



Automation Catalogue

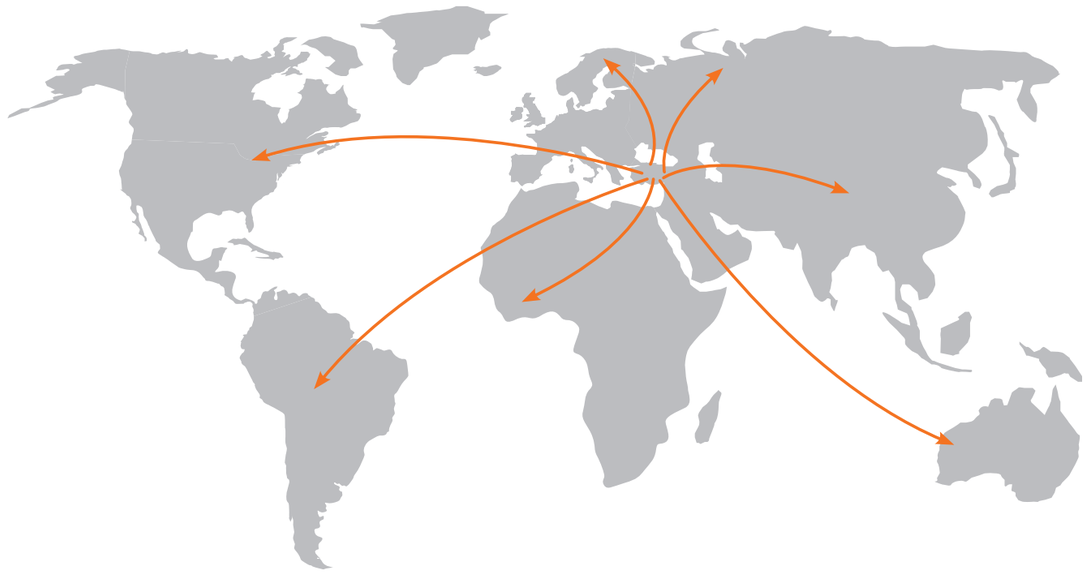
Klemsan®

Leader at Home, Ambitions Worldwide

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

Logistics and After Sales Service

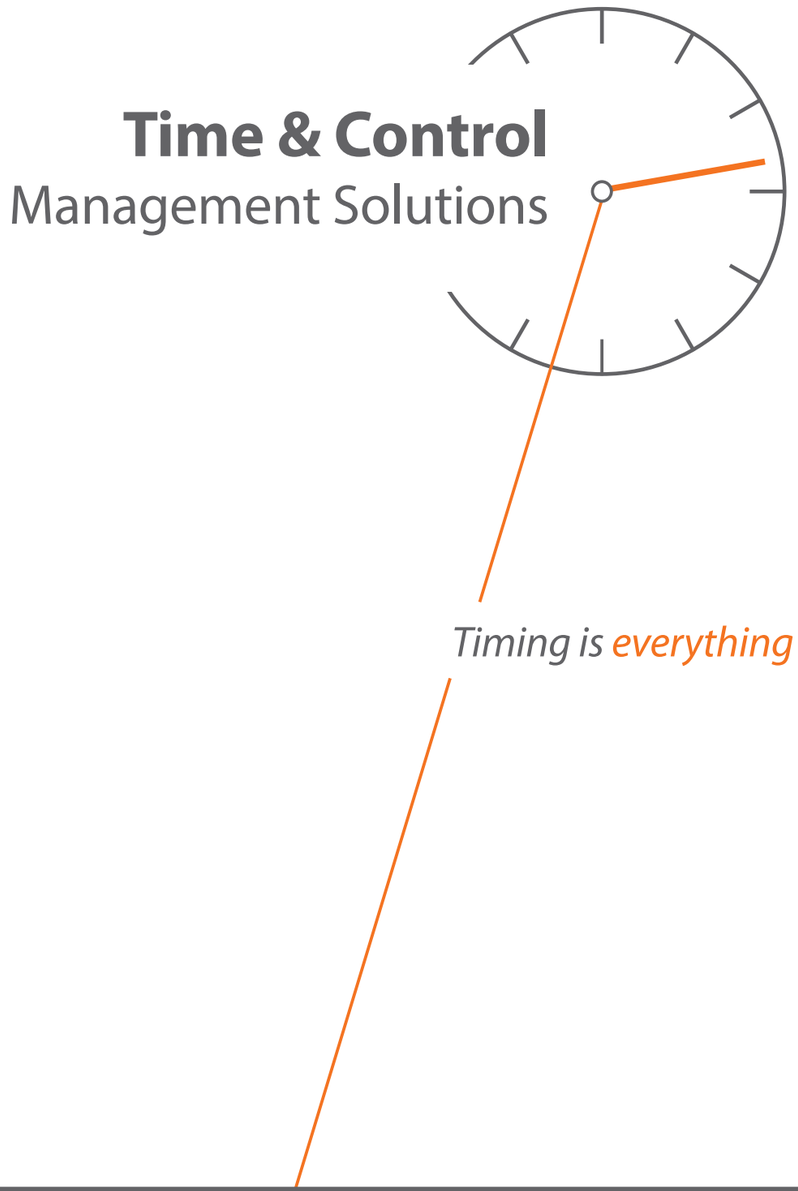
Maximum dependability

Simple and **effective** functions suitable for your application

Analysis of **customer** requirements

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

contents


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.

Which markets are they used frequently?

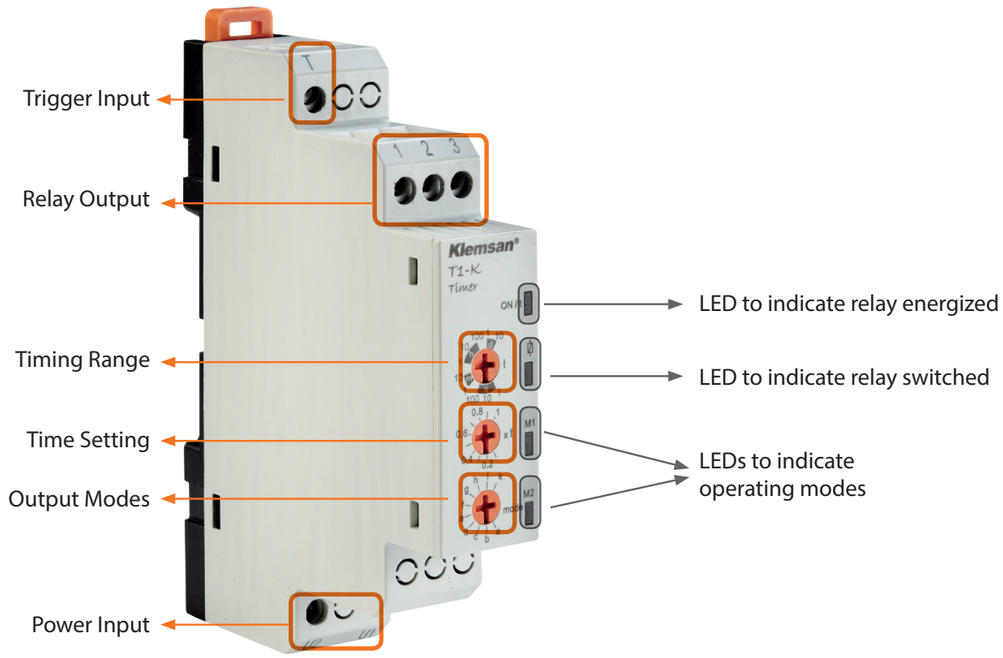
- Industrial Machines
- Illuminating
- Construction industry
- HVAC systems
- Food and agriculture industry

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 widely 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

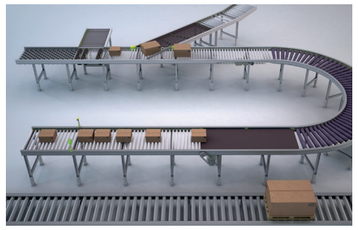
Layout & Mounting

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



T1-K Multifunctional Timer

Conveyor Control



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

Timer
T1 series

Smart Lighting

Controlling flashing on lighted signs.

Timer
T1-Flash, T1-M4, T1-M5

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.

Timer
T1 series

Vending Machines

Automatic management of vending machines.

Timer
T1-K

Direction Control of Industrial Motor

Controls the direction of the motor's rotation.

TIMER
T1-LR

Star-Delta Starter

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

Motor Starter Relay
SD1

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.

Liquid Level Controller
LC3

Billboard and Street Lighting

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

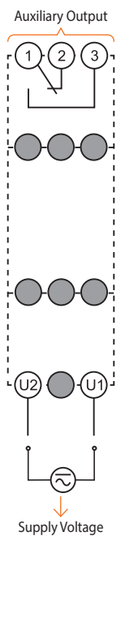
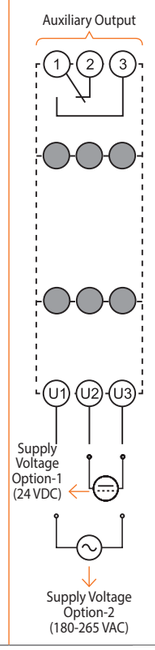
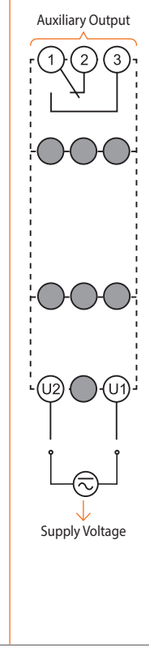
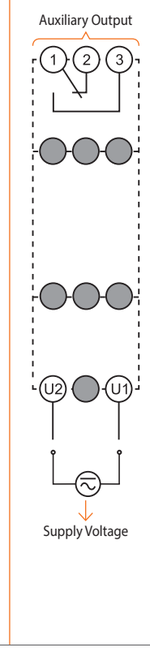
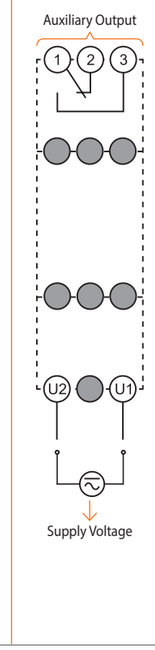
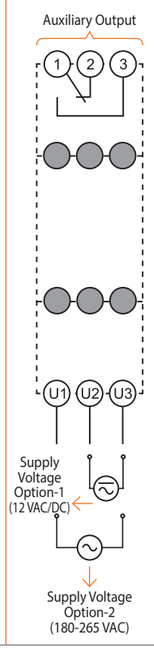
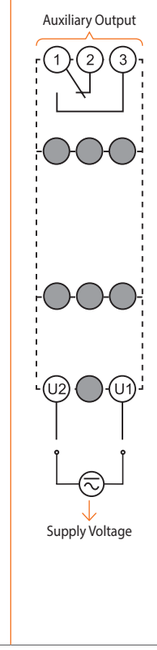
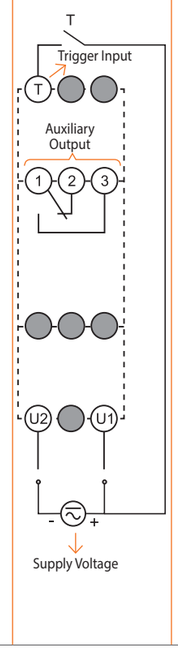
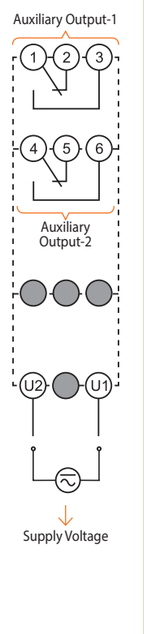
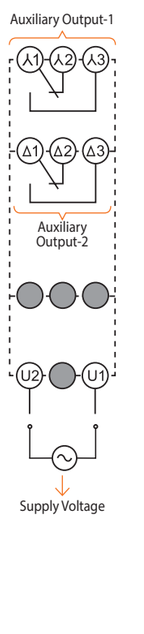
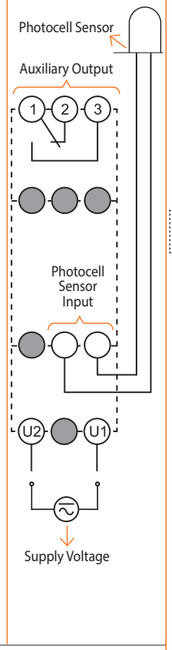
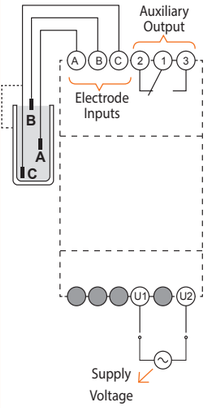
Photocell Relay
PH1-20L

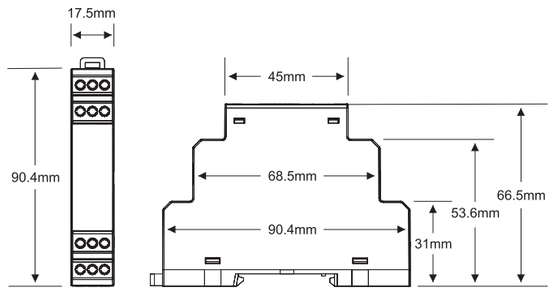
Packing Machine / System

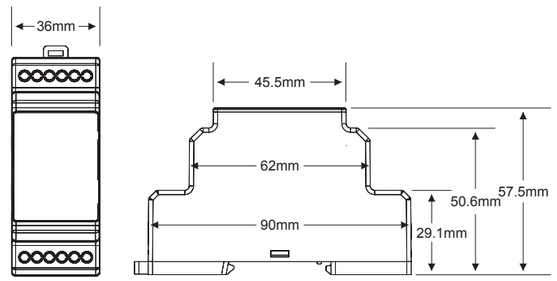
Controlling heat sealing times on blister packs, packaging bags, etc.

Timer
T1-K, T1-M5, T1-M4

Type		T1-60S	T1-100S	T1-XS	T1-FLASH	T1-M4	Z1-M5	T1-M5	T1-K	T1-LR	SD1	PH1-20L	LC3
Timing Function		Single-functional	Single-functional	Single-functional	Single-functional	Multifunctional	Multifunctional	Multifunctional	Multifunctional	Single-functional	Single-functional	Single-functional	Single-functional
Definiton		On delay timer	On delay timer	On delay timer	Off flasher timer	Multimode timer	Multimode timer	Multimode timer	Multimode timer with trigger input	Left-right timer	Star-delta timer	Photocell relay with an external photocell sensor	Liquid level controller
Order Number		270350	270359	270357	270351	270355	270373	270353	270354	270356	270358	270050	270001
Casing Width(mm)		17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	36
Connections		Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Functions		ND	ND	XS	Foff	ND,FD,Fon,Foff	ND,FD,NFD, Fon,Foff	ND,FD,NFD, Fon,Foff	a,b,c,d,e,f,g,h,i,k	LR	SD	PHL	LC
Type of Output		Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Two Relays	Two Relays	Relay	Relay
Auxiliary contacts	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)	1 C/O (SPDT)	2 x C/O	2 x C/O	1 C/O (SPDT)	1 C/O (SPDT)
	Max ratings-AC (for NO side)	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA
	Max ratings-DC (for NO side)	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
	Mechanical life time	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations	$\geq 10^7$ operations
	Electrical life time operations (for NO side)	$5x10^4$(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)	$5x10^4$(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)	$5x10^4$(5A@250VAC) $1x10^5$(5A@30VDC)	$5x10^4$(5A@250VAC) $1x10^5$(5A@30VDC)
Adjustment of Timing-1 & Timing-2		-	-	-	independent	independent	dependent	dependent	-	independent	independent	independent	-
Time Range	Timing-1	1s =>60s	1s =>100s	1s =>2559s	0.1s =>10d	1s =>10d	0.1s =>10d	0.1s =>10d	0.1s =>10d	0.1s =>10d	1s =>30s	1s =>45s	0.1s =>1s
	Timing-2	-	-	-	0.1s =>10d	1s =>10d	0.1s =>10d	0.1s =>10d	-	0.1s =>10d	20ms=>500ms	1s =>45s	-
Lux adjustment range		-	-	-	-	-	-	-	-	-	-	1-20Lux	-
Sensitivity adjustment range		-	-	-	-	-	-	-	-	-	-	-	5-100kΩ
Supply Voltage	DC	24-300 VDC	24VDC	24-300 VDC	24-300 VDC	24-300 VDC	12VDC	24-300 VDC	24-300 VDC	24-300 VDC	-	24-300 VDC	-
	AC	24-300 VAC	24VAC or 180-265 VAC	24-300 VAC	24-300 VAC	24-300 VAC	12VAC or 180-265 VAC	24-300 VAC	24-300 VAC	24-300 VAC	150-500 VAC	24-300 VAC	150-500 VAC
Supply Frequency		35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz
Trigger Input Voltage		-	-	-	-	-	-	-	24-300 VAC/DC	-	-	-	-
Permissible ambient temperature	During operation	-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	-20 to +60 °C	-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	-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	-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	Max. 95% (no condensation	Max. 95% (no condensation	Max. 95% (no condensation	Max. 95% (no condensation	Max. 95% (no condensation
Recovery time		Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms	Max. 100ms
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Power consumption	DC	<1.25W	<1W	<1.25W	<1.25W	<1.25W	<1.25W	<1.25W	<1.25W	<1.25W	<1.25W	<1.25W	-
	AC	<2.5VA	<13VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<2.5VA	<7VA
Weight(gr)		57	57	62	60	60	60	60	66	70	70	63	82

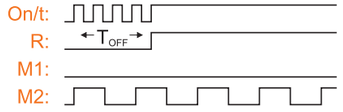
Type			T1-60S	T1-100S	T1-XS	T1-FLASH	T1-M4	Z1-M5	T1-M5	T1-K	T1-LR	SD1	PH1-20L	LC3
Permissible mounting position			any	any	any	any	any	any	any	any	any	any	any	any
EMC-EMI	55011/A1, 61000-4-2, 61000-4-3/A1, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11		OK	OK	OK	OK	OK	-	OK	OK	OK	OK	OK	OK
Accessories	Liquid Level Electrode	Definiton	-	-	-	-	-	-	-	-	-	-	-	Liquid Level probe for LC3
		Order Number	-	-	-	-	-	-	-	-	-	-	-	280610
		Packaging unit	-	-	-	-	-	-	-	-	-	-	-	1 pc.
Schematics														
Dimensional Drawings														





a & ND functions / On delay operation

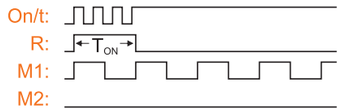
Figure and LED Indication



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

b & FD functions / Off delay operation

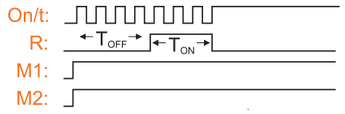
Figure and LED Indication



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

NFD function / On-Off delay operation

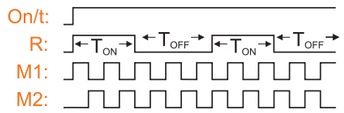
Figure and LED Indication



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

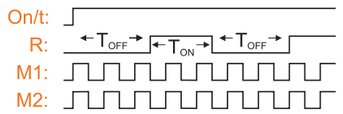
Figure and LED Indication



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

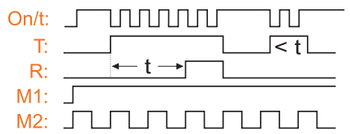
Figure and LED Indication



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

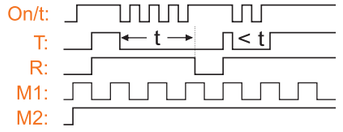
Figure and LED Indication



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

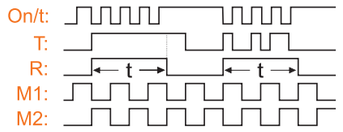
Figure and LED Indication



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

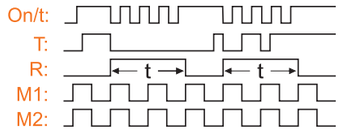
Figure and LED Indication



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 instensitive to state changes and becomes sensitive when time delay, t, expired.

f function / Falling edge triggered off delay

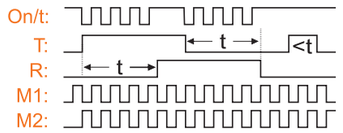
Figure and LED Indication



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

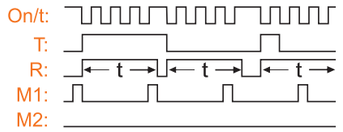
Figure and LED Indication



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

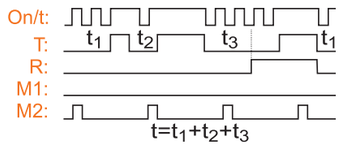
Figure and LED Indication



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

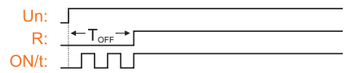
Figure and LED Indication



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

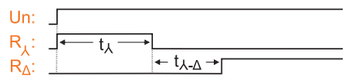
Figure and LED Indication



T1-XS is an ON delay timer thet 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

