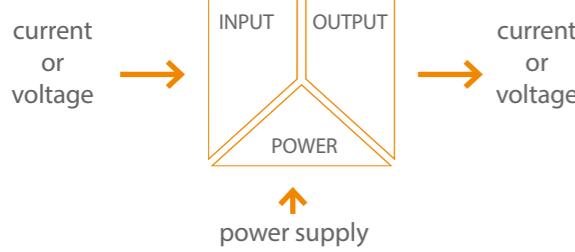
Type	ASCON 311		ASCON 321	
Response Time	< 150ms		< 150ms	
Sensor failure indication	Failure Status The situation of input signal is at least 10 % different than adjusted value	LED Indication 	Failure Status The situation of input signal is at least 10 % different than adjusted value	LED Indication 
Protection	Over voltage and reverse polarity protection		Over voltage and reverse polarity protection	
Connections	Power Input	DC+,DC-	DC+,DC-	DC+,DC-
	Input Connection	mV Input : 2(+), 3(-) V Input : 4(+), 1(-) mA Input : 3(+), 1(-)	P1+ and P1- (2 wire connection) P1+ and P1-P2- (3 wire connection) P1+,P2- and P1+,P2- (4 wire connection)	TC1+ and TC1-
	Output Connection	V,Gnd (Voltage Output) I,Gnd (Current Output)	V,Gnd (Voltage Output) I,Gnd (Current Output)	PNP : 4(+), 2(-), Sensor Supply : 1 or external NPN : 3(+), 2(-), Sensor Supply : 1 or external Namur : 3(+), 2(-) Push Pull : 4(+), 2(-) Dry Contact : 4(+), Sensor Supply : 1
Communication	Protocol	-	-	-
	Serial Connection	-	-	-
	Baud Rate	-	-	1200 9600 57600 2400 19200 4800 38400(Default)
	Parity	-	-	None(Default) Even Odd
Permissible ambient temperature	During Operation	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
	During Storage	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
Relative Humidity	Max.95% (no condensation)		Max.95% (no condensation)	
Degree of protection	IP20		IP20	
Weight(gr)	42		42	
Mounting Type	Rail mounted		Rail mounted	
Permissible mounting position	any		any	
Dimensional Drawings				

Type	ASCON 331	ASCON 341	ASCON 352
Response Time	< 150ms	0 - 20 Hz: < 1050 msec 20 - 100 Hz: < 550 msec 100 Hz: < 300msec	<10ms
Sensor failure indication	M1 M2 leds indication combinations		
Protection	Over voltage and reverse polarity protection	Over voltage and reverse polarity protection	Over voltage and reverse polarity protection
Connections	DC+,DC-	DC+,DC-	DC+,DC-
Input Connection	mV Input : 2(+), 3(-) V Input : 4(+), 1(-) mA Input : 3(+), 1(-)	PNP : 4(+), 2(-), Sensor Supply : 1 or external NPN : 3(+), 2(-), Sensor Supply : 1 or external Namur : 3(+), 2(-) Push Pull : 4(+), 2(-) Dry Contact : 4(+), Sensor Supply : 1	Signal mV Input : 2(+), 3(-) mA Input : 3(+), 1(-) V Input : 4(+), 1(-)  PT100 4 and 3 (2 wire connection) 4 and 2,3(3wire connection) 1,4and2,3(4wireconnction)
Output Connection	V,Gnd (Voltage Output) I,Gnd (Current Output)	V,Gnd (Voltage Output) I,Gnd (Current Output)	V,Gnd (Voltage Output) I,Gnd (Current Output)
Protocol	-	-	MODBUS RTU
Serial Connection	-	-	RS485
Baud Rate	-	-	1200 9600 57600 2400 19200 4800 38400(Default)
Parity	-	-	None(Default) Even Odd
Permissible ambient temperature	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
During Storage	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
Relative Humidity	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
Degree of protection	IP20	IP20	IP20
Weight(gr)	42	42	42
Mounting Type	Rail mounted	Rail Mounted	Rail mounted
Permissible mounting position	any	any	any
Dimensional Drawings			



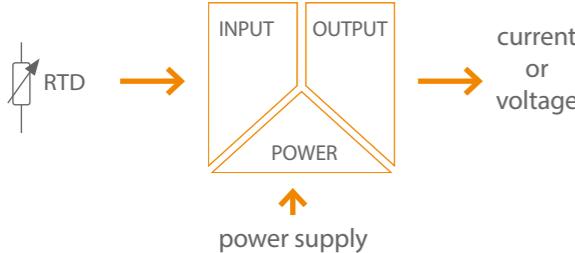
## ASCON 311 / Converting

### ISOLATION



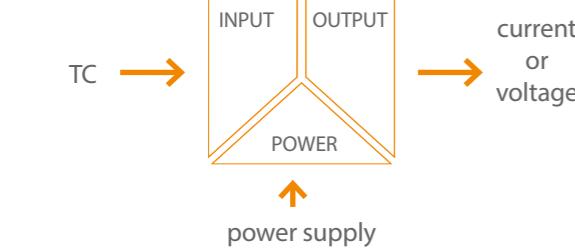
## ASCON 321 / Converting

### ISOLATION



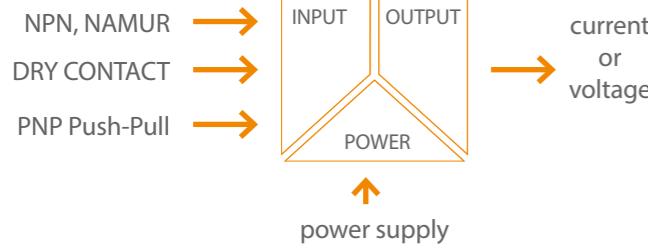
## ASCON 331 / Converting

### ISOLATION



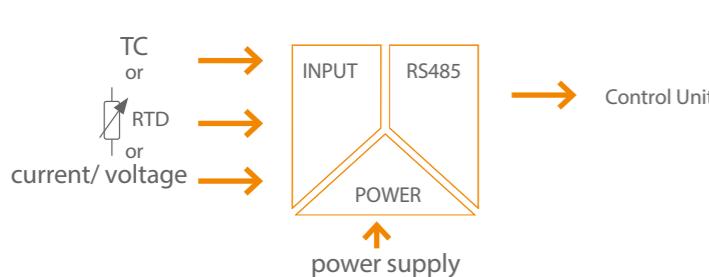
## ASCON 341 / Converting

### ISOLATION



## ASCON 352 / Signal-Temperature Converting / RS485 Communication

### ISOLATION



## Modbus RTU Descriptions

### Modbus Table

<b>Input value</b>	40001	RO	32 bit float	03H
<b>Ambient temprature</b>	40003	RO	32 bit float	03H
<b>Input type</b>	40005	R/W	32 bit integer	03H / 10H
<b>Input type - option 1</b>	40007	R/W	32 bit integer	03H / 10H
<b>Input type - option 2</b>	40009	R/W	32 bit integer	03H / 10H
<b>Input type - option 3</b>	40011	R/W	32 bit integer	03H / 10H
<b>Baudrate</b>	40013	R/W	32 bit integer	03H / 10H
<b>Parity</b>	40015	R/W	32 bit integer	03H / 10H
<b>MODBUS slave ID</b>	40017	R/W	32 bit integer	03H / 10H
<b>Record value</b>	40019	R/W	32 bit integer	03H / 10H

### If Input type is "Voltage / Current"

Input Type option 2	Input type - option 1		
	0, 1, 2	3, 4, 5, 6	7, 8, 9
0	0.. 60mV	-60.. 60mV	0.. 5mA
1	0.. 100mV	-100.. 100mV	0.. 10mA
2	0.. 250mV	-250.. 250mV	0.. 20mA
3	0.. 500mV	-500.. 500mV	-5.. 5mA
4	0.. 1V	-1.. 1V	-10.. 10mA
5	0.. 2V	-2.. 2V	-20.. 20mA
6	0.. 2.5V	-2.5.. 2.5V	4.. 20mA
7	0.. 5V	-5.. 5V	0.. 24mA
8	0.. 10V	-10.. 10V	4.. 24mA
9	0.. 20V	-20.. 20V	0.. 12mA

"Input type -option 3" value must be a 9.

### If Input type is "PT100"

Input type - option 1		
0, 1, 2	3, 4, 5, 6	7, 8, 9
PT100-2W	PT100-3W	PT100-4W

"Input type -option 2" value must be a 9.  
"Input type -option 3" value must be a 9.

### If Input type is "TC"

Input type - option 1				
0, 1	2, 3	4, 5,	6,7	8, 9
J type TC	K type TC	E type TC	R type TC	S type TC

"Input type -option 2" value must be a 9.  
"Input type -option 3" value must be a 9.

### Baudrate

0	1	2	3	4	5	6
1200	2400	4800	9600	19200	38400	57600

### Parity

0	1	2
None	Even	Odd

Slave ID \_\_\_\_\_ 1 .. 247

**NOTE:** Record value Enter "100" to save the changes

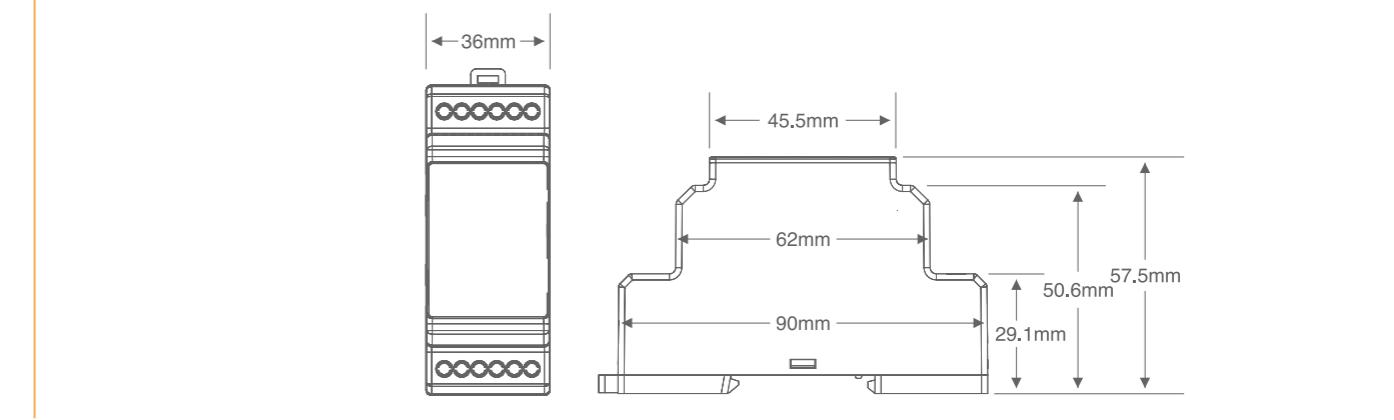
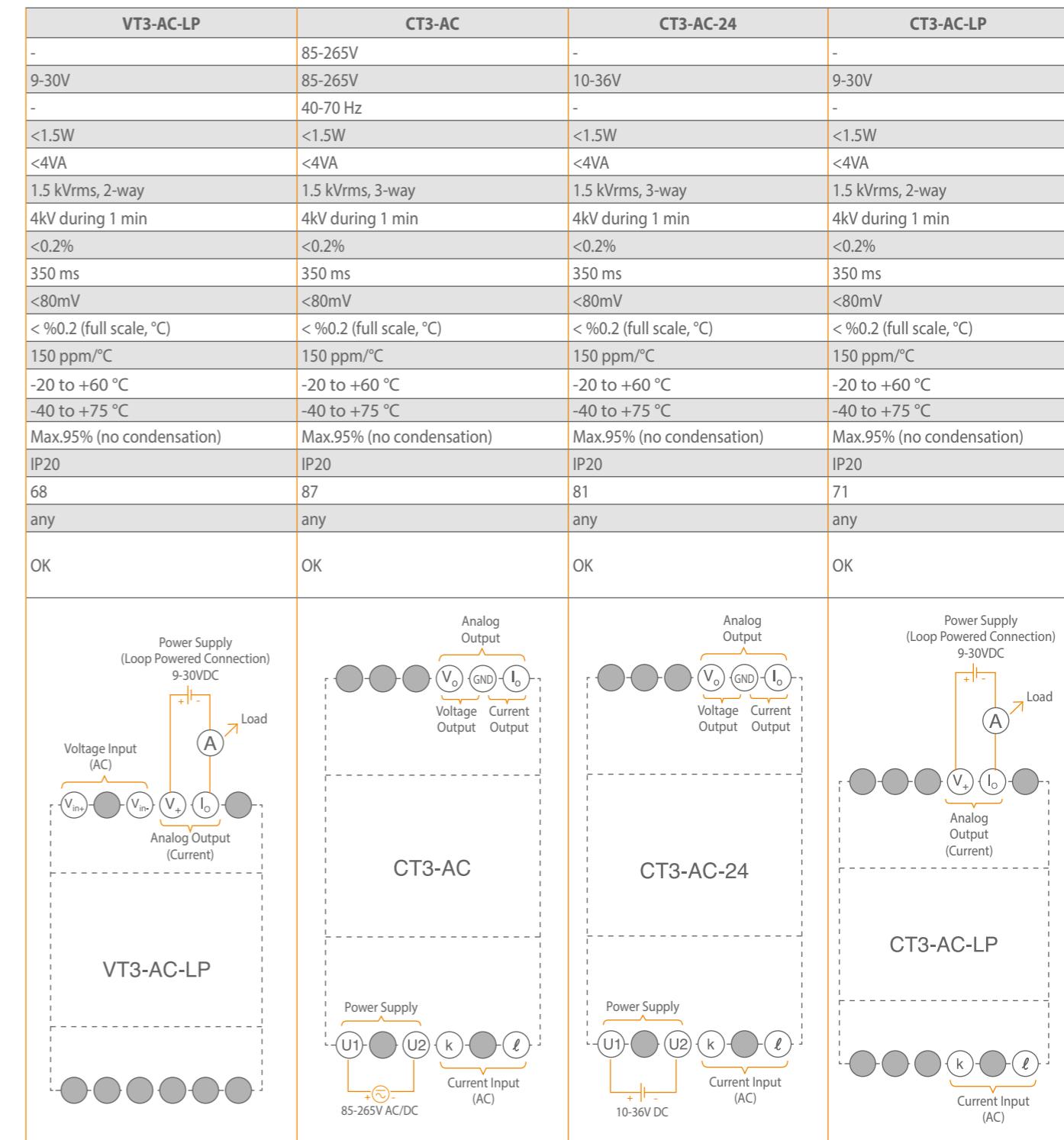
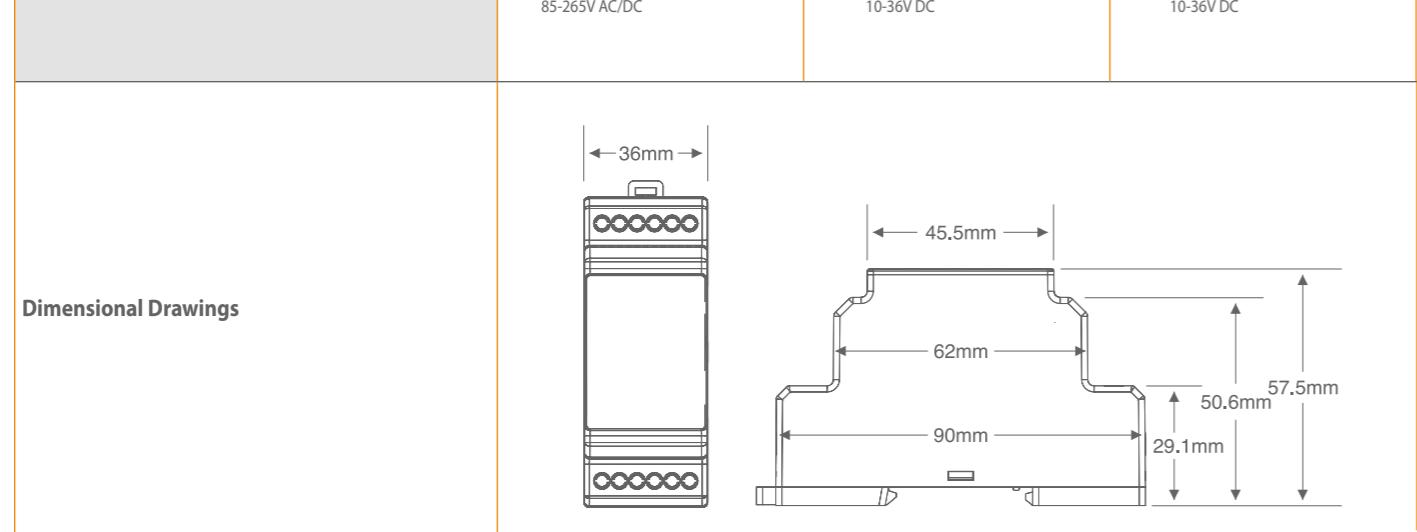
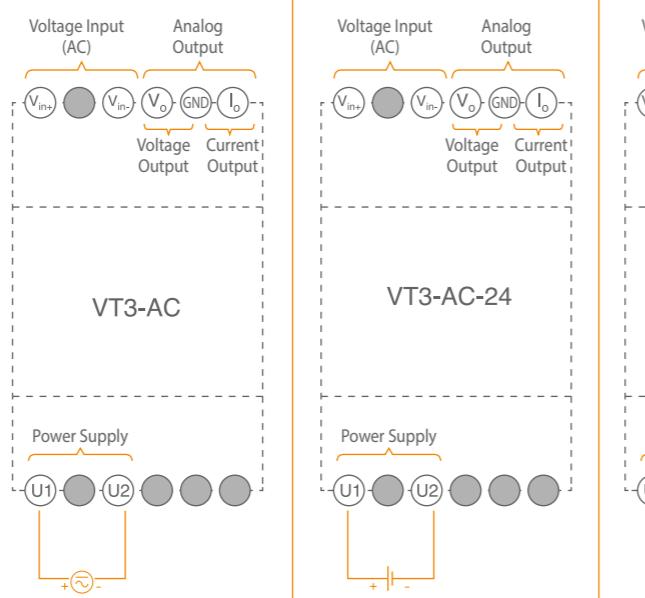


Type	VT3-AC	VT3-AC-24	VT3-ACDC-24
Definition	True RMS Voltage Transducer	True RMS Voltage Transducer	True RMS Voltage Transducer
Order Number	600101	600103	600106
Casing Width(mm)	36	36	36
Connections	Screw terminal	Screw terminal	Screw terminal
Input Signal	Configurable Voltage range	0-24 VAC	Available
		0-36 VAC	Available
		0-54 VAC	Available
		0-80 VAC	Available
		0-120 VAC	Available
		0-170 VAC	Available
		0-250 VAC	Available
		0-400 VAC	Available
		0-450 VAC	Available
		0-500 VAC	Available
	Configurable Current Range	0-24 VDC	-
		0-54 VDC	-
		0-120 VDC	-
		0-250 VDC	-
		0-450 VDC	-
Output	Type	0-1 AAC	-
		0-2 AAC	-
		0-3 AAC	-
		0-4 AAC	-
		0-5 AAC	-
		Frequency	40-70 Hz
		Surge overload	< 2 x Uinput max. range (5 pulses 1s)
		Constant overload	Max. 600 V
		Input impedances	240 kΩ
		0-20 mA	Available
Analog Output		4-20 mA	Available
		±20 mA	Available
		20-0 mA	Available
		20-4 mA	Available
		0-5 V	Available
		0-10 V	Available
		±5 V	Available
		± 10 V	Available
		10-0 V	Available
		Max. Current	24 mA
		Max. Voltage	12 V
		Max. Load	10kΩ(for voltage) / 600Ω(for current)
			10kΩ(for voltage) / 600Ω(for current)

			
VT3-AC-LP	CT3-AC	CT3-AC-24	CT3-AC-LP
True RMS Voltage Transducer	True RMS Current Transducer	True RMS Current Transducer	True RMS Current Transducer
600105	600100	600102	600104
36	36	36	36
Screw terminal	Screw terminal	Screw terminal	Screw terminal
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
Available	-	-	-
40-70 Hz	40-70 Hz	40-70 Hz	40-70 Hz
<2 x Uinput max. range (5 pulses 1s)	20xin(100A) for 1 Sec.	20xin(100A) for 1 Sec.	20xin(100A) for 1 Sec.
Max. 600 V	10A(2x Rated IN)	10A(2x Rated IN)	10A(2x Rated IN)
240 kΩ	49.9 Ω (burden resistor)	49.9 Ω (burden resistor)	49.9 Ω (burden resistor)
-	Available	Available	-
Available	Available	Available	Available
-	Available	Available	-
-	Available	Available	-
-	Available	Available	-
-	Available	Available	-
-	Available	Available	-
-	Available	Available	-
-	Available	Available	-
24 mA	24 mA	24 mA	24 mA
-	12 V	12 V	-
10kΩ(for voltage) / 600Ω(for current)			



Type	VT3-AC	VT3-AC-24	VT3-ACDC-24	
Supply	Voltage AC 85-265V	-	-	
	DC 85-265V	10-36V	10-36V	
Frequency	40-70 Hz	-	-	
Power consumption	DC <1.5W <4VA	AC <1.5W <4VA	AC <1.5W <4VA	
Isolation	1.5 kVrms, 3-way	1.5 kVrms, 3-way	1.5 kVrms, 3-way	
Test Voltage between input-output	4kV during 1 min	4kV during 1 min	4kV during 1 min	
Linearity	<0.2%	<0.2%	<0.2%	
Response Time	350 ms	350 ms	350 ms	
Ripple	<80mV	<80mV	<80mV	
Accuracy	< %0.2 (full scale, 25°C)	< %0.2 (full scale, °C)	< %0.2 (full scale, °C)	
Temperature coefficient	150 ppm/°C	150 ppm/°C	150 ppm/°C	
Permissible ambient temperature	During operation -20 to +60 °C	-20 to +60 °C	-20 to +60 °C	
	During storage -40 to +75 °C	-40 to +75 °C	-40 to +75 °C	
Relative Humidity	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	
Degree of protection	IP20	IP20	IP20	
Weight(gr)	84	76	70	
Permissible mounting position	any	any	any	
EMC-EMI	Radiated Emissions Test, 61000-6-2/AC:2012, 61000-6-4:2007/A1:2011	OK	OK	OK





Type	TT-RTD-LP (-50 .. 100)	TT-RTD-LP (0 .. 100)	TT-RTD-LP (0 .. 150)
<b>Definiton</b>	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer
<b>Order Number</b>	603860	603861	603862
<b>Casing Width(mm)</b>	17,5	17,5	17,5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal
<b>Input</b>	Sensor Type	PT100	PT100
	Connection Method	2 wire or 3 wire	2 wire or 3 wire
	Temperature Measuring Range	-50°C .. 100°C	0°C .. 100 °C
	Sensor excitation current	<0.6mA	<0.6mA
<b>Output</b>	Output Signal	4-20mA	4-20mA
	Linear output range	3.6mA .. 23.6mA	3.6mA .. 23.6mA
	Max. Load	≤ 750Ω	≤ 750Ω
	Ripple	< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)
<b>Supply</b>	Voltage AC	-	-
	DC	10-30V	10-30V
<b>Isolation</b>	-	-	-
<b>Measurement error</b>	< %0.1 Full scale	< %0.1 Full scale	< %0.1 Full scale
<b>Temperature coefficient</b>	≤ %0.02/°C	≤ %0.02/°C	≤ %0.02/°C
<b>Response Time</b>	< 20ms	< 20ms	< 20ms
<b>Sensor failure indication</b>	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)
<b>Permissible ambient temperature</b>	During operation	-20 to +60 °C	-20 to +60 °C
	During storage	-40 to +75 °C	-40 to +75 °C
<b>Relative Humidity</b>	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
<b>Degree of protection</b>	IP20	IP20	IP20
<b>Weight(gr)</b>	42	42	42
<b>Permissible mounting position</b>	any	any	any
<b>EMC-EMI</b>	Radiated Emissions Test, 61000-6-2/AC:2012, 61000-6-4:2007/A1:2011	-	-

Type	TT-RTD-LP (0 .. 200)	TT-RTD-LP (0 .. 300)	TT-RTD-LP (-50 .. 150)	TT-RTD-LP (-50 .. 200)	TT-RTD-LP (0 .. 500)
<b>Definiton</b>	Non-Isolated PT100 Transducer				
<b>Order Number</b>	603863	603864	603865	603866	603867
<b>Casing Width(mm)</b>	17,5	17,5	17,5	17,5	17,5
<b>Connections</b>	Screw terminal				
<b>Input</b>	Sensor Type	PT100	PT100	PT100	PT100
	Connection Method	2 wire or 3 wire			
	Temperature Measuring Range	0°C .. 200 °C	0°C .. 300 °C	-50°C .. 150°C	-50°C .. 200°C
	Sensor excitation current	<0.6mA	<0.6mA	<0.6mA	<0.6mA
<b>Output</b>	Output Signal	4-20mA	4-20mA	4-20mA	4-20mA
	Linear output range	3.6mA .. 23.6mA	3.6mA .. 23.6mA	3.6mA .. 23.6mA	3.6mA .. 23.6mA
	Max. Load	≤ 750Ω	≤ 750Ω	≤ 750Ω	≤ 750Ω
	Ripple	< 20 mVPP (at 750 Ω)			
<b>Supply</b>	Voltage AC	-	-	-	-
	DC	10-30V	10-30V	10-30V	10-30V
<b>Isolation</b>	-	-	-	-	-
<b>Measurement error</b>	< %0.1 Full scale				
<b>Temperature coefficient</b>	≤ %0.02/°C				
<b>Response Time</b>	< 20ms				
<b>Sensor failure indication</b>	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)	3.1mA (1 wire is broken), 24.6mA (at least 2 wire is broken)
<b>Permissible ambient temperature</b>	During operation	-20 to +60 °C			
	During storage	-40 to +75 °C			
<b>Relative Humidity</b>	Max.95% (no condensation)				
<b>Degree of protection</b>	IP20	IP20	IP20	IP20	IP20
<b>Weight(gr)</b>	42	42	42	42	42
<b>Permissible mounting position</b>	any	any	any	any	any
<b>EMC-EMI</b>	-	-	-	-	-



Type	TT-RTD-LP (-50 .. 100)	TT-RTD-LP (0 .. 100)	TT-RTD-LP (0 .. 150)	TT-RTD-LP (0 .. 200)	TT-RTD-LP (0 .. 300)	TT-RTD-LP (-50 .. 150)	TT-RTD-LP (-50 .. 200)	TT-RTD-LP (0 .. 500)
2 wire connection								
Schematics								
Dimensional Drawings								



