

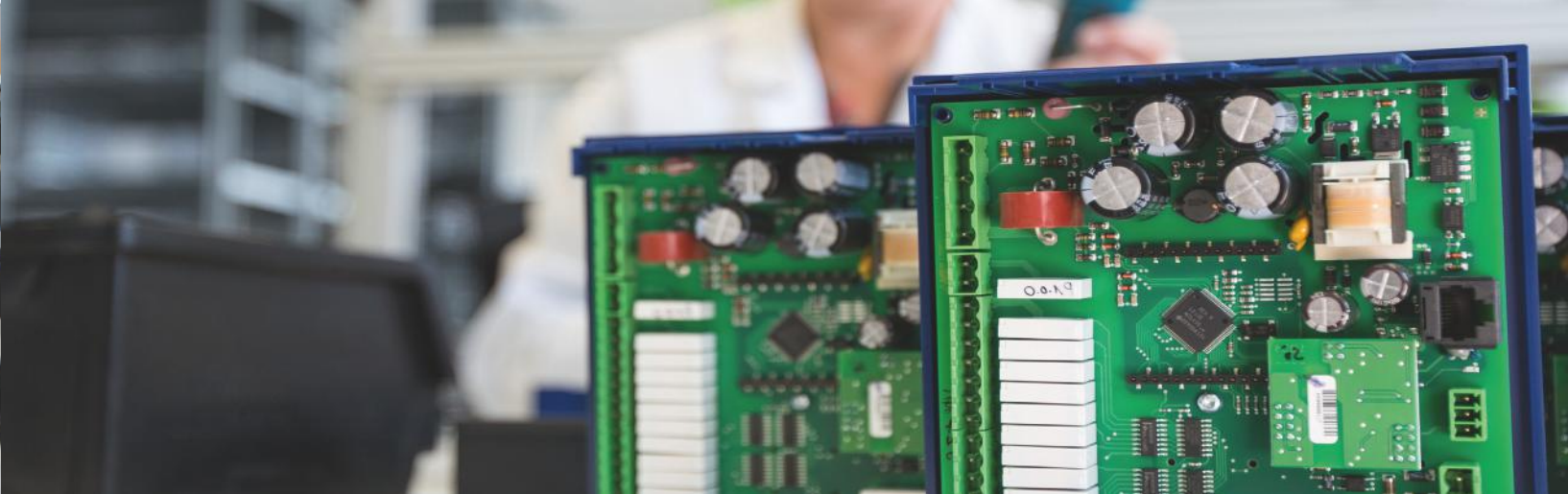


BELUK



**TOUGH
TRUSTED
BELUK**

**SYSTEM COMPONENTS FOR
POWER FACTOR CORRECTION AND
POWER QUALITY**



BELUK - PURE ENERGY

BELUK is pioneer and leading manufacturer in the area of power factor control. Since 1956 we have developed and produced innovative as well as robust products for this technologically complex field. Next to the power factor control, our customers benefit from trend-setting concepts in the area of low and medium voltage switchgear.

Based on our extensive know-how we offer proven standard components as well as tailored solutions designed to fit your specific requirements. Experienced specialists will support you by words and deeds already during the planning phase.

The manufacturing organization has been set up following modern and lean principles and methods to ensure a quick and cost-efficient production.

Our quality management system is certified in accordance with DIN ISO 9001 and ensures a constant high level of quality.

We are permanently on the latest technological level due to a sound research and development.

A large number of renowned customers all over the world document our reliability.

Our current generation of power factor controllers is the result of decades of continuous technological development.

WE CONTROL, WHAT NEEDS TO BE CONTROLLED

In the early days, BELUK was known for its electromechanical devices. In the 70s electronics became day-to-day business and the first power factor controllers with microprocessor were delivered in 1988. Since the beginning of the century power analyzers, thyristor switches and capacitor protection relays have been added to our portfolio.