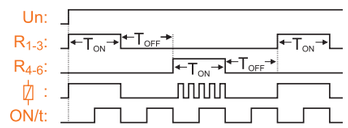
Figure and LED Indication



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

LR function / Left-Right operation

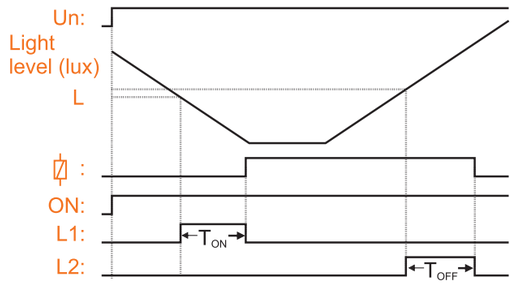
Figure and LED Indication



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

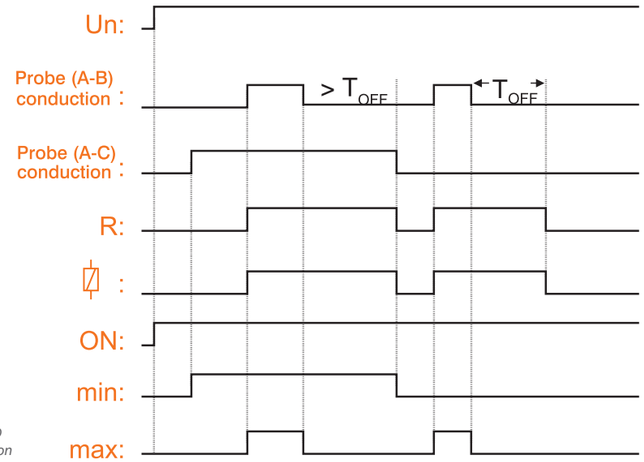
Figure and LED Indication

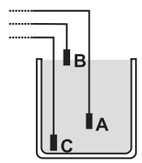


PH1-20L photocell relay measures the luminous intensity by means of a photocell sensor. On-off thereshold value is adjusted in the range of 1-20 lux, via the front adjustment dial. The output relay is energized when the ambient light level is below the adjusted limit. On and off delays are adjustable 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

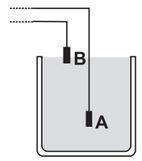
Figure and LED Indication





3 electrodes mode:

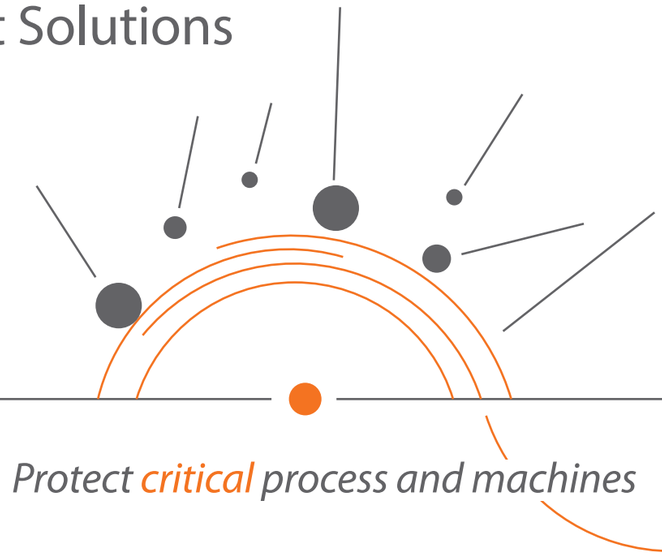
When the level of liquid in the tank reaches to electrode B, the output relay is activated and stays in this position even if the level drops below the electrode B level. The output relay is deactivated when the liquid level drops below the electrode A level. Re-activation occurs when the level reaches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



Protect critical process and machines

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?

Sensing Detection Delaying Protection

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 stoped 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.

Which markets are they used frequently?

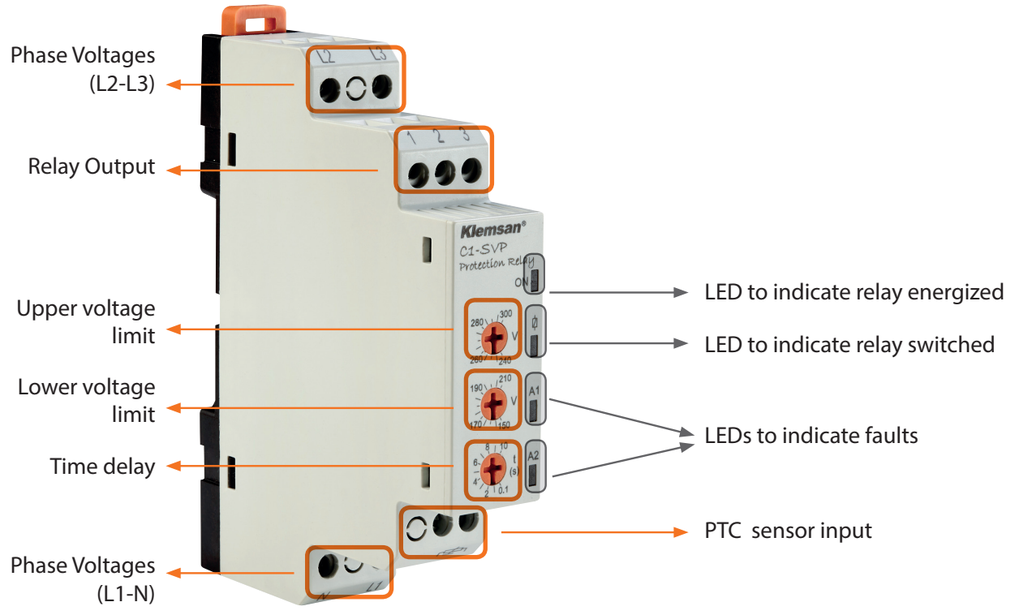
- Industrial machines
- Construction industry
- Stone pits
- Food and agriculture industry
- Water treatment system
- Moving stairs & elevators

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 automaticlly.

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, ...

Escalators

Detection of unbalanced voltage on motors.

MOTOR PROTECTION

C1D-SA, P1-SA, ...

Temperature Control of Motors

Preventing overheating with external PTC sensor.

OVERHEAT PROTECTION

C1D-SVP, P1-SAP...

Conveyor Application

Detection of overcurrent when conveyor is jamed.

CURRENT PROTECTION

CPR-16

Generators

Frequency control for generators.

FREQUENCY PROTECTION

F1

Machine Line

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

MOTOR PROTECTION

P1D-SA, C1-SA ...

Cranes

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

VOLTAGE PROTECTION

V1, V1D, C1-SVP,

Compressors

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

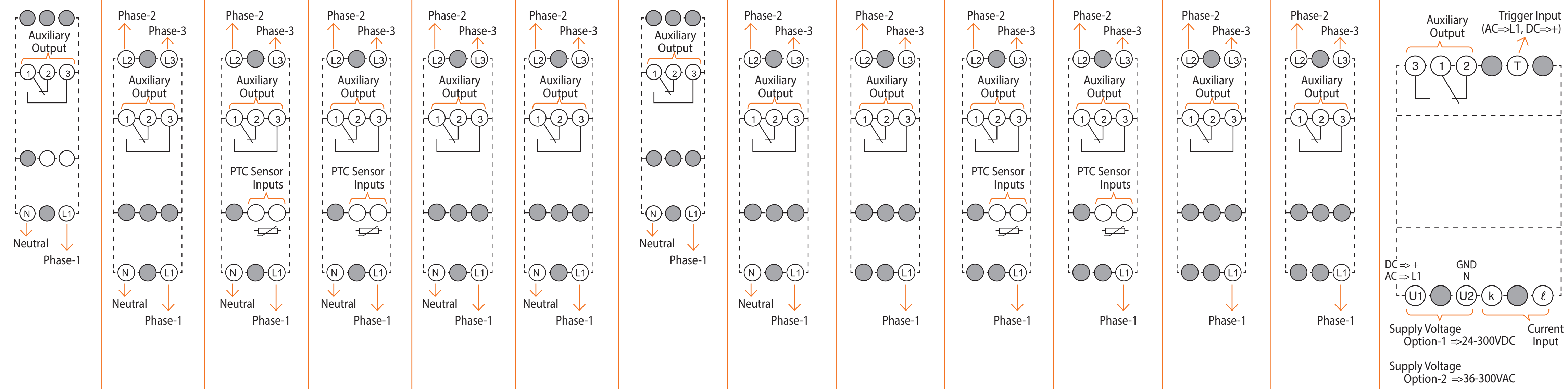
MOTOR PROTECTION

P1-S, C1-SA, ...

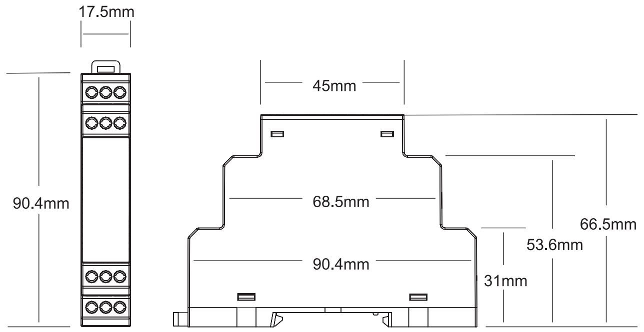
Type			F1	C1-SA	C1-SAP	C1-SVP	V1	V1-S	V1-M	V1-T	C1D-SA	C1D-SAP	C1D-SVP	V1D	V1D-S	CPR-16
Definiton			Frequency monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Voltage monitoring relay	Current monitoring relay
Order Number			270161	270156	270157	270158	270159	270160	270170	270162	270256	270257	270258	270259	270260	270270
Casing Width(mm)			17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	36
Connections			Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	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 with neutral	1Ø with neutral	3Ø with neutral	3Ø without neutral	3Ø without neutral	3Ø without neutral	3Ø without neutral	3Ø without neutral	-
Monitoring Functions	Phase Failure	Fixed delay time	-	500ms	500ms	500ms	500ms	500ms	500ms	500ms	500ms	500ms	500ms	500ms	500ms	-
	Phase Sequence	Fixed delay time	-	500ms	500ms	500ms	-	500ms	-	-	500ms	500ms	500ms	-	500ms	-
	Adjustable Unbalanced Protection	Range	-	± (5% => 20%)	± (5% => 20%)	-	-	-	-	-	± (5% => 20%)	± (5% => 20%)	-	-	-	-
		Hysteresis	-	6,9VAC	6,9VAC	-	-	-	-	-	12 VAC	12 VAC	-	-	-	-
		Delay time	-	0.1=>10s	0.1=>10s	-	-	-	-	-	0.1=>10s	0.1=>10s	-	-	-	-
	Adjustable Voltage Protection	Upper limit	-	-	-	240=>300VAC (L-N)	240=>300VAC (L-N)	240=>300VAC (L-N)	240=>300VAC (L-N)	240=>300VAC (L-N)	-	-	270=>370VAC (L-L)	270=>370VAC (L-L)	270=>370VAC (L-L)	-
		Lower limit	-	-	-	150=>210VAC (L-N)	150=>210VAC (L-N)	150=>210VAC (L-N)	150=>210VAC (L-N)	150=>210VAC (L-N)	-	-	400=>500VAC (L-L)	400=>500VAC (L-L)	400=>500VAC (L-L)	-
		Hysteresis	-	-	-	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	-	-	6 VAC	6 VAC	6 VAC	-
		Delay time	-	-	-	0.1=>10s for off delay operation	0.1=>10s for off delay operation	0.1=>10s for off delay operation	0.1=>10s for off delay operation	0.1=>10s for on delay operation & 0.1=>10s for off delay operation	-	-	0.1=>10s for off delay operation	0.1=>10s for off delay operation	0.1=>10s for off delay operation	-
	Adjustable Current Protection	Upper limit	-	-	-	-	-	-	-	-	-	-	-	-	-	1=>16AAC
		Lower limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Hysteresis	-	-	-	-	-	-	-	-	-	-	-	-	-	5=>20% x Upper limit
		Delay time	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1=>10s
	Adjustable Frequency Protection	Upper limit	42.5 => 65Hz	-	-	-	-	-	-	-	-	-	-	-	-	-
		Lower limit	40 => 62.5Hz	-	-	-	-	-	-	-	-	-	-	-	-	-
		Hysteresis	0.4Hz	-	-	-	-	-	-	-	-	-	-	-	-	-
		Delay time	1=>10s	-	-	-	-	-	-	-	-	-	-	-	-	-
	Extremely High-Low Voltage Protection	Upper limit	-	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	510 VAC (L-L)	510 VAC (L-L)	510 VAC (L-L)	510 VAC (L-L)	510 VAC (L-L)	-
		Lower limit	-	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	240 VAC (L-L)	240 VAC (L-L)	240 VAC (L-L)	240 VAC (L-L)	240 VAC (L-L)	-
		Hysteresis	-	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	-
		Delay time	-	100ms	100ms	100ms	100ms	100ms	100ms	100ms	100ms	100ms	100ms	100ms	100ms	-
	PTC Protection	Fixed delay time	-	-	2000ms	2000ms	-	-	-	-	-	2000ms	2000ms	-	-	-
		Threshold	-	-	1100Ω	1100Ω	-	-	-	-	-	1100Ω	1100Ω	-	-	-
Response time for monitoring any function			Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 250ms	Max. 100ms
Type of Output			Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay
Auxiliary contacts		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)	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)	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	16A/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	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	-
		Mechanical life time	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations

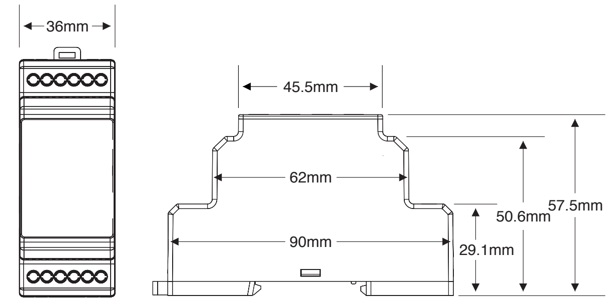
Type		F1	C1-SA	C1-SAP	C1-SVP	V1	V1-S	V1-M	V1-T	C1D-SA	C1D-SAP	C1D-SVP	V1D	V1D-S	CPR-16
Auxiliary contacts	Electrical life time operations (for NO side)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	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)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	5x10^4(5A@250VAC) 1x10^5(5A@30VDC)	1x10^5
Supply Voltage	DC	-	-	-	-	-	-	-	-	-	-	-	-	-	24-300 VDC
	AC	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	150-500VAC from L2-L3	150-500VAC from L2-L3	150-500VAC from L2-L3	150-500VAC from L2-L3	150-500VAC from L2-L3	36 -300VAC
Supply Frequency		35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	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		-	-	-	-	-	-	-	-	-	-	-	-	-	Same with supply voltage
Permissible ambient temperature	During operation	-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	-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
	During storage	-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	-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
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)	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	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	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Power consumption	DC	-	-	-	-	-	-	-	-	-	-	-	-	-	<1W
	AC	<3VA	<3VA	<3VA	<3VA	<3VA	<3VA	<3VA	<3VA	<4VA	<4VA	<4VA	<4VA	<4VA	<3VA
Weight(gr)		62	66	70	71	66	66	62	66	70	75	75	70	70	95
Permissible mounting position		any	any	any	any	any	any	any	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	OK	OK	OK	OK	OK	OK	OK	OK

Schematics

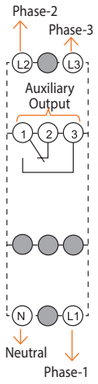
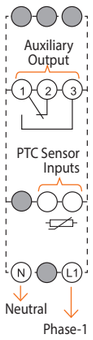
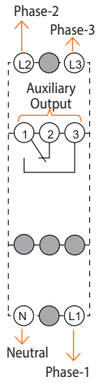
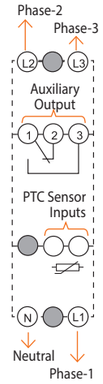
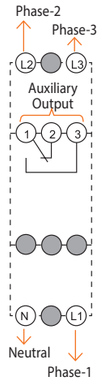
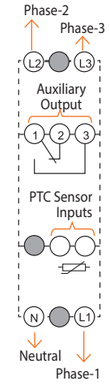
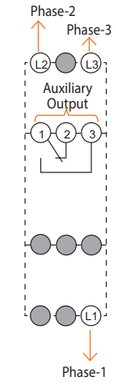
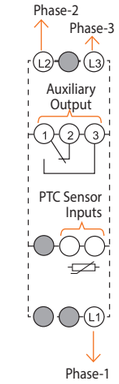
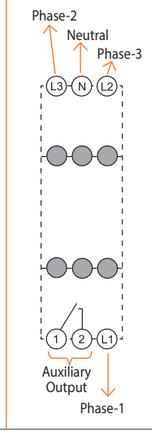
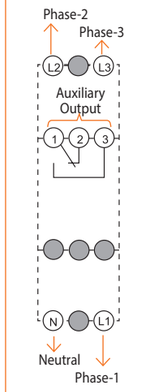
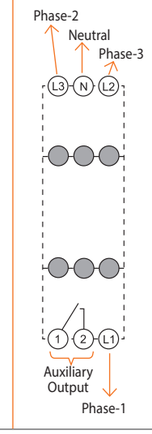
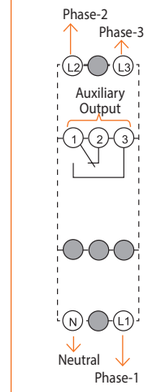
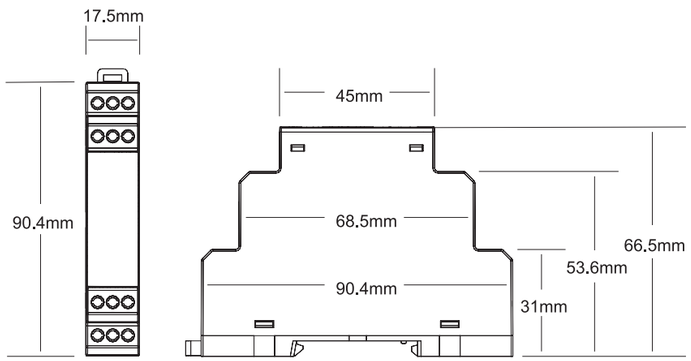


Dimensional Drawings

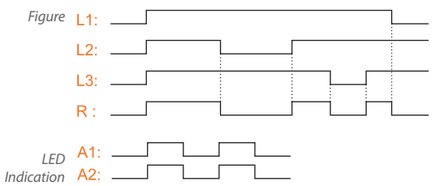




Type			P1-A	P1-P	P1-S	P1-SP	P1-SA	P1-SAP	P1D-SA	P1D-SAP	P1-SU (FormA-220V)	P1-SU (FormC-220V)	P1-SU (FormA-110V)	P1-SU (FormC-110V)
Definiton			Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay
Order Number			270150	270151	270152	270153	270154	270155	270254	270255	270400	270401	270402	270403
Casing Width(mm)			17.5	17.5	17.5	17.5	17.5	17.5	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	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Network			3Ø with neutral	1Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø without neutral	3Ø without neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral
Monitoring Functions	Phase Failure	Fixed delay time	500msec	-	500msec	500msec	500msec	500msec	500msec	500msec	<1sn	<1sn	<1sn	<1sn
	Phase Sequence	Fixed delay time	-	-	500msec	500msec	-	500msec	-	500msec	<1sn	<1sn	<1sn	<1sn
	Fixed Unbalanced Protection	Limit	± 20%	-	-	-	± 20%	± 20%	± 20%	± 20%	-40%	-40%	-40%	-40%
		Hysteresis	3% x Un ≈ 6,9VAC	-	-	-	3% x Un ≈ 6,9VAC	3% x Un ≈ 6,9VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC
		Delay time	500msec	-	-	-	500msec	500msec	500msec	500msec	<1sn	<1sn	<1sn	<1sn
	Extremely High-Low Voltage Protection	Upper limit	310 VAC (L-N)	-	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)	510 VAC (L-L)	510 VAC (L-L)	-	-	-	-
		Lower limit	140 VAC (L-N)	-	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)	240 VAC (L-L)	240 VAC (L-L)	-	-	-	-
		Hysteresis	6 VAC	-	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	6 VAC	-	-	-	-
		Delay time	100ms	-	100ms	100ms	100ms	100ms	100ms	100ms	-	-	-	-
	PTC Protection	Fixed delay time	-	2000ms	-	2000ms	-	2000ms	-	2000ms	-	-	-	-
		Threshold	-	1100Ω	-	1100Ω	-	1100Ω	-	1100Ω	-	-	-	-
Response time for monitoring any function			Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms	Max.250ms
Type of Output			Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay
Auxiliary contacts		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)	1 C/O (SPDT)	1 NO (SPST)	1 C/O (SPDT)	1 NO (SPST)	1 C/O (SPDT)
		Max ratings-AC (for NO side)	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA	5A/250V; 1250 VA
		Max ratings-DC (for NO side)	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
		Mechanical life time	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations
		Electrical life time operations (for NO side)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)	5×10^4(5A@250VAC) 1×10^5(5A@30VDC)
Supply Voltage			85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	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
Supply Frequency			35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Permissible ambient temperature		During operation	-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	-20 to +60 °C	-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	-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	-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)	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	35-70 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz

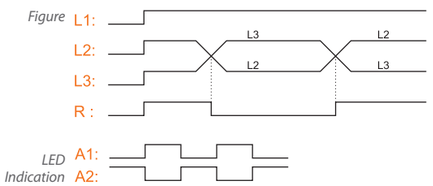
Type		P1-A	P1-P	P1-S	P1-SP	P1-SA	P1-SAP	P1D-SA	P1D-SAP	P1-SU (FormA-220V)	P1-SU (FormC-220V)	P1-SU (FormA-110V)	P1-SU (FormC-110V)
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Power consumption	DC	-	-	-	-	-	-	-	-	-	-	-	-
	AC	<3VA	<3VA	<3VA	<3VA	<3VA	<3VA	<4VA	<4VA	<13VA	<13VA	<4.5VA	<4.5VA
Permissible mounting position		any	any	any	any	any	any	any	any	any	any	any	any
Weight(gr)		66	65	65	69	65	69	70	74	59	59	59	59
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	OK	OK	OK	OK	OK	OK
Schematics													
Dimensional Drawings													

Phase Failure / Off delay operation



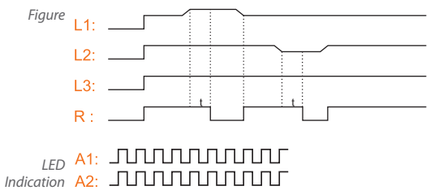
if a phase failure occurs the output relay de-energizes in 500msec.
The fault is indicated by flashing LED A1 and LED A2 simultaneously. The output relay re-energizes automatically as soon as the voltage returns to the tolerance range.