Type	PISO-DC-1 (0-20mA/0-20mA)	PISO-DC-1 (4-20mA/4-20mA)	PISO-DC-1 (0-20mA/0-10V)	PISO-DC-1 (0-20mA/0-5V)	PISO-DC-2 (0-20mA/0-20mA)
<b>Definition</b>	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator
<b>Order Number</b>	602800	602801	602802	602803	602850
<b>Casing Width(mm)</b>	17,5	17,5	17,5	17,5	17,5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
<b>Input</b>	Number of Channels	1 pc.	1 pc.	1 pc.	2 pc.
	Signal type	0-20mA	4-20mA	0-20mA	0-20mA
	Maximum input signal	50mA	50mA	50mA	50mA
<b>Output</b>	Number of Channels	1 pc.	1 pc.	1 pc.	2 pcs.
	Signal Type	0-20 mA	4-20 mA	0-10 V	0-5 V
	Max. Current	24 mA	24 mA	-	24 mA
	Max. Voltage	-	-	12 V	12 V
	Ripple	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)
	Load Resistance	$\leq 250\Omega$	$\leq 250\Omega$	$\geq 5M\Omega$	$\geq 5M\Omega$
<b>Isolation</b>	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms
<b>Measurement error(Full Scale)</b>	<%0.1	<%0.1	<%0.2	<%0.2	<%0.1
<b>Response Time</b>	20 ms	20 ms	20 ms	20 ms	20 ms
<b>Temperature coefficient</b>	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K
<b>Permissible ambient temperature</b>	During operation	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
	During storage	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
<b>Relative Humidity</b>	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)

PISO-DC-2 (4-20mA/4-20mA)	PISO-DC-2 (0-20mA/0-10V)	PISO-DC-2 (0-20mA/0-5V)	PISO-DC-DUO (0-20mA/0-20mA, 0-20mA)	PISO-DC-DUO (4-20mA/4-20mA, 0-20mA)	PISO-DC-DUO (0-20mA/0-10V,0- 10V)	PISO-DC-DUO (0-20mA/0-5V,0- 5V)
Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator
602851	602852	602853	602700	602701	602702	602703
17,5	17,5	17,5	17,5	17,5	17,5	17,5
Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
2 pc.	2 pc.	2 pc.	1 pc.	1 pc.	1 pc.	1 pc.
4-20mA	0-20mA	0-20mA	0-20mA	4-20mA	0-20mA	0-20mA
50mA	50mA	50mA	50mA	50mA	50mA	50mA
2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.
4-20 mA	0-10 V	0-5 V	0-20 mA	4-20 mA	0-10 V	0-5 V
24 mA	-	-	24 mA	24 mA	-	-
-	12 V	12 V	-	-	12 V	12 V
< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)
$\leq 250\Omega$	$\geq 5M\Omega$	$\geq 5M\Omega$	$\leq 250\Omega$	$\leq 250\Omega$	$\geq 5M\Omega$	$\geq 5M\Omega$
1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms
<%0.1	<%0.2	<%0.2	<%0.1	<%0.1	<%0.2	<%0.2
20 ms	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms
<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K
-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)



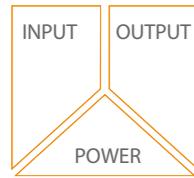
Type	PISO-DC-1 (0-20mA/0-20mA)	PISO-DC-1 (4-20mA/4-20mA)	PISO-DC-1 (0-20mA/0-10V)	PISO-DC-1 (0-20mA/0-5V)	PISO-DC-2 (0-20mA/0-20mA)	PISO-DC-2 (4-20mA/4-20mA)	PISO-DC-2 (0-20mA/0-10V)	PISO-DC-2 (0-20mA/0-5V)	PISO-DC-DUO (0-20mA/0-20mA, 0-20mA)	PISO-DC-DUO (4-20mA/4-20mA, 4-20mA)	PISO-DC-DUO (0-20mA/0-10V, 0-10V)	PISO-DC-DUO (0-20mA/0-10V, 0-5V)
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Permissible mounting position	any	any	any	any	any	any	any	any	any	any	any	any
EMC-EMI	61000-4-2, 61000-4-3, CISPR11 / R.E., 61000-4-8	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available
Schematics	 	<p>NOTE: Channel-1 and Channel-2 are totally isolated from each other.</p>	<p>NOTE: Channel-1 and Channel-2 are totally isolated from each other.</p>	<p>NOTE: If only one output channel is used, the other channel (which is not used) must be short-circuited.</p>								
Dimensional Drawings												



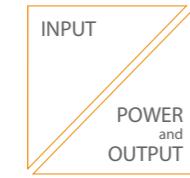
## CT3 series / Converting

## ISOLATION

CT3-AC, CT3-AC-24



CT3-AC-LP



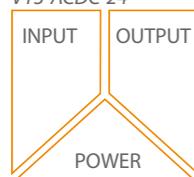
CT3 series transducers measure AC Current and converts it to an industry standard output signal which is directly proportional to the measured input. These transducers provide an output which is load independent and isolated from the input. Input range and output type must be adjusted before use them.

## LED INDICATION

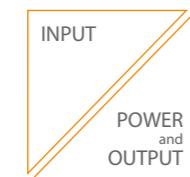
Failure Status	LED Indication
Voltage Output Mode: Short Circuit	Err:
Current Output Mode: Open Circuit	Err:
No Signal	ON:

## VT3 series / Converting

## ISOLATION

VT3-AC, VT3-AC-24,  
VT3-ACDC-24

VT3-AC-LP



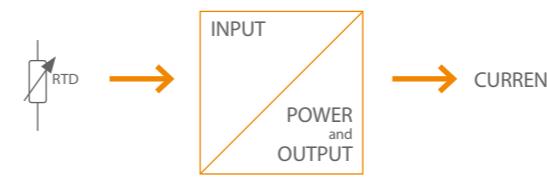
VT3 series transducers measure AC or DC(optional) voltage and converts it to an industry standard output signal which is directly proportional to the measured input. These transducers provide an output which is load independent and isolated from the input. Input range and output type must be adjusted before use them.

## LED INDICATION

Failure Status	LED Indication
Voltage Output Mode: Short Circuit	Err:
Current Output Mode: Open Circuit	Err:
No Signal	ON:

## TT-RTD series / Converting

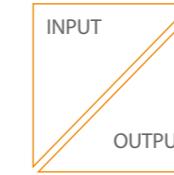
## NO ISOLATION



TT-RTD series transducers convert temperature signals from PT100 sensors to an industry standard output signal (4-20mA) which is directly proportional to the measured input.

## Passive Isolator series / Isolating

## ISOLATION



Passive signal isolator series serve to electrically isolate the analog DC signal in the range from 0-20 or 4-20mA which depending on version, then converted it to 0-20 mA, 4-20mA, 0-5V, 0-10V. It does not require an external power supply. These transducers provide an output which is load independent and isolated from the input.



## Switching Management Solutions

*Industrial  
**switching**  
with wide range*



## Defining an interface relay in simple terms

An interface relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current.

## Which actions are executed?

### Switching Protection Controlling Filtering Isolation

An interface relay is an electrically operated **switch** that is used where it is necessary to **control** a circuit by a low-power signal.

It provides complete electrical **protective isolation** between control and controlled circuits.

**Filtering** AC power input signals in order to prevent leakage current.

Saving money and increasing efficiency for PLC outputs.

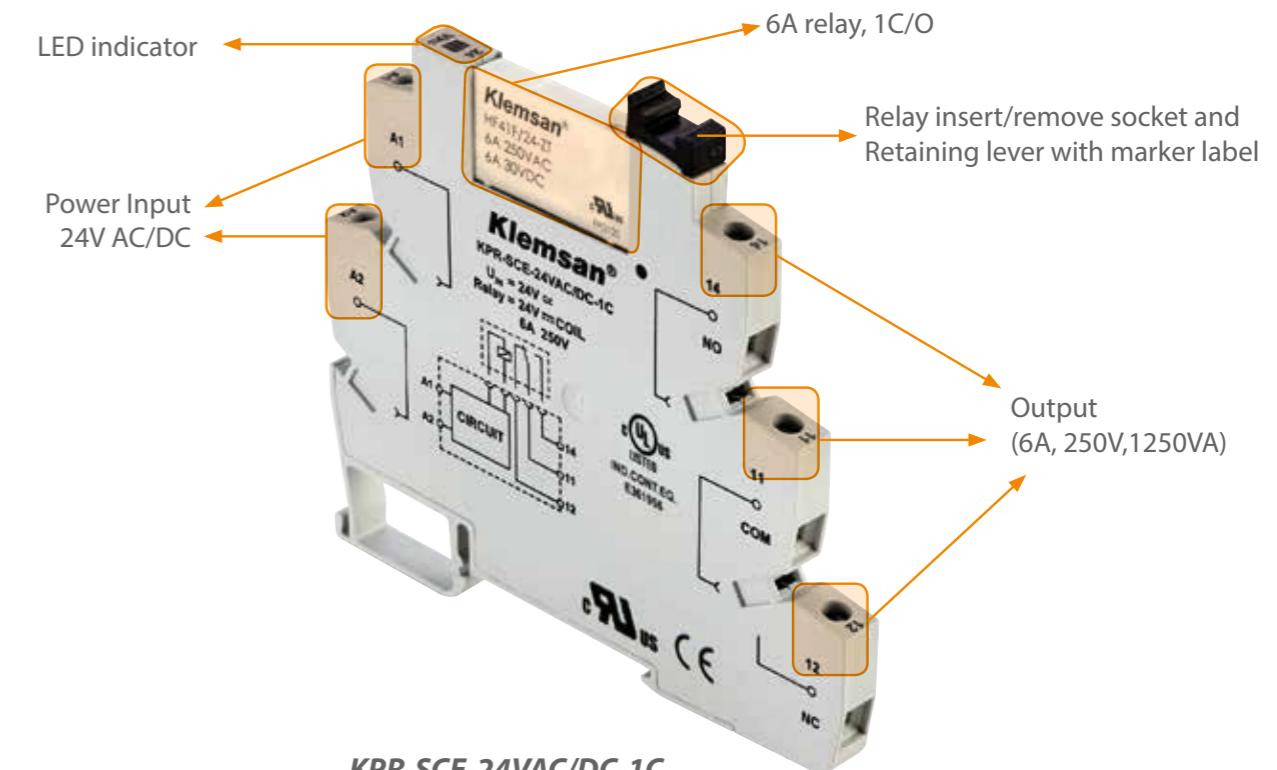
Reduced PLC outputs to meet energy consumption goals.

## Benefits and Advantages

- A wide range of power input from 6V to 230V
- DC and AC supply voltage options
- Integrated RCZ filter option
- Saving wiring time with plug-in bridges
- High quality, long useful life
- Saving space with 6.2mm design
- LED status indicator in order to see actual movement of the contacts
- Labeling with terminal block marking materials
- Highly compact and light weight
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences.
- Self-extinguishing plastic housing
- UL certificate

## Layout & Mounting

Klemsan interface relays are suitable for snap mounting onto 35 mm standards DIN rails.



## Which markets are they used frequently?

- PLC automation systems
- Electric power plants
- Energy management systems
- Medium Voltage Panels
- Industrial Machines



## Automation System



Reduced PLC outputs to meet energy consumption goals



**I/O CONTROL**  
All models

## Machine Control and Safety



Provides isolation between control and controlled circuits.



**ISOLATION**  
All models

## Scada System



Lengthen PLC outputs lives by using interface relay to turn many devices on and off simultaneously.



**I/O CONTROL**  
All models

## Control Panels



It provides to control more than one load with external pluggable bridges.



**I/O CONTROL**  
All models

## Chemical Industry

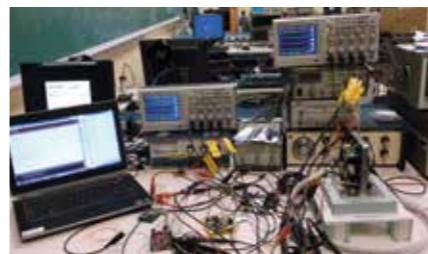


Safe isolation between inputs and outputs for pumps, compressors and air conditioning applications.



**CONTROLLING**  
All models

## Electrical Test Systems



The interface between test equipment and system I/O devices with a high switching capacity.



**CONTROLLING**  
All models

## Pneumatic Control



Switching currents or voltage too high for PLC outputs to handle.



**SWITCHING**  
All models

## Tight Cabinets



Only 6.2 mm wide, thus saving considerable space in your enclosures.

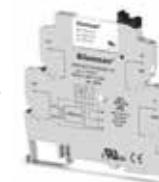


**SPACE SAVING**  
All models

## Leakage Current Applications



Preventing to stuck in "ON" state while the relay is switched as "OFF" which is caused by leakage current.



**SWITCHING**  
KPR-SCF series





Type	KPR-SCE-6VDC-1C	KPR-SCE-12VAC/DC-1C	KPR-SCE-12VDC-1C	KPR-SCE-24VAC/DC-1C	KPR-SCE-24VDC-1C	KPR-SCE-48VAC/DC-1C	KPR-SCE-48VDC-1C							
Accessories and Components	Relay	Type	Slim type 5VDC relay	Slim type 12VDC relay	Slim type 12VDC relay	Slim type 24VDC relay	Slim type 24VDC relay							
		Definiton	Relay for 270794 and 270795	Relay for 270800 and 270801	Relay for 270804 and 270805	Relay for 270810 and 270811	Relay for 270814 and 270815							
		Order Number	095043	095042	095042	095041	095041							
		Packaging unit	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.							
	Plug-in bridge-16	Type	TK-KPR-S (KPR-SCE BRIDGE/16)											
		Definiton	Plug-in bridge for 16 hole											
		Order Number	476605											
		Packaging unit	25 pcs.											
	Plug-in bridge-8	Type	TK-KPR-S (KPR-SCE BRIDGE/8)											
		Definiton	Plug-in bridge for 8 hole											
		Order Number	476606											
	Dekafix	Packaging unit	50 pcs.											
		Type	DG 10/6 T											
		Definiton	Terminal Labels for interface relays											
		Order Number	505390											
		Packaging unit	360 pcs.											
	Schematics													
	Dimensional Drawings													

KPR-SCE-60VAC/DC-1C	KPR-SCE-60VDC-1C	KPR-SCE-115VAC/DC-1C	KPR-SCE-115VDC-1C	KPR-SCF-230VAC/DC-1C	KPR-SCE-230VAC-1C	KPR-SCF-230VAC-1C	KPR-SCF-230VAC-1C
Slim type 60VDC relay							
Relay for 270830 and 270831	Relay for 270834 and 270835	Relay for 270840 and 270841	Relay for 270844 and 270845	Relay for 270846 and 270847	Relay for 270850 and 270851	Relay for 270852 and 270853	Relay for 270856 and 270859
095040	095040	095040	095040	095040	095041	095040	095041
10 pcs.							



## 2C PLC Relays

### Defining an interface relay in simple terms

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**Switching Protection**  
Controlling  
Filtering Isolation

An interface relay is an electrically operated **switch** that is used where it is necessary to **control** a circuit by a low-power signal.

It provides complete electrical **protective isolation** between control and controlled circuits.

**Filtering** AC power input signals in order to prevent leakage current.

Saving money and increasing efficiency for PLC outputs.

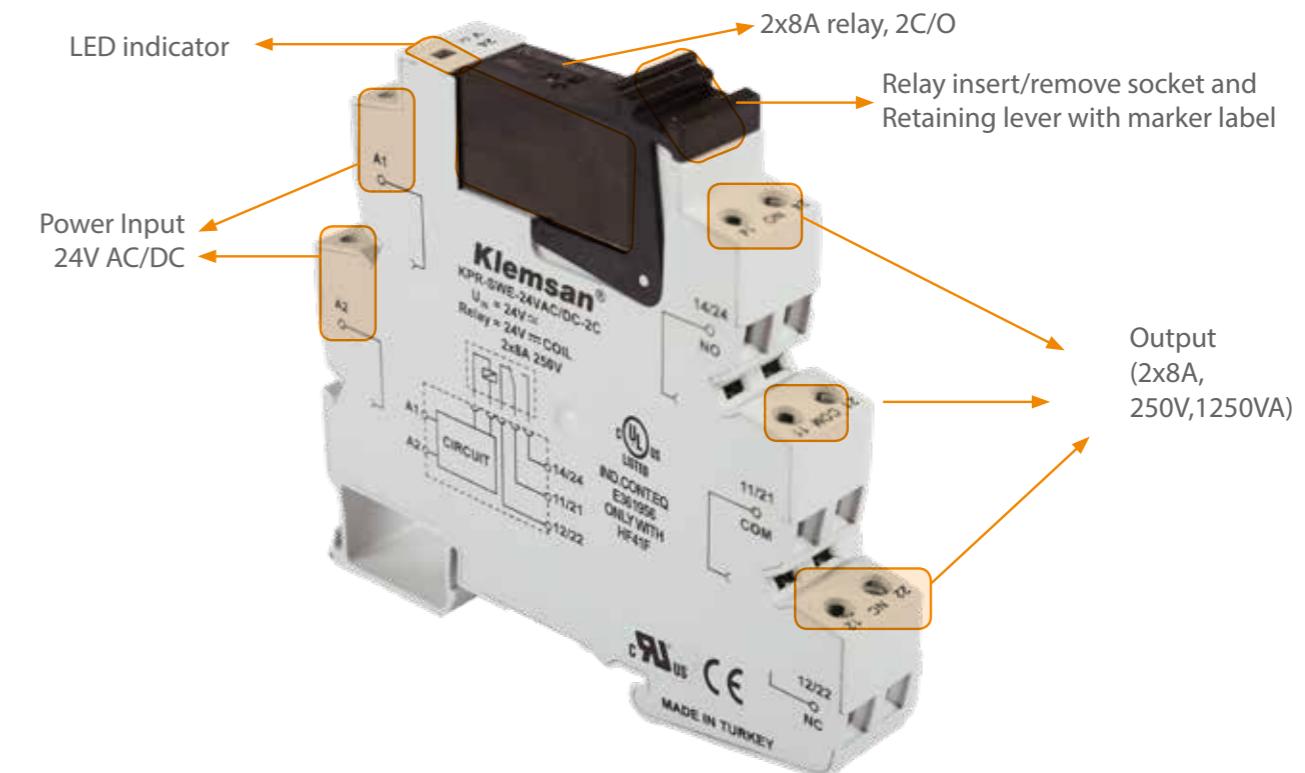
Reduced PLC outputs to meet energy consumption goals.

## Benefits and Advantages

- A wide range of power input from 6V to 230V
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- High quality, long useful life
- Saving space with 14mm design
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- Industrial Machines



## Automation System



Reduced PLC outputs to meet energy consumption goals



I/O CONTROL  
All models

## Machine Control and Safety



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ISOLATION  
All models

## Scada System



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I/O CONTROL  
All models

## Control Panels



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I/O CONTROL  
All models

## Chemical Industry

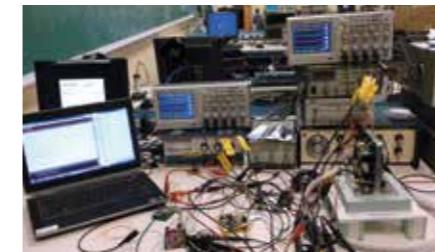


Safe isolation between inputs and outputs for pumps, compressors and air conditioning applications.



CONTROLLING  
All models

## Electrical Test Systems



The interface between test equipment and system/I/O devices with a high switching capacity.



CONTROLLING  
All models

## Pneumatic Control



Switching currents or voltage too high for PLC outputs to handle.



SWITCHING  
All models

## Tight Cabinets



Only 6.2 mm wide, thus saving considerable space in your enclosures.



SPACE SAVING  
All models

## Leakage Current Applications

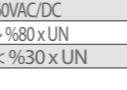
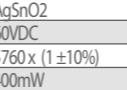
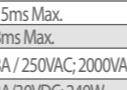
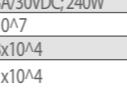
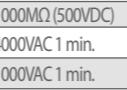
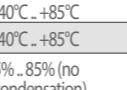


Preventing to stuck in "ON" state while the relay is switched as "OFF" which is caused by leakage current.



SWITCHING  
KPR-SCF series

<b>Pre-assembled module (relay + socket)</b>	<b>Type</b>	KPR-SWE-6VDC-2C	KPR-SWE-12VAC/DC-2C	KPR-SWE-12VDC-2C	KPR-SWE-24VAC/DC-2C	KPR-SWE-24VDC-2C	KPR-SWE-48VAC/DC-2C	KPR-SWE-48VDC-2C
	<b>Definiton</b>	Interface relay module						
	<b>Order Number</b>	272 504	272 520	272 524	272 540	272 544	272 560	272 564
<b>Casing Width(mm)</b>	14	14	14	14	14	14	14	14
<b>Connection</b>	Screw terminal							
<b>Packaging unit</b>	10	10	10	10	10	10	10	10
<b>Input</b>	Nominal Voltage(Un)	6VDC	12VAC/DC	12VDC	24VAC/DC	24VDC	48VAC/DC	48VDC
	Operating voltage range	>%80 x UN						
	Release voltage	<%40 x UN	<%40 x UN	<%40 x UN	<%40 x UN	<%30 x UN	<%30 x UN	<%30 x UN
	Integrated RCZ filter	-	-	-	-	-	-	-
	<b>Power Consumption</b>	AC	-	<1VA	-	<1VA	-	<1VA
	DC	<1W						
<b>Contact Characteristic</b>	<b>Type</b>	2 C/O (SPDT)						
	<b>Material</b>	AgSnO2						
	<b>Coil voltage</b>	5VDC	12VDC	12VDC	24VDC	24VDC	48VDC	48VDC
	<b>Coil impedance</b>	62 x (1±10%) Ω	360 x (1±10%)	360 x (1±10%)	1440 x (1±10%)	1440 x (1±10%)	5760 x (1±10%)	5760 x (1±10%)
	<b>Coil consumption</b>	400mW						
	<b>Operate time</b>	15ms Max.						
	<b>Release time</b>	8ms Max.						
	<b>Max. ratings (AC)</b>	8A / 250VAC; 2000VA						
	<b>Max. ratings (DC)</b>	8A/30VDC; 240W						
	<b>Mechanical life time</b>	10^7	10^7	10^7	10^7	10^7	10^7	10^7
	<b>Electrical life time</b>	3x10^4						
	<b>NO</b>	1x10^4						
	<b>NC</b>	1x10^4						
<b>Isolation resistance</b>	1000MΩ (500VDC)							
<b>Dielectric Strength</b>	Between relay coil and contacts	4000VAC 1 min.						
	Between contacts	1000VAC 1 min.						
<b>Permissible ambient temperature</b>	During operation	-40°C .. +85°C						
	During storage	-40°C .. +85°C						
<b>Relative Humidity</b>	5% .. 85% (no condensation)							
<b>Degree of protection</b>	IP20							
<b>Weight(gr)</b>	56	56	56	56	56	56	56	56
<b>Max. cable cross-section</b>	2.5mm <sup>2</sup>							
<b>Max. Torque</b>	0.4Nm							
<b>Permissible mounting position</b>	any							
	<b>Type</b>	APP/KPR						
	<b>Definiton</b>	Separator plate						
	<b>Order Number</b>	463 247	463 247	463 247	463 247	463 247	463 247	463 247
<b>Accessories and Components</b>	<b>Packaging unit</b>	25	25	25	25	25	25	25
	<b>Type</b>	KPR-SWE-6VDC-2C (RELAY SOCKET)	KPR-SWE-12VAC/DC-2C (RELAY SOCKET)	KPR-SWE-12VDC-2C (RELAY SOCKET)	KPR-SWE-24VAC/DC-2C (RELAY SOCKET)	KPR-SWE-24VDC-2C (RELAY SOCKET)	KPR-SWE-48VAC/DC-2C (RELAY SOCKET)	KPR-SWE-48VDC-2C (RELAY SOCKET)
	<b>Definiton</b>	Interface relay socket (6VDC)	Interface relay socket (12VAC/DC)	Interface relay socket (12VDC)	Interface relay socket (24VAC/DC)	Interface relay socket (24VDC)	Interface relay socket (48VAC/DC)	Interface relay socket (48VDC)
	<b>Order Number</b>	272 505	272 521	272 525	272 541	272 545	272 561	272 565
	<b>Packaging unit</b>	10	10	10	10	10	10	10
	<b>Type</b>	2 C/O 5VDC Relay	2 C/O 12VDC Relay	2 C/O 24VDC Relay	2 C/O 48VDC Relay	2 C/O 48VDC Relay	2 C/O 115VDC Relay	2 C/O 115VDC Relay
	<b>Definiton</b>	Relay for 272 504 and 272 505	Relay for 272 520 and 272 521	Relay for 272 524 and 272 525	Relay for 272 540 and 272 541	Relay for 272 560 and 272 564	Relay for 272 564 and 272 565	Relay for 272 622 and 272 623
	<b>Order Number</b>	095 054	095 053	095 053	095 052	095 052	095 051	095 051
	<b>Packaging unit</b>	10	10	10	10	10	10	10
	<b>Type</b>	TK-KPR-S (KPR-SCE BRIDGE/8)						
	<b>Definiton</b>	Plug-in bridge for 8 hole						
	<b>Order Number</b>	476 900	476 900	476 900	476 900	476 900	476 900	476 900
	<b>Packaging unit</b>	25	25	25	25	25	25	25
<b>Type</b>	DG 10/6T							
<b>Definiton</b>	Terminal Labels for interface relays							
<b>Order Number</b>	505 390	505 390	505 390	505 390	505 390	505 390	505 390	505 390
<b>Packaging unit</b>	360	360	360	360	360	360	360	360

													<img alt="KPR-SWE-230V
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Type	KPR-SWE-6VDC-2C	KPR-SWE-12VAC/DC-2C	KPR-SWE-12VDC-2C	KPR-SWE-24VAC/DC-2C	KPR-SWE-24VDC-2C	KPR-SWE-48VAC/DC-2C	KPR-SWE-48VDC-2C	KPR-SWE-60VAC/DC-2C	KPR-SWE-60VDC-2C	KPR-SWE-115VAC/DC-2C	KPR-SWE-115VDC-2C	KPR-SWF-115VAC/DC-2C	KPR-SWE-230VAC/DC-2C	KPR-SWE-230VAC-2C	KPR-SWF-230VAC/DC-2C	KPR-SWF-230VAC-2C
<b>Schematics</b>																
<p>Input 6VDC, 12VDC, 12VAC/DC 24VDC, 24VAC/DC 48VDC, 48VAC/DC 60VDC, 60VAC/DC 115VDC, 115VAC/DC 230VAC, 230VAC/DC</p>								<p>Input 6VDC, 12VDC, 12VAC/DC 24VDC, 24VAC/DC 48VDC, 48VAC/DC 60VDC, 60VAC/DC 115VDC, 115VAC/DC 230VAC, 230VAC/DC</p>								
<b>Dimensional Drawings</b>																



## Defining Interface Relays in simple terms

An interface relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. An interface relay is an electrically operated switch that is used where it is necessary to control a circuit by a low-power signal. It provides complete electrical protective isolation between control and controlled circuits. Filtering AC power input signals in order to prevent leakage current.