Phase Sequence Error / Off delay operation



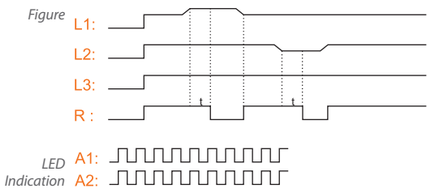
If a phase sequence error occurs the output relay de-energizes in 500msec.
The fault is displayed by alternated flashing of the LEDs A1 and A2. The output relay re-energizes automatically as soon as the phase sequence is correct again.

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%xUn the output relay re-energizes automatically.

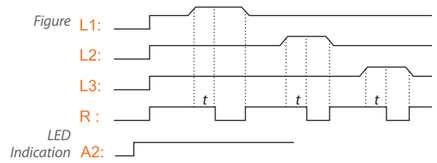
Fixed Unbalance Protection / Off delay operation



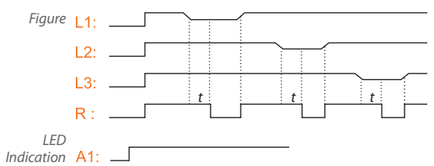
If the voltage to be monitored exceeds or falls below the set phase unbalance threshold percentage (%20), the output relay de-energizes after time delay(2sec). The fault is indicated by flashing LED A1 and LED A2 quickly and simultaneously.
As soon as the voltage returns to the tolerance range, taking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

Adjustable Voltage Protection / Off delay operation

Over Voltage



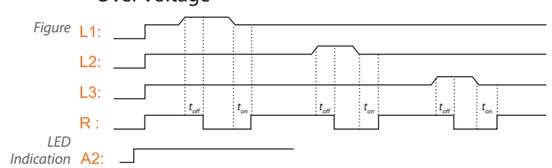
Under Voltage



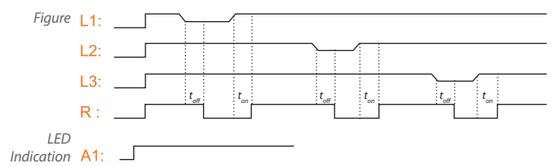
If the voltage to be monitored exceeds or falls below adjusted high limit or low limit value, the output relay de-energizes after time delay(0.1-10s). The fault type is indicated by LEDs A1 or A2 with constant light. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis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

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

Over Voltage



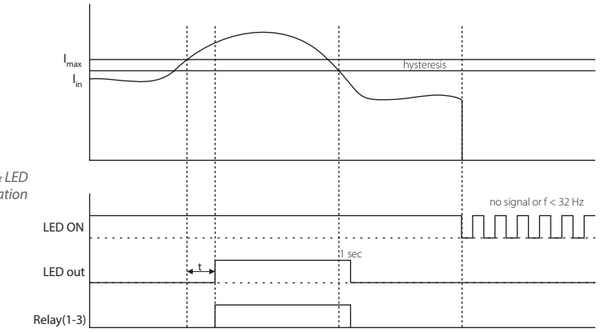
Under Voltage



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

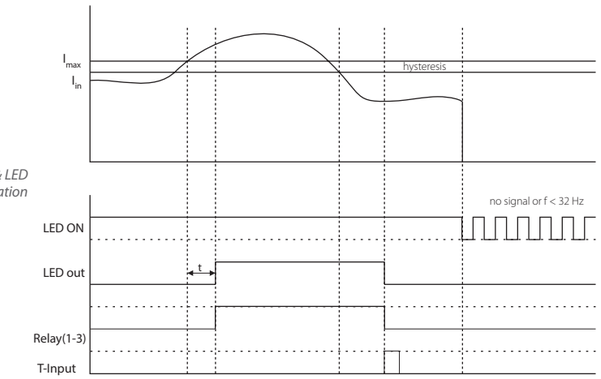
Figure & LED Indication



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.

Figure & LED Indication



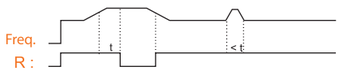
MANUAL MODE

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 automaticlly.

Adjustable Frequency Protection / Off delay operation

Over Frequency

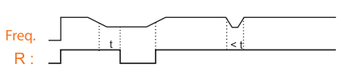
Figure



LED Indication

Under Frequency

Figure



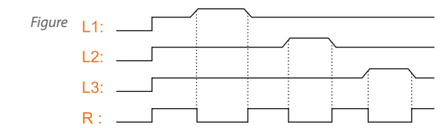
LED Indication

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

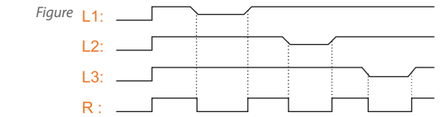
Figure



LED Indication

Under Under Voltage

Figure



LED Indication

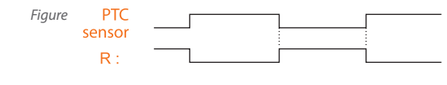
If the voltage to be monitored exceeds 310VAC for star connection device or 510VAC for delta connection device, output relay de-energizes immediately.

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

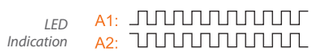
The fault type is indicated by LEDs A1 or A2 with blinking. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes automatically.

PTC Protection / Off delay operation

Figure



LED Indication



In order to use this fuction, 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

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 continuosly.

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.

Which markets are they used frequently?

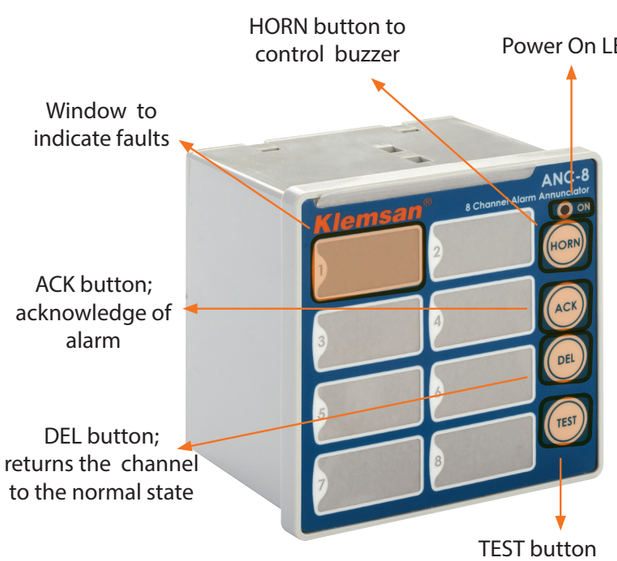
- Medium voltage modular cabinets
- Electric power plants and substations
- Industrial plants and processes
- Technical installations in buildings
- Water treatment plants, etc.

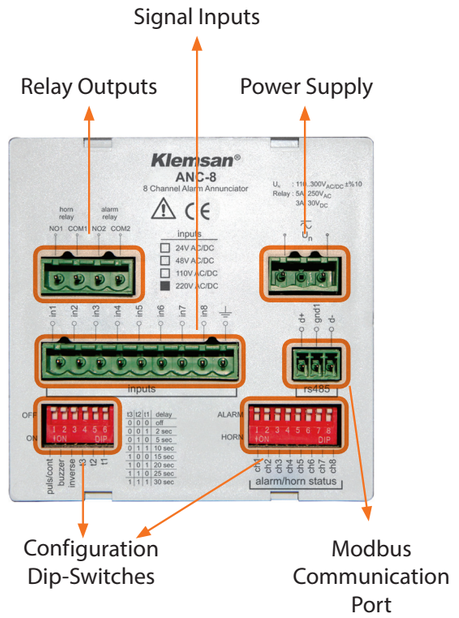
Benefits and Advantages

- 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 standarts.





ANC-8 Alarm Annunciator

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 automaticlly 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.

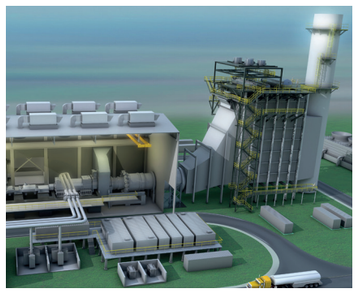
ALARM MONITORING over MODBUS
ANC-16, ANC-8

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-8, ANC-16

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-8, ANC-16

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.

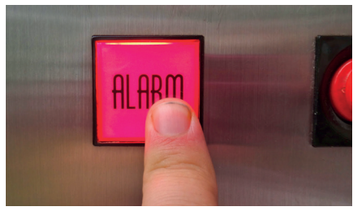
SIGNAL MONITORING
LSK Series

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



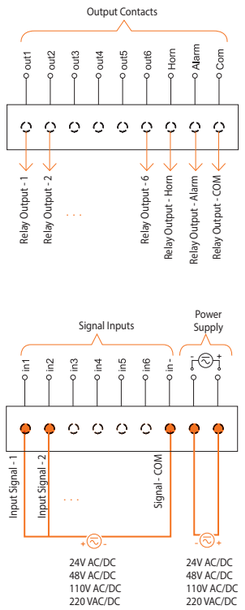
Monitoring process faults with alarm relay controller provides you to stop them rapidly in order to prevent much worse condition thanks to alarm relay outputs.

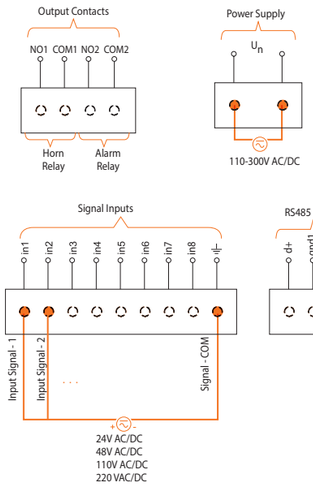
ALARM MANAGEMENT
ALRC-6

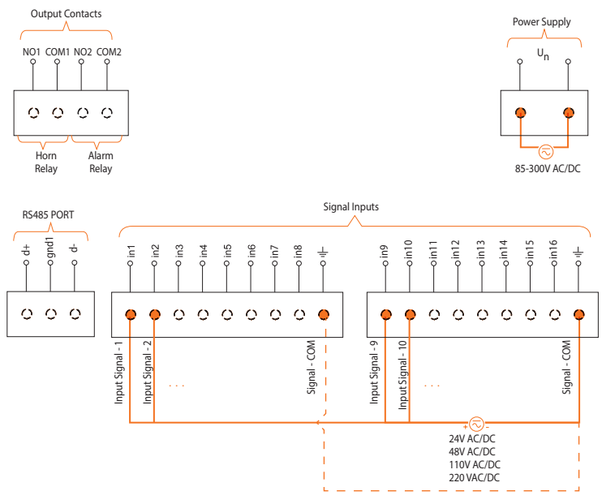
Type			ALRC-6 (24VAC/DC)	ALRC-6 (48VAC/DC)	ALRC-6 (110VAC/DC)	ALRC-6 (220VAC/DC)	ANC-8 (24VAC/DC)	ANC-8 (48VAC/DC)	ANC-8 (110VAC/DC)	ANC-8 (220VAC/DC)	ANC-16 (24VAC/DC)	ANC-16 (48VAC/DC)	ANC-16 (110VAC/DC)	ANC-16 (220VAC/DC)
Definiton			Alarm relay controller	Alarm relay controller	Alarm relay controller	Alarm relay controller	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator	Alarm annunciator
Order Number			604610	604611	604612	604613	604620	604621	604622	604623	604630	604631	604632	604633
Input Signal	Voltage	AC	24V	48V	110V	220V	24V	48V	110V	220V	24V	48V	110V	220V
		DC	24V	48V	110V	220V	24V	48V	110V	220V	24V	48V	110V	220V
	Frequency		45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz
	Numbers		6	6	6	6	8	8	8	8	16	16	16	16
	Response Time		25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec	25 ± 10 msec
Output Contacts	Type of Output		Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay	Relay
	Number of contacts		8	8	8	8	2	2	2	2	2	2	2	2
	Type		1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	1 NO (SPST)	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	5A/277V; 1385 VA	5A/277V; 1385 VA	5A/277V; 1385 VA	5A/277V; 1385 VA	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	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
	Mechanical Life Time		$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations	$\geq 10^8$ operations
	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)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)	1×10^5(5A@250VAC)
Window	Numbers		6	6	6	6	8	8	8	8	16	16	16	16
	Colours		Red	Red	Red	Red	Red/Green selectable	Red/Green selectable	Red/Green selectable	Red/Green selectable	Red/Green selectable	Red/Green selectable	Red/Green selectable	Red/Green selectable
	Sizes(mm)		30.5x21.6	30.5x21.6	30.5x21.6	30.5x21.6	30.5x15.5	30.5x15.5	30.5x15.5	30.5x15.5	44,8x11,9	44,8x11,9	44,8x11,9	44,8x11,9
	İluminating for Each Window		With 4 pcs. red leds	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	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
	Flash rate	Slow	-	-	-	-	60 Flash/Min	60 Flash/Min	60 Flash/Min	60 Flash/Min	60 Flash/Min	60 Flash/Min	60 Flash/Min	60 Flash/Min
		Fast	90 Flash/Min	90 Flash/Min	90 Flash/Min	90 Flash/Min	180 Flash/Min	180 Flash/Min	180 Flash/Min	180 Flash/Min	180 Flash/Min	180 Flash/Min	180 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.	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.
Time Range(sec)			-	-	-	-	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	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, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)	4 nos.(Horn, Ack, Delete, Test)
Buzzer			-	-	-	-	Avaliable	Avaliable	Avaliable	Avaliable	Avaliable	Avaliable	Avaliable	Avaliable
Communication	Protocol		-	-	-	-	Modbus-RTU	Modbus-RTU	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	1200-57600	1200-57600
	Isolation		-	-	-	-	2500 Vrms	2500 Vrms	2500 Vrms	2500 Vrms	2500 Vrms	2500 Vrms	2500 Vrms	2500 Vrms
Real Time Event Recording			-	-	-	-	6080 logs	6080 logs	6080 logs	6080 logs	6080 logs	6080 logs	6080 logs	6080 logs
Battery Life			-	-	-	-	> 5years	> 5years	> 5years	> 5years	> 5years	> 5years	> 5years	> 5years
Supply	Voltage	AC	24V ±%30	48V ±%30	110V ±%30	220V ±%30	110-300V ±%10	110-300V ±%10	110-300V ±%10	110-300V ±%10	85-300V	85-300V	85-300V	85-300V
		DC	24V ±%30	48V ±%30	110V ±%30	220V ±%30	110-300V ±%10	110-300V ±%10	110-300V ±%10	110-300V ±%10	85-300V	85-300V	85-300V	85-300V
	Frequency		45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz	45-65 Hz

Type			ALRC-6 (24VAC/DC)	ALRC-6 (48VAC/DC)	ALRC-6 (110VAC/DC)	ALRC-6 (220VAC/DC)	ANC-8 (24VAC/DC)	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)
Power consumption	DC		<3W	<3W	<1W	<5.5W	<3W	<3W	<3W	<3W	<5W	<5W	<5W	<5W
	AC		<10VA	<10VA	<4.3VA	<7.2VA	<5VA	<5VA	<5VA	<5VA	<7.5VA	<7.5VA	<7.5VA	<7.5VA
Permissible ambient temperature	During operation		-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
	During storage		-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °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)	Max.90% (no condensation)	Max.90% (no condensation)	Max.90% (no condensation)	Max.90% (no condensation)	Max.90% (no condensation)	Max.90% (no condensation)	Max.90% (no condensation)
Degree of protection			IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back))	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)
Connections			Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Dimensions (mm)	Bezel/Overall	Height(mm)	96	96	96	96	96.8	96.8	96.8	96.8	144	144	144	144
		Width(mm)	96	96	96	96	96.8	96.8	96.8	96.8	144	144	144	144
	Panel Cutout	Height(mm)	89.6	89.6	89.6	89.6	89.6	89.6	89.6	89.6	137	137	137	137
		Width(mm)	89.6	89.6	89.6	89.6	89.6	89.6	89.6	89.6	137	137	137	137
		Depth(mm)	66	66	66	66	65	65	65	65	58	58	58	58
Weight(gr)			274	274	274	274	280	280	280	280	517	517	517	517
EMC-EMI		61000-6-2, 61000-6-4	-	-	-	-	OK	OK	OK	OK	OK	OK	OK	OK

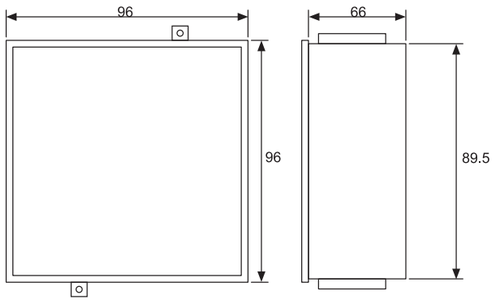
Schematics

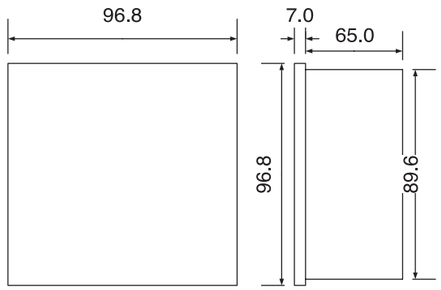


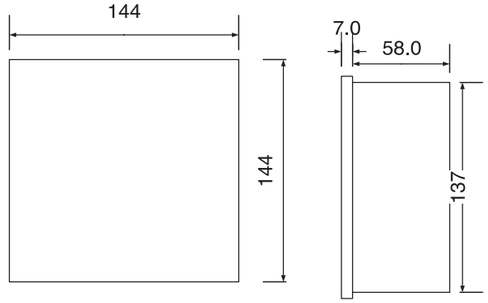




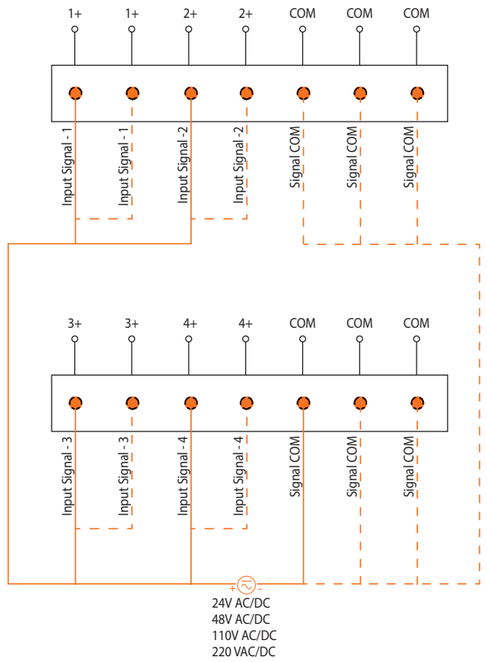
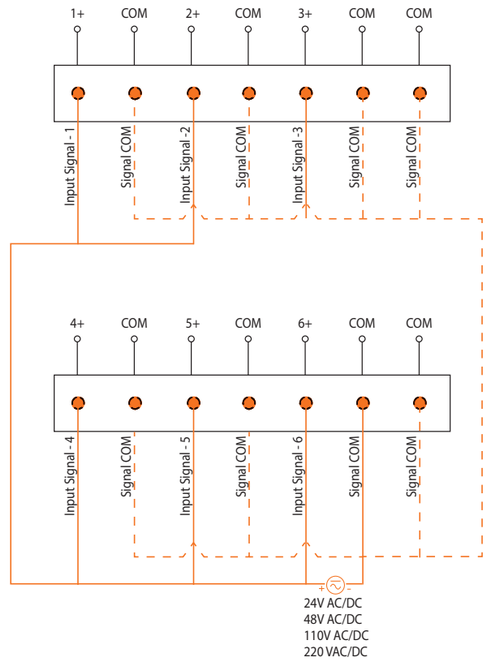
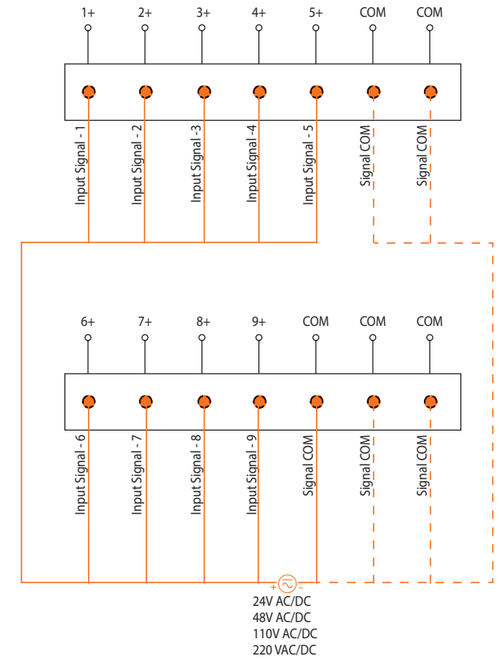
Dimensional Drawings