## Which actions are executed?

### Switching Controlling Filtering Isolation

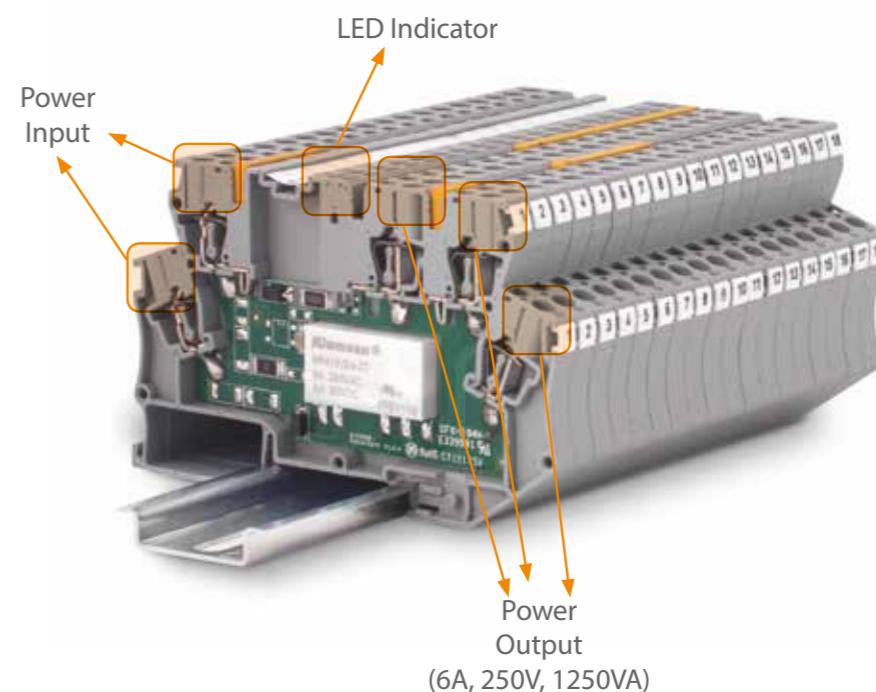
An interface relay is an electrically operated **switch** that is used where it is necessary to control a circuit by a low-power signal. It provides complete electrical protective **isolation** between **control** and controlled circuits. **Filtering** AC power input signals in order to prevent leakage current.

## Benefits and Advantages

- Wide range of power input from 6 V to 230 V
- AC, DC and AC/DC input voltage options
- Spring clamp connection
- Integrated RCZ filter option
- Saving time with plug-in bridged
- High quality, long usage life
- Space-saving 6.2 mm design
- LED status indicator to see actual movements of the contacts
- Labelling with terminal block marking equipments
- Highly compact and lightweight
- High level of electromagnetic compatibility (EMC)
- Maximum immunity to interferences
- Self-extinguishing plastic housing

## Layout & Mounting

Klemsan interface relays are suitable for snap mounting onto 35 mm standards DIN rails.



## Which markets are they used frequently?

- PLC automation systems
- Industrial Machines
- Control and protection systems
- Energy management systems
- Electric power plants
- Medium voltage modular systems



## SCADA System



Lengthen PLC outputs lifes by using interface relay to turn many devices on and off simultaneously.



**I/O CONTROL**  
All models

## Tight Cabinets



Only 6.2 mm wide, thus saving considerable space in your enclosures. Especially suitable for use in switchgear cabinets to use the space in the most efficient way, equipment and machine modification and extend the lifetime.



**SPACE SAVING**  
All models

## Under Vibration



Balances the bad effects of vibration and keep switching with its spring clamp connection. Provides unintended operation for all systems.



**SWITCHING**  
All models

## Pneumatic Control



Switching currents or voltage too high for PLC outputs to handle.



**AMPLIFICATION**  
All models

## Current Leakage Applications



Preventing to stuck in "ON" state while the relay is switched as "OFF" which is caused by leakage current.



**FILTERING**  
All models

## Machine Control and Safety



Prevents isolations between input and control circuits



**ISOLATION**  
All models



Module	Type	KPR-CIE-6VDC-1C	KPR-CIE-12VAC/DC-1C	KPR-CIE-12VDC-1C	KPR-CIE-24VAC/DC-1C	KPR-CIE-24VDC-1C	KPR-CIE-48VAC/DC-1C
	Definiton	Integrated Interface relay module					
	Order Number	271504	271510	271514	271520	271524	271530
Casing Width(mm)		6.2	6.2	6.2	6.2	6.2	6.2
Connection		Cage Clamp					
Packaging unit		10 pcs.					
Input	Nominal Voltage(Un)	6VDC	12VAC/DC	12VDC	24VAC/DC	24VDC	48VAC/DC
	Operating voltage range	0,8 x Un					
	Release voltage	0,2 x Un					
	Power Consumption	AC <0.35W	AC <0.35VA				
Contact Characteristic	Type	1 C/O					
	Material	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2
	Coil voltage	5VDC	12VDC	12VDC	24VDC	24VDC	24VDC
	Coil impedance	147x(1±10%) Ω					
	Coil consumption	170mW	170mW	170mW	170mW	170mW	170mW
	Operate time	10 ms max.					
	Release time	5 ms max.					
	Max. ratings (AC)	6A/250VAC; 1500VA					
	Max. ratings (DC)	6A/30VDC; 180W					
	Mechanical life time	10^7 operations					
Electrical life time operations (UL approval, 85°C )	NO	3 x 10^4 operations					
	NC	1 x 10^4 operations					
Isolation resistance		1000MΩ (500VDC)					
Dielectric Strength	Between relay coil and contacts	4000VAC 1 min					
	Between contacts	1000VAC 1 min					
Permissible ambient temperature	During operation	-40 to +85 °C					
	During storage	-40 to +85 °C					
Relative Humidity		5% .. 85% (no condensation)					
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Weight(gr)		26gr	26gr	26gr	26gr	26gr	26gr
Max. cable cross-section		2.5mm <sup>2</sup>	2.5mm <sup>3</sup>				
Max. torque		0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm
Permissible mounting position		any	any	any	any	any	any
Integrated RCZ Filter		x	x	x	x	x	x

| Integrated Interface relay module |
|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 271534                            | 271540                            | 271544                            | 271550                            | 271554                            | 271556                            | 271560                            | 271562                            |                                   |
| 6.2                               | 6.2                               | 6.2                               | 6.2                               | 6.2                               | 6.2                               | 6.2                               | 6.2                               | 6.2                               |
| Cage Clamp                        |
| 10 pcs.                           |
| 48VDC                             | 60VAC/DC                          | 60VDC                             | 115VAC/DC                         | 115VDC                            | 115VAC/DC                         | 230VAC/DC                         | 230VAC/DC                         |                                   |
| 0,8 x Un                          |
| 0,2 x Un                          |
| <0.35VA                           |
| <0.35W                            |
| 1 C/O                             |
| AgSnO2                            |
| 24VDC                             | 60VDC                             |
| 147x(1±10%) Ω                     |
| 170mW                             |
| 10 ms max.                        |
| 5 ms max.                         |
| 6A/250VAC; 1500VA                 |
| 6A/30VDC; 180W                    |
| 10^7 operations                   |
| 3 x 10^4 operations               |
| 1 x 10^4 operations               |
| 1000MΩ (500VDC)                   |
| 4000VAC 1 min                     |
| 1000VAC 1 min                     |
| -40 to +85 °C                     |
| -40 to +85 °C                     |
| 5% .. 85% (no condensation)       |
| IP20                              |
| 26gr                              |
| 2.5mm <sup>3</sup>                |
| 0.4Nm                             |
| any                               |
| x                                 | x                                 | x                                 | x                                 | x</td                             |                                   |                                   |                                   |                                   |



## Defining OPK-EKI modules in simple terms

OPK-EKI is an optocoupler module that uses a short optical transmission path to transfer an electrical signal between circuits or elements of a circuit, while keeping them electrically isolated from each other. They can be used to switch loads like mechanical relays but they are much more than simply switching...

## Which actions are executed?

### Switching prevents inrush current Controlling Driving Isolation

OPK-EKI module is an electrically operated **switch** that is used where it is necessary to **control** a circuit by a low-power signal.

The main purpose of an optocoupler is to prevent rapidly changing voltages or high voltages on one side of a circuit from distorting transmissions or damaging components on the other side of the circuit. It uses light waves to provide complete electrical **isolation** between control and controlled circuits while transferring an electrical signal.

Zero volt switching circuit **prevents inrush current** so loads can be switched more stable.

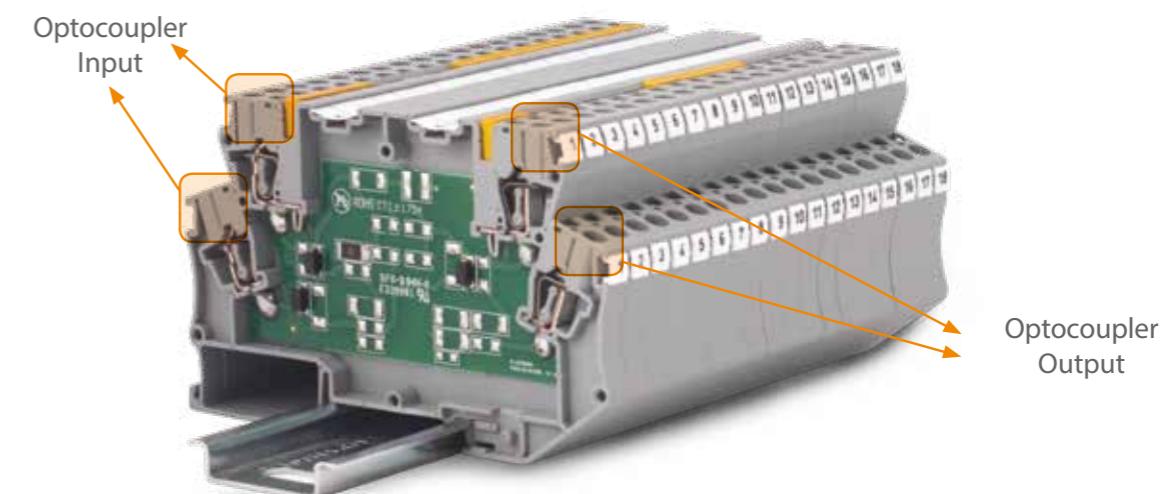
**High side and low side** switching option allows **driving** a load in two different ways.

## Benefits and Advantages

- A wide range of voltage input from 5V to 220V
- Providing high switching frequency due to short switch-on and switch-off times
- Long service life
- Quite working
- No contact arcing
- Resistant to vibration and shock
- Preventing inrush current
- High side and low side switching options
- AC and DC load switching options
- Cage clamp connection
- Saving space with 6.2mm design
- Saving wiring time with plug-in bridges
- LED status indicator in order to see actual movement of the contacts
- Self-extinguishing plastic housing
- Labeling with terminal block marking materials

## Layout & Mounting

Klemsan interface relays are suitable for snap mounting onto 35 mm standards DIN rails.



## Which markets are they used frequently?

- PLC automation systems
- Industrial Machines
- Control and safety systems
- Energy management systems
- Electric power plants
- Medium voltage modular cabinets



## Industrial Applications



Optocoupler modules are used in industrial environments where high voltages, magnetic fields and noise are commonly present, reliability is critical to avoid downtime and ensure data accuracy. In this environment circuit designers use optocouplers to insulate high voltages and isolate unwanted signals.

Klemsan presents OPK-EKI modules that are designed to meet the stringent requirements of industrial applications.



**ISOLATION and  
AMPLIFICATION**  
*All models*

## Solid State Relay Applications



OPK-EKI modules can be used instead of solid state relays due to high switching frequency, short switch-on and switch-off times, no contact bouncing, noiseless switching, long operation

**I/O CONTROL**  
*All models*

## Under Vibration



Klemsan OPK-EKI modules compensate the bad effects of vibration and shock and continue to switch current and voltage thanks to their cage clamp connection and having no moving parts like electromechanical relays. They ensure continuous and uninterrupted operation for any system.



**SWITCHING**  
*All models*

## Narrow Cabinets



Only 6.2 mm wide, thus saving considerable space in your enclosures. OPK-EKI modules are particularly suitable for the modification and extension of equipment and machinery, where it helps to make optimum use of the limited space available in switchgear cabinets.

**SPACE SAVING**  
*All models*



<b>Pre-assembled module (relay + socket)</b>	<b>Type</b>	<b>OPK - EKI 5 VAC/DC</b>	<b>OPK - EKI 12 VAC/DC</b>	<b>OPK - EKI 24 VAC/DC</b>	<b>OPK - EKI 48 VAC/DC</b>
	Definiton	Optocoupler module	Optocoupler module	Optocoupler module	Optocoupler module
	Order Number	112010N	112110N	112220N	112320N
<b>Width/Depth/ Height (mm)</b>	6.2/56/81.9	6.2/56/81.9	6.2/56/81.9	6.2/56/81.9	6.2/56/81.9
<b>Connection</b>	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp
<b>Packaging unit</b>	1 pc.	1 pc.	1 pc.	1 pc.	1 pc.
<b>Mounting</b>	Rail Mount	Rail Mount	Rail Mount	Rail Mount	Rail Mount
<b>Input</b>	Input Voltage	5V AC/DC	12V AC/DC	24V AC/DC	48V AC/DC
<b>Output</b>	Switching Voltage Range	5-48V DC	5-48V DC	5-48V DC	5-48V DC
	Maximum Switcing Current	0.65A DC	0.65A DC	0.65A DC	0.65A DC
<b>Switching Type</b>	High Side	High Side	High Side	High Side	High Side
<b>Zero volt switching circuit</b>	-	-	-	-	-
<b>Response time</b>	<10msec	<10msec	<10msec	<10msec	<10msec
<b>Schematics</b>					

<b>OPK - EKI 60 VAC/DC</b>	<b>OPK - EKI 110 VAC/DC</b>	<b>OPK - EKI 220 VAC/DC</b>	<b>OPK - EKI 9-72 VDC</b>	<b>OPK - EKI 9-72 VDC</b>	<b>OPK - EKI 9-72 VDC</b>
Optocoupler module	Optocoupler module	Optocoupler module	Optocoupler module	Optocoupler module	Optocoupler module
112420N	112520N	112620N	112710N	112720N	112730N
6.2/56/81.9	6.2/56/81.9	6.2/56/81.9	6.2/56/81.9	6.2/56/81.9	6.2/56/81.9
Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp
1 pc.	1 pc.	1 pc.	1 pc.	1 pc.	1 pc.
Rail Mount	Rail Mount	Rail Mount	Rail Mount	Rail Mount	Rail Mount
60V AC/DC	110V AC/DC	220V AC/DC	9-72V DC	9-72V DC	9-72V DC
5-48V DC	5-48V DC	5-48V DC	3-30V DC	3-30V DC	24-260V AC
0.65A DC	0.65A DC	0.65A DC	5A DC	5A DC	0.5A AC
High Side	High Side	High Side	High Side	Low Side	High Side
-	-	-	-	-	available
<10msec	<10msec	<10msec	<500μsec	<500μsec	<500μsec
<b>Schematics</b>					

## Accessories and Components

<b>Definition</b>	End Plate	Plug in bridge for 2 hole	Plug in bridge for 3 hole	Plug in bridge for 4 hole
<b>Order Number</b>	450389	470112	470113	470114
<b>Package Unit</b>	10 pcs.	25 pcs.	20 pcs.	15 pcs.

<b>Plug in bridge for 5 hole</b>	<b>Plug in bridge for 10 hole</b>	<b>DG 6/5 - Label</b>	<b>DB 5 - Label</b>	<b>11.2 Strip label</b>
470115	470119	505330	505850	1020100
10 pcs.	5 pcs.	440 pcs.	500 pcs.	1 pc.

**NOTE:** This product is only compatible with below items:  
-112710N -112720N  
-112730N



Type	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI
Definiton	Reverse Current Protection	Reverse Current Protection	Reverse Current Protection	Reverse Current Protection	Lamp / Test Circuit	Lamp / Test Circuit
Order Number	110010N	110020N	110030N	110040N	110050N	110060N
Casing Width (mm)	6.2	6.2	6.2	6.2	6.2	6.2
Connection	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp
Packing Unit	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.
Nominal Voltage	x	x	x	x	x	x
Diode Coltage	1000V	1000V	1000V	1000V	1000V	1000V
Diode Voltage Drop	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V
Degree of Protection	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Weight	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr
Diode Current	1A	1A	1A	1A	1A	1A
Circuit Diagram						

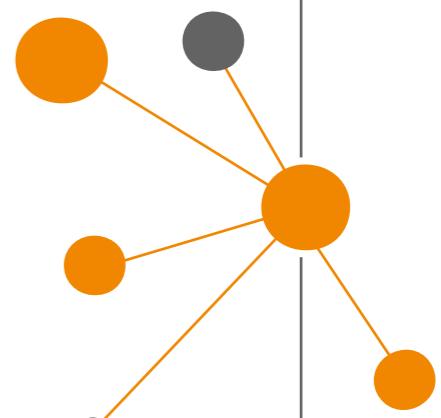
Type	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI
Reverse Current Protection	Reverse Current Protection	Lamp / Test Circuit	Voltage Indicator	Voltage Indicator	Voltage Indicator				
Order Number	110070N	110080N	110090N	110100N	110110N	110120N	110130N	110140N	110150N
Casing Width (mm)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Connection	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp
Packing Unit	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.
Nominal Voltage	x	x	x	x	x	x	24VAC/DC	24VAC/DC	24VDC
Diode Coltage	1000V	1000V	1000V	1000V	1000V	1000V	1000V	1000V	1000V
Diode Voltage Drop	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V
Degree of Protection	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Weight	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr
Diode Current	1A	1A	1A	1A	1A	1A	1A	1A	1A
Circuit Diagram									

Type	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI
Definiton	Voltage Indicator + Flyback Diode	Voltage Indicator + Flyback Diode				
Order Number	110160N	110170N	110180N	110190N	110200N	110210N
Casing Width (mm)	6.2	6.2	6.2	6.2	6.2	6.2
Connection	Cage clamp	Cage clamp				
Packing Unit	10 pcs.	10 pcs.				
Nominal Voltage	220VDC	24VDC	110VDC	220VDC	24VDC	24VDC
Diode Coltage	1000V	1000V	1000V	1000V	1000V	1000V
Diode Voltage Drop	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V
Degree of Protection	IP 20	IP 20				
Weight	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr
Diode Current	1A	1A	1A	1A	1A	1A
Circuit Diagram						

Type	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI	WG-EKI
Voltage Indicator	Voltage Indicator	Voltage Indicator	Voltage Indicator	Voltage Indicator	Voltage Indicator + Rectifier	Voltage Indicator + Rectifier	Voltage Indicator + Rectifier	Terminal with Cross Connection	Voltage Divider
Order Number	110270N	110280N	110290N	110300N	110310N	110320N	110330N	110380N	110410N
Casing Width (mm)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Connection	Cage clamp	Cage clamp	Cage clamp	Cage clamp	Cage clamp				
Packing Unit	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.				
Nominal Voltage	24VAC/DC	48VAC/DC	110VAC/DC	220VAC/DC	24VAC/DC	110VAC/DC	220VAC/DC	X	24VAC/DC
Diode Coltage	1000V	1000V	1000V	1000V	1000V	1000V	1000V	1000V	1000V
Diode Voltage Drop	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V	0,7V
Degree of Protection	IP 20	IP 20	IP 20	IP 20	IP 20				
Weight	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr	19.8gr
Diode Current	1A	1A	1A	1A	1A	1A	1A	1A	1A
Circuit Diagram									

Definition	End Plate	Plug in bridge for 2 hole	Plug in bridge for 3 hole	Plug in bridge for 4 hole
Order Number	450389	470112	470113	470114
Package Unit	10 pcs.	25 pcs.	20 pcs.	15 pcs.

					11.2 Strip label
	Plug in bridge for 5 hole	Plug in bridge for 10 hole	DG 6/5 - Label	DB 5 - Label	NOTE: This product is only compatible with below items: -112710N -112720N -112730N
Order Number	470115	470119	505330	505850	1020100
Package Unit	10 pcs.	5 pcs.	440 pcs.	500 pcs.	1 pc.



## Communication Management Solutions

*Made to communicate*



## Defining an ethernet gateway in simple terms

An ethernet gateway is an automation device which converts between serial to ethernet, GPRS or WI - FI protocols in order to monitor and control serial devices over internet network or ethernet based devices over serial network

## Which actions are executed?

**Converting the data**  
Fast data transmission  
Querying simultaneously  
**Bidirectional working**  
Protective Isolation  
Dual-mode configuration  
**Ping blocking**  
Auto-learning IP address

An ethernet gateway **converts the data** between different protocols and supports system integrators by ensuring a consistent flow of information throughout the entire facility. Etor, Wtor and Gtor gateway provides **fast data transmission** for serial devices up to 115Kbps. **Simultaneous queries** that belong to 6 different users can be replied by 64 slave devices over one Etor-4, Gtor and Wtor gateway. It is possible to control serial devices over internet network(server mode) or ethernet based devices over serial interface(client mode) thanks to **bidirectional working** feature. The integrated galvanic **isolation** between ethernet, modbus and supply parts provides line protection against over voltage and the anti-noise circuit eliminates the effects of EMI. It has ability to be configured over USB or Web server thanks to **dual-mode configuration**. Ping queries from unauthorized people can be prevented thus your network can be secured, thanks to **ping blocking** feature. **Auto-learning IP address** feature allows you to adopt **ethernet gateway ETOR** to your system more easily.

## Benefits and Advantages

- First Class quality to fulfill all your communication needs
- Quick view of status with leds
- Line protection by galvanic isolation
- Isolates noise on Remote I/O cable for improved communications
- Bidirectional protocol converting; client and server mode
- Ethernet-RS485 and Ethernet-RS232 options
- Supports 6 simultaneous TCP masters with up to 64 simultaneous serial slave devices
- Multi-Slave gateway solutions for large data transfers
- Converting between Modbus TCP and Modbus RTU/ASCII
- Easy configuration over USB or Web Server
- User friendly configuration software
- 300-115200 bps baudrate adjustment
- Dual supply option: 18-50VAC/DC or can be powered up through a mini USB cable
- Automatic or manual IP addressing
- Ping blocking
- High mechanical endurance
- Sleek 17.5mm wide housing and compact design saves panel space.
- Perfect to fit in modular enclosure
- Self-Extinguishing plastic housing
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences.

## Layout & Mounting

Klemsan interface relays are suitable for snap mounting onto 35 mm standards DIN rails.



**ETOR-4 Ethernet Gateway - WTOR WI - FI Gateway - GTOR GPRS Gateway**



## Data Center Management



Efficiency of IT infrastructure depends on accessing, monitoring, and managing IT equipment remotely. Although some equipments may be installed in data center, need of support remote offices, factory floors or other unattended locations, is also important. Many devices have a serial port for making configuration changes or uploading new firmware. However, visiting remote equipment cabinets with a serial cable and laptop is a time-consuming and expensive task. KLEMSAN gateways bridge the distance between remote IT equipment and data center. Costs and cut downtime can be reduced by allowing remote access.



**ETHERNET GATEWAY**  
ETOR-4, ETOR-2,  
GTOR, WTOR

## Wastewater Treatment Plants



Because of the dynamic nature of many water treatment systems and the worldwide need for improved reliability and quality, a higher degree of precision is required in the monitoring and control of water treatment programs than that obtained through manual monitoring. To achieve the degree of precision needed, continuous on-line monitoring with automatic instrumentation is required. Most of engineers use radio modems to collect RTU system data in Modbus RTU format. However, since most SCADA monitors use Modbus TCP for remote monitoring, a gateway is used to connect the two protocols.



**ETHERNET GATEWAY**  
ETOR-4, GTOR,  
WTOR

## Factory Automation



TCP/IP is widely used in many electrical systems for remote monitoring to ensure reliable performance and energy control. Although systems and equipments can often be managed from the network itself, such access may not always be possible. The problem comes when such equipment doesn't support TCP/IP protocol. It is an option to modify these devices with TCP/IP versions but it may be too expensive and sometimes not possible. Fortunately, most of electrical devices, computers, equipments provide a serial port for local access. Users are able to have access from anywhere, just as if they were connected locally through a serial connection. So that's why gateways have become a popular way to achieve TCP/IP requirements.



**ETHERNET GATEWAY**  
ETOR-4, ETOR-2,  
WTOR, GTOR

## Power Generation System



Generally, power plants have their own generation system in order to provide uninterrupted power supply. It is highly important to get data continuously from power RTUs, smart electronic devices, energy measuring devices which support serial communication and transmit them to TCP network which is required to reach those information from anywhere in the world. At this point, Etor gateways present best solution between serial devices and TCP network.



**ETHERNET GATEWAY**  
ETOR-4, ETOR-2,  
WTOR

## Industrial Motors



The consumption of industrial motors should be monitored carefully by energy meters that are located throughout the facility because they use a significant amount of energy, with many factories spending 70% of their total production budget on this expense. Generally meters support Modbus RTU protocol so the data from the meters is transmitted via an industrial gateway to a ModbusTCP network and monitored any place in the world.



**ETHERNET GATEWAY**  
ETOR-4, ETOR-2,  
GTOR, WTOR

## Energy Metering Applications



These days most of energy meters support RS232 or RS485 communication protocols. Human efforts and wasted time that are spent for meter readings can be reduced by using remote monitoring system and Etor gateway.



**ETHERNET GATEWAY**  
ETOR-4, ETOR-2,  
GTOR, WTOR

## Multi-User & Multi-Device Applications



Ethernet is a general purpose communication protocol that is very fast, can be used any purpose and can be found anywhere in the world. 6 users located from different places can connect to one gateway simultaneously and communicate up to 64 serial devices over one gateway. So ethernet gateway presents cost-effective solution for IP-based systems which are growing at an exponential rate nowadays.



**ETHERNET GATEWAY**  
ETOR-4, WTOR

## Wind & Solar Power Plants



Renewable energy power plants are required to be monitored in long distance because of their locations. In order not transmission distance to become a problem, data should have been transmitted through the ethernet gateways over TCP/IP protocol which provides safe, reliable and fast communication all over the world.



**ETHERNET GATEWAY**  
ETOR-4, GTOR,  
WTOR

## Oil and Gas Automation



For most oil and gas industries, the need for accurate, real-time information obtained through a SCADA system is a must. These industrial facilities are looking to improve efficiencies in data communication by connecting serial devices which support RS485 or RS232 protocols. KLEMSAN gateways can be used to optimize efficiency, productivity, reliability, and safety at any stage of oil and gas production.



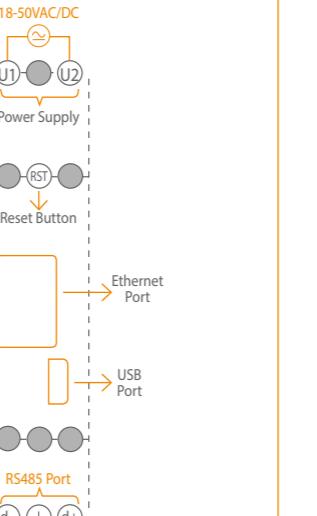
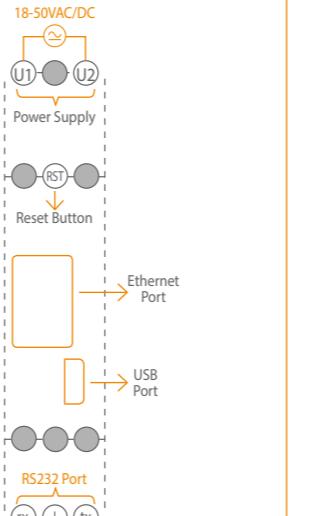
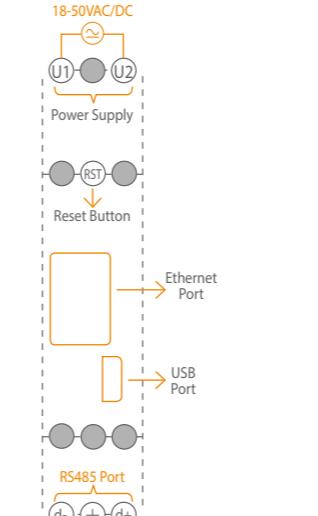
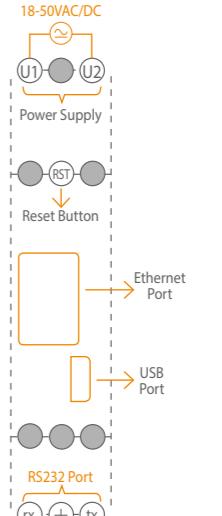
**ETHERNET GATEWAY**  
ETOR-4, ETOR-2,  
GTOR, WTOR

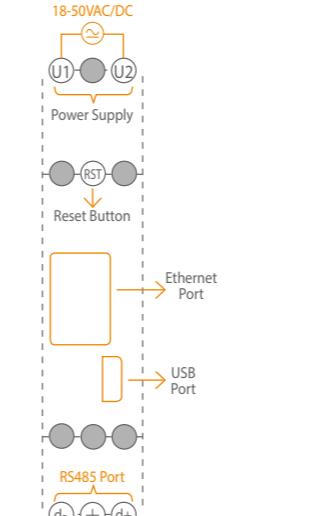
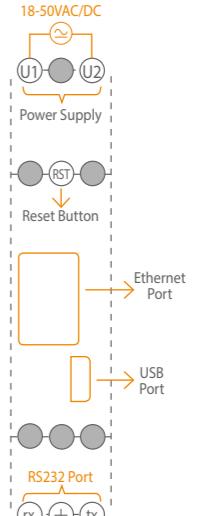
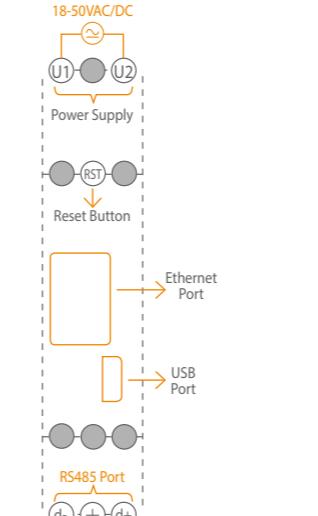
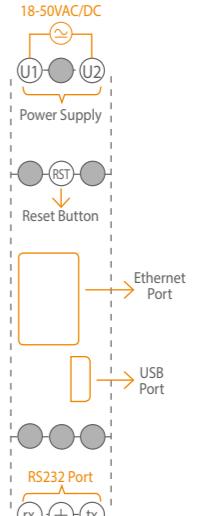


Type		ETOR-4	ETOR-2
Definition	Ethernet gateway (TCP/IP - RS485)	Ethernet gateway (TCP/IP - RS232)	
Order Number	601400	601401	
Casing Width(mm)	17.5	17.5	
Connections	Screw terminal (for supply and serial interface)	Screw terminal (for supply and serial interface)	
Working Mode	Server or Client selectable (Bidirectional)	Server or Client selectable (Bidirectional)	
Configuration	Mini USB port or WEB interface	Mini USB port or WEB interface	
DHCP (Automatic IP Receive)	Available	Available	
ARP	Available	Available	
Ping blocking	Available	Available	
LED indicators	Available	Available	
Reset Function	Available	Available	
ESD protection	Available	Available	
Driver Supported	Windows® XP/Vista/7/8/8.1	Windows® XP/Vista/7/8/8.1	
Number of Ports	1	1	
Operation Modes	Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP	Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP	
Number of Remote Connections	6	6	
Client mode	1	1	
Connector	RJ45	RJ45	
Data Transmission Rate	10/100 Base-TX	10/100 Base-TX	
Number of Ports	1	1	
Operation Modes	MODBUS RTU, MODBUS ASCII	MODBUS RTU, MODBUS ASCII	
Serial Standard	RS485	RS232	
Number of Serial Devices	64	1	
Client mode	1	1	
Baud Rate	300 to 115200 bps	300 to 115200 bps	
Data Bit	8	8	
Stop Bits	1 or 2	1 or 2	
Parity	None, Even, Odd	None, Even, Odd	
Voltage	AC 18-50V	18-50V	
	DC 18-50V	18-50V	
Consumption	AC < 2.2VA	< 2.2VA	
	DC < 1.2W	< 1.2W	
Frequency	45-65Hz	45-65Hz	
Supply- Ethernet port	1500VRMS, 2250VDC	1500VRMS, 2250VDC	
Supply- Serial port	1500VRMS, 2250VDC	1500VRMS, 2250VDC	
Serial port-Ethernet port	2500VRMS	2500VRMS	
Weight(g)	58	58	
Protection Class	IP20	IP20	
Assembly Type	Rail Mount	Rail Mount	
Permissible mounting position	Any	Any	
Operating Temperature	-10 to +60 °C	-10 to +60 °C	
Storage Temperature	-30 to +80 °C	-30 to +80 °C	
Relative Humidity (no condensation)	Max.95%	Max.95%	

ETOR-4 (with external power supply)		ETOR-2 (with external power supply)
Ethernet gateway (TCP/IP - RS485)		Ethernet gateway (TCP/IP - RS232)
601402		601403
17.5		17.5
Screw terminal (for supply and serial interface)		Screw terminal (for supply and serial interface)
Server or Client selectable (Bidirectional)		Server or Client selectable (Bidirectional)
Mini USB port or WEB interface		Mini USB port or WEB interface
Available		Available
Windows® XP/Vista/7/8/8.1		Windows® XP/Vista/7/8/8.1
1		1
Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP		Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP
6		6
1		1
RJ45		RJ45
10/100 Base-TX		10/100 Base-TX
1		1
MODBUS RTU, MODBUS ASCII		MODBUS RTU, MODBUS ASCII
RS485		RS232
64		1
1		1
300 to 115200 bps		300 to 115200 bps
8		8
1 or 2		1 or 2
None, Even, Odd		None, Even, Odd
18-50V		18-50V
18-50V		18-50V
< 2.2VA		< 2.2VA
< 1.2W		< 1.2W
45-65Hz		45-65Hz
1500VRMS, 2250VDC		1500VRMS, 2250VDC
1500VRMS, 2250VDC		1500VRMS, 2250VDC
2500VRMS		2500VRMS
58		58
IP20		IP20
Rail Mount		Rail Mount
Any		Any
-10 to +60 °C		-10 to +60 °C
-30 to +80 °C		-30 to +80 °C
Max.95%		Max.95%



Type	ETOR-4	ETOR-2
EMC-EMI	TS EN 55022, TS EN 55024	OK
Accessories	<p>Mini USB Cable </p> <p>Available</p>	<p>Available</p>
External Power Supply (220/110VAC to 24VDC)	<p>External Power Supply (220/110VAC to 24VDC) </p> <p>-</p>	<p>-</p>
Schematics	 	 
Dimensional Drawings		

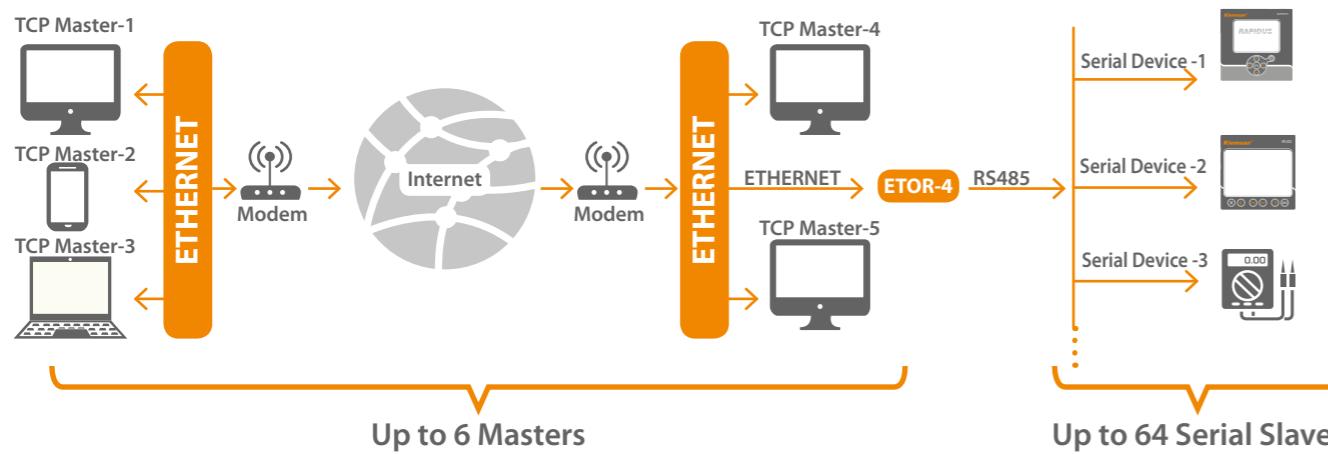
Type	ETOR-4 (with external power supply)	ETOR-2 (with external power supply)
EMC-EMI	OK	-
Accessories	<p>Available</p>	<p>Available</p>
External Power Supply (220/110VAC to 24VDC)	<p>Available</p>	<p>Available</p>
Schematics	 	 
Dimensional Drawings		



## ETOR-4 / Ethernet-RS485 Bidirectional Converting

**Server Mode**

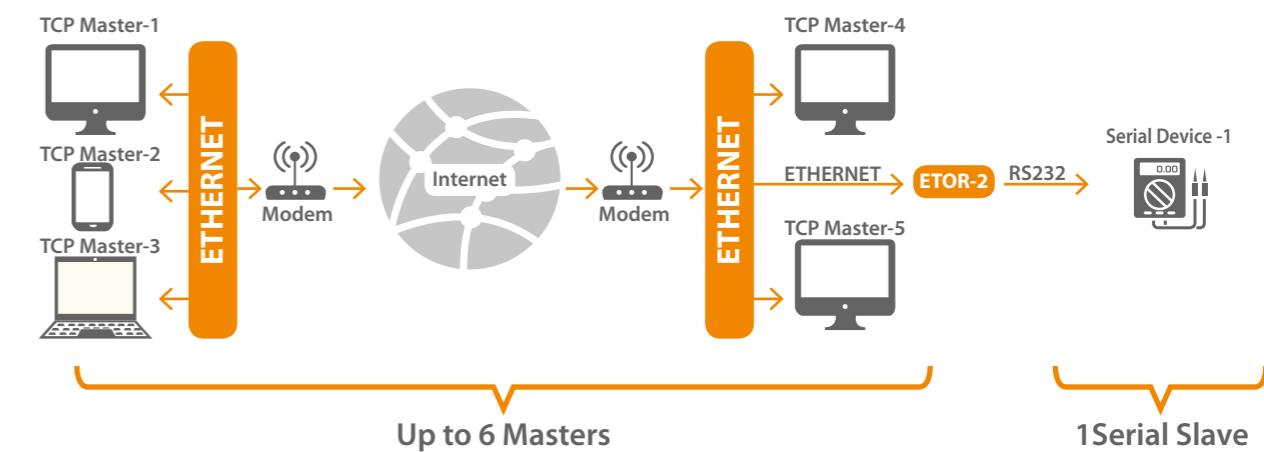
When running in the server mode; ETOR-4 converts the MODBUS TCP, MODBUS RTU over TCP and MODBUS ASCII over TCP queries to MODBUS RTU and MODBUS ASCII queries and transmits these queries to the serial devices. After that, it converts the responses which are received by slave devices, then transmits them to master devices. 6 TCP masters and 64 serial devices can be communicated simultaneously over one Etor-4 gateway in server mode.



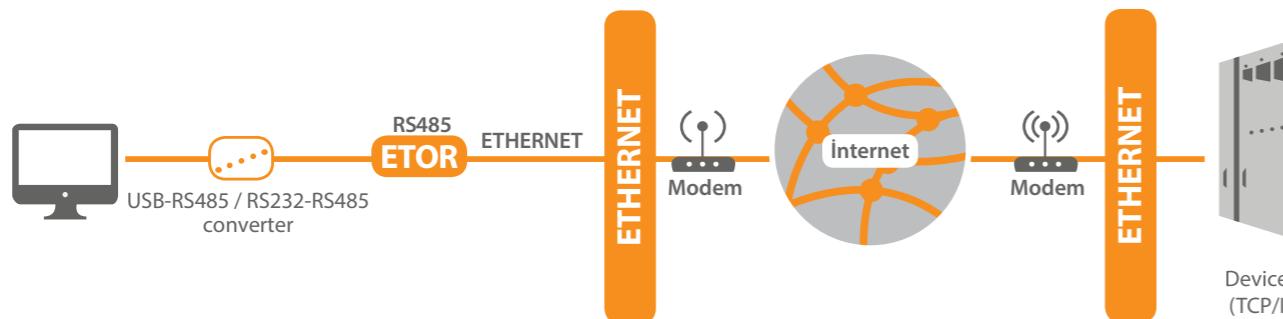
## ETOR-2 / Ethernet-RS232 Bidirectional Converting

**Server Mode**

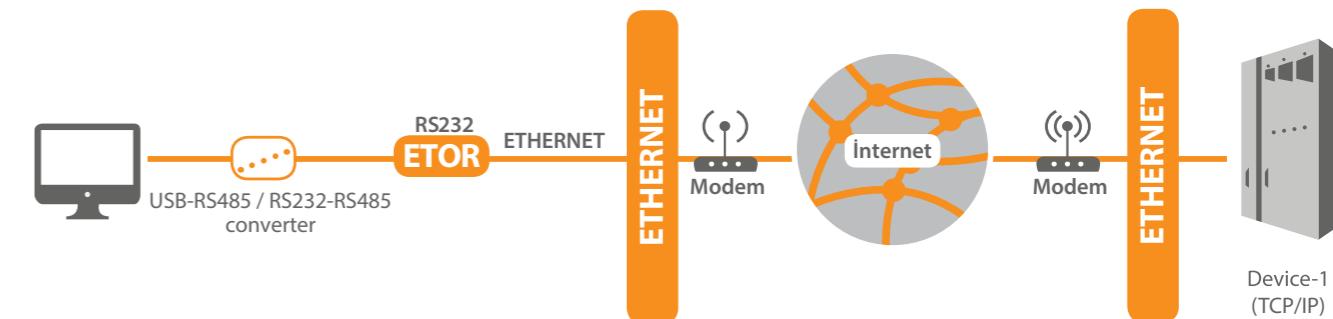
When running in the server mode; ETOR-2 converts the MODBUS TCP, MODBUS RTU over TCP and MODBUS ASCII over TCP queries to MODBUS RTU and MODBUS ASCII queries and transmits these queries to the serial device. After that, it converts the responses which are received by slave device, then transmits them to master devices. 6 TCP masters and 1 serial device can be communicated simultaneously over one Etor-2 gateway in server mode.

**Client Mode**

When running in the client mode; ETOR-4 converts the MODBUS RTU and MODBUS ASCII queries to MODBUS TCP, MODBUS RTU over TCP and MODBUS ASCII over TCP queries and transmits these queries to the remote device which is connected to the internet or the local network. After that, it converts the responses which are received by slave devices, then transmits them to master devices. 1 TCP master and 1 serial device can be communicated simultaneously over one Etor-4 gateway in client mode.

**Client Mode**

When running in the client mode; ETOR-2 converts the MODBUS RTU and MODBUS ASCII queries to MODBUS TCP, MODBUS RTU over TCP and MODBUS ASCII over TCP queries and transmits these queries to the remote device which is connected to the internet or the local network. After that, it converts the responses which are received by slave device, then transmits them to master device. 1 TCP master and 1 serial device can be communicated simultaneously over one Etor-2 gateway in client mode.



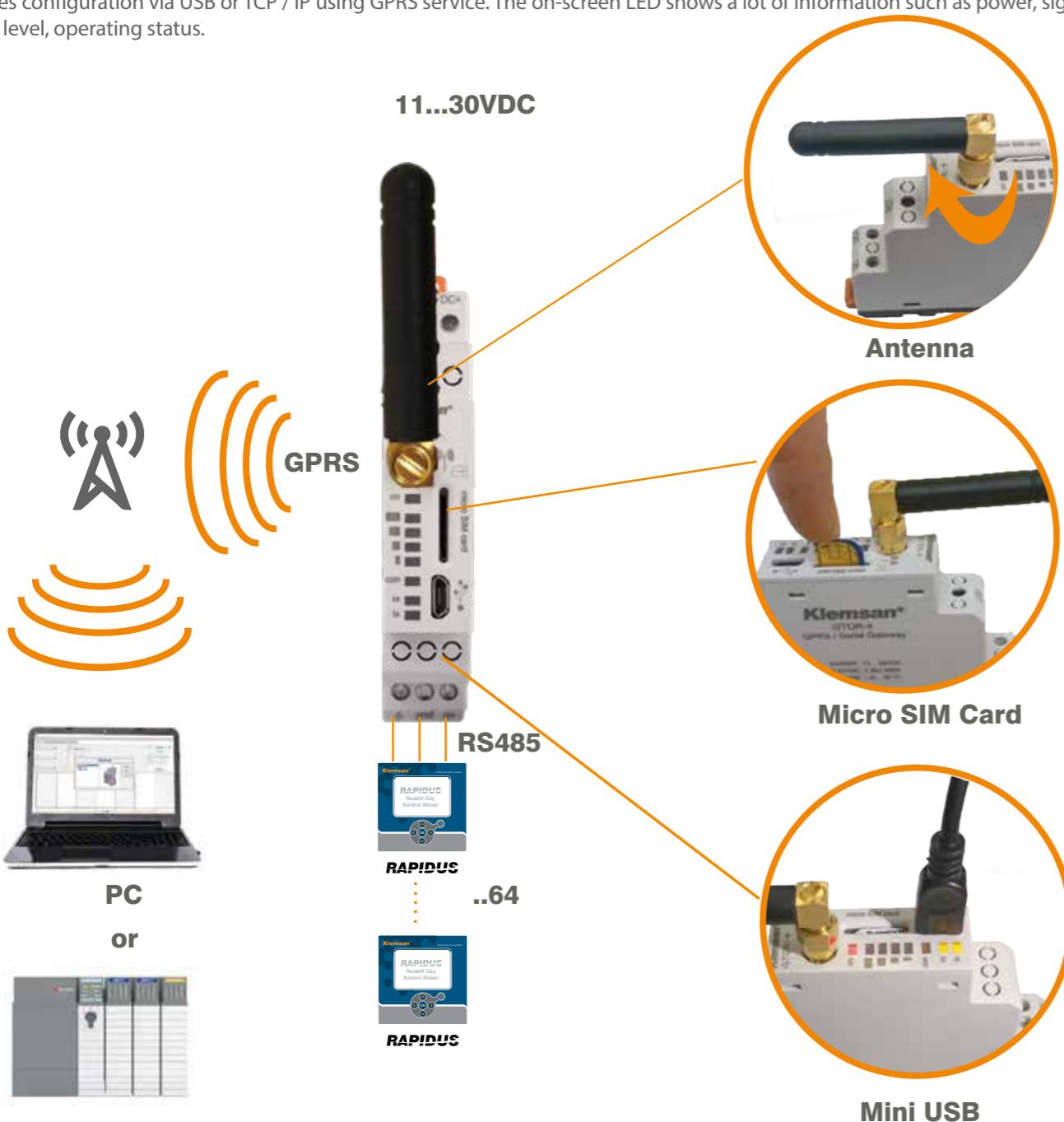
## GTOR-4 / GPRS to RS45 Gateway

GTOR series products connect to serial MODBUS devices with TCP / IP based systems via GPRS service. In this way, it is possible to remotely control and monitor serial devices connected to MODBUS network via GPRS service. GTOR can be easily integrated into existing MODBUS networks thanks to their wide range of configuration options. GTOR series products works as a TCP / IP server. GTOR is user friendly with easy to configure and free interface program.

- Micro SIM Card
- Free user interface program
- RS45 interface
- 17,5mm width

- 8 LED indicators
- APN configuration with Mini USB
- Supports all operators
- Supports up to 64 devices

It provides configuration via USB or TCP / IP using GPRS service. The on-screen LED shows a lot of information such as power, signal strength level, operating status.



Type	GTOR	GTOR(with power supply)
<b>Definition</b>	GPRS Gateway	GPRS Gateway
<b>Order Number</b>	601 440	601 441
<b>Casing Width(mm)</b>	17,5mm	17,5mm
<b>Connections</b>	Screw Terminal	Screw Terminal
<b>Mounting</b>	Rail Mount	Rail Mount
<b>General Information</b>	Configuration	Configurable via USB Micro USB Connection Interface
	IP Based Security	✓
	LED Indicators	✓
	Reset Function	✓
	ESD Protection	✓
	Supported Drivers	WindowsXP/Vista/7/8/10
<b>GPRS Interface</b>	SIM/USIM	3V/1.8V
	Quad Band	850/900/1800/1900MHz
	GPRS Multi Slot Class	Downlink Class 12 85.6kbps Uplink Class 12 85.6kbps
	GPRS Mobile Station	Class B
	Compliant to GSM Phase 2/2+	Class 4 (2W @850/900MHz) Class 1 (1W @1800/1900MHz)
	Number of Port	1
<b>Serial Interface</b>	Serial Connection Standard	RS485
	Number of Serial Connection Devices	Server Mode 32
		Client Mode 1
	Serial Connection Parameters	Baud Rate Between 600 - 57600 bps Data Bit 8 Stop Bit 1 or 2 Parity None, even, odd
	Supported Protocols	MODBUS TCP; MODBUS RTU via TCP; MODBUS ACII via TCP
	Voltage	DC 11-30VDC AC -
<b>Isolation</b>	Frequency	45-65Hz
	Permissible Ambient Temperature	During Operation -10°C..+60°C During Storage -30°C..+80°C
Relative Humidity		Max.95% (no condensation)
Operating Frequency		45-65Hz
Degree of Protection		IP20
<b>Power Consumption</b>	DC	1.2W
	AC	-



Tip		GTOR	GTOR (with power supply)
EMC-EMI	TS EN 55022, TS EN 55024	-	-
Accessories	Mini USB Cable	Available	Available
	Antenna	Available	Available
	High gain antenna	Available	Available
	External Power Supply (220/110VAC to 24VDC)	-	Available
Schematics			
Dimensional Drawings			

### WTOR-4 / WI - FI to RS485 Gateway

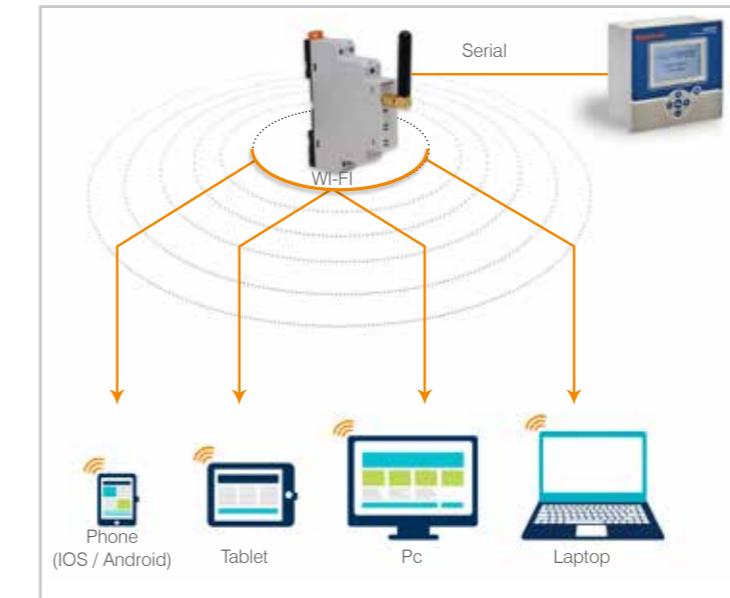
WTOR series products connect to serial MODBUS devices with TCP / IP based systems via Wi-Fi service. In this way, it is possible to remotely control and monitor serial devices connected to MODBUS network via Wi-Fi service. WTOR can be easily integrated into existing MODBUS networks thanks to their wide range of configuration options. WTOR series products works as a TCP / IP server.

- Operating with Access
- Point or Station mode
- Configuring via web interface
- RS485

- 4 pcs. led indication
- Supports up to 64 devices
- 17,5mm wide

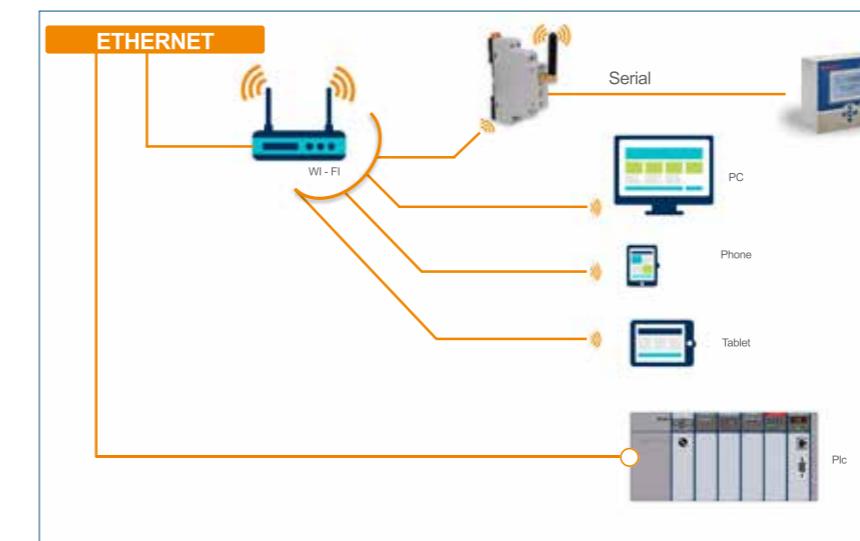
It provides configuration via web interface. The on-screen LED shows a lot of information such as power, mode information, operating status.

#### AP(Access Point) Mode



Where there is no established Wi-Fi network, the WTOR may create a Wi-Fi network. A single device can join the Wi-Fi network created by WTOR. Serial devices can be controlled and monitored in this way.

#### STA Mode:



Joins an external Wi-Fi router to connect serial devices to the existing Wi-Fi network. This way the serial devices can be controlled and monitored. The configuration page can be accessed by entering the IP address set for WTOR in the WEB browser of a computer joined to the same network, and the desired configuration settings can be made.