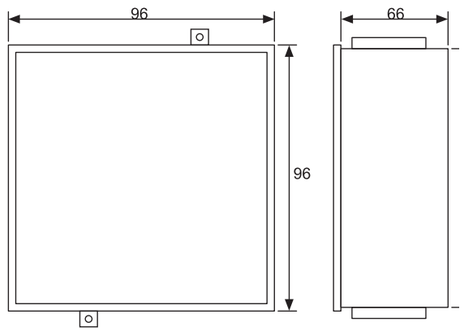




														
Type			**LSK-4 (24VAC/DC)**	**LSK-4 (48VAC/DC)**	**LSK-4 (110VAC/DC)**	**LSK-4 (220VAC/DC)**	**LSK-6 (24VAC/DC)**	**LSK-6 (48VAC/DC)**	**LSK-6 (110VAC/DC)**	**LSK-6 (220VAC/DC)**	**LSK-9 (24VAC/DC)**	**LSK-9 (48VAC/DC)**	**LSK-9 (110VAC/DC)**	**LSK-9 (220VAC/DC)**
Definiton			Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module	Signal Indicator Module
Order Number			583041	583042	583043	583045	583061	583062	583063	583065	583091	583092	583093	583095
Input Signal	Voltage	AC	24V	48V	110V	220V	24V	48V	110V	220V	24V	48V	110V	220V
		DC	24V	48V	110V	220V	24V	48V	110V	220V	24V	48V	110V	220V
	Frequency		Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)	Min. 45Hz (for AC signal input)
	Numbers		4	4	4	4	6	6	6	6	9	9	9	9
	Response Time:		Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 10ms
Output Contacts			-	-	-	-	-	-	-	-	-	-	-	-
Window	Numbers		4	4	4	4	6	6	6	6	9	9	9	9
	Colours		Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
	Sizes(mm)		34,85 x 30	34,85 x 30	34,85 x 30	34,85 x 30	34,85 x 18,70	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
	Iluminating for each window		With 9 pcs. red leds	With 9 pcs. red leds	With 9 pcs. red leds	With 9 pcs. red leds	With 6 pcs. red leds	With 6 pcs. red leds	With 6 pcs. red leds	With 6 pcs. red leds	With 4 pcs. red leds	With 4 pcs. red leds	With 4 pcs. red leds	With 4 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.	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.	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	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C
	During storage		-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-30 to +80 °C	-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)	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)
Degree of protection			IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back))	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)	IP50(front), IP20(back)
Connections			Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal

Type			LSK-4 (24VAC/DC)	LSK-4 (48VAC/DC)	LSK-4 (110VAC/DC)	LSK-4 (220VAC/DC)	LSK-6 (24VAC/DC)	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)
Dimensions (mm)	Bezel/Overall	Height(mm)	96	96	96	96	96	96	96	96	96	96	96	96
		Width(mm)	96	96	96	96	96	96	96	96	96	96	96	96
	Panel Cutout	Height(mm)	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5
		Width(mm)	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5
		Depth(mm)	66	66	66	66	66	66	66	66	66	66	66	66
Weight(gr)			218	218	218	218	220	220	220	220	222	222	222	222
EMC-EMI			-	-	-	-	-	-	-	-	-	-	-	-
Schematics														

Dimensional Drawings



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.

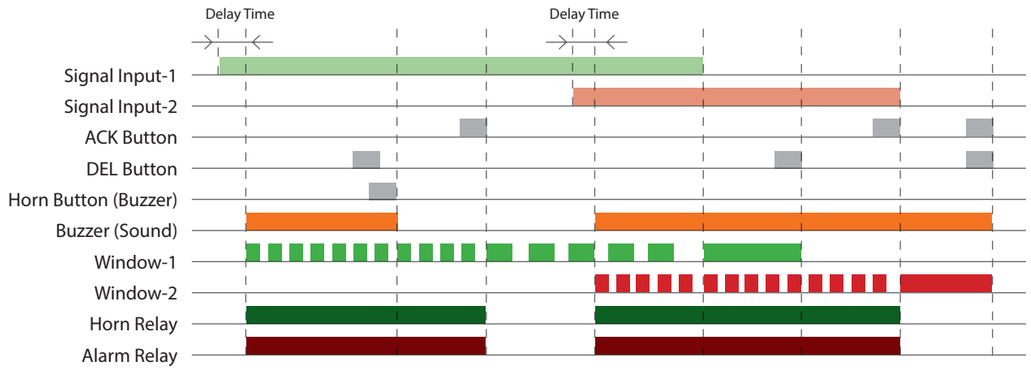
e.g.

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.

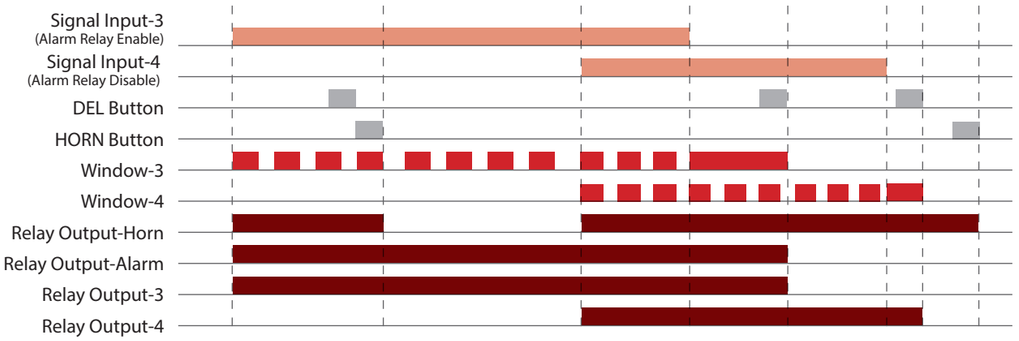
When DEL button is pressed, relays of the channels whose input signals are interrupted will be inactive and displays of these channels will turn-off. For the channels whose input signals are continued, displays and relays maintain their initial state, as described above (relay active, display blinking).

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.

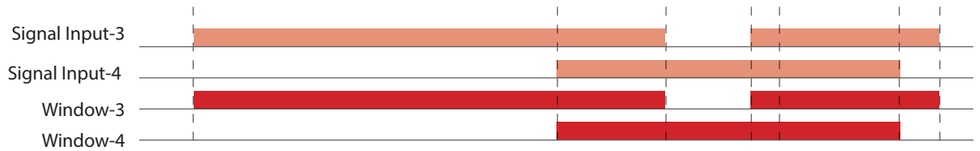
FUNCTIONAL INDICATION



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.

Which actions are executed?

Measuring
Converting
Protection
Isolation
Configuration

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

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.

Which markets are they used frequently?

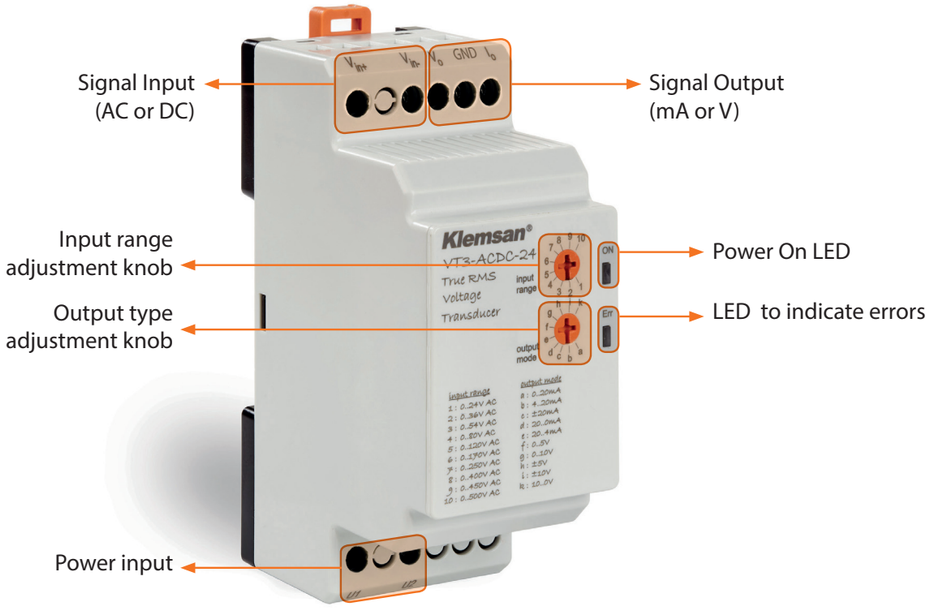
- Renewable Energy
- Medium motors
- Electric power plants and substations
- Telecontrol systems
- Industial Process
- Energy management systems
- Medium voltage modular cabinets
- Control and safety systems
- Telecontrol systems

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 suppy 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.

Layout & Mounting

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



VT3-ACDC-24 Transducer

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

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.

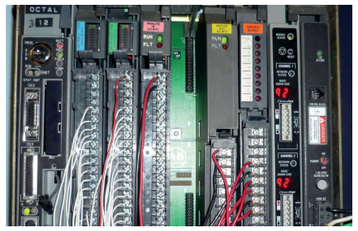
SIGNAL CONVERTING
TT-RTD series

UPS Voltage Control

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

SIGNAL CONVERTING
VT3-ACDC-24

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 eleminate measurement errors caused by differences in earth potentials.

SIGNAL ISOLATING
PISO-DC series

Substation Automation

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

SIGNAL CONVERTING
CT3 & VT3 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

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

On Board Automation for Railways

The electrical power is supplied to the trains via the catenaries. So, depanding 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

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 monitored them by Scada System.

SIGNAL CONVERTING
CT3 & VT3 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

Air Conditioning System

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

PROTECTION

CT3 & VT3 series

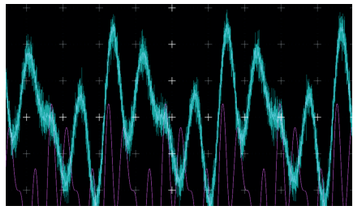
Motor Traction Control

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

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

Tele-Control System

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

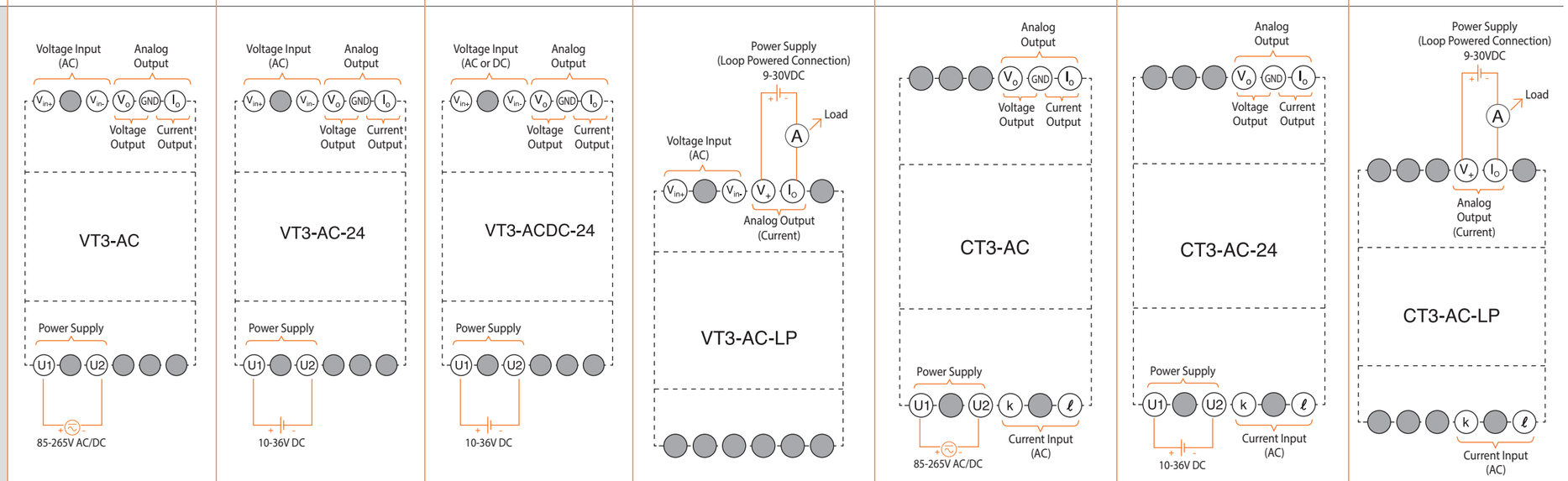
SIGNAL CONVERTING

CT3 & VT3 series

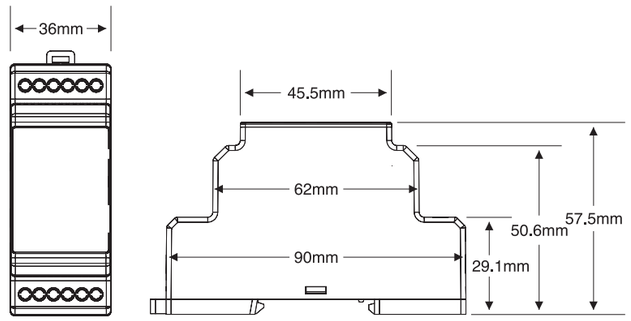
									
Type			**VT3-AC**	**VT3-AC-24**	**VT3-ACDC-24**	**VT3-AC-LP**	**CT3-AC**	**CT3-AC-24**	**CT3-AC-LP**
Definiton			True RMS Voltage Transducer	True RMS Voltage Transducer	True RMS Voltage Transducer	True RMS Voltage Transducer	True RMS Current Transducer	True RMS Current Transducer	True RMS Current Transducer
Order Number			600101	600103	600106	600105	600100	600102	600104
Casing Width(mm)			36	36	36	36	36	36	36
Connections			Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Input Signal	Configurable Voltage range	0-24 VAC	Avaliable	Avaliable	Avaliable	Avaliable	-	-	-
		0-36 VAC	Avaliable	Avaliable	-	Avaliable	-	-	-
		0-54 VAC	Avaliable	Avaliable	Avaliable	Avaliable	-	-	-
		0-80 VAC	Avaliable	Avaliable	-	Avaliable	-	-	-
		0-120 VAC	Avaliable	Avaliable	Avaliable	Avaliable	-	-	-
		0-170 VAC	Avaliable	Avaliable	-	Avaliable	-	-	-
		0-250 VAC	Avaliable	Avaliable	Avaliable	Avaliable	-	-	-
		0-400 VAC	Avaliable	Avaliable	-	Avaliable	-	-	-
		0-450 VAC	Avaliable	Avaliable	Avaliable	Avaliable	-	-	-
		0-500 VAC	Avaliable	Avaliable	-	Avaliable	-	-	-
		0-24 VDC	-	-	Avaliable	-	-	-	-
		0-54 VDC	-	-	Avaliable	-	-	-	-
		0-120 VDC	-	-	Avaliable	-	-	-	-
		0-250 VDC	-	-	Avaliable	-	-	-	-
		0-450 VDC	-	-	Avaliable	-	-	-	-
	Configurable Current Range	0-1 AAC	-	-	-	-	Avaliable	Avaliable	Avaliable
		0-2 AAC	-	-	-	-	Avaliable	Avaliable	Avaliable
		0-3 AAC	-	-	-	-	Avaliable	Avaliable	Avaliable
		0-4 AAC	-	-	-	-	Avaliable	Avaliable	Avaliable
		0-5 AAC	-	-	-	-	Avaliable	Avaliable	Avaliable
	Frequency		40-70 Hz	40-70 Hz	40-70 Hz	40-70 Hz	40-70 Hz	40-70 Hz	40-70 Hz
	Surge overload		< 2 x Uinput max. range (5 pulses 1s)	< 2 x Uinput max. range (5 pulses 1s)	< 2 x Uinput max. range (5 pulses 1s)	< 2 x Uinput max. range (5 pulses 1s)	20xin(100A) for 1 Sec.	20xin(100A) for 1 Sec.	20xin(100A) for 1 Sec.
	Constant overload		Max. 600 V	Max. 600 V	Max. 600 V	Max. 600 V	10A(2x Rated IN)	10A(2x Rated IN)	10A(2x Rated IN)
	Input impedances		240 kΩ	240 kΩ	240 kΩ	240 kΩ	49.9 Ω (burden resistor)	49.9 Ω (burden resistor)	49.9 Ω (burden resistor)
Output	Type	0-20 mA	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		4-20 mA	Avaliable	Avaliable	Avaliable	Avaliable	Avaliable	Avaliable	Avaliable
		±20 mA	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		20-0 mA	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		20-4 mA	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		0-5 V	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		0-10 V	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		±5 V	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		± 10 V	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
		10-0 V	Avaliable	Avaliable	Avaliable	-	Avaliable	Avaliable	-
	Analog Output	Max. Current	24 mA	24 mA	24 mA	24 mA	24 mA	24 mA	24 mA
		Max. Voltage	12 V	12 V	12 V	-	12 V	12 V	-
		Max. Load	10kΩ(for voltage) / 600Ω(for current)	10kΩ(for voltage) / 600Ω(for current)	10kΩ(for voltage) / 600Ω(for current)	10kΩ(for voltage) / 600Ω(for current)	10kΩ(for voltage) / 600Ω(for current)	10kΩ(for voltage) / 600Ω(for current)	10kΩ(for voltage) / 600Ω(for current)

Type			VT3-AC	VT3-AC-24	VT3-ACDC-24	VT3-AC-LP	CT3-AC	CT3-AC-24	CT3-AC-LP
Supply	Voltage	AC	85-265V	-	-	-	85-265V	-	-
		DC	85-265V	10-36V	10-36V	9-30V	85-265V	10-36V	9-30V
	Frequency		40-70 Hz	-	-	-	40-70 Hz	-	-
Power consumption	DC		<1.5W	<1.5W	<1.5W	<1.5W	<1.5W	<1.5W	<1.5W
	AC		<4VA	<4VA	<4VA	<4VA	<4VA	<4VA	<4VA
Isolation			1.5 kVrms, 3-way	1.5 kVrms, 3-way	1.5 kVrms, 3-way	1.5 kVrms, 2-way	1.5 kVrms, 3-way	1.5 kVrms, 3-way	1.5 kVrms, 2-way
Test Voltage between input-output			4kV during 1 min	4kV during 1 min	4kV during 1 min	4kV during 1 min	4kV during 1 min	4kV during 1 min	4kV during 1 min
Linearity			<0.2%	<0.2%	<0.2%	<0.2%	<0.2%	<0.2%	<0.2%
Response Time			350 ms	350 ms	350 ms	350 ms	350 ms	350 ms	350 ms
Ripple			<80mV	<80mV	<80mV	<80mV	<80mV	<80mV	<80mV
Accuracy			< %0.2 (full scale, 25°C)	< %0.2 (full scale, °C)	< %0.2 (full scale, °C)	< %0.2 (full scale, °C)	< %0.2 (full scale, °C)	< %0.2 (full scale, °C)	< %0.2 (full scale, °C)
Temperature coefficient			150 ppm/°C	150 ppm/°C	150 ppm/°C	150 ppm/°C	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	-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	-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)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)	Max.95% (no condensation)
Degree of protection			IP20	IP20	IP20	IP20	IP20	IP20	IP20
Weight(gr)			84	76	70	68	87	81	71
Permissible mounting position			any	any	any	any	any	any	any
EMC-EMI	Radiated Emissions Test, 61000-6-2/AC:2012, 61000-6-4:2007/A1:2011		OK	OK	OK	OK	OK	OK	OK