Type	WTOR	WTOR (with power supply)
Definition	WI-FI Gateway	WI-FI Gateway
Order Number	601 450	601 451
Casing Width(mm)	17,5mm	17,5mm
Connections	Screw Terminal	Screw Terminal
Mounting	Rail Mount	Rail Mount
General Information	Configuration	Web Interface
	DHCP	✓
	Ping Blocking	✓
	LED Indicators	✓
	Reset Function	✓
	ESD Protection	✓
	Supported Drivers	WindowsXP/Vista/7/8/10
WIFI Interface	Standard	802.11b/g/n
	Operating Modes	AP(Access Point)/ STA (Station) Mode
	Number of Remote Connections	Server Mode 7 Client Mode 1
	Security Type	WPA2
	Number of Port	1
Serial Interface	Serial Connection Standard	RS485
	Number of Serial Connection Devices	Server Mode 64 Client Mode 1
	Serial Connection Parameters	Baud Rate Between 600 - 57600 bps Data Bit 8 Stop Bit 1 or 2 Parity None, Even, Odd
	Supported Protocols	MODBUS TCP; MODBUS RTU via TCP; MODBUS ASCII via TCP
	Voltage Supply	DC 11-30VDC AC -
	Frequency	45-65Hz
	Isolation	1.5kV RMS
Permissible Ambient Temperature	During Operation	-10°C..+60°C
	During Storage	-30°C..+80°C
Relative Humidity	Max.95% (no condensation)	
Operating Frequency	45-65Hz	
Degree of Protection	IP20	
Power Consumption	DC 1.2W	AC -

Tip	WTOR	WTOR (with power supply)
EMC-EMI	TS EN 55022, TS EN 55024	-
Antenna		Available
High gain antenna		Available
External Power Supply (220/110VAC to 24VDC)		-
<b>Schematics</b>		
<b>Dimensional Drawings</b>		

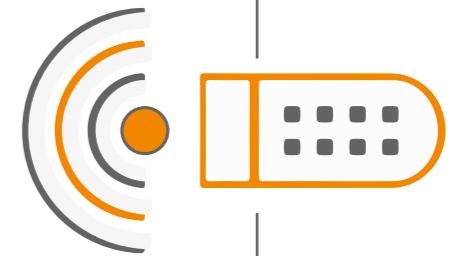
### UTOR / USB to RS485,RS232 and TTL Converter



#### UTOR series products,

- USB to RS485
- USB to RS232
- Provides TTL conversion from USB.
- UTOR is powered from the USB port without the need for an external power supply. Unlike most converters, UTOR has an isolation barrier that provides electrical isolation between your computer and serial devices. This creates an ideal environment where equipment and data are critical.

Type	UTOR-4i	UTOR-2i	UTOR-T5i	UTORT3i	
Definition	Isolated RS485 to USB Converter	Isolated RS232 to USB Converter	Isolated TTL(5V) to USB Converter	Isolated TTL(3V) to USB Converter	
Order Number	601 430	601 431	601 432	601 433	
USB	Compatibility Connector	USB 1.1 and USB 2.0 USB Type A	USB 1.1 and USB 2.1 USB Type A	USB 1.1 and USB 2.2 USB Type A	USB 1.1 and USB 2.3 USB Type A
Interface	Port Number Standart Connector Isolation	1 RS485 Removable terminal block with screw connection 2500Vrms	1 RS232 Removable terminal block with screw connection 2500Vrms	1 TTL(5V) Removable terminal block with screw connection 2500Vrms	1 TTL(3.3V) Removable terminal block with screw connection 2500Vrms
Serial	Baudrate Stop Bits Data Bits Parity Terminals	300 .. 115200 bps 1, 1.5, 2 5, 6, 7, 8 None, Even, Odd D+D-	300 .. 115200 bps 1, 1.5, 2 5, 6, 7, 8 None, Even, Odd Tx, Rx	300 .. 115200 bps 1, 1.5, 2 5, 6, 7, 8 None, Even, Odd Tx, Rx	300 .. 115200 bps 1, 1.5, 2 5, 6, 7, 8 None, Even, Odd Tx, Rx
Voltage Supply	via USB port	via USB port	via USB port	via USB port	
Permissible Ambient Temperature	During Operation During Storage	-20°C..+60°C -20°C..+70°C	-20°C..+60°C -20°C..+70°C	-20°C..+60°C -20°C..+70°C	
Relative Humidity	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	
Degree of Protection	IP20	IP20	IP20	IP20	
Accessories		Available	Available	Available	



## Remote I/O Solutions

Remote controlling

## Defining an Remote I/O in simple terms

Remote I/O monitors and controls external signals at a distance from the controller or PC. It could have various input/output combinations.

## Benefits and Advantages

- Quick view of status with LEDs
- Isolated RS485 Port
- Line protection by galvanic isolation
- 10A switching capacity
- Bidirectional protocol converting; client and server mode
- Keeps the status of the relay
- Digital Input counter
- Easy configuration
- 1200-115200 bps baudrate adjustment
- Dual supply option: 85-265VAC/DC
- High mechanical endurance
- Sleek 17.5mm wide housing and compact design saves panel space.
- Perfect to fit in modular enclosure
- Self-Extinguishing plastic housing
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences.

## Which actions are executed?

Modbus RTU  
control relay output  
Stored in  
the memory  
keep the switching counts  
115Kbps

EASIO series devices can control relay output remotely over MODBUS RTU and read digital input status. EASIO keep the switching counts of digital inputs in memory. The last set relay output status is stored in the memory as well. It switches the relay output to the last set state after the power interruption, either when the device is energized or when the device is restarted. EASIO supports fast data transmission up to 115Kbps.

## Layout & Mounting

Klemsan interface relays are suitable for snap mounting onto 35 mm standards DIN rails.



EASIO - REMOTE I/O

## Which markets are they used frequently?

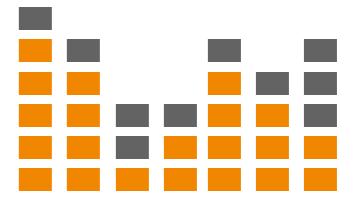
- Electrical power plants and substations
- PLC-Scada applications
- Submetering station
- Building automation
- Factory automation
- Water & wastewater treatment plants
- Machine tool industry
- IT centres
- Alarm station
- Production line management



Type	EASIO 1001	EASIO 1100	EASIO 1101
<b>Definition</b>	Remote I/O Module	Remote I/O Module	Remote I/O Module
<b>Order Number</b>	260 001	260 002	260 003
<b>Casing Width(mm)</b>	17,5	17,5	17,5
<b>Connections</b>	Screw terminal	Screw terminal	Screw terminal
<b>Inputs and Outputs</b>	Relay Outputs	Number of outputs Type Max. Switching Current Max. Switching Voltage	- 1 pcs. NO (SPST) 10 A 250 VAC
	Digital Inputs	Max. Switching Power Number of inputs Activation type Min. delay time Input Voltage Frequency Isolation Level DI Counter	1250VA 1 pcs. Active Low, Active High 10msec 24..265V AC/DC 45-65Hz 5kVRMS Available
	Supply	Voltage AC	85..265V
		DC	85..265V
	Isolation	2,5kVRMS	1,5kVRMS
	Power Consumption	AC DC	< 2,2 VA < 1 W
	Connections	Power input Input Connection Output Connection	A1,A2 DI, COM+E27:G27E27:G31 11(COM),14(NO),12(NC)
	Communication	Protocol Baud rate Stop bit Address Isolation	Modbus RTU 1200 -115200 bps adjustable 1 1-247 2750V RMS
<b>Permissible Ambient Temperature</b>	During Operation	-20 to +60 °C	-20 to +60 °C
	During Storage	-30°C..+80°C	-30°C..+80°C
Relative Humidity	Max.95% (no condensation)		
Degree of Protection	IP20		
Weight(gr)	44		
Mounting Type	Rail Mounted		
Permissible mounting position	any		
<b>Schematics</b>			

Type	EASIO 1001	EASIO 1100	EASIO 1101
<b>Dimensional Drawings</b>			

## Energy Monitoring Solutions



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*More efficiency  
than you expected*

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## Defining an energy analyzer in simple terms

An energy analyzer is an automation device which offers 3-phase energy monitoring, analyzing and controlling the network comprehensively. It enables advanced applications such as energy metering, data logging, DIO applications, transducer applications etc.

## Which actions are executed?

An energy analyzer provides highly accurate **measuring** for main electrical parameters and expanded energy **metering** solutions for your electrical network.

All the data which are being measured or kept in its memory can be transmitted to remote monitoring system thanks to **modbus communication**.

It offers 3-phase energy and power measurement with **data logging** such as min/max/avg values, energy values, demand values etc. with date and time.

Digital inputs can be used for equipment status/position monitoring, activation second tariff which is used by generators or as a **counter**.

Digital outputs can be used to **take an impulse** which is synchronized with internal energy meters.

It provides **conversion** of main electrical parameters

**Measuring**  
**Metering**  
Communicating  
Harmonic monitoring  
**Counting**  
Waveform displaying  
Taking impulse  
**Converting**  
Data logging  
**Phasor analyzing**  
Specifying hour meters

into DC voltage or DC mA outputs thanks to analogue outputs which can be easily programmed by the users.

Low/high limit thresholds for all electrical parameters can be defined so load management in a network is possible by means of **alarm** relay outputs.

In dept-analysis of individual current and voltage **harmonics** in order to increase network quality.

Displaying **signal waveforms** for current and voltage phases to detect signal deviations which are observed in real time.

Detailed analyze of phase relationships between current and voltage lines thanks to **phasor diagram** feature.

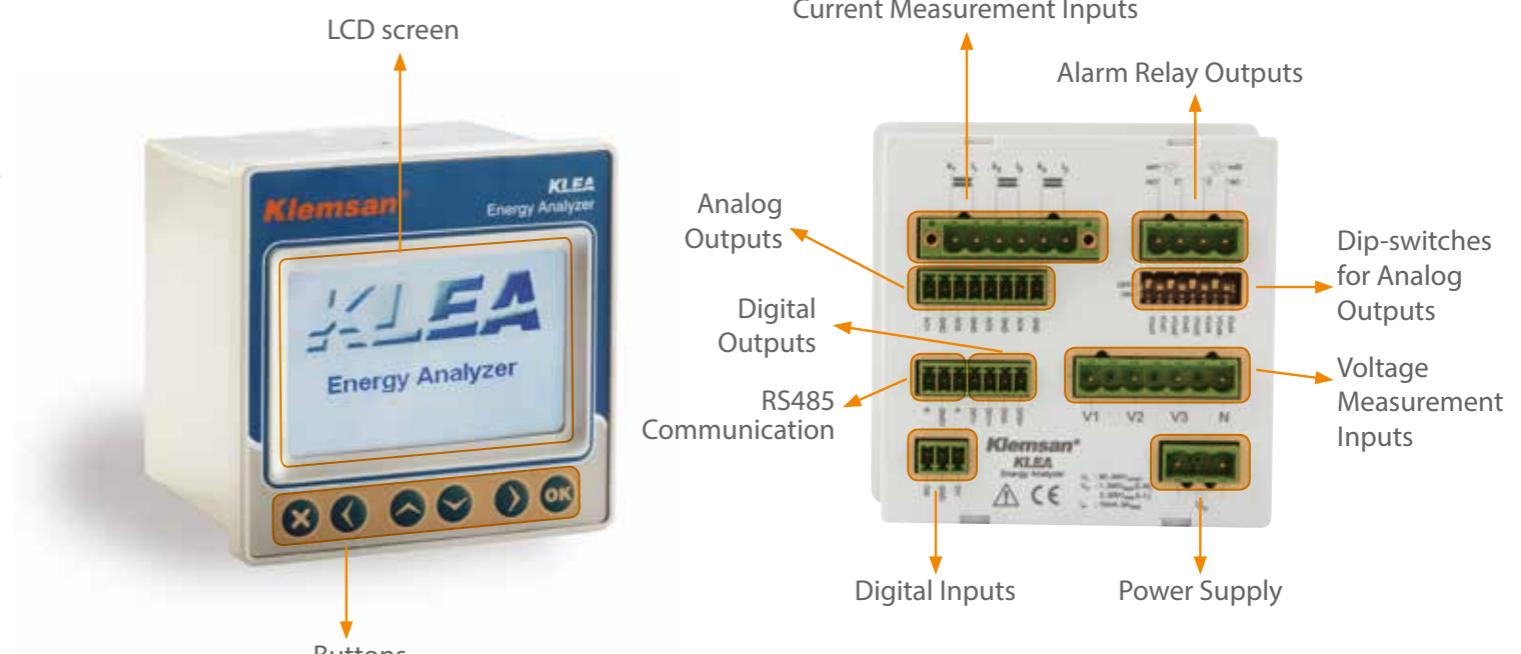
Specifying **run hours, on hours** and **power interruptions** in order for your machines to be used more effectively.

## Benefits and Advantages

- Current inputs can withstand surges up to 100 A for 1 second
- State of the art technology; modular design, no connector cables, no fixing screws inside
- Panel or rail mount options
- 3 phase and 1 phase options
- Adjustable multi-tariff energy meter
- 4 quadrant measurement
- Harmonic measurement up to 51st
- Programmable analog outputs
- Programmable digital inputs and outputs
- Prgrammable alarm output
- Modbus communication
- Long distance visibility with super bright seven segment displays
- AC/DC power supply
- Real time clock
- Connection to current transformer x/1 A or x/5 A
- High measurement accuracy according to IEC standards
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences
- Self-Extinguishing plastic housing.

## Layout & Mounting

Klemsan measuring devices are suitable for panel mounting for 96x96mm standards or for snap mounting onto 35 mm standards DIN rails.



KLEA 324P Energy Analyzer



## Dual Source Energy Measurement



Recording and displaying the consumption of the energy from two different sources; network and generator. Users can set Tariff 2 to measure genset usage as a power supply so exact cost of the energy for network and genset can be identified more easily.



**ENERGY ANALYZER**  
KLEA and POWYS series

## PLC-Scada Applications



Conversion of measured electrical parameters such as voltage, current, active power, reactive power, frequency etc. can be converted to a DC output which is connected to analog input of PLC module by means of power transducer. So it is possible to integrate network measurands with a scada system.



**POWER TRANSDUCER**  
DNPT

## Equipment Maintenance



Monitoring elapsed hours for equipment warranty, recording actual running hours for equipment resale, tracking running time for equipment service thanks to Run hour, On hour and Power interruption counter features.



**ENERGY ANALYZER**  
KLEA 110P  
KLEA 220P  
POWYS 3121 ...

## Cost Management



Industry faces a never ending challenge to keep down its operating costs. One of the prerequisites for achieving this goal is to identify where costs occur. Energy analyzers present best solution to detect, analyze and prevent them thanks to their advanced multi-tariff meters and real time demand logs.



**ENERGY ANALYZER**  
KLEA 3xxx Series

## Buildings and Infrastructure

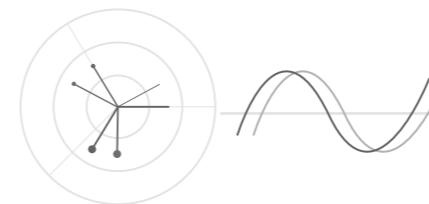


The main consumers can be identified by measuring the energy consumption of the various sub-assemblies in your buildings. So energy costs that belong to the departments can be managed and distributed between the various users thanks to submetering function. By correctly detecting peak demands in consumption gives you opportunity to reduce your electricity bills.



**ANALYZER / MULTIMETER**  
KLEA, ECRAS and POWYS Series

## Signal Analyzing

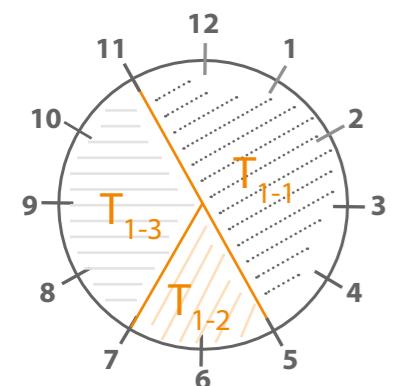


Advanced monitoring of current and voltage waveforms, monitoring signal disturbances, detailed analyze of phase relationships.



**ENERGY ANALYZER**  
KLEA 3xxx Series

## Sub-metering Station



User can use these sub-tariffs in order to measure energy consumption for different shifts in a facility. In addition to Tariff 2, Tariff 1 is splitted into three pieces with adjustable start & end times for each sub-tariff.



**ENERGY ANALYZER**  
KLEA 3xxx Series

## Remote Monitoring

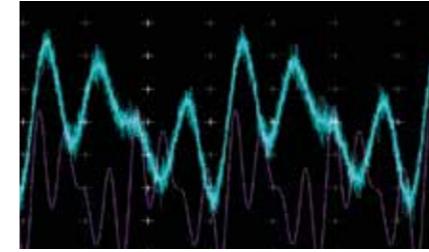


All measured parameters are transmitted to a PC through RS485 so that keep you informed of system performance 24 hours per day. Parameters can be changed remotely and a variety of measured values can be monitored, analyzed and downloaded via a Web browser with using an energy management softwares and ethernet gateway from anywhere in the world.



**ANALYZER / MULTIMETER**  
KLEA, ECRAS and POWYS Series

## Pulse Concentration Applications



Klemsan energy analyzers offer several meters which are suitable all type of electrical networks. The pulse output function enables the kWh/kVArh consumption to be exported to a concentrator so that they can be analyzed for energy saving and billing purposes.



**ENERGY ANALYZER**  
KLEA and POWYS Series



## Din-Rail Applications



Installation costs are significantly decreased by the installation of measurement devices on a standard 35mm din-rail instead of mount them in a panel. This means that panel cut-out is no longer necessary so time and energy can be saved.



**ANALYZER/  
POWER  
TRANSDUCER**  
POWYS and  
DNPT Series

## Counting Quantities

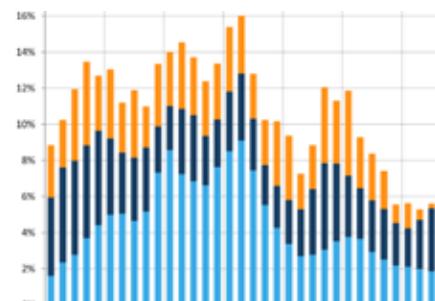


Production quantity can be collected by a limit switch or a dry contact coming from a proximity sensor thanks to digital input feature.



**ENERGY  
ANALYZER**  
KLEA and  
POWYS Series

## Demand Management



Measuring demand values for active power with date and time helps identifying time periods when energy use is very high so that unnecessary and unexpected costs can be detected and reduced.



**ENERGY  
ANALYZER**  
KLEA 3xxx Series

## Harmonic Management

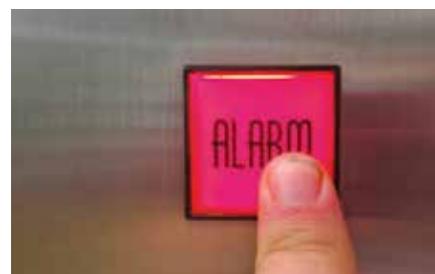


Harmonics cause many problems for all sorts of equipment connected to the low voltage network. Before take the cost and consequences of poor power quality, harmonics must be measured instantaneously and isolated from the source when it is necessary.



**ENERGY  
ANALYZER**  
KLEA and  
POWYS Series

## Load Management by means of Alarm Outputs



Fully programmable alarm function for any electrical parameter which is measured by the product, gives you opportunity to define pickup setpoint, dropout setpoint and time delay in order to detect a fault condition and prevent it with activating alarm outputs before it's too late.



**ANALYZER/  
MULTIMETER**  
KLEA, ECRAS and  
POWYS Series

## Fan Control



Assigning temperature value as an alarm parameter allows you to control temperature in a cabinet and prevents equipments from overheating thanks to integrated temperature sensor.



**ENERGY  
ANALYZER**  
KLEA 3xxx  
Series

## Facility Management



DNPT series transducers provide all requirements of entire facility such as monitoring and conversion of mono/three phase electrical parameters, remote communication, 2 relay output, 2 DIO, 4 analog output, advanced multi-tariff energy meters. Briefly all power management needs are provided by only one product.



**POWER  
TRANSDUCER**  
DNPT

## Data and Event Logging



Minimum, maximum and average values of measurements and consumption data are stored in non-volatile memory as hourly, daily and monthly. Plus, 50 alarm logs with time stamp allows you to analyze the malfunctions which were occurred in the past.



**ENERGY  
ANALYZER**  
KLEA 3xxx  
Series

## Equipment Status Management



The status of a circuit breaker or a disconnector in an electrical power distribution center can be monitored by means of digital inputs. According to digital input status(open or short circuit), simple Logic-0 or Logic-1 signal is sent to the PC through the modbus communication instantaneously.



**ANALYZER/  
MULTIMETER**  
KLEA and  
POWYS Series



Type	KLEA 320P	KLEA 370P	KLEA 322P	KLEA 324P	KLEA 320P-D
Definition	3Ø Energy Analyzer				
Order Number	606100	606101	606102	606103	606130
Seven Segment Display	-	-	-	-	-
LCD	Available	Available	Available	Available	Available
Language Support	Turkish, English, Russian				
Battery	Available	Available	Available	Available	Available
Real Time Clock	Available	Available	Available	Available	Available
Password Protection	Available	Available	Available	Available	Available
Current Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1-5000
Voltage Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1-5000
Demand Period	1-60 minutes adjustable				
Connection Type	3P4W, 3P3W, Aron				
Measurement in Quadrants	4	4	4	4	4
Number of Measurement in a period	512	512	512	512	512
LCD/Display Refresh Period	1 sec				
Networks	TT, TN, IT				
Phasor Diagram	Available	Available	Available	Available	Available
Signal Waveforms	Available	Available	Available	Available	Available
Min/Max/Demand Values	Available	Available	Available	Available	Available
Number of Tariffs	2	2	2	2	2
Multi Sub-Tariffs(Peak, Day and Off-Peak)	Available	Available	Available	Available	Available
1Ø Phase Energy Meters	Available	Available	Available	Available	Available
3Ø Phase Energy Meters	Available	Available	Available	Available	Available
4-Quadrant Reactive Energy Meters	-	-	-	-	Available
Measurement Range	10mA-6A AC				
Overvoltage Category	300 V Cat II				
Measurement Surge Voltage	2 kV				
Power Consumption	<0.2 VA				
intermittent overload	100A for 1 sec				
Sampling Freq.between 45-65 Hz	25,6 kHz				
Overvoltage Category	300 V Cat III				
Measured Range L-N	1-300 Vrms				
Measured Range L-L	2-500 Vrms				
Measured Frequency Range	45-65 Hz				
Power Consumption	<0.1 VA				
Sampling Freq.between 45-65 Hz	25,6 kHz				
Harmonics for current and voltage phases	Upto 51st				
THD-Voltage in %	Available	Available	Available	Available	Available
THD-Current in %	Available	Available	Available	Available	Available
Run Hour (Operating time for load in hours)	Available	Available	Available	Available	Available
On Hour (Operating time for meter in hours)	Available	Available	Available	Available	Available
Int Counter (Number of power interruptions)	Available	Available	Available	Available	Available
Total Active Power	Class 0.2				
Total Reactive Power	Class 1				
Total Apparent Power	Class 0.2				
Total Active Energy	Class 0.5				
Total Reactive Energy	Class 2				
Frequency	Class 0.05				
Current	Class 0.2				
Neutral Current (calculated)	Class 0.5				
Voltage	Class 0.2				
Power factor	Class 0.5				
THDV, THDI	Class 1				
According to IEC 61557-12	Total Active Energy	Class 0.25	Class 0.25	Class 0.25	Class 0.25
According to IEC 62053-22	Total Active Energy	Class 0.25	Class 0.25	Class 0.25	Class 0.25
According to IEC 62053-23	Total Reactive Energy	Class 2	Class 2	Class 2	Class 2
Inputs and Outputs	Alarm Relay Outputs	Number of outputs	2 pcs.	2 pcs.	2 pcs.
		Type	NO (SPST)	NO (SPST)	NO (SPST)
		Max. Switching Current	10 A	10 A	10 A
		Max. Switching Voltage	250 VAC	250 VAC	250 VAC
		Max. Switching Power	1250 VA	1250 VA	1250 VA
			1250 VA	1250 VA	1250 VA

Type	KLEA 370P-D	KLEA 220P	KLEA 110P	KLEA-370P-VSM	KLEA-320P-DC	KLEA-220P-DC
Definition	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer
Order Number	606131	606160	606180	606121	606150	606190
Seven Segment Display	-	-	Available	-	-	-
LCD	Available	Available	Available	Available	Available	Available
Language Support	Turkish, English, Russian	-	Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	-
Battery	Available	-	Available	Available	-	-
Real Time Clock	Available	-	Available	Available	-	-
Password Protection	Available	-	Available	Available	-	-
Current Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1-5000	1-5000
Voltage Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1-5000	1-5000
Demand Period	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable
Connection Type	3P4W, 3P3W, Aron	3P4W, 3P3W, Aron	3P4W, 3P3W, Aron	3P4W, 3P3W, Aron	3P4W, 3P3W, Aron	3P4W, 3P3W
Measurement in Quadrants	4	4	4	4	4	4
Number of Measurement in a period	512	256	256	512	512	256
LCD/Display Refresh Period	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec
Networks	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT
Phasor Diagram	Available	-	Available	Available	-	-
Signal Waveforms	Available	-	Available	Available	-	-
Min/Max/Demand Values	Available	Available	Available	Available	Available	Available
Number of Tariffs	2	2	2	2 + 7 different energy meters	2	2
Multi Sub-Tariffs(Peak, Day and Off-Peak)	Available	-	Available	Available	-	-
1Ø Phase Energy Meters	Available	-	Available	Available	-	-
3Ø Phase Energy Meters	Available	-	Available	Available	-	-
4-Quadrant Reactive Energy Meters	-	-	-	-	-	-
Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC
Overvoltage Category	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II
Measurement Surge Voltage	2 kV	2 kV	2 kV	2 kV	2 kV	2 kV
Power Consumption	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA
intermittent overload	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec
Sampling Freq.between 45-65 Hz	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz
Overvoltage Category	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III
Measured Range L-N	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms
Measured Range L-L	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms
Measured Frequency Range	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
Power Consumption	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA
Sampling Freq.between 45-65 Hz	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz
Harmonics for current and voltage phases	Upto 51st	Upto 51st	Upto 51st	Upto 51st	Upto 51st	Upto 51st
THD-Voltage in %	Available	Available	Available	Available	Available	Available
THD-Current in %	Available	Available	Available	Available	Available	Available
Run Hour (Operating time for load in hours)	Available	-	Available	Available	-	-
On Hour (Operating time for meter in hours)	Available	-	Available	Available	-	-
Int Counter (Number of power interruptions)	Available	-	Available	Available	-	-
Total Active Power	Class 0.2	Class 0.5	Class 0.5	Class 0.2	Class 0.5	Class 0.5
Total Reactive Power	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1
Total Apparent Power	Class 0.2	Class 0.5	Class 0.5	Class 0.2	Class 0.5	Class 0.5
Total Active Energy	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Total Reactive Energy	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2
Frequency	Class 0.05	Class 0.05	Class 0.05	Class 0.05	Class 0.05	Class 0.05
Current	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2
Neutral Current (calculated)	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Voltage	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2
Power factor	Class 0.5	Class 0.5	Class 0.5	Class		