Schematics



Dimensional Drawings

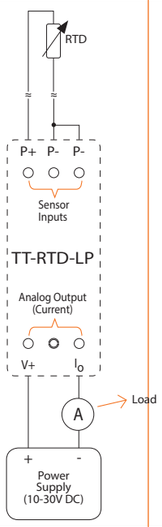
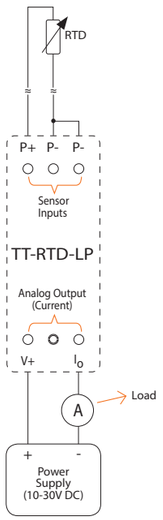
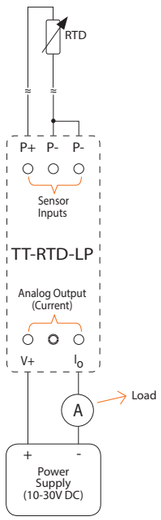
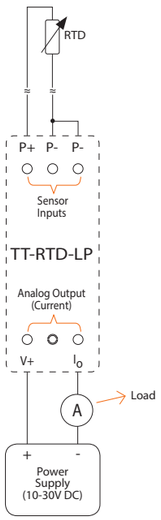
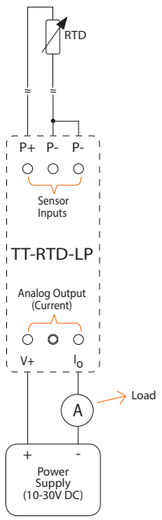
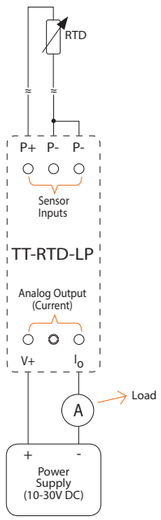
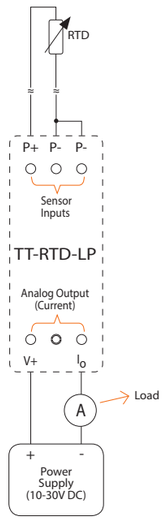
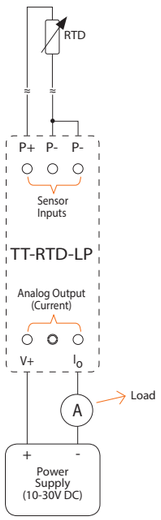
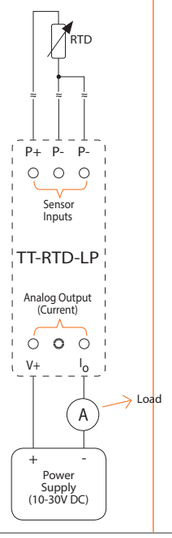
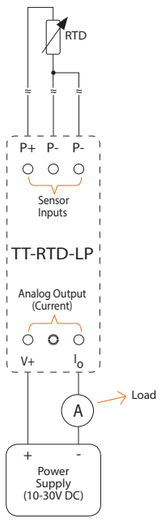
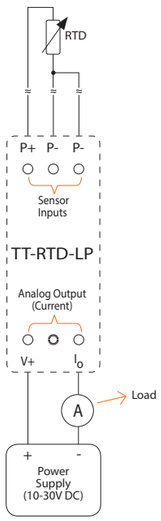
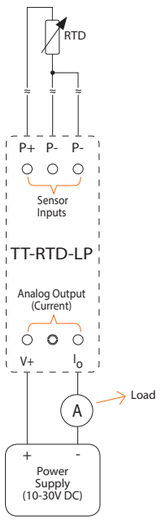
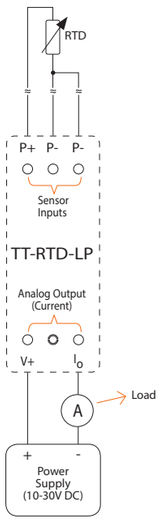
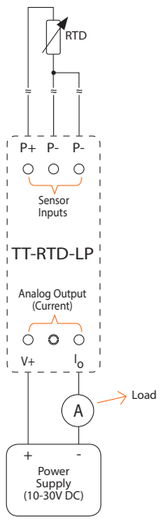
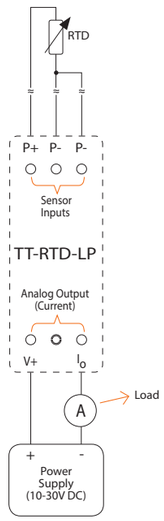
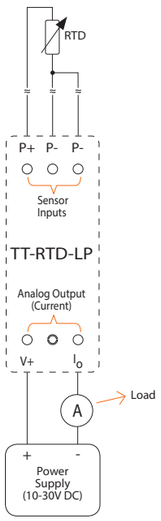
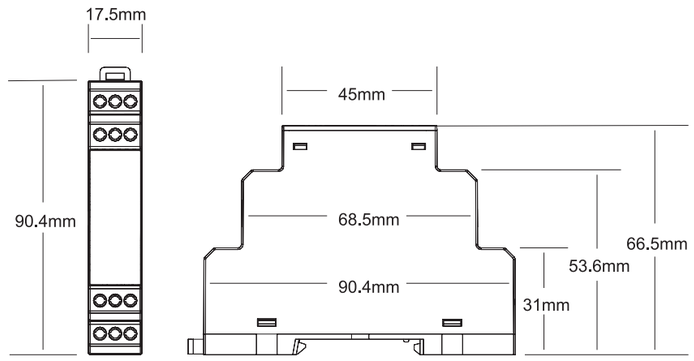




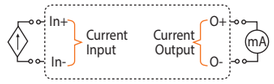
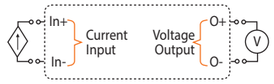
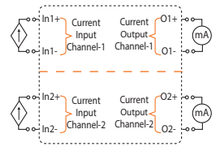
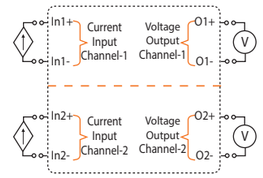
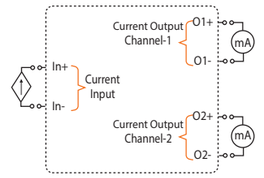
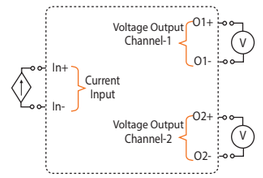




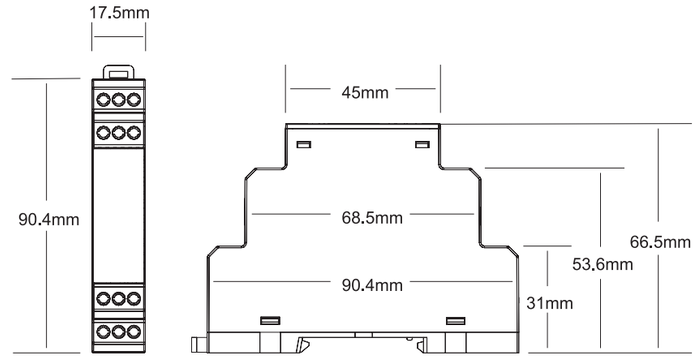

Type			TT-RTD-LP (-50 .. 100)	TT-RTD-LP (0 .. 100)	TT-RTD-LP (0 .. 150)	TT-RTD-LP (0 .. 200)	TT-RTD-LP (0 .. 300)	TT-RTD-LP (-50 .. 150)	TT-RTD-LP (-50 .. 200)	TT-RTD-LP (0 .. 500)
Definiton			Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer	Non-Isolated PT100 Transducer
Order Number			603860	603861	603862	603863	603864	603865	603866	603867
Casing Width(mm)			17,5	17,5	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	Screw terminal	Screw terminal
Input	Sensor Type		PT100	PT100	PT100	PT100	PT100	PT100	PT100	PT100
	Connection Method		2 wire or 3 wire	2 wire or 3 wire	2 wire or 3 wire	2 wire or 3 wire	2 wire or 3 wire	2 wire or 3 wire	2 wire or 3 wire	2 wire or 3 wire
	Temperature Measuring Range		-50°C .. 100°C	0°C .. 100 °C	0°C .. 150 °C	0°C .. 200 °C	0°C .. 300 °C	-50°C .. 150°C	-50°C .. 200°C	0°C .. 500°C
	Sensor excitation current		<0.6mA	<0.6mA	<0.6mA	<0.6mA	<0.6mA	<0.6mA	<0.6mA	<0.6mA
Output	Output Signal		4-20mA	4-20mA	4-20mA	4-20mA	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	3.6mA .. 23.6mA	3.6mA .. 23.6mA	3.6mA .. 23.6mA	3.6mA .. 23.6mA
	Max. Load		≤ 750Ω	≤ 750Ω	≤ 750Ω	≤ 750Ω	≤ 750Ω	≤ 750Ω	≤ 750Ω	≤ 750Ω
	Ripple		< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)	< 20 mVPP (at 750 Ω)
Supply	Voltage	AC	-	-	-	-	-	-	-	-
		DC	10-30V	10-30V	10-30V	10-30V	10-30V	10-30V	10-30V	10-30V
Isolation			-	-	-	-	-	-	-	-
Measurement error			< %0.1 Full scale	< %0.1 Full scale	< %0.1 Full scale	< %0.1 Full scale	< %0.1 Full scale	< %0.1 Full scale	< %0.1 Full scale	< %0.1 Full scale
Temperature coefficient			≤ %0.02/°C	≤ %0.02/°C	≤ %0.02/°C	≤ %0.02/°C	≤ %0.02/°C	≤ %0.02/°C	≤ %0.02/°C	≤ %0.02/°C
Response Time			< 20ms	< 20ms	< 20ms	< 20ms	< 20ms	< 20ms	< 20ms	< 20ms
Sensor failure indication			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)	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)
Permissible ambient temperature		During operation	-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	-20 to +60 °C
		During storage	-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	-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)	Max.95% (no condensation)
Degree of protection			IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Weight(gr)			42	42	42	42	42	42	42	42
Permissible mounting position			any	any	any	any	any	any	any	any
EMC-EMI	Radiated Emissions Test, 61000-6-2/AC:2012, 61000-6-4:2007/A1:2011		-	-	-	-	-	-	-	-

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)
Schematics	2 wire connection								
	3 wire connection								
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)	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/0-5V,0-5V)
Definiton		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	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator	Passive DC Signal Isolator
Order Number		602800	602801	602802	602803	602850	602851	602852	602853	602700	602701	602702	602703
Casing Width(mm)		17,5	17,5	17,5	17,5	17,5	17,5	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	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Input	Number of Channels	1 pc.	1 pc.	1 pc.	1 pc.	2 pc.	2 pc.	2 pc.	2 pc.	1 pc.	1 pc.	1 pc.	1 pc.
	Signal type	0-20mA	4-20mA	0-20mA	0-20mA	0-20mA	4-20mA	0-20mA	0-20mA	0-20mA	4-20mA	0-20mA	0-20mA
	Maximum input signal	50mA	50mA	50mA	50mA	50mA	50mA	50mA	50mA	50mA	50mA	50mA	50mA
Output	Number of Channels	1 pc.	1 pc.	1 pc.	1 pc.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.
	Signal Type	0-20 mA	4-20 mA	0-10 V	0-5 V	0-20 mA	4-20 mA	0-10 V	0-5 V	0-20 mA	4-20 mA	0-10 V	0-5 V
	Max. Current	24 mA	24 mA	-	-	24 mA	24 mA	-	-	24 mA	24 mA	-	-
	Max. Voltage	-	-	12 V	12 V	-	-	12 V	12 V	-	-	12 V	12 V
	Ripple	< 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)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)	< 20 mV (full scale)
	Load Resistance	≤ 250Ω	≤ 250Ω	≥ 5MΩ	≥ 5MΩ	≤ 250Ω	≤ 250Ω	≥ 5MΩ	≥ 5MΩ	≤ 250Ω	≤ 250Ω	≥ 5MΩ	≥ 5MΩ
Isolation		1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms	1.5 kVrms
Measurement error(Full Scale)		< %0.1	< %0.1	< %0.2	< %0.2	< %0.1	< %0.1	< %0.2	< %0.2	< %0.1	< %0.1	< %0.2	< %0.2
Response Time		20 ms	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms
Temperature coefficient		<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K	<50 ppm/K
Permissible ambient temperature	During operation	-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	-20 to +60 °C	-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	-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	-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)	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/0-5V,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	Radiated Emissions Test, 61000-6-2/AC:2012, 61000-6-4:2007/A1:2011	-	-	-	-	-	-	-	-	-	-	-	-
Schematics						 **NOTE:** Channel-1 and Channel-2 are totally isolated from each other.		 **NOTE:** Channel-1 and Channel-2 are totally isolated from each other.		 **NOTE:** If only one output channel is used, the other channel (which is not used) must be short-circuited.			

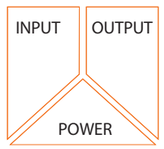
Dimensional Drawings



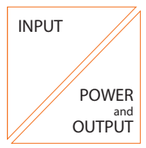
CT3 series / Converting

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.

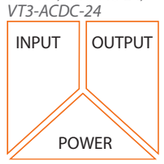
LED INDICATION

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

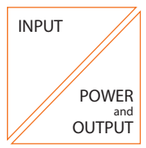
VT3 series / Converting

ISOLATION

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



VT3-AC-LP



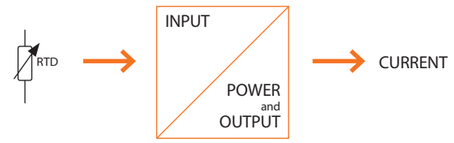
VT3 series transducers measure AC or DC(optional) voltage and converts it to an industry standard output signal which is directly proportional to the measured input. These transducers provide an output which is load independent and isolated from the input. Input range and output type must be adjusted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

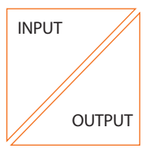
NO ISOLATION



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 necesarry 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.

Which markets are they used frequently?

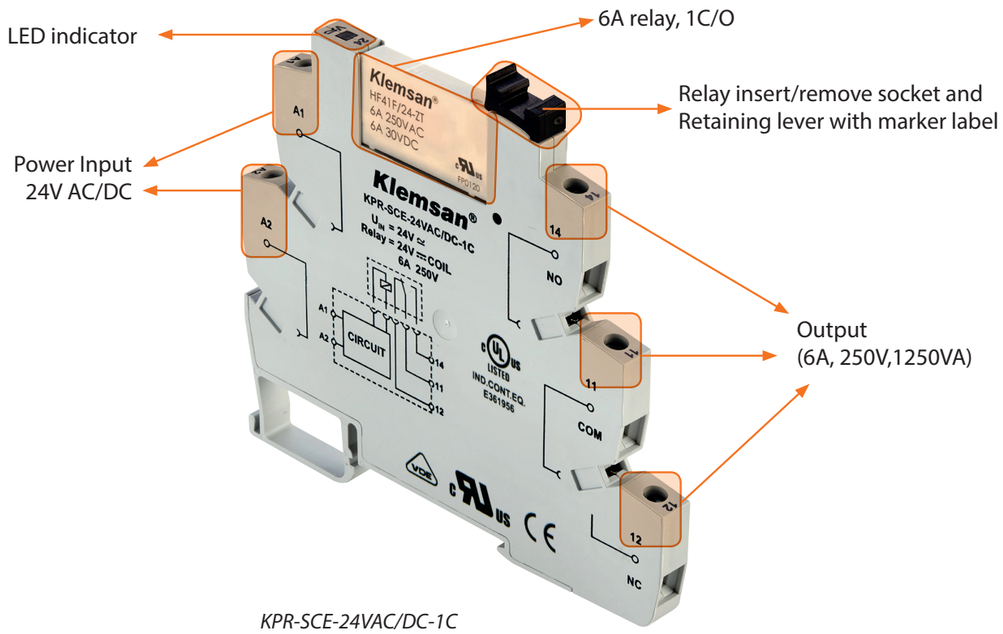
- PLC automation systems
- Electric power plants
- Energy management systems
- Medium Voltage Panels
- Industrial Machines

Benefits and Advantages

- A widely 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.



KPR-SCE-24VAC/DC-1C

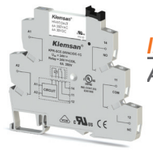
Automation System

Reduced PLC outputs to meet energy consumption goals

I/O CONTROL
All models

Machine Control and Safety

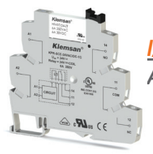
Provides isolation between control and controlled circuits .



ISOLATION
All models

Scada System

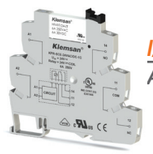
Lenghten PLC outputs lifes by using interface relay to turn many devices on and off simultaneously.



I/O CONTROL
All models

Control Panels

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



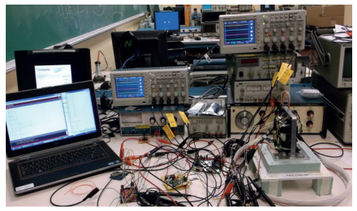
I/O CONTROL
All models

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 systeml/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

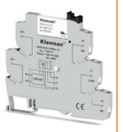
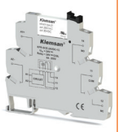
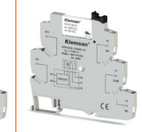
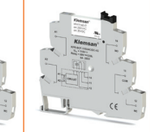
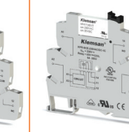
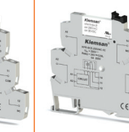
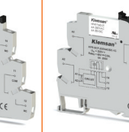
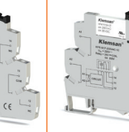
Only 6.2 mm wide, thus saving considerable space in your enclosures.

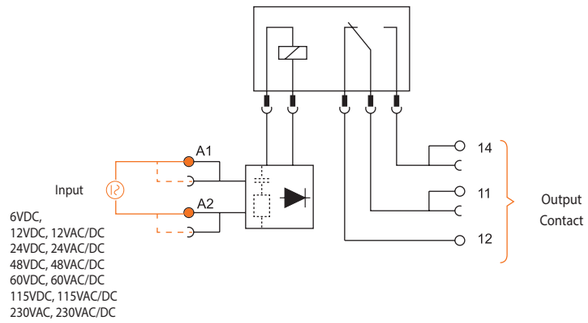
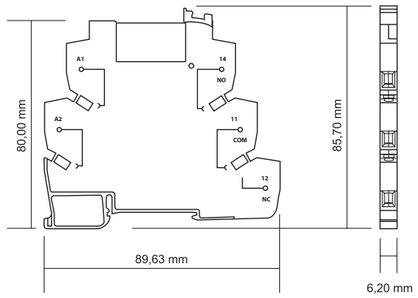
SPACE SAVING
All models

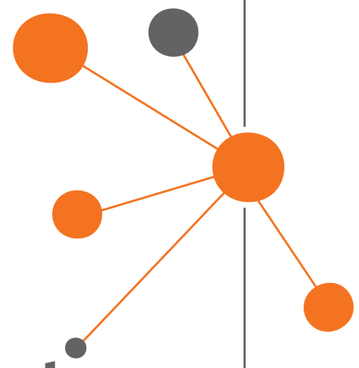
Leakage Current Applications

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

SWITCHING
KPR-SCF series

																		
Pre-assembled module (relay + socket)		**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**	**KPR-SCE-60VAC/DC-1C**	**KPR-SCE-60VDC-1C**	**KPR-SCE-115VAC/DC-1C**	**KPR-SCE-115VDC-1C**	**KPR-SCF-115VAC/DC-1C**	**KPR-SCE-230VAC/DC-1C**	**KPR-SCE-230VAC-1C**	**KPR-SCF-230VAC/DC-1C**	**KPR-SCF-230VAC-1C**
		Definiton	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module	Interface relay module with filter	Interface relay module	Interface relay module	Interface relay module with filter	Interface relay module with filter
		Order Number	270794	270800	270804	270810	270814	270820	270824	270830	270834	270840	270844	270846	270850	270852	270856	270858
Casing Width(mm)			6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2
Connection			Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Packaging unit			10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.
Input	Nominal Voltage(Un)		6VDC	12VAC/DC	12VDC	24VAC/DC	24VDC	48VAC/DC	48VDC	60VAC/DC	60VDC	115VAC/DC	115VDC	115VAC/DC	230VAC/DC	230VAC	230VAC/DC	230VAC
	Operating voltage range		(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un	(0,8 – 1,15) x Un
	Release voltage		0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un	0,2 x Un
	Integrated RCZ filter		-	-	-	-	-	-	-	-	-	-	-	OK	-	-	OK	OK
	Power Consumption	AC	-	<0.35VA	-	<0.2VA	-	<0.6VA	-	<0.4VA	-	<0.7VA	-	<1.1VA	<1.3VA	-	<2.3VA	-
		DC	<0.35W	<0.35W	<0.35W	<0.2W	<0.2W	<0.6W	<0.6W	<0.3W	<0.3W	<0.6W	<0.6W	<0.6W	<1.2W	-	<1.2W	-
Contact Characteristic	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)	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)	1 C/O (SPDT)	1 C/O (SPDT)
	Material		AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2	AgSnO2
	Coil voltage		5VDC	12VDC	12VDC	24VDC	24VDC	24VDC	24VDC	60VDC	60VDC	60VDC	60VDC	60VDC	60VDC	24VDC	60VDC	24VDC
	Coil empedance		147x(1± 10%) Ω	212x(1± 10%) Ω	212x(1± 10%) Ω	3390x(1± 15%) Ω	3390x(1± 15%) Ω	3390x(1± 15%) Ω	3390x(1± 15%) Ω	16600x(1± 15%) Ω	16600x(1± 15%) Ω	16600x(1± 15%) Ω	16600x(1± 15%) Ω	16600x(1± 15%) Ω	16600x(1± 15%) Ω	3390x(1± 15%) Ω	16600x(1± 15%) Ω	3390x(1± 15%) Ω
	Coil consumption		170mW	170mW	170mW	170mW	170mW	170mW	170mW	210mW	210mW	210mW	210mW	210mW	210mW	170mW	210mW	170mW
	Operate time		10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.	10 ms max.
	Release time		5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.	5 ms max.
	Max. ratings (AC)		6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA	6A/250VAC; 1500VA
	Max. ratings (DC)		6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W	6A/30VDC; 180W
	Mechanical life time		10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations	10^7 operations
	Electrical life time operations (UL approvel, 85°C)	NO	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations	3×10^4 operations
		NC	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations	1×10^4 operations
Isolation resistance			1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)	1000MΩ (500VDC)
Dielectric Strength	Between relay coil and contacts		4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.	4000VAC 1 min.
	Between contacts		1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.	1000VAC 1 min.
Permissible ambient temperature		During operation	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C
		During storage	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C
Relative Humidity			5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)	5% .. 85% (no condensation)
Degree of protection			IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Weight(gr)			32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Max. cable cross-section			2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2	2.5mm2
Max. torque			0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm	0.4Nm
Permissible mounting position			any	any	any	any	any	any	any	any	any	any	any	any	any	any	any	any
Certificates	**U**L508, IEC EN 61984-2011, IEC EN 61947-1:2010		-	-	-	OK	-	OK	-	OK	-	OK	-	-	OK	-	-	-
Accessories and Components	Socket 	Type	KPR-SCE-6VDC-1C (RELAY SOCKET)	KPR-SCE-12VAC/DC-1C (RELAY SOCKET)	KPR-SCE-12VDC-1C (RELAY SOCKET)	KPR-SCE-24VAC/DC-1C (RELAY SOCKET)	KPR-SCE-24VDC-1C (RELAY SOCKET)	KPR-SCE-48VAC/DC-1C (RELAY SOCKET)	KPR-SCE-48VDC-1C (RELAY SOCKET)	KPR-SCE-60VAC/DC-1C (RELAY SOCKET)	KPR-SCE-60VDC-1C (RELAY SOCKET)	KPR-SCE-115VAC/DC-1C (RELAY SOCKET)	KPR-SCE-115VDC-1C (RELAY SOCKET)	KPR-SCF-115VAC/DC-1C (RELAY SOCKET)	KPR-SCE-230VAC/DC-1C (RELAY SOCKET)	KPR-SCE-230VAC-1C (RELAY SOCKET)	KPR-SCF-230VAC/DC-1C (RELAY SOCKET)	KPR-SCF-230VAC-1C (RELAY SOCKET)
		Definiton	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)	Interface relay socket (60VAC/DC)	Interface relay socket (60VDC)	Interface relay socket (115VAC/DC)	Interface relay socket (115VDC)	Interface relay socket with RCZ filter (115VAC/DC)	Interface relay socket (230VAC/DC)	Interface relay socket (230VAC)	Interface relay socket with RCZ filter (230VAC/DC)	Interface relay socket eith RCZ filter (230VAC)
		Order Number	270795	270801	270805	270811	270815	270821	270825	270831	270835	270841	270845	270847	270851	270853	270857	270859
		Packaging unit	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.