Type		KLEA 320P	KLEA 370P	KLEA 322P	KLEA 324P	KLEA 320P-D
Inputs and Outputs	Digital Inputs	Number of inputs Frequency Input Present or Not Isolation Level	2 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms	7 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms	2 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms	2 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms
		Number of outputs Switching Voltage Range Frequency Isolation Level	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	7 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms
	Digital Outputs	Number of outputs Switching Voltage Range Frequency Isolation Level	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	7 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms
		Number of outputs Range of Outputs Isolation	2 pcs. 0-5 V, 0-10V, -5-5 V, -10-10V, 0-20 mA, 4-20 mA -	7 pcs. Available	2 pcs. Available	2 pcs. -
Supply	Voltage	AC	85-300V	85-300V	85-300V	85-300V
		DC	85-300V	85-300V	85-300V	85-300V
	Consumption	AC	< 3VA	< 3VA	< 3VA	< 3VA
		DC	< 2.5W	< 2.5W	< 2.5W	< 2.5W
	Frequency		45-65Hz	45-65Hz	45-65Hz	45-65Hz
Data Logging with timestamp	Min/max/avg Values	Hourly records	1920 hours x 68 different parameters	1920 hours x 68 different parameters	1920 hours x 68 different parameters	1920 hours x 68 different parameters
		Daily records	240 days x 68 different parameters	240 days x 68 different parameters	240 days x 68 different parameters	240 days x 68 different parameters
		Monthly records	36 months x 68 different parameters	36 months x 68 different parameters	36 months x 68 different parameters	36 months x 68 different parameters
	Demand		4 months x 16 different parameters	4 months x 16 different parameters	4 months x 16 different parameters	4 months x 16 different parameters
Communication	Alarm records		50	50	50	50
	Protocol	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU
	Baud rate	2400-115200 bps adjustable	2400-115200 bps adjustable	2400-115200 bps adjustable	2400-115200 bps adjustable	2400-115200 bps adjustable
	Parity number	None	None	None	None	None
	Stop bit	1	1	1	1	1
	Address	1-247	1-247	1-247	1-247	1-247
Mechanical Properties	Isolation	2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS
	Weight(g)	404	428	428	428	404
	Protection Class	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)
	Assembly Type	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Cable Cross Sections	Supply, Voltage, Current, Relay Outputs	Stranded	2,5 mm <sup>2</sup> - 14AWG	2,5 mm <sup>2</sup> - 14AWG	2,5 mm <sup>2</sup> - 14AWG	2,5 mm <sup>2</sup> - 14AWG
		Solid	4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG	4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG	4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG	4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG
	Digital I/O, RS 485, Analog Output	Stranded	1,5 mm <sup>2</sup> -16AWG	1,5 mm <sup>2</sup> -16AWG	1,5 mm <sup>2</sup> -16AWG	1,5 mm <sup>2</sup> -16AWG
		Solid	1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG
Ambient Conditions	Operating Temperature	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
	Storage Temperature	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C
	Relative Humidity (no condensation)	Max.95%	Max.95%	Max.95%	Max.95%	Max.95%
EMC-EMI	300 VAC CAT II acc. to IEC 61010-1	Available	Available	Available	Available	Available
	EN 55011/A1:2010, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11		Available	Available	Available	Available

KLEA 370P-D	KLEA 220P	KLEA 110P	KLEA-370P-VSM	KLEA-320P-DC	KLEA-220P-DC
Inputs and Outputs	2 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms	2 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms	7 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms	2 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms	2 pcs. 100 Hz, 10 ms Dry Contact 5000 Vrms
	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	7 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms	2 pcs. Transistor 5-30 VDC 20 Hz, 50 ms
	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -
Supply	85-300V 85-300V	85-300V 85-300V	85-300V 85-300V	85-300V 85-300V	85-300V 85-300V
	< 3VA < 3VA	< 3VA < 3VA	< 3VA < 3VA	< 3VA < 3VA	< 3VA < 3VA
	< 2.5W < 2.5W	< 2.5W < 2.5W	< 2.5W < 2.5W	< 2.5W < 2.5W	< 2.5W < 2.5W
	45-65Hz 45-65Hz	45-65Hz 45-65Hz	45-65Hz 45-65Hz	45-65Hz 45-65Hz	45-65Hz 45-65Hz
Data Logging with timestamp	1920 hours x 68 different parameters 240 days x 68 different parameters 36 months x 68 different parameters	1920 hours x 68 different parameters	- -	1920 hours x 68 different parameters	1920 hours x 68 different parameters
		240 days x 68 different parameters	- -	240 days x 68 different parameters	240 days x 68 different parameters
		36 months x 68 different parameters	- -	36 months x 68 different parameters	36 months x 68 different parameters
	Demand Alarm records	4 months x 16 different parameters 50			
Communication	Modbus RTU 2400-115200 bps adjustable	Modbus RTU 2400-115200 bps adjustable	Modbus RTU 1200-57600 bps adjustable	Modbus RTU 2400-115200 bps adjustable	Modbus RTU 2400-115200 bps adjustable
	Parity number Stop bit	None 1	None 1	Odd, Even, None 1	Odd,Even, None 1
	Address	1-247	1-247	1-247	1-247
	Isolation	2750V RMS	2750V RMS	2750V RMS	2750V RMS
	Weight(g)	428	378	323	428
	Protection Class	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)
Mechanical Properties	Assembly Type	Panel Mount	Panel Mount	Panel Mount	Panel Mount
	Supply, Voltage, Current, Relay Outputs	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG
	Digital I/O, RS 485, Analog Output	1,5 mm <sup>2</sup> -16AWG 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16AWG 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16AWG 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16AWG 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG
	Operating Temperature Storage Temperature Relative Humidity (no condensation)	-20 to +70 °C -30 to +80 °C Max.95%	-20 to +70 °C -30 to +80 °C Max.95%	-20 to +70 °C -30 to +80 °C Max.95%	-20 to +70 °C -30°C +80°C Maks. 95%
EMC-EMI	300 VAC CAT II acc. to IEC 61010-1	Available	Available	Available	Available
	EN 55011/A1:2010, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11	Available	Available	Available	Available

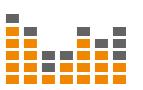


Type	KLEA 320P	KLEA 370P	KLEA 322P	KLEA 324P	KLEA 320P-D	KLEA 370P-D	KLEA 220P	KLEA 110P	KLEA-370P-VSM	KLEA-320P-DC	KLEA-220P-DC
Network Connections	 <b>3 wires with 3 CTs</b>	 <b>4 wires with 3 CTs</b>	 <b>3 wires with 2 CTs</b>	 <b>3 wires with 2 CTs</b>	 <b>3 wires with 2 CTs</b>	 <b>3 wires with 3 CTs</b>	 <b>4 wires with 3 CTs</b>				
Schematics	 <b>Digital Input</b>	 <b>Alarm Relay Output</b>	 <b>Digital Output</b>			 <b>Digital Input</b>	 <b>Alarm Relay Output</b>		 <b>Digital Output</b>		
Analog Output Connection			 <b>AO GND</b>								
Dimensional Drawings	 <b>96.8</b> <b>7.0</b> <b>96.8</b> <b>89.6</b>		 <b>96.8</b> <b>7.0</b> <b>96.8</b> <b>89.6</b>		 <b>96.8</b> <b>7.0</b> <b>96.8</b> <b>89.6</b>						



Type	ECRAS 100	ECRAS 120	ECRAS 200	ECRAS 220	ECRAS 100 VCF
Definoton	3Ø Multimeter	3Ø Multimeter	3Ø Multimeter	3Ø Multimeter	3Ø Multimeter
Order Number	606210	606211	606212	606213	606218
Seven Segment Display	Available	Available	Available	Available	Available
LCD	-	-	-	-	-
Language Support	-	-	-	-	-
Battery	-	-	-	-	-
Real Time Clock	-	-	-	-	-
Password Protection	Available	Available	Available	Available	Available
Current Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1- 5.000
Voltage Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1 - 5.000
Demand Period	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	-
Connection Type	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W
Measurement in Quadrants	4	4	4	4	-
Number of Measurement in a period	256	256	256	256	256
LCD/Display Refresh Period	1 sec	1 sec	1 sec	1 sec	1 sec.
Networks	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT
Phasor Diagram	-	-	-	-	-
Signal Waveforms	-	-	-	-	-
Min/Max/Demand Values	Available	Available	Available	Available	-
Number of Tariffs	1	1	1	1	-
Multi Sub-Tariffs(Peak, Day and Off-Peak)	-	-	-	-	-
1Ø Phase Energy Meters	Available	Available	Available	Available	-
3Ø Phase Energy Meters	Available	Available	Available	Available	Available
4-Quadrant Reactive Energy Meters	-	-	-	-	-
Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC
Oversvoltage Category	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II
Measurement Surge Voltage	2 kV	2 kV	2 kV	2 kV	2 kV
Power Consumption	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA
intermittent overload	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec
Sampling Freq.between 45-65 Hz	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz
Oversvoltage Category	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III
Measured Range L-N	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms
Measured Range L-L	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms
Measured Frequency Range	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
Power Consumption	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA
Sampling Freq.between 45-65 Hz	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz
Power Quality Measurements	Harmonics for current and voltage phases	Upto 31st	Upto 31st	Upto 31st	-
THD-Voltage in %	Available	Available	Available	Available	-
THD-Current in %	Available	Available	Available	Available	-
Other Measurements	Run Hour (Operating time for load in hours)	Available	Available	Available	-
	On Hour (Operating time for meter in hours)	Available	Available	Available	-
	Int Counter (Number of power interruptions)	Available	Available	Available	-
	Total Active Power	Class 0.5	Class 0.5	Class 0.5	Class 0.5
	Total Reactive Power	Class 1	Class 1	Class 1	Class 1
	Total Apparent Power	Class 0.5	Class 0.5	Class 0.5	Class 0.5
	Total Active Energy	Class 0.5	Class 0.5	Class 0.5	Class 0.5
	Total Reactive Energy	Class 2	Class 2	Class 2	Class 2
	Frequency	Class 0.1	Class 0.1	Class 0.1	Class 0.1
	Current	Class 0.5	Class 0.5	Class 0.5	Class 0.5
	Neutral Current (calculated)	Class 0.5	Class 0.5	Class 0.5	Class 0.5
	Voltage	Class 0.2	Class 0.2	Class 0.2	Class 0.2
	Power factor	Class 0.5	Class 0.5	Class 0.5	Class 0.5
	THDV, THDI	Class 1	Class 1	Class 1	Class 1
	According to IEC 62053-22	Total Active Energy	Class 0.55	Class 0.55	Class 0.55
	According to IEC 62053-23	Total Reactive Energy	Class 2	Class 2	Class 2
Inputs and Outputs	Number of outputs	-	2 pcs.	-	2 pcs.
	Type	NO (SPST)	NO (SPST)	NO (SPST)	-
	Max. Switching Current	-	10 A	-	10 A
	Max. Switching Voltage	-	250 VAC	-	250 VAC
	Max. Switching Power	-	1250 VA	-	1250 VA

Type	ECRAS 100	ECRAS 120	ECRAS 200	ECRAS 220	ECRAS 100 VCF
Digital Inputs	Number of inputs	-	-	-	-
	Minimum Counting Frequency	-	-	-	-
	Input Present or Not	-	-	-	-
	Isolation Level	-	-	-	-
Digital Outputs	Number of outputs	-	-	-	-
	Type	-	-	-	-
	Switching Voltage Range	-	-	-	-
	Minimum Switching Frequency	-	-	-	-
	Isolation Level	-	-	-	-
Analog Outputs	Number of outputs	-	-	-	-
	Range of Outputs	0-5 V, -5-5 V, -10-10V, 0-20 mA, 4-20 mA	-	-	-
	Isolation	-	-	-	85-300V
Supply	Voltage	AC 85-300V	85-300V	85-300V	85-300V
	DC	85-300V	85-300V	85-300V	85-300V
	AC	<6VA	<6VA	<6VA	<6VA
	DC	<3W	<3W	<3W	<3W
	Frequency	45-65Hz	45-65Hz	45-65Hz	45-65Hz
Data Logging with timestamp	Hourly records	-	-	-	-
	Daily records	-	-	-	-
	Monthly records	-	-	-	-
Demand	-	-	-	-	-
Alarm records	-	-	-	-	-
Communication	Protocol	-	-	Modbus RTU	Modbus RTU
	Baud rate	-	-	1200-57600 bps adjustable	1200-57600 bps adjustable
	Parity number	-	-	Odd, Even, None	Odd, Even, None
	Stop bit	-	-	1	1
	Address	-	-	1-247	1-247
	Isolation	-	-	2750V RMS	2750V RMS
Mechanical Properties	Weight(g)	272	290	296	316
	Protection Class	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)
	Assembly Type	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Cable Cross Sections	Supply, Voltage, Current, Relay Outputs	Stranded: 2,5 mm²-14AWG Solid: 4mm²-12 AWG, 2x1.5 mm²-2x16 AWG	2,5 mm²-14AWG	2,5 mm²-14AWG	2,5 mm²-14AWG
	Digital I/O, RS 485, Analog Output	Stranded: - Solid: -	-	1,5 mm²-16AWG	1,5 mm²-16AWG
		Solid:	-	1,5 mm²-16 AWG, 2x0,75 mm²-2x18 AWG	1,5 mm²-16 AWG, 2x0,75 mm²-2x18 AWG
Ambient Conditions	Operating Temperature	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
	Storage Temperature	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30°C +80°C
	Relative Humidity (no condensation)	Max.95%	Max.95%	Max.95%	Maks. 95%
EMC-EMI	300 VAC CAT II acc. to IEC 61010-1	Available	Available	Available	Available
	EN 55011/A1:2010, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11	Available	Available	Available	Available



Type	ECRAS 100	ECRAS 120	ECRAS 200	ECRAS 220	ECRAS 100 VCF
Network Connections	<p>3 wires with 3 CTs</p>	<p>4 wires with 3 CTs</p>			
Schematics	<p>Digital I/O And Alarm Output Connections</p> <p>Alarm Relay Output</p>	<p>Alarm Relay Output</p>			
Analog Output Connection	-	-	-	-	-

Type	ECRAS 100	ECRAS 120	ECRAS 200	ECRAS 220	ECRAS 100 VCF
Dimensional Drawings					



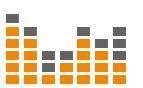
Type	DNPT	POWYS 3121	POWYS 3111	POWYS 3101
Definition	3Ø Power Transducer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer
Order Number	606400	606305	606304	606303
Seven Segment Display	-	-	Available	-
LCD	-	Available	-	-
Language Support	-	-	-	-
Battery	Available	-	-	-
Real Time Clock	Available	-	-	-
Password Protection	-	Available	Available	Available
Current Transformer Ratio	1-5000	1-5000	1-5000	1-5000
Voltage Transformer Ratio	1-5000	1-5000	1-5000	1-5000
Demand Period	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable
Measurement in Quadrants	4	4	4	4
Number of Measurement in a period	512	256	256	256
LCD/Display Refresh Period	-	1 sec	1 sec	-
Network	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT
Wiring	3P4W, 3P3W, Aron	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W
Phasor Diagram	-	-	-	-
Signal Waveforms	-	-	-	-
Min/Max/Demand Values	Available	Available	Available	Available
Number of Tariffs	2	2	2	2
Multi Sub-Tariffs(Peak, Day and Off-Peak)	Available	-	-	-
1Ø Phase Energy Meters	-	Available	Available	Available
3Ø Phase Energy Meters	Available	Available	Available	Available
4 Quadrant Reactive Energy Meters	-	-	-	-
Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC
Overvoltage Category	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II
Measurement Surge Voltage	2 kV	2 kV	2 kV	2 kV
Power Consumption	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA
Intermittent overload	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec
Sampling Freq.between 45-65 Hz	25.6 kHz	12.8 kHz	12.8 kHz	12.8 kHz
Overvoltage Category	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III
Measured Range L-N	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms
Measured Range L-L	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms
Measured Frequency Range	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
Power Consumption	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA
Sampling Freq.between 45-65 Hz	25.6 kHz	12.8 kHz	12.8 kHz	12.8 kHz
Harmonics for current and voltage phases	Upto 51st	Upto 31st	Upto 31st	Upto 31st
THD-Voltage in %	Available	Available	Available	Available
THD-Current in %	Available	Available	Available	Available
Run Hour (Operating time for load in hours)	-	Available	Available	Available
On Hour (Operating time for meter in hours)	-	Available	Available	Available
Int Counter (Number of power interruptions)	-	Available	Available	Available
Total Active Power	Class 0.2	Class 0.5	Class 0.5	Class 0.5
Total Reactive Power	Class 1	Class 1	Class 1	Class 1
Total Apparent Power	Class 0.2	Class 0.5	Class 0.5	Class 0.5
Total Active Energy	Class 0.5	Class 0.5	Class 0.5	Class 0.5
According to IEC 61557-12	Total Reactive Energy	Class 2	Class 2	Class 2
Frequency	Class 0.05	Class 0.1	Class 0.1	Class 0.1
Current	Class 0.2	Class 0.5	Class 0.5	Class 0.5
Neutral Current	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Voltage	Class 0.2	Class 0.2	Class 0.2	Class 0.2
Power factor	Class 0.5	Class 0.5	Class 0.5	Class 0.5
THDV, THDI	Class 1	Class 1	Class 1	Class 1
According to IEC 62053-22	Total Active Energy	Class 0.2S	Class 0.5S	Class 0.5S
Accoding to IEC 62053-23	Total Reactive Energy	Class 2	Class 2	Class 2
Alarm Relay Outputs	Number of outputs	2 pcs.	2 pcs.	2 pcs.
	Type	NO (SPST)	NO (SPST)	NO (SPST)
	Max. Switching Current	10 A	10 A	10 A
	Max. Switching Voltage	250 VAC	250 VAC	250 VAC
	Max. Switching Power	1250 VA	1250 VA	1250 VA
Digital Inputs	Number of inputs	2 pcs.	2 pcs.	2 pcs.
	Minimum Counting Frequency	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms
	Input Present or Not	Dry Contact	Dry Contact	Dry Contact
	Isolation Level	5000 Vrms	5000 Vrms	5000 Vrms
Digital Outputs	Number of outputs	2 pcs.	2 pcs.	2 pcs.
	Type	Transistor	Transistor	Transistor
	Switching Voltage Range	5-30 VDC	5-30 VDC	5-30 VDC
	Minimum Switching Frequency	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms
	Isolation Level	5000 Vrms	5000 Vrms	5000 Vrms
Analog Outputs	Number of outputs	4	-	-
	Range of Outputs	0-5 V, 0-10 V, -5-5 V, -10-10V, 0-20 mA, 4-20 mA	Available	-
	Isolation	isolated	-	-

Type	POWYS 3100	POWYS 1110	POWYS 1120	POWYS 1012	POWYS 1022
Definition	3Ø Energy Analyzer	1Ø Energy Analyzer	1Ø Energy Analyzer	1Ø Energy Analyzer	1Ø Energy Analyzer
Order Number	606300	606351	606352	606354	606355
Seven Segment Display	-	-	-	-	-
LCD	-	-	-	-	-
Language Support	-	-	-	-	-
Battery	-	-	-	-	-
Real Time Clock	-	-	-	-	-
Password Protection	-	-	-	-	-
Current Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1-5000
Voltage Transformer Ratio	1-5000	1-5000	1-5000	1-5000	1-5000
Demand Period	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable
Measurement in Quadrants	4	4	4	4	4
Number of Measurement in a period	256	256	256	256	256
LCD/Display Refresh Period	1 sec	1 sec	1 sec	1 sec	1 sec
Network	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT
Wiring	3P4W, 3P3W	Single-phase with neutral and 1 CT			
Phasor Diagram	-	-	-	-	-
Signal Waveforms	-	-	-	-	-
Min/Max/Demand Values	Available	Available	Available	Available	Available
Number of Tariffs	1	1	1	1	1
Multi Sub-Tariffs(Peak, Day and Off-Peak)	-	-	-	-	-
1Ø Phase Energy Meters	-	-	-	-	-
3Ø Phase Energy Meters	-	-	-	-	-
4 Quadrant Reactive Energy Meters	-	-	-	-	-
Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC
Overvoltage Category	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II
Measurement Surge Voltage	2 kV	2 kV	2 kV	2 kV	2 kV
Power Consumption	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA
Intermittent overload	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec
Sampling Freq.between 45-65 Hz	25.6 kHz	12.8 kHz	12.8 kHz	12.8 kHz	12.8 kHz
Overvoltage Category	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III
Measured Range L-N	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms	1-300 Vrms
Measured Range L-L	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms	2-500 Vrms
Measured Frequency Range	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
Power Consumption	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA	<0.1 VA
Sampling Freq.between 45-65 Hz	25.6 kHz	12.8 kHz	12.8 kHz	12.8 kHz	12.8 kHz
Harmonics for current and voltage phases	Upto 51st	Upto 31st	Upto 31st	Upto 31st	Upto 31st
THD-Voltage in %	Available	Available	Available	Available	Available
THD-Current in %	Available	Available	Available	Available	Available
Run Hour (Operating time for load in hours)	-	Available	Available	Available	Available
On Hour (Operating time for meter in hours)	-	Available	Available	Available	Available
Int Counter (Number of power interruptions)	-	Available	Available	Available	Available
Total Active Power	Class 0.2	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Total Reactive Power	Class 1	Class 1	Class 1	Class 1	Class 1
Total Apparent Power	Class 0.2	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Total Active Energy	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
According to IEC 61557-12	Total Reactive Energy	Class 2	Class 2	Class 2	Class 2
Frequency	Class 0.05	Class 0.1	Class 0.1	Class 0.1	Class 0.1
Current	Class 0.2	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Neutral Current	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Voltage	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2
Power factor	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
THDV, THDI	Class 1	Class 1	Class 1	Class 1	Class 1
According to IEC 62053-22	Total Active Energy	Class 0.2S	Class 0.5S	Class 0.5S	Class 0.5S
Accoding to IEC 62053-23	Total Reactive Energy	Class 2	Class 2	Class 2	



Type	DNPT	POWYS 3121	POWYS 3111	POWYS 3101
Supply	Voltage	AC 85-300V DC 85-300V	85-300V 85-300V	85-300V 85-300V
	Consumption	AC <3VA DC <2.5W	<4.5VA <2W	<6VA <3W
	Frequency	45-65Hz	45-65Hz	45-65Hz
Data Logging with timestamp	Min/max/avg Values	Hourly records 240 days x 68 different parameters	-	-
	Demand	Monthly records 36 months x 68 different parameters	-	-
	Alarm records	4 months x 16 different parameters 50	-	-
Communication	Protocol	Modbus RTU	Modbus RTU	Modbus RTU
	Baud rate	2400-115200 bps adjustable	1200-57600 bps adjustable	1200-57600 bps adjustable
	Parity number	None	Odd, Even, None	Odd, Even, None
	Stop bit	1	1	1
Mechanical Properties	Address	1-247	1-247	1-247
	Isolation	2750V RMS	2750V RMS	2750V RMS
	Weight(g)	335	340	278
	Protection Class	IP20	IP20	IP20
Cable Cross Sections	Assembly Type	Panel Mount	Panel Mount	Panel Mount
	Supply, Voltage, Current, Relay Outputs	2,5 mm <sup>2</sup> - 14AWG Solid:	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG
	Digital I/O, RS 485, Analog Output	Solid: 1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG	1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG
Ambient Conditions	Operating Temperature	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
	Storage Temperature	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C
	Relative Humidity (no condensation)	Max.95%	Max.95%	Max.95%
EMC-EMI				
	3 wires with 3 CTs			
	4 wires with 3 CTs			
Schematics	3 wires with 2 CTs  NOTE: CTs can be connected any phase. They are connected to phase 1 and phase 3 in this figure.			
	Single Phase with 1 CT  NOTE: CT and VT can be connected any phase. They are connected to phase-1 in this figure			

POWYS 3100	POWYS 1110	POWYS 1120	POWYS 1012	POWYS 1022
85-300V 85-300V <6VA <3W 45-65Hz	85-300V 85-300V <4VA <4VA 45-65Hz	85-300V 85-300V <4VA <4VA 45-65Hz	85-300V 85-300V <4VA <4VA 45-65Hz	85-300V 85-300V <4VA <4VA 45-65Hz
- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
Modbus RTU 1200-57600 bps adjustable Odd, Even, None 1 1-247 2750V RMS IP20				
2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG 1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG 1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG 1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG 1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG	2,5 mm <sup>2</sup> - 14AWG 4mm <sup>2</sup> -12 AWG, 2x1.5 mm <sup>2</sup> -2x16 AWG 1,5 mm <sup>2</sup> -16AWG 1.5 mm <sup>2</sup> -16 AWG, 2x0.75 mm <sup>2</sup> -2x18 AWG
2A 2A 2A	2A 2A 2A	2A 2A 2A	2A 2A 2A	2A 2A 2A
L1 L2 L3 N	L1 L2 L3 N	L1 L2 L3 N	L1 L2 L3 N	L1 L2 L3 N
I1 I2 I3 k1 k2 k3	I1 I2 I3 k1 k2 k3	I1 I2 I3 k1 k2 k3	I1 I2 I3 k1 k2 k3	I1 I2 I3 k1 k2 k3



Type	DNPT	POWYS 3121	POWYS 3111	POWYS 3101	POWYS 3100	POWYS 1110	POWYS 1120	POWYS 1012	POWYS 1022
Digital Output Connection									
Digital Input Connection									
Alarm Output Connection									
Analog Output Connection									
Dimensional Drawings									

# **Reactive Power Management Solutions**



*Electrical way of saving*



## Defining a power factor controller in simple terms

A power factor controller is an automation device which allows power distribution system to operate at its maximum efficiency with reducing reactive power. This control process reduces the load requirement on the energy generation and transmission supply system.

## Which actions are executed?

Switching capacitors and shunt reactors in order to compensate your system.

Learning voltage-current connections and correcting them when wrong connecting is detected.

Estimating exact step powers thanks to dynamic step monitoring feature.

Displaying switching cycles and connection times for capacitors and shunt reactors.

Activating target- $2 \cos\phi$ , which is required by generators to work their maximum efficiency thanks to generator input.

Provides highly accurate measuring for main electrical parameters and energy metering solutions for your electrical network.

**Measuring**  
Metering  
Communicating  
**Alarming**  
Harmonic monitoring  
**Compensation**  
Data logging  
Dynamic capacitor monitoring  
Learning  
Displaying  
Switching Cycles  
Activating target- $2 \cos\phi$

All the data which are being measured or kept in its memory, can be transmitted to remote monitoring system thanks to modbus communication.

It offers 3-phase energy and power measurement with data logging such as min/max/avg values, energy values, demand values etc. with date and time.

Low/high limit thresholds for all parameters can be defined so load management is possible by means of alarm relay outputs.

In dept-analysis of individual current and voltage harmonics in order to increase network quality.

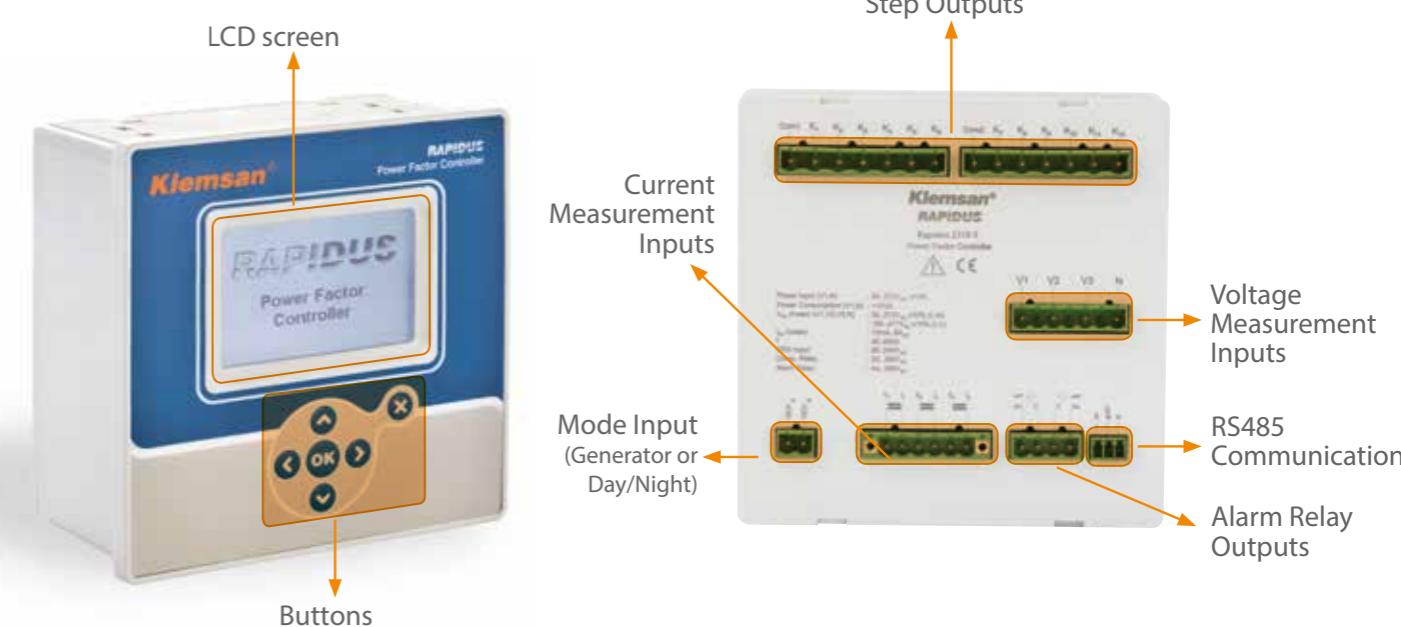
Detailed analyze of phase relationships between current and voltage lines thanks to phasor diagram feature.

## Benefits and Advantages

- Current inputs can withstand surges up to 100 A for 1 second
- State of the art technology; modular design, no connector cables, no fixing screws inside
- Multiple compensation modes
- Capacitors and shunt reactors can be connected to each step
- Mono phase and 3 phase compensation
- Dynamic capacitor monitoring
- Learning connections and step powers
- Display of switching cycle for each step
- Display of connection time for each step
- Multi-language support
- Adjustable phase difference angle
- Energy meters
- Harmonic measurement up to 51st
- Programmable alarm output
- Modbus communication
- Real time clock
- Connection to current transformer x/1 A or x/5 A
- High measurement accuracy according to IEC standards
- Easy configuration with integrated push buttons
- High level of Electromagnetic compatibility (EMC) i.e. maximum immunity to interferences
- Self-Extinguishing plastic housing

## Layout & Mounting

Klemsan power factor devices are suitable for panel mounting for 96x96mm or 144x144mm standards.



## Data Centers, UPS system



Rapidus reactive controller provides two way compensation with controlling capacitors and shunt reactors. Thus, it presents perfect solution for the places where the load is capacitive, such as data centers, mining areas, UPS system, energy transmission lines etc.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Dynamic Capacitor Monitoring(DCM)



DCM is a supreme function in Rapidus which enables the user to make pro-active maintenance for compensation cabinets. DCM tracks the real time KVAR values of each step and uses the measured KVAR value in compensation calculations.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Reducing Energy Losses



Limiting energy losses by Joule effect, increasing available active power to use better kW/KVA ratio, reducing level of system noises.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Reduction of the Electricity Bill



Depending on the different electrical tariffs in different countries, the cost of electricity can be reduced by balancing reactive energy or elimination of reactive penalty payments.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Energy Metering Applications



In standart compensation cabinets, there are always a multimeter or an analyzer to be associated with a power factor controller. Rapidus, as a two-in-one device meets both requirements of the industry. Users can reduce analyzer, wiring and labor costs by not using an external energy analyzer.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Steel Process Plants



Disconnection of capacitors can be provided by using alarm relay outputs of Rapidus. So undesired voltage levels in compensation panels and subsequent switchgear damages can be prevented before it is too late.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Industrial Plants



Low power factor problems which are occurred in industrial facilities such as overloaded cables and transformers, reduced voltage level, poor quality motor performance, utility penalty payments etc. can be eliminated with proper analysis by a power factor controller.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Contactor, Capacitor and Shunt Reactor Maintenance



Monitoring switching cycles and operation times for capacitors and shunt reactors helps you to understand how long they are used and how many times they are switched. Plus, DCM feature calculates exact step powers. So it is easy to define maintenance schedules for your compensation panels.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

## Alarm Control Applications



All necessary parameters such as voltage, current, frequency, temperature, step powers, Q/P ratios, harmonics etc. can be assigned to an alarm relay in order to provide system reliability and durability.

**POWER  
FACTOR  
CONTROLLER**  
RAPIDUS Series

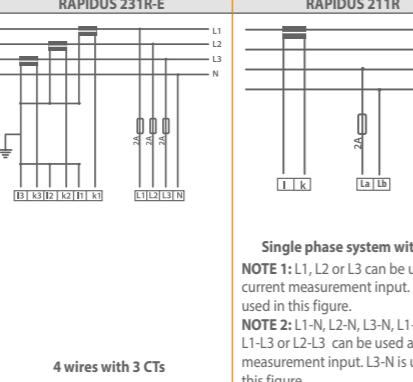
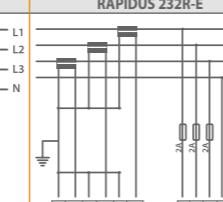
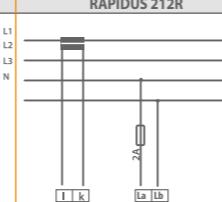
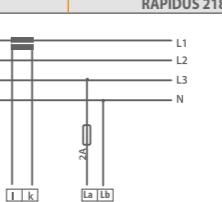
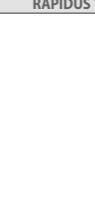
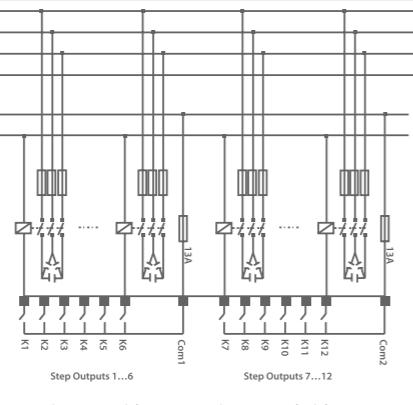
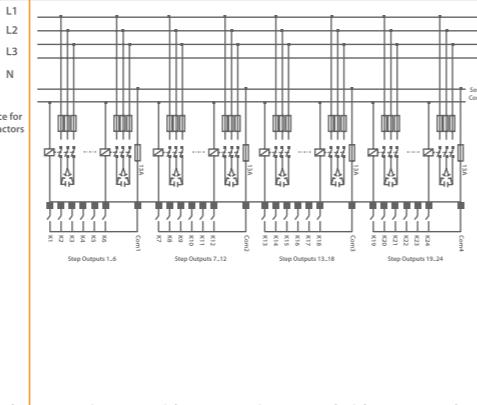
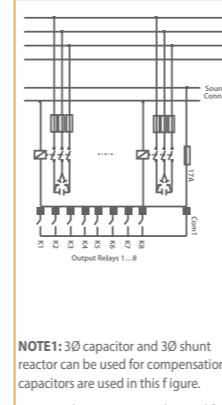
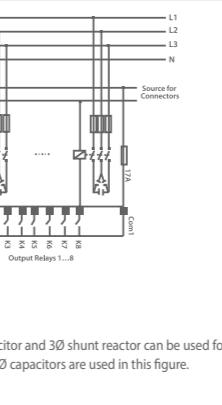
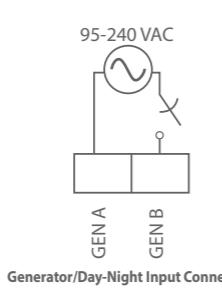
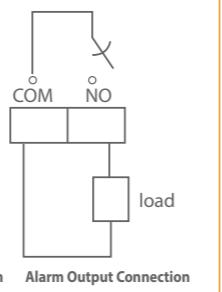
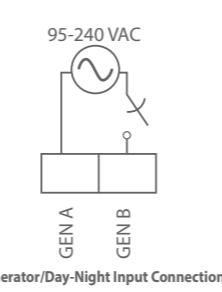
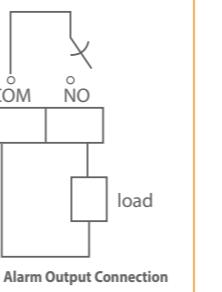
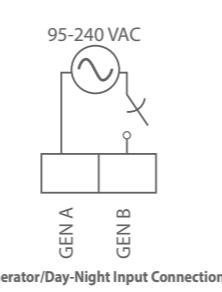
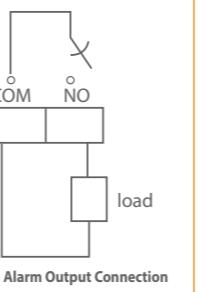
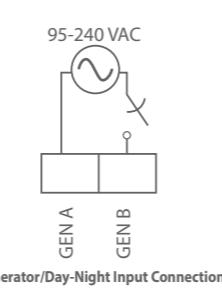
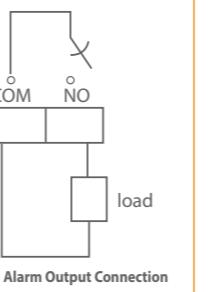
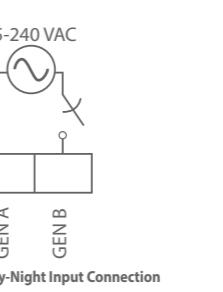
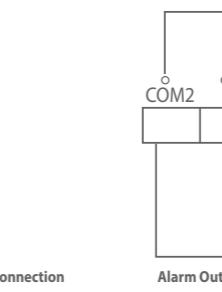
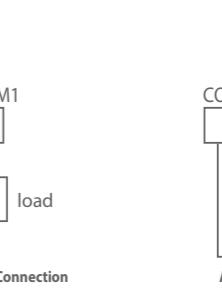
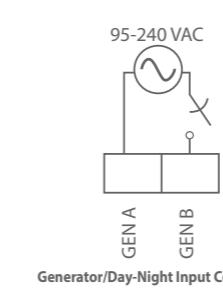
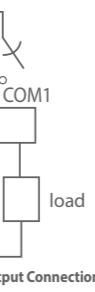
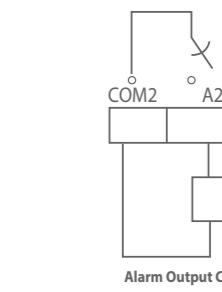
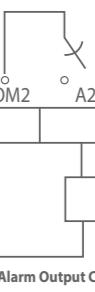
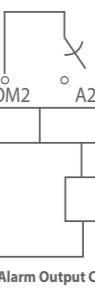
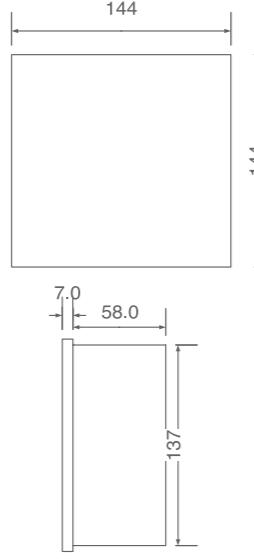
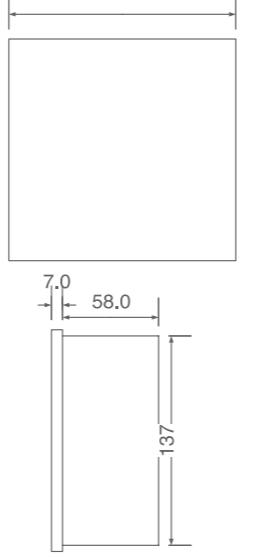
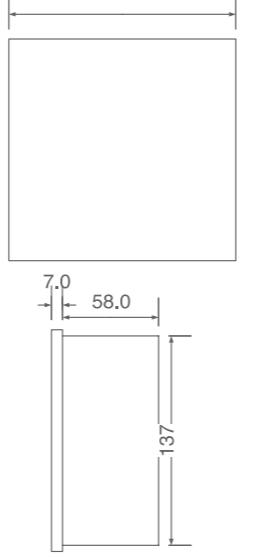
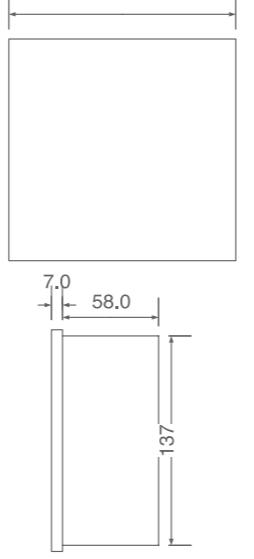
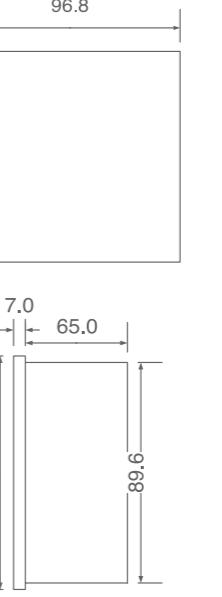
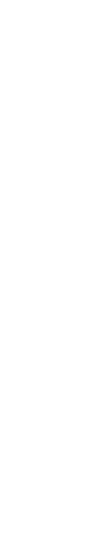


Type	RAPIDUS 231R-E	RAPIDUS 211R	RAPIDUS 232R-E	RAPIDUS 212R
Definition	Power Factor Controller (3Ø-12steps)	Power Factor Controller (1Ø-12steps)	Power Factor Controller (3Ø-24steps)	Power Factor Controller (1Ø-24steps)
Order Number	606005	606011	606007	606014
Measuring system	3Ø	1Ø	3Ø	1Ø
LCD Screen	Available	Available	Available	Available
Language Support	Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian
Battery	Available	Available	Available	Available
Real Time Clock	Available	Available	Available	Available
Password Protection	Available	Available	Available	Available
Current Transformer Ratio	1-5000	1-5000	1-5000	1-5000
Voltage Transformer Ratio	1-5000	1-5000	1-5000	1-5000
Demand Period	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable
Connection Type	3P4W		Single phase(L-L or L-N) voltage connection with 1 CT	3P4W
Measurement in Quadrants	4	4	4	4
Number of Measurement in a period	512	512	512	512
LCD/Display Refresh Period	1 sec	1 sec	1 sec	1 sec
Networks	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT
Phasor Diagram	Available	Available	Available	Available
Signal Waveforms	-	-	-	-
Min/Max/Demand Values	Available	Available	Available	Available
Compensation Modes	Rapido (Intelligent control mode)	Available	Available	Available
	Sequential	Available	Available	Available
	Linear	Available	Available	Available
	Circular	Available	Available	Available
	Manual	Available	Available	Available
Step Configurations	Manually Assign	Available	Available	Available
	Predefined	1-1-1, 1-1-2-2, 1-2-2-4, 1-2-3-3, 1-2-4-4, 1-1-2-4, 1-2-3-4, 1-2-4-8, 1-1-2-3	1-1-1, 1-1-2-2, 1-2-2-4, 1-2-3-3, 1-2-4-4, 1-1-2-4, 1-2-3-4, 1-2-4-8, 1-1-2-3	1-1-1, 1-1-2-2, 1-2-2-4, 1-2-3-3, 1-2-4-4, 1-1-2-4, 1-2-3-4, 1-2-4-8, 1-1-2-3
	DCM	Available	Available	-
	Fixed Step Assignment	Available	Available	Available
	Power(kVAr)	0.00-1000 adjustable	0.00-1000 adjustable	0.00-1000 adjustable
Control Operations and Functions	Type	3Ø capacitor, 3Ø shunt reactor, 1Ø capacitor or 1Ø shunt reactor adjustable	3Ø capacitor, 3Ø shunt reactor, 1Ø capacitor or 1Ø shunt reactor adjustable	3Ø capacitor, 3Ø shunt reactor adjustable
	Power factor settings	Target 1 cosØ 0.8cap. to 0.8ind. adjustable Target 2 cosØ 0.8cap. to 0.8ind. adjustable	0.8cap. to 0.8ind. adjustable 0.8cap. to 0.8ind. adjustable	0.8cap. to 0.8ind. adjustable 0.8cap. to 0.8ind. adjustable
	Learning Step Powers and Connections	Available	Available	Available
	Dual cosØ target	Available	Available	Available
	4 Quadrant operation for generators	Available	Available	Available
Time delays	Step activation time	1-600 sec adjustable	1-600 sec adjustable	1-600 sec adjustable
	Step deactivation time	1-600 sec adjustable	1-600 sec adjustable	1-600 sec adjustable
	Step discharge time	3-1000 sec adjustable	3-1000 sec adjustable	3-1000 sec adjustable
	Phase shift angle	±45 degree adjustable	±45 degree adjustable	±45 degree adjustable
	Averaging time	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable
Energy Meters	Number of Tariffs	1	1	1
	Multi Sub-Tariffs(Peak, Day and Off-Peak)	-	-	-
	1Ø Phase Energy Meter	-	-	-
	3Ø Phase Energy Meters	Available	Available	Available
Current Measurement Input	4 Quadrant Reactive Energy Meters	-	-	-
	Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC
	Overvoltage Category	300 V Cat II	300 V Cat II	300 V Cat II
	Measurement Surge Voltage	2 kV	2 kV	2 kV
	Power Consumption	<0.2 VA	<0.2 VA	<0.2 VA
Voltage Measurement Input	Intermittent overload	100A for 1 sec	100A for 1 sec	100A for 1 sec
	Sampling Freq.between 45-65 Hz	25.6 kHz	25.6 kHz	25.6 kHz
	Overvoltage Category	300 V Cat III	300 V Cat III	300 V Cat III
	Measured Range L-N	95-272 VAC ±10%	95-410VAC ±10%	95-272 VAC ±10%
	Measured Range L-L	164-471 VAC ±10%	95-410VAC ±10%	164-471 VAC ±10%
Power Quality Measurements	Measured Frequency Range	45-65 Hz	45-65 Hz	45-65 Hz
	Power Consumption	<0.1 VA	<0.1 VA	<0.1 VA
	Sampling Freq.between 45-65 Hz	25.6 kHz	25.6 kHz	25.6 kHz
	Harmonics / current and voltage	Upto 51st	Upto 51st	Upto 51st
	THD-Voltage in %	Available	Available	Available
	THD-Current in %	Available	Available	Available

RAPIDUS 218R	RAPIDUS 114	RAPIDUS 114R	RAPIDUS 116	RAPIDUS 116R	RAPIDUS 118
Power Factor Controller (1Ø-8steps)	Power Factor Controller (1Ø-4steps)	Power Factor Controller (1Ø-4steps)	Power Factor Controller (1Ø-6steps)	Power Factor Controller (1Ø-6steps)	Power Factor Controller (1Ø-8steps)
606021	606060	606061	606062	606063	606064
1Ø	1Ø	1Ø	1Ø	1Ø	1Ø
Available	Custom LCD	Custom LCD	Custom LCD	Custom LCD	Custom LCD
Turkish, English, Russian	Turkish, English	Turkish, English	Turkish, English	Turkish, English	Turkish, English
Battery	-	-	-	-	-
Real Time Clock	-	-	-	-	-
Password Protection	Available	Available	Available	Available	Available
Current Transformer Ratio	1-5000	1 - 5.000	1 - 5.000	1 - 5.000	1 - 5.000
Voltage Transformer Ratio	1-5000	1 - 999.9	1 - 999.9	1 - 999.9	1 - 999.9
Demand Period	1-60 minutes adjustable	-	-	-	-
Connection Type	Single phase(L-L or L-N) voltage connection with 1 CT	L-L/L-N	L-L/L-N	L-L/L-N	L-L/L-N
Measurement in Quadrants	4	-	-	-	-
Number of Measurement in a period	512	512	512	512	512
LCD/Display Refresh Period	<0.5 sec.	<0.5 sec.	<0.5 sec.	<0.5 sec.	<0.5 sec.
Networks	TT, TN, IT	TT, TN	TT, TN	TT, TN	TT, TN
Phasor Diagram	Available	-	-	-	-
Signal Waveforms	-	-	-	-	-
Min/Max/Demand Values	Available	Available	Available	Available	Available
Compensation Modes	Rapido (Intelligent control mode)	Available	Available	Available	Available
	Sequential	Available	Available	Available	Available
	Linear	Available	Available	Available	Available
	Circular	Available	Available	Available	Available
	Manual	Available	Available	Available	Available
Step Configurations	Manually Assign	Available	Available	Available	Available
	Predefined	1-1-1, 1-1-2-2, 1-2-2-4, 1-2-3-3, 1-2-4-4, 1-1-2-4, 1-2-3-4, 1-2-4-8, 1-1-2-3	1-1-1, 1-1-2-2, 1-2-2-4, 1-2-3-3, 1-2-4-4, 1-1-2-4, 1-2-3-4, 1-2-4-8, 1-1-2-3	1-1-1, 1-1-2-2, 1-2-2-4, 1-2-3-3, 1-2-4-4, 1-1-2-4, 1-2-3-4, 1-2-4-8, 1-1-2-3	
	DCM	Available	-	-	-
	Fixed Step Assignment	Available	Available	Available	Available
	Power(kVAr)	0.00-1000 adjustable	0.00-1000 adjustable	0.00-1000 adjustable	0.00-1000 adjustable
Control Operations and Functions	Type	3Ø capacitor, 3Ø shunt reactor, 1Ø capacitor or 1Ø shunt reactor adjustable	3Ø capacitor, 3Ø shunt reactor, 1Ø capacitor or 1Ø shunt reactor adjustable	3Ø capacitor, 3Ø shunt reactor adjustable	3Ø capacitor, 3Ø shunt reactor or 1Ø capacitor
	Power factor settings	0.8cap. to 0.8ind. adjustable 0.8cap. to 0.8ind. adjustable	0.8cap. to 0.8ind. adjustable 0.8cap. to 0.8ind. adjustable	0.8cap. to 0.8ind. adjustable 0.8cap. to 0.8ind. adjustable	0.8cap. to 0.8ind. adjustable 0.8cap. to 0.8ind. adjustable
	Learning Step Powers and Connections	Available	Available	Available	Available
	Dual cosØ target	Available	Available	Available	Available
	4 Quadrant operation for generators	Available	Available	Available	Available
Time delays	Step activation time	1-600 sec adjustable	1-600 sec adjustable	1-600 sec adjustable	1-600 sec adjustable
	Step deactivation time	1-600 sec adjustable	1-600 sec adjustable	1-600 sec adjustable	1-600 sec adjustable
	Step discharge time	3-1000 sec adjustable	3-1000 sec adjustable	3-1000 sec adjustable	3-1000 sec adjustable
	Phase shift angle	±45 degree adjustable	±45 degree adjustable	±45 degree adjustable	±45 degree adjustable
	Averaging time	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable
Energy Meters	Number of Tariffs	1	1	1	1
	Multi Sub-Tariffs(Peak, Day and Off-Peak)	-	-	-	-
	1Ø Phase Energy Meter	-	-	-	-
	3Ø Phase Energy Meters	Available	Available	Available	Available
Current Measurement Input	4 Quadrant Reactive Energy Meters	-	-	-	-
	Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC
	Overvoltage Category	300 V Cat II	300 V Cat II	300 V Cat II	300 V Cat II
	Measurement Surge Voltage	2 kV	2 kV	2 kV	2 kV
	Power Consumption	<0.2 VA	<0.2 VA	<0.2 VA	<0.2 VA
Voltage Measurement Input	Intermittent overload	100A for 1 sec	100A for 1 sec	100A for 1 sec	100A for 1 sec
	Sampling Freq.between 45-65 Hz	25.6 kHz	25.6 kHz	25.6 kHz	25.6 kHz
	Overvoltage Category	300 V Cat III	300 V Cat III	300 V Cat III	300 V Cat III
	Measured Range L-N	95-272 VAC ±10%	95-410VAC ±10%	95-272 VAC ±10%	95-410VAC ±10%
	Measured Range L-L	164-471 VAC ±10%	95-410VAC ±10%	164-471 VAC ±10%	164-471 VAC ±10%
Power Quality Measurements	Measured Frequency Range	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
	Power Consumption	<0.1 VA	<0.1 VA	<0.1 VA</td	