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	KPR-SCE-60VAC/DC-1C	KPR-SCE-60VDC-1C	KPR-SCE-115VAC/DC-1C	KPR-SCE-115VDC-1C	KPR-SCF-115VAC/DC-1C	KPR-SCE-230VAC/DC-1C	KPR-SCE-230VAC-1C	KPR-SCF-230VAC/DC-1C	KPR-SCF-230VAC-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	Slim type 24VDC relay	Slim type 24VDC relay	Slim type 60VDC relay	Slim type 60VDC relay	Slim type 60VDC relay	Slim type 60VDC relay	Slim type 60VDC relay	Slim type 60VDC relay	Slim type 24VDC relay	Slim type 60VDC 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	Relay for 270820 and 270821	Relay for 270824 and 270825	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 270857	Relay for 270858 and 270859
		Order Number	095043	095042	095042	095041	095041	095041	095041	095040	095040	095040	095040	095040	095040	095041	095040	095041
		Packaging unit	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	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															
		Packaging unit	50 pcs.															
	Dekafix 	Type	DG 10/6 T															
		Definiton	Terminal Labels for interface relays															
		Order Number	505390															
		Packaging unit	360 pcs.															
Schematics																		
Dimensional Drawings																		



Communication
Management Solutions

Made to communicate

Defining an ethernet gateway in simple terms

An ethernet gateway is an automation device which converts between serial and ethernet 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 coverts the data between different protocols and supports system integrators by ensuring a consistent flow of information throughout the entire facility.

Etor 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 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 to your system more easily.

Which markets are they used frequently?

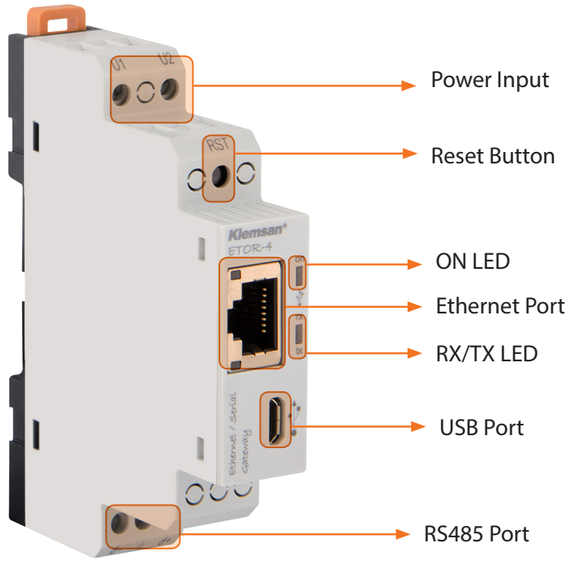
- Electrical power plants and substations
- PLC-Scada applications
- Submetering station
- Building automation
- Food and agriculture industry
- Railway automation
- Machine tool industry
- IT centres
- Alarm station
- Production line management

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



ETOR-4 Ethernet Gateway

Data Center Management

ETHERNET GATEWAY
Etor-4, Etor-2

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. Etor gateways bridge the distance between remote IT equipment and data center. Costs and cut downtime can be reduced by allowing remote access.

Wastewater Treatment Plants

ETHERNET GATEWAY
Etor-4

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.

Factory Automation

ETHERNET GATEWAY
Etor-4, Etor-2

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.

Power Generation System

ETHERNET GATEWAY
Etor-4, Etor-2

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.

Industrial Motors

ETHERNET GATEWAY
Etor-4, Etor-2

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 Modbus TCP network and monitored any place in the world.

Energy Metering Applications

ETHERNET GATEWAY
Etor-4, Etor-2

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

Multi-User & Multi-Device Applications

ETHERNET GATEWAY
Etor-4

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 a exponential rate nowadays.

Wind & Solar Power Plants

ETHERNET GATEWAY
Etor-4

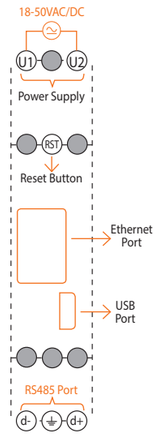
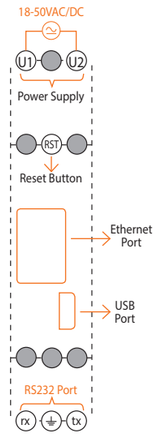
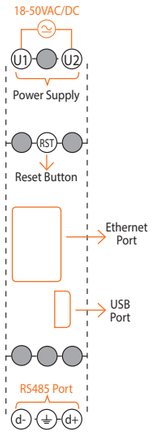
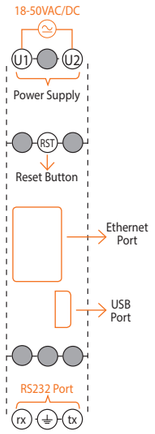
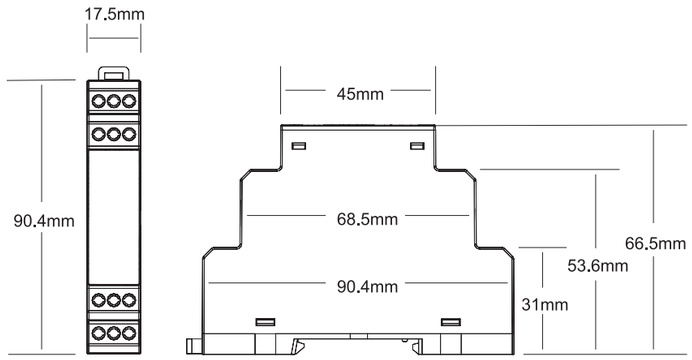
Renewable energy power plants are required to be monitored in long distance because of their locations. In order not transmission distance to become a problem, data should have transmitted through the ethernet gateways over TCP/IP protocol which provides safe, reliable and fast communication all over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

Oil and Gas Automation

ETHERNET GATEWAY
Etor-4, Etor-2

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. Etor can be used to optimize efficiency, productivity, reliability, and safety at any stage of oil and gas production.

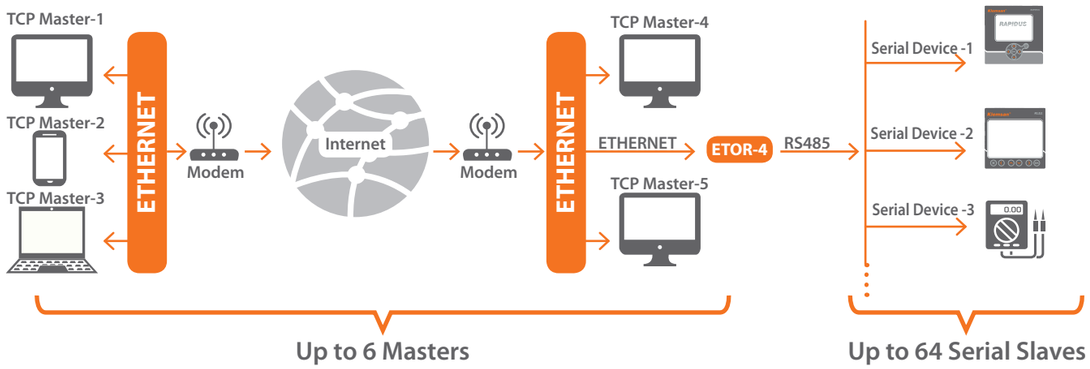
						
Type			**ETOR-4**	**ETOR-2**	**ETOR-4 (with external power supply)**	**ETOR-2 (with external power supply)**
Definiton			Ethernet gateway (TCP/IP - RS485)	Ethernet gateway (TCP/IP - RS232)	Ethernet gateway (TCP/IP - RS485)	Ethernet gateway (TCP/IP - RS232)
Order Number			601400	601401	601402	601403
Casing Width(mm)			17.5	17.5	17.5	17.5
Connections			Screw terminal (for supply and serial interface)	Screw terminal (for supply and serial interface)	Screw terminal (for supply and serial interface)	Screw terminal (for supply and serial interface)
General Information	Working Mode		Server or Client selectable (Bidirectional)	Server or Client selectable (Bidirectional)	Server or Client selectable (Bidirectional)	Server or Client selectable (Bidirectional)
	Configuration		Mini USB port or WEB interface	Mini USB port or WEB interface	Mini USB port or WEB interface	Mini USB port or WEB interface
	DHCP (Automatic IP Receive)		Available	Available	Available	Available
	ARP		Available	Available	Available	Available
	Ping blocking		Available	Available	Available	Available
	LED indicators		Available	Available	Available	Available
	Reset Function		Available	Available	Available	Available
	ESD protection		Available	Available	Available	Available
	Driver Supported		Windows® XP/Vista/7/8/8.1	Windows® XP/Vista/7/8/8.1	Windows® XP/Vista/7/8/8.1	Windows® XP/Vista/7/8/8.1
Ethernet Interface	Number of Ports		1	1	1	1
	Operation Modes		Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP	Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP	Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP	Modbus TCP, Modbus RTU over TCP, Modbus ASCII over TCP
	Number of Remote Connections	Server mode	6	6	6	6
		Client mode	1	1	1	1
	Connector		RJ45	RJ45	RJ45	RJ45
	Data Transmission Rate		10/100 Base-TX	10/100 Base-TX	10/100 Base-TX	10/100 Base-TX
Serial Interface	Number of Ports		1	1	1	1
	Operation Modes		MODBUS RTU, MODBUS ASCII	MODBUS RTU, MODBUS ASCII	MODBUS RTU, MODBUS ASCII	MODBUS RTU, MODBUS ASCII
	Serial Standart		RS485	RS232	RS485	RS232
	Number of Serial Devices	Server mode	64	1	64	1
		Client mode	1	1	1	1
	Serial Communication Parameters	Baud Rate	300 to 115200 bps	300 to 115200 bps	300 to 115200 bps	300 to 115200 bps
		Data Bit	8	8	8	8
		Stop Bits	1 or 2	1 or 2	1 or 2	1 or 2
		Parity	None, Even, Odd	None, Even, Odd	None, Even, Odd	None, Even, Odd
Supply	Voltage	AC	18-50V	18-50V	18-50V	18-50V
		DC	18-50V	18-50V	18-50V	18-50V
	Consumption	AC	< 2.2VA	< 2.2VA	< 2.2VA	< 2.2VA
		DC	< 1.2W	< 1.2W	< 1.2W	< 1.2W
	Frequency		45-65Hz	45-65Hz	45-65Hz	45-65Hz
Galvanic Isolation	Supply- Ethernet port		1500VRMS, 2250VDC	1500VRMS, 2250VDC	1500VRMS, 2250VDC	1500VRMS, 2250VDC
	Supply- Serial port		1500VRMS, 2250VDC	1500VRMS, 2250VDC	1500VRMS, 2250VDC	1500VRMS, 2250VDC
	Serial port-Ethernet port		2500VRMS	2500VRMS	2500VRMS	2500VRMS
Mechanical Properties	Weight(g)		58	58	58	58
	Protection Class		IP20	IP20	IP20	IP20
	Assembly Type		Rail Mount	Rail Mount	Rail Mount	Rail Mount
	Permissible mounting position		Any	Any	Any	Any
Ambient Conditions	Operating Temperature		-10 to +60 °C	-10 to +60 °C	-10 to +60 °C	-10 to +60 °C
	Storage Temperature		-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%

Type		ETOR-4	ETOR-2	ETOR-4 (with external power supply)	ETOR-2 (with external power supply)
EMC-EMI	TS EN 55022, TS EN 55024	OK	-	OK	-
Accesorries	Mini USB Cable 	Available	Available	Available	Available
	External Power Supply (220/110VAC to 24VDC) 	-	-	Available	Available
Schematics					
Dimensional Drawings					

ETOR-4 / Ethernet-RS485 Bidirectional Converting

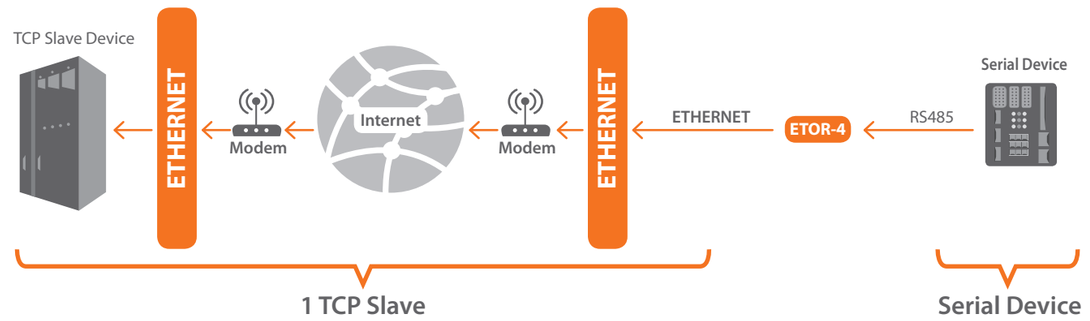
Server Mode

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.



Client Mode

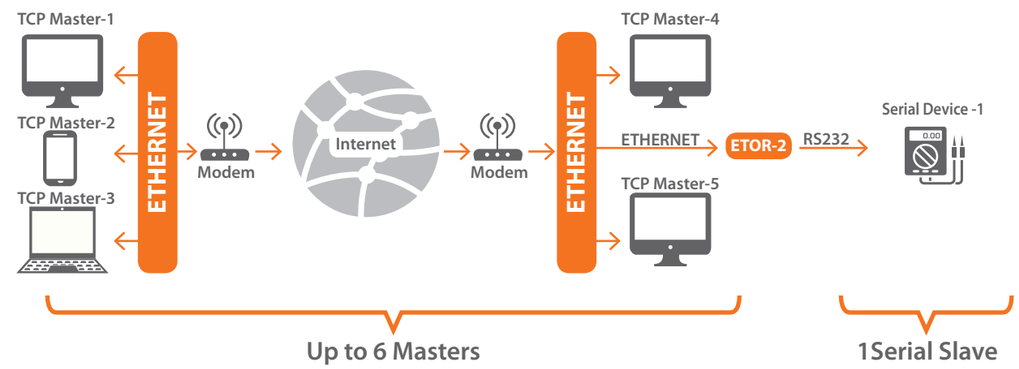
When running in the client mode; ETOR-4 converts the MODBUS RTU and MODBUS ASCII queries to MODBUS TCP, MODBUS RTU over TCP and MODBUS ASCII over TCP queries and transmits these queries to the remote device which is connected to the internet or the local network. After that, it converts the responses 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.



ETOR-2 / Ethernet-RS232 Bidirectional Converting

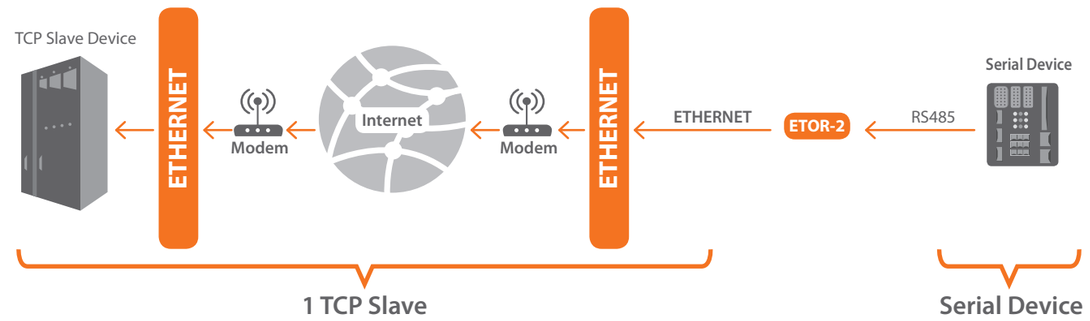
Server Mode

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-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.



Energy Monitoring
Solutions

More efficiency
than you expected

Defining an energy analyzer in simple terms

An energy analzer 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?

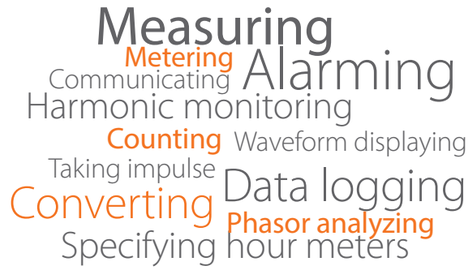
An energy analyzer provides highly accurate measuring for main electrical parameters and expanded energy metering solutions for your electrical network.

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 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 paramaters 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.

Which markets are they used frequently?

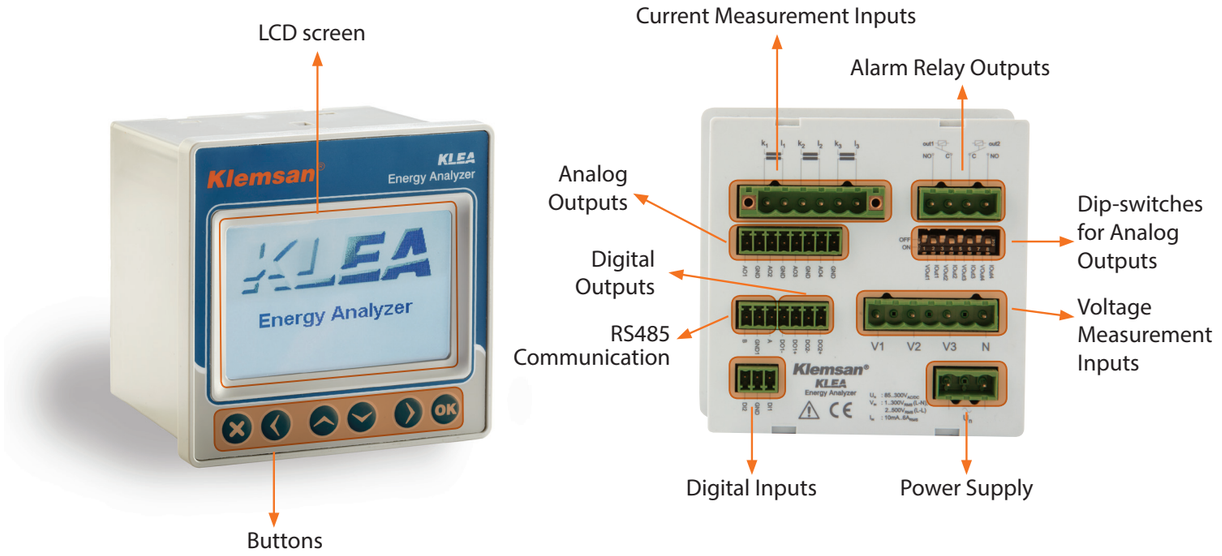
- Medium voltage modular cabinets
- Submetering station
- PLC-Scada applications
- Electrical power plants and substations
- Electric utilities
- Enery meter applications
- Infrastructure
- Alarm station
- IT centres
- High-rise buildings

Benefits and Advantages

- Current inputs can withstand surges up to 100 A for 1 second
- State of the art technology; moduler 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 standarts
- 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 standarts 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

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.

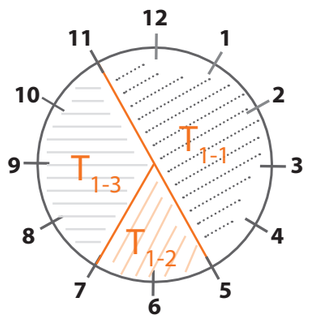
ENERGY ANALYZER
KLEA 110P
KLEA 220P
POWYS 3121 ...

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

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

PLC-Scada Applications

POWER TRANSDUCER
DNPT

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.

Cost Management

ENERGY ANALYZER
KLEA 3xxx Series

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.

Signal Analyzing

ENERGY ANALYZER
KLEA 3xxx Series

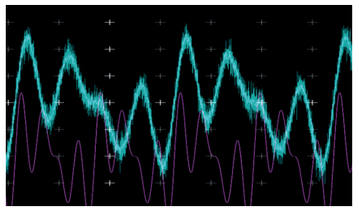
Advanced monitoring of current and voltage waveforms, monitoring signal disturbances, detailed analyze of phase relationships.

Remote Monitoring

ANALYZER / MULTIMETER
KLEA, ECRAS and POWYS Series

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.

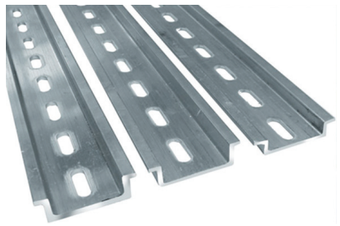
Pulse Concentration Applications



ENERGY ANALYZER
KLEA and POWYS Series

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 purpuses.

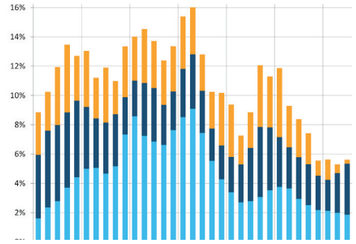
Din-Rail Applications



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

ANALZER/ POWER TRANSDCUER
POWYS and DNPT 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

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

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

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

Harmonic Management

Harmonics cause many problems for all sorts of equipment connected to the low voltage network. Before take the cost and 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

Fan Control

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

ENERGY ANALYZER
KLEA 3xxx Series

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 occured in the past.

ENERGY ANALYZER
KLEA 3xxx Series

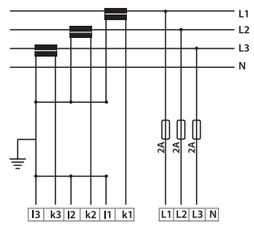
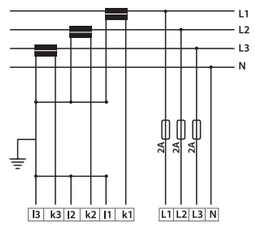
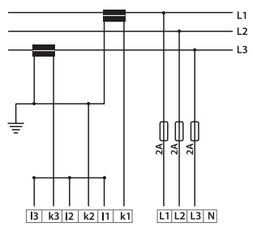
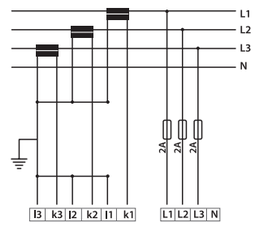
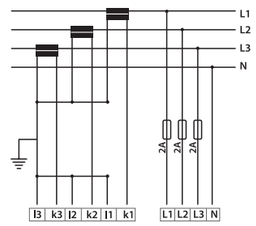
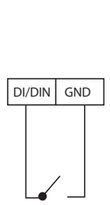
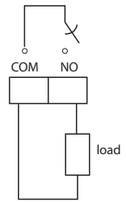
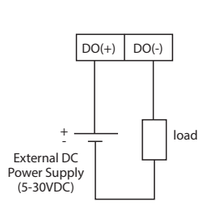
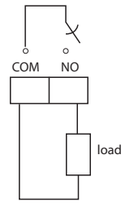
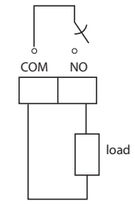
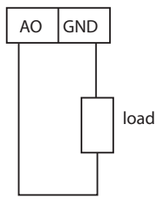
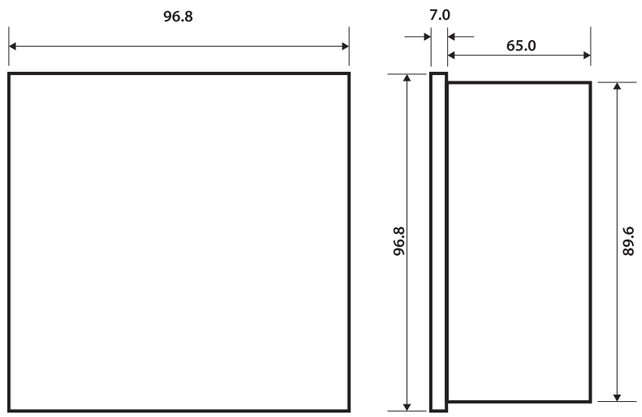
Equipment Status Management

The status of a circuit breaker or a disconnector in an electrical power distrubution 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.

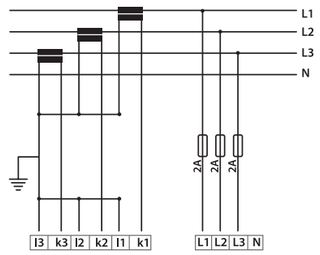
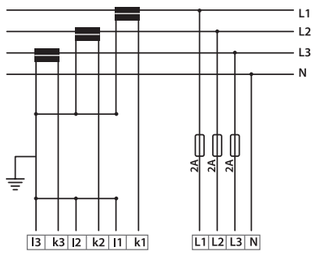
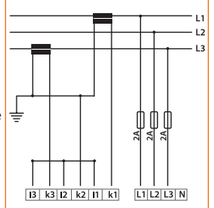
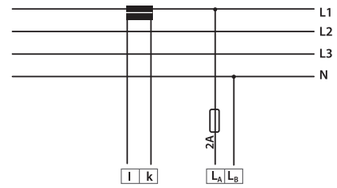
ANALYZER / MULTIMETER
KLEA and POWYS Series

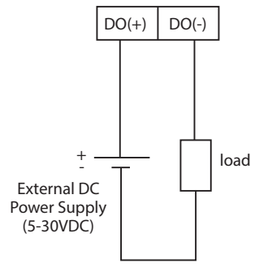
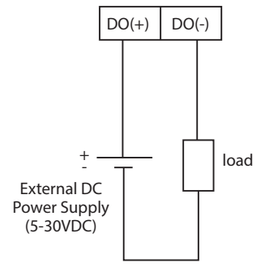
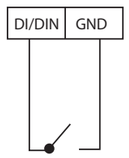
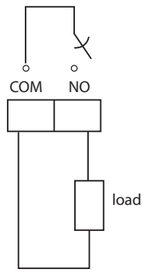
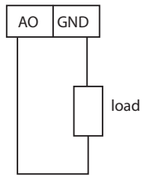
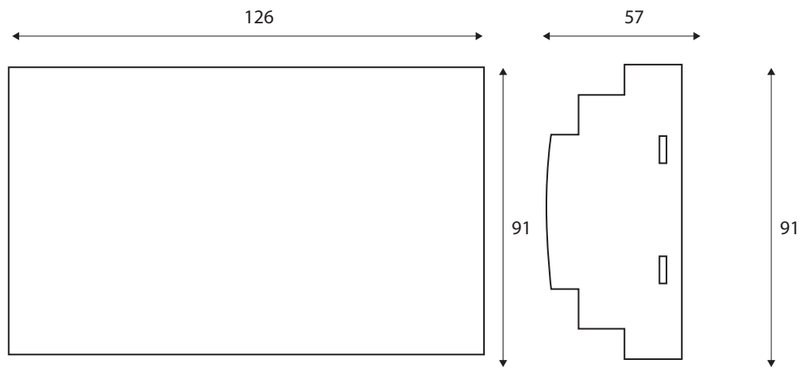
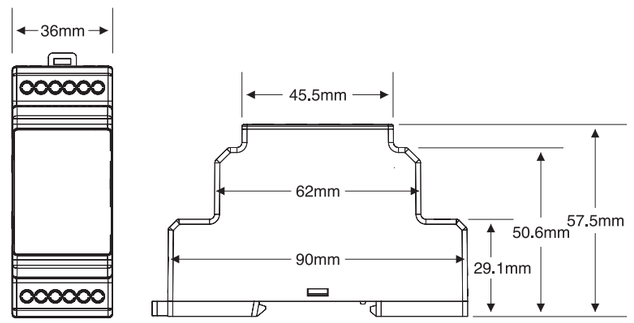
			KLEA 320P	KLEA 370P	KLEA 322P	KLEA 324P	KLEA 320P-D	KLEA 370P-D	KLEA 220P	KLEA 110P	ECRAS 100	ECRAS 120	ECRAS 200	ECRAS 220
Type														
Definiton			3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Multimeter	3Ø Multimeter	3Ø Multimeter	3Ø Multimeter
Order Number			606100	606101	606102	606103	606130	606131	606160	606180	606210	606211	606212	606213
General	Seven Segment Display		-	-	-	-	-	-	-	Available	Available	Available	Available	Available
	LCD		Available	Available	Available	Available	Available	Available	Available	-	-	-	-	-
	Language Support		Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	-	-	-	-	-	-
	Battery		Available	Available	Available	Available	Available	Available	-	-	-	-	-	-
	Real Time Clock		Available	Available	Available	Available	Available	Available	-	-	-	-	-	-
	Password Protection		Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available
	Current Transformer Ratio		1-5000	1-5000	1-5000	1-5000	1-5000	1-5000	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	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	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, Aron	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W
	Measurement in Quadrants		4	4	4	4	4	4	4	4	4	4	4	4
	Number of Measurement in a period		512	512	512	512	512	512	256	256	256	256	256	256
	LCD/Display Refresh Period		1 sec	1 sec	1 sec	1 sec	1 sec	1 sec	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	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT
	Phasor Diagram		Available	Available	Available	Available	Available	Available	-	-	-	-	-	-
	Signal Waveforms		Available	Available	Available	Available	Available	Available	-	-	-	-	-	-
	Min/Max/Demand Values		Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available
Energy Measurement	Number of Tariffs		2	2	2	2	2	2	2	2	1	1	1	1
	Multi Sub-Tariffs(Peak, Day and Off-Peak)		Available	Available	Available	Available	Available	Available	-	-	-	-	-	-
	1Ø Phase Energy Meters		-	-	-	-	-	-	Available	Available	Available	Available	Available	Available
	3Ø Phase Energy Meters		Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available
	4-Quadrant Reactive Energy Meters		-	-	-	-	Available	Available	-	-	-	-	-	-
Current Measurement Input	Measurement Range		10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC	10mA-6A AC	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	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	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	<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	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	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz
Voltage Measurement Input	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	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	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	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	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	<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	12,8 kHz	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 51st	Upto 51st	Upto 51st	Upto 51st	Upto 51st	Upto 51st	Upto 31st	Upto 31st	Upto 31st	Upto 31st	Upto 31st	Upto 31st
	THD-Voltage in %		Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available
	THD-Current in %		Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available
Other Measurements	Run Hour (Operating time for load in hours)		-	-	-	-	-	-	Available	Available	Available	Available	Available	Available
	On Hour (Operating time for meter in hours)		-	-	-	-	-	-	Available	Available	Available	Available	Available	Available
	Int Counter (Number of power interruptions)		-	-	-	-	-	-	Available	Available	Available	Available	Available	Available
Measurement Accuracy	According to IEC 61557-12	Total Active Power	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
		Total Reactive Power	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1
		Total Apparent Power	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
		Total Active Energy	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	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	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	Class 0.1	Class 0.1	Class 0.1	Class 0.1	Class 0.1	Class 0.1
		Current	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
		Neutral Current (calculated)	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	Class 0.5	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	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 0.5	Class 0.5	Class 0.5	Class 0.5	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	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1
	According to IEC 62053-22	Total Active Energy	Class 0.2S	Class 0.2S	Class 0.2S	Class 0.2S	Class 0.2S	Class 0.2S	Class 0.5S	Class 0.5S	Class 0.5S	Class 0.5S	Class 0.5S	Class 0.5S
	According to IEC 62053-23	Total Reactive Energy	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2
Inputs and Outputs	Alarm Relay Outputs	Number of outputs	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	-	2 pcs.	-	2 pcs.
		Type	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)		NO (SPST)		NO (SPST)
		Max. Switching Current	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	-	10 A	-	10 A
		Max. Switching Voltage	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	-	250 VAC	-	250 VAC
		Max. Switching Power	1250 VA	1250 VA	1250 VA	1250 VA	1250 VA	1250 VA	1250 VA	1250 VA	-	1250 VA	-	1250 VA

Type			KLEA 320P	KLEA 370P	KLEA 322P	KLEA 324P	KLEA 320P-D	KLEA 370P-D	KLEA 220P	KLEA 110P	ECRAS 100	ECRAS 120	ECRAS 200	ECRAS 220
Inputs and Outputs	Digital Inputs	Number of inputs	2 pcs.	7 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	1 pc.	-	-	-	-
		Minimum Counting Frequency	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	-	-	-	-
		Input Present or Not	Dry Contact	Dry Contact	Dry Contact	Dry Contact	Dry Contact	Dry Contact	Dry Contact	Dry Contact	-	-	-	-
		Isolation Level	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	-	-	-	-
	Digital Outputs	Number of outputs	2 pcs.	7 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.	-	-	-	-
		Type	Transistor	Transistor	Transistor	Transistor	Transistor	Transistor	Transistor	Transistor	-	-	-	-
		Switching Voltage Range	5-30 VDC	5-30 VDC	5-30 VDC	5-30 VDC	5-30 VDC	5-30 VDC	5-30 VDC	5-30 VDC	-	-	-	-
		Minimum Switching Frequency	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	-	-	-	-
		Isolation Level	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	-	-	-	-
	Analog Outputs	Number of outputs	-	-	2	4	-	-	-	-	-	-	-	-
		Range of Outputs 0-5 V, 0-10 V, -5-5 V, -10-10V, 0-20 mA, 4-20 mA	-	-	Available	Available	-	-	-	-	-	-	-	-
		Isolation	-	-	Isolated	Non-isolated	-	-	-	-	-	-	-	-
Supply	Voltage	AC	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V
		DC	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V
	Consumption	AC	< 3VA	< 3VA	< 3VA	< 3VA	< 3VA	< 3VA	<4.5VA	<6VA	<6VA	<6VA	<6VA	<6VA
		DC	<2.5W	<2.5W	<2.5W	<2.5W	<2.5W	<2.5W	<2W	<3W	<3W	<3W	<3W	<3W
	Frequency		45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz
Data Logging with timestamp	Min/max/avg Values	Hourly records	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	-	-	-	-	-	-
		Daily records	240 days x 68 different paramaters	240 days x 68 different paramaters	240 days x 68 different paramaters	240 days x 68 different paramaters	240 days x 68 different paramaters	240 days x 68 different paramaters	-	-	-	-	-	-
		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	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	4 months x 16 different parameters	4 months x 16 different parameters	-	-	-	-	-	-
	Alarm records		50	50	50	50	50	50	-	-	-	-	-	-
Communication	Protocol		Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	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	2400-115200 bps adjustable	1200-57600 bps adjustable	1200-57600 bps adjustable	-	-	1200-57600 bps adjustable	1200-57600 bps adjustable
	Parity number		None	None	None	None	None	None	Odd, Even, None	Odd, Even, None	-	-	Odd, Even, None	Odd, Even, None
	Stop bit		1	1	1	1	1	1	1	1	-	-	1	1
	Address		1-247	1-247	1-247	1-247	1-247	1-247	1-247	1-247	-	-	1-247	1-247
	Isolation		2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS	-	-	2750V RMS	2750V RMS
Mechanical Properties	Weight(g)		404	428	428	428	404	428	378	323	272	290	296	316
	Protection Class		IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear
	Assembly Type		Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Cable Cross Sections	Supply, Voltage, Current, Relay Outputs	Stranded:	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG
		Solid:	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG
	Digital I/O, RS 485, Analog Output	Stranded:	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	-	-	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	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	-	-	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	-20 to +70 °C	-20 to +70 °C	-20 to +70 °C	-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	-30 to +80 °C	-30 to +80 °C	-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%	Max.95%	Max.95%	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	Available	Available	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	Available	Available	Available	Available	Available	Available	Available	Available

Type		KLEA 320P	KLEA 370P	KLEA 322P	KLEA 324P	KLEA 320P-D	KLEA 370P-D	KLEA 220P	KLEA 110P	ECRAS 100	ECRAS 120	ECRAS 200	ECRAS 220
Schematics	Network Connections	 **3 wires with 3 CTs**		 **4 wires with 3 CTs**		 **3 wires with 2 CTs**		 **3 wires with 3 CTs**		 **4 wires with 3 CTs**			
	Digital I/O And Alarm Output Connections	 **Digital Input**  **Alarm Relay Output**  **Digital Output**								-	 **Alarm Relay Output**	-	 **Alarm Relay Output**
	Analog Output Connection	-	-		-	-	-	-	-	-	-	-	-
Dimensional Drawings													

												
Type		**DNPT**	**POWYS 3121**	**POWYS 3111**	**POWYS 3101**	**POWYS 3100**	**POWYS 1110**	**POWYS 1120**	**POWYS 1012**	**POWYS 1022**		
Definiton		3Ø Power Transducer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	3Ø Energy Analyzer	1Ø Energy Analyzer	1Ø Energy Analyzer	1Ø Energy Analyzer	1Ø Energy Analyzer		
Order Number		606400	606305	606304	606303	606300	606351	606352	606354	606355		
General	Seven Segment Display	-	-	Available	-	-	Available	-	Available	-		
	LCD	-	Available	-	-	-	-	Available	-	Available		
	Language Support	-	-	-	-	-	-	-	-	-		
	Battery	Available	-	-	-	-	-	-	-	-		
	Real Time Clock	Available	-	-	-	-	-	-	-	-		
	Password Protection	-	Available	Available	Available	Available	Available	Available	Available	Available		
	Current Transformer Ratio	1-5000	1-5000	1-5000	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	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	1-60 minutes adjustable	1-60 minutes adjustable	1-60 minutes adjustable		
	Measurement in Quadrants	4	4	4	4	4	4	4	4	4		
	Number of Measurement in a period	512	256	256	256	256	256	256	256	256		
	LCD/Display Refresh Period	-	1 sec	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	TT, TN, IT	TT, TN, IT	TT, TN, IT	TT, TN, IT		
	Wiring	3P4W, 3P3W, Aron	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W	3P4W, 3P3W	Single-phase with neutral and 1 CT	Single-phase with neutral and 1 CT	Single-phase with neutral and 1 CT	Single-phase with neutral and 1 CT		
	Phasor Diagram	-	-	-	-	-	-	-	-	-		
	Signal Waveforms	-	-	-	-	-	-	-	-	-		
	Min/Max/Demand Values	Available	Available	Available	Available	Available	Available	Available	Available	Available		
Energy Measurement	Number of Tariffs	2	2	2	2	1	1	1	1	1		
	Multi Sub-Tariffs(Peak, Day and Off-Peak)	Available	-	-	-	-	-	-	-	-		
	1Ø Phase Energy Meters	-	Available	Available	Available	Available	Available	Available	Available	Available		
	3Ø Phase Energy Meters	Available	Available	Available	Available	Available	-	-	-	-		
	4 Quadrant Reactive Energy Meters	-	-	-	-	-	-	-	-	-		
Current Measurement Input	Measurement Range	10mA-6A AC	10mA-6A AC	10mA-6A AC	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	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	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	<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	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	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz		
Voltage Measurement Input	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	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	10-500 Vrms	10-500 Vrms	10-500 Vrms	10-500 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	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	<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	12,8 kHz	12,8 kHz	12,8 kHz	12,8 kHz		
Power Quality Measurements	Harmonics for current and voltage phases	Upto 51st	Upto 31st	Upto 31st	Upto 31st	Upto 31st	Upto 31st	Upto 31st	Upto 31st	Upto 31st		
	THD-Voltage in %	Available	Available	Available	Available	Available	Available	Available	Available	Available		
	THD-Current in %	Available	Available	Available	Available	Available	Available	Available	Available	Available		
Other Measurements	Run Hour (Operating time for load in hours)	-	Available	Available	Available	Available	Available	Available	Available	Available		
	On Hour (Operating time for meter in hours)	-	Available	Available	Available	Available	Available	Available	Available	Available		
	Int Counter (Number of power interruptions)	-	Available	Available	Available	Available	Available	Available	Available	Available		
Measurement Accuracy	According to IEC 61557-12	Total Active Power	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 0.5	
		Total Reactive Power	Class 1	Class 1	Class 1	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 0.5	Class 0.5	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	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	Class 2	Class 2	Class 2	
		Frequency	Class 0.05	Class 0.1	Class 0.1	Class 0.1	Class 0.1	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	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	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	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	Class 0.5	Class 0.5	Class 0.5	Class 0.5	
		THDV, THDI	Class 1	Class 1	Class 1	Class 1	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	Class 0.5S	Class 0.5S	Class 0.5S	Class 0.5S	Class 0.5S	
	Accoding to IEC 62053-23	Total Reactive Energy	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2	
Inputs and Outputs	Alarm Relay Outputs	Number of outputs	2 pcs.	2 pcs.	2 pcs.	2 pcs.	-	-	-	-	-	
		Type	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)						
		Max. Switching Current	10 A	10 A	10 A	10 A	-	-	-	-	-	
		Max. Switching Voltage	250 VAC	250 VAC	250 VAC	250 VAC	-	-	-	-	-	
		Max. Switching Power	1250 VA	1250 VA	1250 VA	1250 VA	-	-	-	-	-	
	Digital Inputs	Number of inputs	2 pcs.	2 pcs.	2 pcs.	2 pcs.	-	-	-	-	-	
		Minimum Counting Frequency	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	100 Hz, 10 ms	-	-	-	-	-	
		Input Present or Not	Dry Contact	Dry Contact	Dry Contact	Dry Contact	-	-	-	-	-	
		Isolation Level	5000 Vrms	5000 Vrms	5000 Vrms	5000 Vrms	-	-	-	-	-	
	Digital Outputs	Number of outputs	2 pcs.	2 pcs.	2 pcs.	2 pcs.	-	-	-	2 pcs.	2 pcs.	
		Type	Transistor	Transistor	Transistor	Transistor	-	-	-	Transistor	Transistor	
		Switching Voltage Range	5-30 VDC	5-30 VDC	5-30 VDC	5-30 VDC	-	-	-	5-30 VDC	5-30 VDC	
		Minimum Switching Frequency	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	20 Hz, 50 ms	-	-	-	20 Hz, 50 ms	20 Hz, 50 ms	
		Isolation Level	5000 Vrms	5000 Vrms	5000 Vrms	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			DNPT	POWYS 3121	POWYS 3111	POWYS 3101	POWYS 3100	POWYS 1110	POWYS 1120	POWYS 1012	POWYS 1022
Supply	Voltage	AC	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V
		DC	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V	85-300V
	Consumption	AC	< 3VA	<4.5VA	<6VA	<6VA	<6VA	<4VA	<4VA	<4VA	<4VA
		DC	<2.5W	<2W	<3W	<3W	<3W				
	Frequency		45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz
Data Logging with timestamp	Min/max/avg Values	Hourly records	1920 hours x 68 different paramaters	-	-	-	-	-	-	-	-
		Daily records	240 days x 68 different paramaters	-	-	-	-	-	-	-	-
		Monthly records	36 months x 68 different parameters	-	-	-	-	-	-	-	-
	Demand		4 months x 16 different parameters	-	-	-	-	-	-	-	-
	Alarm records		50	-	-	-	-	-	-	-	-
Communication	Protocol		Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	-	-
	Baud rate		2400-115200 bps adjustable	1200-57600 bps adjustable	1200-57600 bps adjustable	1200-57600 bps adjustable	1200-57600 bps adjustable	1200-57600 bps adjustable	1200-57600 bps adjustable	-	-
	Parity number		None	Odd, Even, None	Odd, Even, None	Odd, Even, None	Odd, Even, None	Odd, Even, None	Odd, Even, None	-	-
	Stop bit		1	1	1	1	1	1	1	-	-
	Address		1-247	1-247	1-247	1-247	1-247	1-247	1-247	-	-
	Isolation		2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS	2750V RMS	-	-
Mechanical Properties	Weight(g)		335	340	330	278	259	135	135	135	135
	Protection Class		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
	Assembly Type		Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Cable Cross Sections	Supply, Voltage, Current, Relay Outputs	Stranded:	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG
		Solid:	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG
	Digital I/O, RS 485, Analog Output	Stranded:	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG
		Solid:	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 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	-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	-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%	Max.95%	Max.95%	Max.95%	Max.95%
EMC-EMI			-	-	-	-	-	-	-	-	-
Schematics	3 wires with 3 CTs							-	-	-	-
	4 wires with 3 CTs							-	-	-	-
	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		-	-	-	-	-				

Type		DNPT	POWYS 3121	POWYS 3111	POWYS 3101	POWYS 3100	POWYS 1110	POWYS 1120	POWYS 1012	POWYS 1022
Schematics	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 distrubution 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 cosØ, 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
Phasor analyzing
Metering
Communicating
Alarming
Harmonic monitoring
Compensation
Data logging
Dynamic capacitor monitoring
Learning
Displaying Switching Cycles
Activating target-2 cosØ

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 paramaters 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.