Type	RAPIDUS 231R-E	RAPIDUS 211R	RAPIDUS 232R-E	RAPIDUS 212R	
Measurement Accuracy According to IEC 61557-12	Total Active Power	Class 0.2	Class 0.2	Class 0.2	
	Total Reactive Power	Class 1	Class 1	Class 1	
	Total Apparent Power	Class 0.2	Class 0.2	Class 0.2	
	Total Active Energy	Class 0.5	Class 0.5	Class 0.5	
	Total Reactive Energy	Class 2	Class 2	Class 2	
	Frequency	Class 0.05	Class 0.05	Class 0.05	
	Current	Class 0.2	Class 0.2	Class 0.2	
	Neutral Current	Class 0.5	Class 0.5	Class 0.5	
	Voltage	Class 0.2	Class 0.2	Class 0.2	
	Power factor	Class 0.5	Class 0.5	Class 0.5	
According to IEC 62053-22	THDV, THDI	Class 1	Class 1	Class 1	
	Total Active Energy	Class 0.25	Class 0.25	Class 0.25	
	Total Reactive Energy	Class 2	Class 2	Class 2	
Input and Outputs Compensation Relay Outputs	Number of outputs	12 pcs.	12 pcs.	24 pcs.	
	Type	NO (SPST)	NO (SPST)	NO (SPST)	
	Max. Switching Current	2 A	2 A	2 A	
	Max. switching Voltage	250 VAC	250 VAC	250 VAC	
	Max. switching Power	1250 VA	1250 VA	1250 VA	
	Mechanical life time	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	
	Electrical life time operations (for NO side)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	
	Number of outputs	2 pcs.	2 pcs.	2 pcs.	
	Type	NO (SPST)	NO (SPST)	NO (SPST)	
	Max. Switching Current	4 A	4 A	4 A	
Input and Outputs Alarm Relay Outputs	Max. switching Voltage	250 VAC	250 VAC	250 VAC	
	Max. switching Power	1250 VA	1250 VA	1250 VA	
	Mechanical life time	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	
	Electrical life time operations (for NO side)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	
	Number of inputs	1 pc.	1 pc.	1 pc.	
	Frequency	45-65Hz	45-65Hz	45-65Hz	
	Input Present or Not	95-240VAC	95-240VAC	95-240VAC	
	Digital Outputs	-	-	-	
	Analog Outputs	-	-	-	
	Auxiliary supply input	No	No	No	
Supply	Voltage	95-272VAC ±10% from L1-N	95-410VAC ±10% from La-Lb	95-272VAC ±10% from L1-N	95-410VAC ±10% from La-Lb
	Frequency	45-65Hz	45-65Hz	45-65Hz	45-65Hz
	Consumption	AC < 10VA DC -	< 10VA -	< 10VA -	< 10VA -
Data Logging with timestamp	Min/max/avg Values	Hourly records Daily records Monthly records	1920 hours x 68 different paramters 240 days x 68 different paramters 36 hours x 68 different paramters	1920 hours x 68 different paramters 240 days x 68 different paramters 36 hours x 68 different paramters	1920 hours x 68 different paramters 240 days x 68 different paramters 36 hours x 68 different paramters
	Demand	4 months x 16 different parameters	4 months x 16 different parameters	4 months x 16 different parameters	4 months x 16 different parameters
	Alarm records	50	50	50	50
	Protocol	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU
Communication	Baud rate	2400-115200 bps adjustable	2400-115200 bps adjustable	2400-115200 bps adjustable	2400-115200 bps adjustable
	Parity number	None	None	None	None
	Stop bit	1	1	1	1
	Address	1-247 adjustable	1-247 adjustable	1-247	1-247
	Isolation	2000V RMS	2000V RMS	2000V RMS	2000V RMS
Mechanical Properties	Weight(g)	670	663	765	750
	Protection Class	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)
	Assembly Type	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Cable Cross Sections	Voltage, Current, All Relay Outputs, Gen Input	Stranded: 2,5 mm <sup>2</sup> - 14AWG Solid: 4mm <sup>2</sup> -12 AWG, 2x1,5 mm <sup>2</sup> -2x16 AWG	Stranded: 2,5 mm <sup>2</sup> - 14AWG Solid: 4mm <sup>2</sup> -12 AWG, 2x1,5 mm <sup>2</sup> -2x16 AWG	Stranded: 2,5 mm <sup>2</sup> - 14AWG Solid: 4mm <sup>2</sup> -12 AWG, 2x1,5 mm <sup>2</sup> -2x16 AWG	Stranded: 2,5 mm <sup>2</sup> - 14AWG Solid: 4mm <sup>2</sup> -12 AWG, 2x1,5 mm <sup>2</sup> -2x16 AWG
	RS 485	Stranded: 1,5 mm <sup>2</sup> -16AWG Solid: 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	Stranded: 1,5 mm <sup>2</sup> -16AWG Solid: 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	Stranded: 1,5 mm <sup>2</sup> -16AWG Solid: 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG	Stranded: 1,5 mm <sup>2</sup> -16AWG Solid: 1,5 mm <sup>2</sup> -16 AWG, 2x0,75 mm <sup>2</sup> -2x18 AWG
	Operating Temperature	-20 to +55 °C	-20 to +55 °C	-20 to +55 °C	-20 to +55 °C
	Storage Temperature	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C
Ambient Conditions	Relative Humidity (no condensation)	Max.95%	Max.95%	Max.95%	Max.95%
	EMC-EMI	EN 61000-6-1:2011 Available	Available	Available	Available
EMC-EMI	EN 61000-6-3/A1/AC2013	Available	Available	Available	Available

RAPIDUS 218R	RAPIDUS 114	RAPIDUS 114R	RAPIDUS 116	RAPIDUS 116R	RAPIDUS 118
Class 0.2	Class 0.5				
Class 1	Class 1	Class 1	Class 1	Class 1	Class 1
Class 0.2	Class 0.5				
Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Class 2	Class 2	Class 2	Class 2	Class 2	Class 2
Class 0.05	Class 0.1				
Class 0.2	Class 0.5				
Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2
Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5
Class 1	Class 1	Class 1	Class 1	Class 1	Class 1
Class 0.25	Class 0.55				
Class 2	Class 2	Class 2	Class 2	Class 2	Class 2
8+2 (If alarm relay outputs are used for compensation) pcs.	4	4	6	6	8
NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)
2 A	2A	2A	2A	2A	2A
250 VAC	250VAC	250VAC	250VAC	250VAC	250VAC
1250 VA	1250VA	1250VA	1250VA	1250VA	1250VA
≥ 10 <sup>7</sup> operations	≥ 10.000000 operations	≥ 10.000000 operations	≥ 10.000000 operations	≥ 10.000000 operations	≥ 10.000000 operations
5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)
2 pcs.	2	2	2	2	2
NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)
4 A	4A	4A	4A	4A	4A
250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC
1250 VA	1250 VA	1250 VA	1250 VA	1250 VA	1250 VA
≥ 10 <sup>7</sup> operations	≥ 10.000000 operations	≥ 10.000000 operations	≥ 10.000000 operations	≥ 10.000000 operations	≥ 10.000000 operations
5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)
1 pc.	1	1	1	1	1
45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz
95-240VAC	95-240VAC	95-240VAC	95-240VAC	95-240VAC	95-240VAC
No	-	-	-	-	-
95-410VAC ±10% from La-Lb	120...510V AC ±10% from L1-N				
45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz
< 10VA	< 10VA	< 10VA	< 10VA	< 10VA	< 10VA
-	-	-	-	-	-
1920 hours x 68 different paramters	-	-	-	-	-
240 days x 68 different paramters	-	-	-	-	-
36 hours x 68 different paramters	-	-	-	-	-
4 months x 16 different parameters	-	-	-	-	-
50	-	-	-	-	-
Modbus RTU	-	Modbus RTU	-	Modbus RTU	-
2400-115200 bps adjustable	-	1200-38400 bps adjustable	-	1200-38400 bps adjustable	-
None	-	Odd, Even, None	-	Odd, Even, None	-
1	-	1	-	1	-
1-247	-	1-247	-	1-247	-
2000V RMS	-	2000V RMS	-	2000V RMS	-
415	309	314	319	324	329
Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP2				

Type	RAPIDUS 231R-E	RAPIDUS 211R	RAPIDUS 232R-E	RAPIDUS 212R	RAPIDUS 218R	RAPIDUS 114	RAPIDUS 114R	RAPIDUS 218R	RAPIDUS 116R	RAPIDUS 118
Network Connections										
Schematics										
Gen Input and Alarm Output Connections	 	 	 	 	 	 	 	 	 	 
Dimensional Drawings										

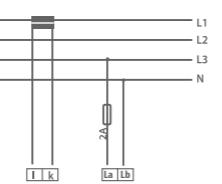
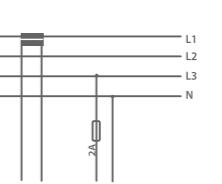
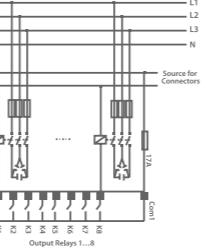
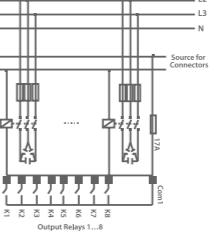
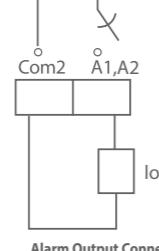
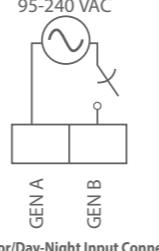
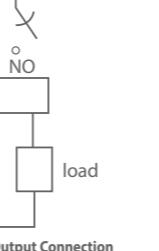
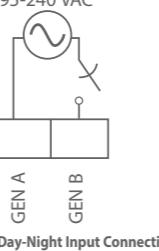
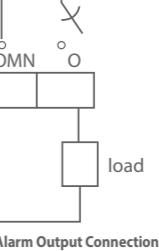
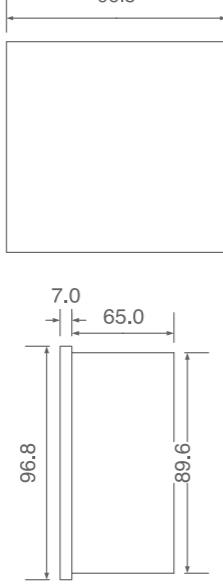
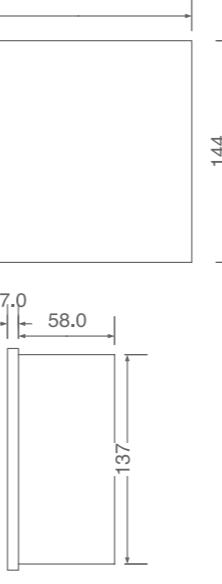
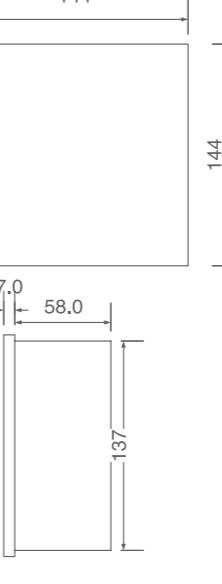


Type	RAPIDUS 118R	RAPIDUS 110	RAPIDUS 110R
Definition	Power Factor Controller (1Ø-8steps)	Power Factor Controller (1Ø-10steps)	Power Factor Controller (1Ø-10steps)
Order Number	606065	606070	606071
Measuring system	1Ø	1Ø	1Ø
LCD Screen	Custom LCD	Custom LCD	Custom LCD
Language Support	Turkish, English	Turkish, English	Turkish, English
Battery	-	-	-
Real Time Clock	-	-	-
Password Protection	Available	Available	Available
Current Transformer Ratio	1 - 5.000	1 - 5.000	1 - 5.000
Voltage Transformer Ratio	1 - 999.9	1 - 999.9	1 - 999.9
Demand Period	-	-	-
Connection Type	L-L/L-N	L-L/L-N	L-L/L-N
Measurement in Quadrants	-	-	-
Number of Measurement in a period	256	256	256
LCD/Display Refresh Period	<0.5 sec.	<0.5 sec.	<0.5 sec.
Networks	TT, TN	TT, TN	TT, TN
Phasor Diagram	-	-	-
Signal Waveforms	-	-	-
Min/Max/Demand Values	-	-	-
Control Operations and Functions			
Compensation Modes	Rapids (Intelligent control mode) Sequential Linear Circular Manual	Available Available	Available Available
Step Configurations	Manually Assign Predefined DCM Fixed Step Assignment	Available 1-1-1-1, 1-2-2-2, 1-2-4-4 - -	Available 1-1-1-1, 1-2-2-2, 1-2-4-4 - -
Power(kVAr)	0.00-1000 adjustable	0.00-1000 adjustable	0.00-1000 adjustable
Type	3Ø capacitor or 1Ø capacitor	3Ø capacitor or 1Ø capacitor	3Ø capacitor or 1Ø capacitor
Power factor settings	Target 1 cosØ Target 2 cosØ	0.8cap. to 0.8ind. Adjustable 0.8cap. to 0.8ind. Adjustable	0.8cap. to 0.8ind. Adjustable 0.8cap. to 0.8ind. Adjustable
Learning Step Powers and Connections	-	-	-
Dual cosØ target	Available	Available	Available
4 Quadrant operation for generators	-	-	-
Step activation time	1-600 sec adjustable	1-600 sec adjustable	1-600 sec adjustable
Time delays	Step deactivation time Step discharge time	1-600 sec adjustable 3-600 sec adjustable	1-600 sec adjustable 3-600 sec adjustable
Phase shift angle	-	-	-
Averaging time	-	-	-
Energy Meters			
Number of Tariffs	1	1	1
Multi Sub-Tariffs(Peak, Day and Off-Peak)	-	-	-
1Ø Phase Energy Meter	Available	Available	Available
3Ø Phase Energy Meters	-	-	-
4 Quadrant Reactive Energy Meters	-	-	-
Current Measurement Input			
Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC
Overvoltage Category	510V CAT II	510V CAT II	510V CAT II
Measurement Surge Voltage	2 kV	2 kV	2 kV
Power Consumption	<0.3 VA	<0.3 VA	<0.3 VA
Intermittent overload	100A for 1 sec	100A for 1 sec	100A for 1 sec
Sampling Freq.between 45-65 Hz	12,8 kHz	12,8 kHz	12,8 kHz
Voltage Measurement Input			
Overvoltage Category	510V CAT III	510V CAT III	510V CAT III
Measured Range L-N	120-510V AC ±10%	120-510V AC ±10%	120-510V AC ±10%
Measured Range L-L	120-510V AC ±10%	120-510V AC ±10%	120-510V AC ±10%
Measured Frequency Range	45...65 Hz	45...65 Hz	45...65 Hz
Power Consumption	<0.2 VA	<0.2 VA	<0.2 VA
Sampling Freq.between 45-65 Hz	12,8 kHz	12,8 kHz	12,8 kHz
Power Quality Measurements			
Harmonics / current and voltage	-	-	-
THD-Voltage in %	Available	Available	Available
THD-Current in %	Available	Available	Available

Type	RAPIDUS 111	RAPIDUS 111R
Definition	Power Factor Controller (1Ø-12steps)	Power Factor Controller (1Ø-12steps)
Order Number	606072	606073
Measuring system	1Ø	1Ø
LCD Screen	Custom LCD	Custom LCD
Language Support	Turkish, English	Turkish, English
Battery	-	-
Real Time Clock	-	-
Password Protection	Available	Available
Current Transformer Ratio	1 - 5.000	1 - 5.000
Voltage Transformer Ratio	1 - 999.9	1 - 999.9
Demand Period	-	-
Connection Type	L-L/L-N	L-L/L-N
Measurement in Quadrants	-	-
Number of Measurement in a period	512	512
LCD/Display Refresh Period	<0.5 sec.	<0.5 sec.
Networks	TT, TN	TT, TN
Phasor Diagram	-	-
Signal Waveforms	-	-
Min/Max/Demand Values	-	-
Control Operations and Functions		
Compensation Modes	Available	Available
Step Configurations	Available Manually Assign Predefined DCM Fixed Step Assignment	Available Available 1-1-1-1, 1-2-2-2, 1-2-4-4 - -
Power(kVAr)	0.00-1000 adjustable	0.00-1000 adjustable
Type	3Ø capacitor or 1Ø capacitor	3Ø capacitor or 1Ø capacitor
Power factor settings	0.8cap. to 0.8ind. Adjustable 0.8cap. to 0.8ind. Adjustable	0.8cap. to 0.8ind. Adjustable 0.8cap. to 0.8ind. Adjustable
Learning Step Powers and Connections	-	-
Dual cosØ target	Available	Available
4 Quadrant operation for generators	-	-
Step activation time	1-600 sec adjustable	1-600 sec adjustable
Time delays	Step deactivation time Step discharge time	1-600 sec adjustable 3-600 sec adjustable
Phase shift angle	-	-
Averaging time	-	-
Energy Meters		
Number of Tariffs	1	1
Multi Sub-Tariffs(Peak, Day and Off-Peak)	-	-
1Ø Phase Energy Meter	Available	Available
3Ø Phase Energy Meters	-	-
4 Quadrant Reactive Energy Meters	-	-
Current Measurement Input		
Measurement Range	10mA-6A AC	10mA-6A AC
Overvoltage Category	510V CAT II	510V CAT II
Measurement Surge Voltage	2 kV	2 kV
Power Consumption	<0.3 VA	<0.3 VA
Intermittent overload	100A for 1 sec	100A for 1 sec
Sampling Freq.between 45-65 Hz	12,8 kHz	12,8 kHz
Voltage Measurement Input		
Overvoltage Category	510V CAT III	510V CAT III
Measured Range L-N	120-510V AC ±10%	120-510V AC ±10%
Measured Range L-L	120-510V AC ±10%	120-510V AC ±10%
Measured Frequency Range	45...65 Hz	45...65 Hz
Power Consumption	<0.2 VA	<0.2 VA
Sampling Freq.between 45-65 Hz	12,8 kHz	12,8 kHz
Power Quality Measurements		
Harmonics / current and voltage	-	-
THD-Voltage in %	Available	Available
THD-Current in %	Available	Available

Type	RAPIDUS 118R	RAPIDUS 110	RAPIDUS 110R
Measurement Accuracy	Total Active Power	Class 0.5	Class 0.5
	Total Reactive Power	Class 1	Class 1
	Total Apparent Power	Class 0.5	Class 0.5
	Total Active Energy	Class 0.5	Class 0.5
	Total Reactive Energy	Class 2	Class 2
	Frequency	Class 0.1	Class 0.1
	Current	Class 0.5	Class 0.5
	Neutral Current	Class 0.5	Class 0.5
	Voltage	Class 0.2	Class 0.2
	Power factor	Class 0.5	Class 0.5
According to IEC 61557-12	THDV, THDI	Class 1	Class 1
	Total Active Energy	Class 0.55	Class 0.55
	Total Reactive Energy	Class 2	Class 2
According to IEC 62053-22	Total Active Energy	Class 0.55	Class 0.55
	Total Reactive Energy	Class 2	Class 2
According to IEC 62053-23	Number of outputs	8	10
	Type	NO (SPST)	NO (SPST)
Input and Outputs	Max. Switching Current	2A	2A
	Max. Switching Voltage	250VAC	250VAC
	Max. Switching Power	1250VA	1250VA
	Mechanical life time	≥ 10.0000000 operations	≥ 10.0000000 operations
	Electrical life time operations (for NO side)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)
	Number of outputs	2	2
	Type	NO (SPST)	NO (SPST)
	Max. Switching Current	4A	4A
	Max. Switching Voltage	250 VAC	250 VAC
	Max. Switching Power	1250 VA	1250 VA
Alarm Relay Outputs	Mechanical life time	≥ 10.0000000 operations	≥ 10.0000000 operations
	Electrical life time operations (for NO side)	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)
	Number of inputs	1	1
	Frequency	45-65Hz	45-65Hz
	Input Present or Not	95-240VAC	95-240VAC
Generator/ Day-Night Input	Digital Outputs	-	-
	Analog Outputs	-	-
Supply	Auxiliary supply input	-	-
	Voltage	120...510V AC ±10% from L1-N	120...510V AC ±10% from L1-N
	Frequency	45-65Hz	45-65Hz
	Consumption	AC < 10VA DC -	< 10VA -
	Min/max/avg Values	Hourly records Daily records Monthly records	- - -
Data Logging with timestamp	Demand	-	-
	Alarm records	-	-
	Protocol	Modbus RTU	Modbus RTU
	Baud rate	1200-38400 bps adjustable	1200-38400 bps adjustable
	Parity number	Odd, Even, None	Odd, Even, None
Communication	Stop bit	1	1
	Address	1-247	1-247
	Isolation	2000V RMS	2000V RMS
	Weight(g)	334	365
	Protection Class	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)
Mechanical Properties	Assembly Type	Panel Mount	Panel Mount
	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)
Cable Cross Sections	Voltage, Current, All Relay Outputs, Gen Input	Stranded: 2.5mm² - 14AWG Solid: 4mm² - 12AWG, 2x1.5mm² - 2x16AWG	2.5mm² - 14AWG 4mm² - 12AWG, 2x1.5mm² - 2x16AWG
	RS 485	Stranded: 1.5mm² - 16AWG Solid: 1.5mm² - 16AWG, 2x0.75mm² - 2x18AWG	- 1.5mm² - 16AWG, 2x0.75mm² - 2x18AWG
	Operating Temperature	-20 to +55 °C	-20°C +55°C
	Storage Temperature	-30 to +80 °C	-30°C +80°C
Ambient Conditions	Relative Humidity (no condensation)	Max.95%	Maks. 95%
	EN 61000-6-1:2011	Available	Available
EMC-EMI	EN 61000-6-3/A1/AC:2013	Available	Available

Type	RAPIDUS 111	RAPIDUS 111R
Measurement Accuracy	Class 0.5	Class 0.5
	Class 1	Class 1
	Class 0.5	Class 0.5
	Class 0.5	Class 0.5
	Class 2	Class 2
	Class 0.1	Class 0.1
	Class 0.5	Class 0.5
	Class 0.5	Class 0.5
	Class 0.2	Class 0.2
	Class 0.5	Class 0.5
According to IEC 61557-12	Class 1	Class 1
	Class 0.5S	Class 0.5S
	Class 2	Class 2
According to IEC 62053-22	12	12
	NO (SPST)	NO (SPST)
	2A	2A
According to IEC 62053-23	250VAC	250VAC
	1250VA	1250VA
	≥ 10.0000000 operations	≥ 10.0000000 operations
Input and Outputs	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)
	2	2
	NO (SPST)	NO (SPST)
	4A	4A
	250 VAC	250 VAC
	1250 VA	1250 VA
	≥ 10.0000000 operations	≥ 10.0000000 operations
	5x104(5A@250VAC) 1x105(5A@30VDC)	5x104(5A@250VAC) 1x105(5A@30VDC)
	1	1
	45-65Hz	45-65Hz
Generator/ Day-Night Input	95-240VAC	95-240VAC
	-	-
	-	-
	-	-
	-	-
Supply	120...510V AC ±10% from L1-N	120...510V AC ±10% from L1-N
	45-65Hz	45-65Hz
	< 10VA	< 10VA
	-	-
	-	-
Data Logging with timestamp	-	-
	-	-
	-	-
	-	-
	-	-
Communication	Modbus RTU	Modbus RTU
	1200-38400 bps adjustable	1200-38400 bps adjustable
	Odd, Even, None	Odd, Even, None
	1	1
	1-247	1-247
Mechanical Properties	2000V RMS	2000V RMS
	374	379
	Front IP40 / Rear IP20 (IP66 with accessory)	Front IP40 / Rear IP20 (IP66 with accessory)
	Panel Mount	Panel Mount
	2.5mm² - 14AWG	2.5mm² - 14AWG
Cable Cross Sections	4mm² - 12AWG, 2x1.5mm² - 2x16AWG	4mm² - 12AWG, 2x1.5mm² - 2x16AWG
	1.5mm² - 16AWG	1.5mm² - 16AWG
	-	-
	1.5mm² - 16AWG, 2x0.75mm² - 2x18AWG	1.5mm² - 16AWG, 2x0.75mm² - 2x18AWG
	-	-
Ambient Conditions	-20°C +55°C	-20°C +55°C
	-30°C +80°C	-30°C +80°C
	Maks. 95%	Maks. 95%
	Available	Available
	Available	Available

Type	RAPIDUS 118R	RAPIDUS 110	RAPIDUS 110R	RAPIDUS 111	RAPIDUS 111R	
Network Connections						
Schematics						
Gen Input and Alarm Output Connections	 Alarm Output Connection	 Generator/Day-Night Input Connection	 Alarm Output Connection	 Generator/Day-Night Input Connection	 Alarm Output Connection	
Dimensional Drawings						

Product Description	"URÜN KODU" Product Code <sup>a</sup>	LVD										EMC <sup>b</sup>										UL US Listed	CSA C22.2 NO14-13	UL 508	CSA C22.2 NO14-13	UL 508	RoHS			
		EN 61010-1	EN 61010-2-30	EN 60664-1	EN 60688	EN 61557-12	EN 61984-1	EN 61010-1	EN 61984-1	EN 61326-1	EN 61000-3-2	EN 61000-3-3	EN 61000-4-2	EN 61000-4-3	EN 61000-4-4	EN 61000-4-5	EN 61000-4-6	EN 61000-4-8	EN 61000-4-11	EN 61000-6-1	EN 61000-6-2	EN 61000-6-3	EN 61000-6-4	EN 55011	EN 55022	CISPR 11/R.E.	CISPR 11/C.E.			
KPR-SCE-12VAC/DC-1C interface relay	270800																											✓	✓	✓
KPR-SCE-24VAC/DC-1C interface relay	270810																											✓	✓	✓
KPR-SCE-48VAC/DC-1C interface relay	270820																											✓	✓	✓
KPR-SCE-60VAC/DC-1C interface relay	270830																											✓	✓	✓
KPR-SCE-115VAC/DC-1C interface relay	270840																											✓	✓	✓
KPR-SCE-230VAC/DC-1C interface relay	270850																											✓	✓	✓
KPR-SCE-12VAC/DC-1C relay socket	270801							✓																				✓	✓	✓
KPR-SCE-24VAC/DC-1C relay socket	270811							✓																				✓	✓	✓
KPR-SCE-48VAC/DC-1C relay socket	270821							✓																				✓	✓	✓
KPR-SCE-60VAC/DC-1C relay socket	270831							✓																				✓	✓	✓
KPR-SCE-115VAC/DC-1C relay socket	270841							✓																				✓	✓	✓
KPR-SCE-230VAC/DC-1C relay socket	270851							✓																				✓	✓	✓
KPR-SCE-6VDC-1C interface relay	270794																											✓	✓	✓
KPR-SCE-12VDC-1C interface relay	270804																											✓	✓	✓
KPR-SCE-24VDC-1C interface relay	270814																											✓	✓	✓
KPR-SCE-48VDC-1C interface relay	270824																											✓	✓	✓
KPR-SCE-60VDC-1C interface relay	270834																											✓	✓	✓
KPR-SCE-115VDC-1C interface relay	270844																											✓	✓	✓
KPR-SCE-6VDC-1C relay socket	270795							✓																				✓	✓	✓
KPR-SCE-12VDC-1C relay socket	270805							✓																				✓	✓	✓
KPR-SCE-24VDC-1C relay socket	270815							✓																				✓	✓	✓
KPR-SCE-48VDC-1C relay socket	270825							✓																				✓	✓	✓
KPR-SCE-60VDC-1C relay socket	270835							✓																				✓	✓	✓
KPR-SCE-115VDC-1C relay socket	270845							✓																				✓	✓	✓
KPR-SCF-115VAC/DC-1C interface relay with filter	270846																											✓	✓	✓
KPR-SCF-230VAC/DC-1C interface relay with filter	270856																											✓	✓	✓
KPR-SCF-230VAC/DC-1C interface relay with filter	270858																											✓	✓	✓
KPR-SCF-115VAC/DC-1C relay socket with filter	270847							✓																				✓	✓	✓
KPR-SCF-230VAC/DC-1C relay socket with filter	270857							✓																				✓	✓	✓
KPR-SCF-230VAC/DC-1C relay socket with filter	270859							✓																				✓	✓	✓
KPR-SWE-6VDC-1C interface relay	272004																											✓	✓	✓
KPR-SWE-12VDC-1C interface relay	272024																											✓	✓	✓
KPR-SWE-24VDC-1C interface relay	272044																											✓	✓	✓
KPR-SWE-48VDC-1C interface relay	272064																											✓	✓	✓
KPR-SWE-60VDC-1C interface relay	272084																											✓	✓	✓
KPR-SWE-115VDC-1C interface relay	272104																											✓	✓	✓
KPR-SWE-6VDC-1C relay socket	272005							✓																				✓	✓	✓
KPR-SWE-12VDC-1C relay socket	272025							✓																				✓	✓	✓
KPR-SWE-24VDC-1C relay socket	272045							✓																				✓	✓	✓
KPR-SWE-48VDC-1																														



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