Which markets are they used frequently?

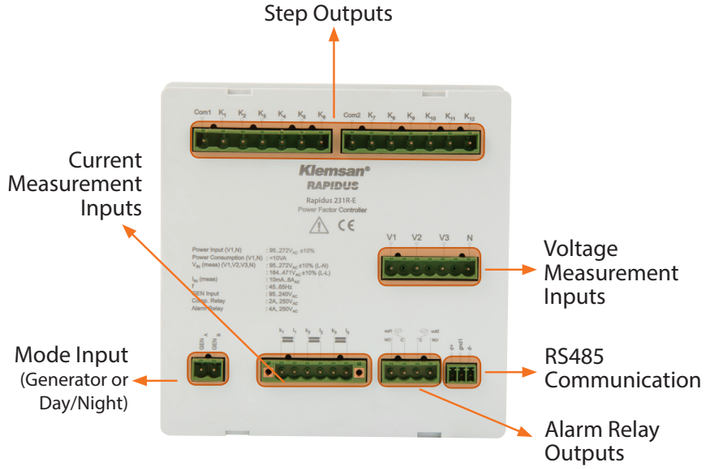
- Medium voltage modular cabinets
- Submetering station
- PLC-Scada applications
- Electric power plants and substations
- Electric utilities
- Enery meter applications
- Infrastructure
- Alarm station
- IT centres
- High-rise buildings

Benefits and Advantages

- Current inputs can withstand surges up to 100 A for 1 second
- State of the art technology; moduler 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 standarts
- 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 standarts.



RAPIDUS 231R-E Power Factor Controller

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 Loses

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 elemination 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 occured 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 contoller.

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

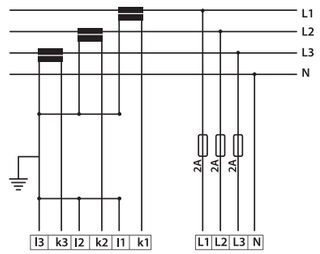
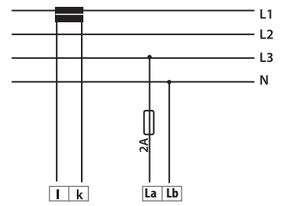
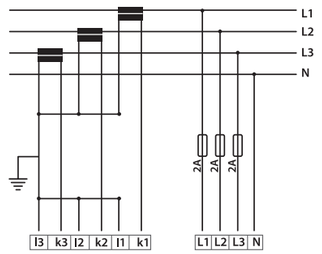
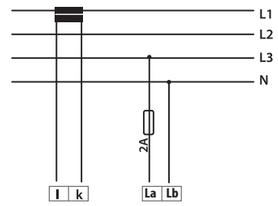
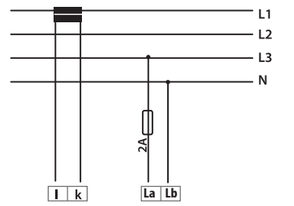
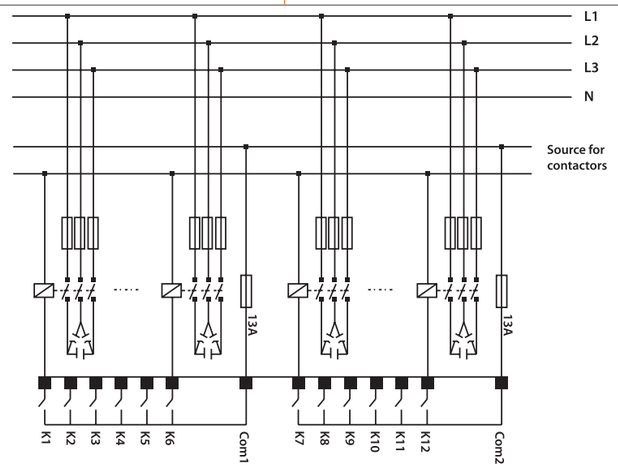
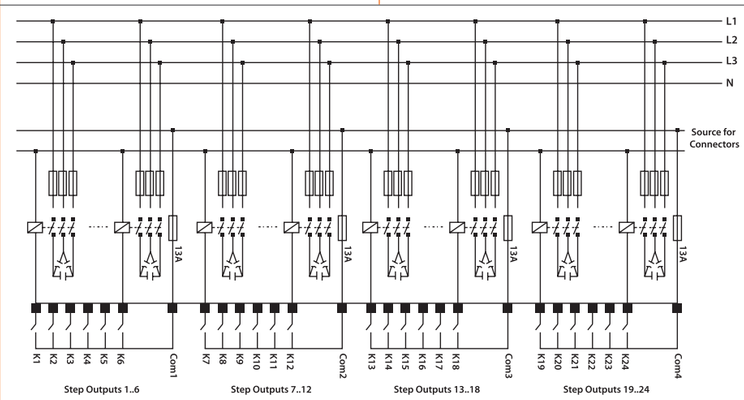
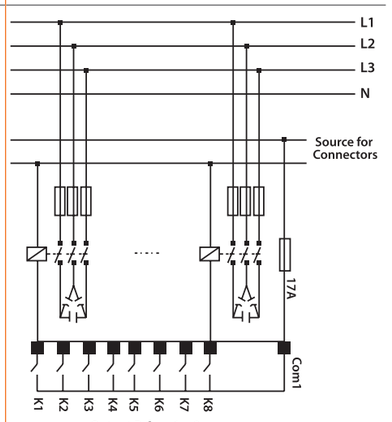
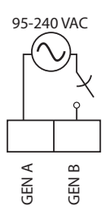
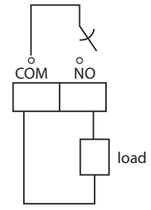
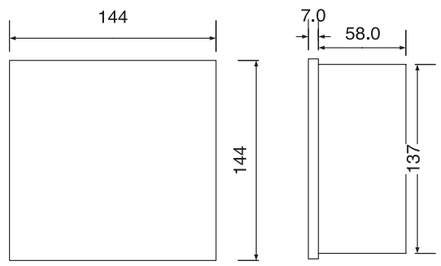
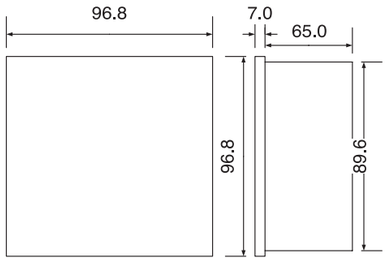
Alarm Control Applications

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	RAPIDUS 218R
Definiton			Power Factor Controller (3Ø-12steps)	Power Factor Controller (1Ø-12steps)	Power Factor Controller (3Ø-24steps)	Power Factor Controller (1Ø-24steps)	Power Factor Controller (1Ø-8steps)
Order Number			606005	606011	606007	606014	606021
General	Measuring system		3Ø	1Ø	3Ø	1Ø	1Ø
	LCD Sreen		Available	Available	Available	Available	Available
	Language Support		Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	Turkish, English, Russian	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	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	Single phase(L-L or L-N) voltage connection with 1 CT	Single phase(L-L or L-N) voltage connection with 1 CT
	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	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		Available	Available	Available	Available	Available
	Signal Waveforms		-	-	-	-	-
	Min/Max/Demand Values		Available	Available	Available	Available	Available
Control Operations and Functions	Compensation Modes	Rapidus (Intelligent control mode)	Available	Available	Available	Available	Available
		Sequential	Available	Available	Available	Available	Available
		Linear	Available	Available	Available	Available	Available
		Circular	Available	Available	Available	Available	Available
		Manual	Available	Available	Available	Available	Available
	Step Configurations	Manually Assign	Available	Available	Available	Available	Available
		Predefined	1-1-1-1, 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, 1-1-2-2, 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, 1-1-2-2, 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, 1-1-2-2, 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, 1-1-2-2, 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	-	-	Available
		Fixed Step Assigment	Available	Available	Available	Available	Available
		Power(kVAr)	0.00-1000 adjustable	0.00-1000 adjustable	0.00-1000 adjustable	0.00-1000 adjustable	0.00-1000 adjustable
		Type	3Ø capacitor,3Ø shunt reactor,1Ø capacitor or 1Ø shunt reactor adjustable	3Ø capacitor, 3Ø 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 adjustable
	Power factor settings	Target 1 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
		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	Available	Available
	Dual cosØ target		Available	Available	Available	Available	Available
	4 Quadrant operation for generators		Available	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	1-600 sec adjustable
		Step deactivation time	1-600 sec adjustable	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	3-1000 sec adjustable
	Phase shift angle		±45 degree adjustable	±45 degree adjustable	±45 degree adjustable	±45 degree a 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	Off, 5sec, 10sec, 20sec, 30sec, 40sec, 50sec, 60sec adjustable
Energy Meters	Number of Tariffs		1	1	1	1	1
	Multi Sub-Tariffs(Peak, Day and Off-Peak)		-	-	-	-	-
	1Ø Phase Energy Meter		-	-	-	-	-
	3Ø Phase Energy Meters		Available	Available	Available	Available	Available
	4 Quadrant Reactive Energy Meters		-	-	-	-	-
Current Measurement Input	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	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz
Voltage Measurement Input	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		95-272 VAC ±10%	95-410VAC ±10%	95-272 VAC ±10%	95-410VAC ±10%	95-410VAC ±10%
	Measured Range L-L		164-471 VAC ±10%	95-410VAC ±10%	164-471 VAC ±10%	95-410VAC ±10%	95-410VAC ±10%
	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	25,6 kHz	25,6 kHz	25,6 kHz	25,6 kHz
Power Quality Measurements	Harmonics / current and voltage		Upto 51st	Upto 51st	Upto 51st	Upto 51st	Upto 51st
	THD-Voltage in %		Available	Available	Available	Available	Available
	THD-Current in %		Available	Available	Available	Available	Available

Type			RAPIDUS 231R-E	RAPIDUS 211R	RAPIDUS 232R-E	RAPIDUS 212R	RAPIDUS 218R
Measurement Accuracy	According to IEC 61557-12	Total Active Power	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2
		Total Reactive Power	Class 1	Class 1	Class 1	Class 1	Class 1
		Total Apparent Power	Class 0.2	Class 0.2	Class 0.2	Class 0.2	Class 0.2
		Total Active Energy	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
		Frequency	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
		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 0.2S	Class 0.2S	Class 0.2S	Class 0.2S
	Accoding to IEC 62053-23	Total Reactive Energy	Class 2	Class 2	Class 2	Class 2	Class 2
Input and Outputs	Compensation Relay Outputs	Number of outputs	12 pcs.	12 pcs.	24 pcs.	24 pcs.	8+2(If alarm relay outputs are used for compensation) pcs.
		Type	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)
		Max. Switching Current	2 A	2 A	2 A	2 A	2 A
		Max. Switching Voltage	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC
		Max. Switching Power	1250 VA	1250 VA	1250 VA	1250 VA	1250 VA
		Mechanical life time	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations
		Electrical life time operations (for NO side)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)
	Alarm Relay Outputs	Number of outputs	2 pcs.	2 pcs.	2 pcs.	2 pcs.	2 pcs.
		Type	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)	NO (SPST)
		Max. Switching Current	4 A	4 A	4 A	4 A	4 A
		Max. Switching Voltage	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC
		Max. Switching Power	1250 VA	1250 VA	1250 VA	1250 VA	1250 VA
		Mechanical life time	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations	≥ 10^7 operations
		Electrical life time operations (for NO side)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)	5×104(5A@250VAC) 1×105(5A@30VDC)
	Generator/ Day-Night Input	Number of inputs	1 pc.	1 pc.	1 pc.	1 pc.	1 pc.
		Frequency	45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz
		Input Present or Not	95-240VAC	95-240VAC	95-240VAC	95-240VAC	95-240VAC
	Digital Outputs		-	-	-	-	-
	Analog Outputs		-	-	-	-	-
Supply	Auxilary supply input		No	No	No	No	No
	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	95-410VAC ±10% from La-Lb
	Frequency		45-65Hz	45-65Hz	45-65Hz	45-65Hz	45-65Hz
	Consumption	AC	< 10VA	< 10VA	< 10VA	< 10VA	< 10VA
		DC	-	-	-	-	-
Data Logging with timestamp	Min/max/avg Values	Hourly records	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters	1920 hours x 68 different paramaters
		Daily records	240 days x 68 different paramaters	240 days x 68 different paramaters	240 days x 68 different paramaters	240 days x 68 different paramaters	240 days x 68 different paramaters
		Monthly records	36 hours x 68 different paramaters	36 hours x 68 different paramaters	36 hours x 68 different paramaters	36 hours x 68 different paramaters	36 hours x 68 different paramaters
	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	4 months x 16 different parameters
	Alarm records		50	50	50	50	50
Communication	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 adjustable	1-247 adjustable	1-247	1-247	1-247
	Isolation		2000V RMS	2000V RMS	2000V RMS	2000V RMS	2000V RMS
Mechanical Properties	Weight(g)		670	663	765	750	415
	Protection Class		IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear	IP40 front / IP20 rear
	Assembly Type		Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Cable Cross Sections	Voltage, Current, All Relay Outputs, Gen Input	Stranded:	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG	2,5 mm2 - 14AWG
		Solid:	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG	4mm2-12 AWG, 2x1.5 mm2-2x16 AWG
	RS 485	Stranded:	1,5 mm2-16AWG	1,5 mm2-16AWG	1,5 mm2-16AWG	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	1.5 mm2-16 AWG, 2x0.75 mm2-2x18 AWG	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 +55 °C	-20 to +55 °C	-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	-30 to +80 °C	-30 to +80 °C
	Relative Humidity (no condensation)	Max.95%	Max.95%	Max.95%	Max.95%	Max.95%	Max.95%
EMC-EMI	EN 61000-6-1:2011	Available	Available	Available	Available	Available	Available
	EN 61000-6-3/A1/AC:2013	Available	Available	Available	Available	Available	Available

Type		RAPIDUS 231R-E	RAPIDUS 211R	RAPIDUS 232R-E	RAPIDUS 212R	RAPIDUS 218R
Schematics	Network Connections	 **4 wires with 3 CTs**	 **Single phase system with 1 CT** **NOTE 1:** L1, L2 or L3 can be used as current measurement input. L1 is used in this figure. **NOTE 2:** L1-N, L2-N, L3-N, L1-L2, L1-L3 or L2-L3 can be used as voltage measurement input. L3-N is used in this figure.	 **4 wires with 3 CTs**	 **Single phase system with 1 CT** **NOTE 1:** L1, L2 or L3 can be used as current measurement input. L1 is used in this figure. **NOTE 2:** L1-N, L2-N, L3-N, L1-L2, L1-L3 or L2-L3 can be used as voltage measurement input. L3-N is used in this figure.	 **Single phase system with 1 CT** **NOTE 1:** L1, L2 or L3 can be used as current measurement input. L1 is used in this figure. **NOTE 2:** L1-N, L2-N, L3-N, L1-L2, L1-L3 or L2-L3 can be used as voltage measurement input. L3-N is used in this figure.
	Step Output Connection	 **Step Outputs 1…6** **Step Outputs 7…12** **NOTE1**: 3Ø capacitor, 3Ø shunt reactor, 1Ø capacitor and 1Ø shunt reactor can be used as compensation steps for RAPIDUS 231R-E. 3Ø capacitors are used in above figure. **NOTE2**: 3Ø capacitor and 3Ø shunt reactor can be used as compensation steps for RAPIDUS 211R. 3Ø capacitors are used in above figure.		 **Step Outputs 1..6** **Step Outputs 7..12** **Step Outputs 13..18** **Step Outputs 19..24** **NOTE1:** 3Ø capacitor, 3Ø shunt reactor, 1Ø capacitor and 1Ø shunt reactor can be used as compensation steps for RAPIDUS 232R-E. 3Ø capacitors are used in above figure. **NOTE2:** 3Ø capacitor and 3Ø shunt reactor can be used as compensation steps for RAPIDUS 212R. 3Ø capacitors are used in above figure.	 **Output Relays 1…8** **NOTE1:** 3Ø capacitor and 3Ø shunt reactor can be used for compensation. 3Ø capacitors are used in this f igure. **NOTE2:** Alarm ouputs can be used for compensation as well. So totally 10 pcs.(8+2) step outputs can be used for compensation
	Gen Input and Alarm Output Connections		 **Generator/Day-Night Input Connection**		 **Alarm Output Connection**	
Dimensional Drawings						

Klemsan®

Leader at Home, Ambitions Worldwide

Important Notice:

- Klemsan Inc. reserves the rights for any changes in this catalogue
- For the products that are not included in our catalogue please contact with our Trade Department.
- Figures and technical specs in this catalogue are only for general purpose.
- Our products are assembled to be in accordance with EC technical regulations and correspond to the national and international standards. All our products are fabricated in our ISO 9001 and ISO 14001 certified manufacturing plants.
- For further information on the certificates:

Tel : +90 (232) 877 08 00
Fax : +90 (232) 877 08 06
Mail : info@klemsan.com.tr

Klemsan®

Factory
Kemalpaşa Yolu 3. km 35170
İZMİR / TURKEY
Tel: (+90 232) 877 08 00
Fax: (+90 232) 877 08 06

Sales Head Office
Perpa A Blok K:2 No: 9/0041
Okmeydanı – İstanbul / TURKEY
Tel:+90 (212) 222 52 00
Fax:+90 (212) 222 66 55

OVERSEAS OFFICES

Russian Federation
141400, Khimki,
Zavodskaya 2- Moscow
Tel : +7 495 644 02 21

USA
255 West Martin Luther King Blvd.
Unit 1511 28202 - Charlotte NC.
Tel : +1 980 226 06 88

China
Soho Plaza, 360 Hengtong Road,
20th Floor, Suite 20B04 Zip: 200070
Shanghai
Tel :+86 21 62260338
Fax :+86 21 62263983

U.A.E
Z Building Z 57 Saif ZoneSharjah
Tel :+971 6-557 37 10
Mobile :+971 56-760 28 37

Ukraine
6-8A, Yaroslava Ivashkevicha Str.
Office 7-8 04074, Kiev
Tel :+380 637 217 185

Colombia
Mobile :+57 304 427 73 59

Mexico
Mobile :+52 (55) 4511 8809

www.klemsan.com.tr

29336011521521554136000001

6.6.4.2.1.00160
AUTOMATION CATALOG (2015)

Revision No: 12112015