Patented Algorithms take care of precise and reliable results and allow a wide range of standard and customized applications, like dynamic compensations, compensations for induction furnaces, medium voltage switchgear or wind farms.

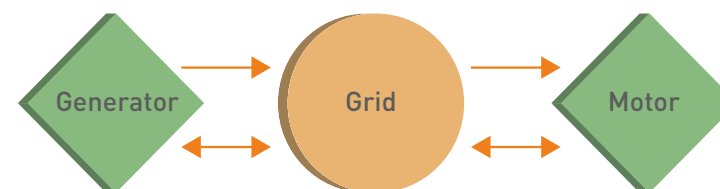
BELUK power factor controllers "separate the chaff from the wheat", or more precisely the reactive from active energy, regardless of the number of harmonics disturbing the network.



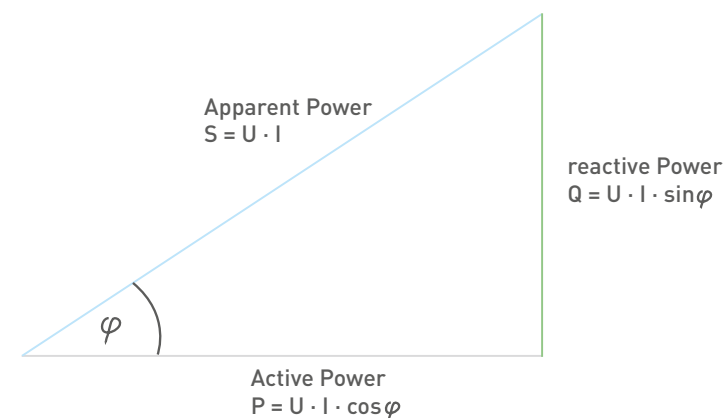
BELUK

ENERGY EFFICIENCY BY POWER FACTOR CONTROL

The power factor describes the ratio between active power and apparent power. This ratio is effected by the reactive power, whereby the reactive power is zero if the values of active and apparent powers are equal. The goal of a power factor control is to reach a $\cos\varphi$ between 0.9 and 1.0 by compensating the reactive power with a reactive power compensation system. Here, a power factor controller handles all adjustments.

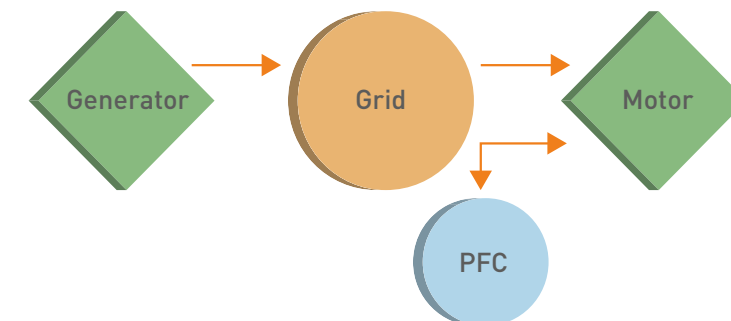


Apparent Power = active power + reactive power, to be more precise it is the geometrical addition of active and reactive power.



While active power can be transformed into mechanical, thermal or chemical power, reactive power stresses the supply net and cannot be used. Due to reactive loads like magnetizing currents of electro-motors or capacitive behavior of cable-based medium voltage grids, the supply net has to handle oscillating reactive energy between the supplier and the consumer. Hence, significant power losses occur over the resistance of each power line. Since grid operators have to expand its net infrastructures to connect fluctuating power generators like photovoltaic plants or windmills and to be capable to provide reactive power at the same time, the costumers are charged for obtaining reactive power.

In order to reduce grid loads, reactive power compensation systems are applied as a cost efficient solution, which provides the demand of either capacitive or/and inductive reactive power, depending on the use case. These systems are installed locally in order to reduce the reactive power flow over the regarded electrical system. Therefore, power grids are strained less and can be designed smaller. Moreover, the customer no longer obtains reactive power from the grid operator and saves money.



CX plus / CX eco



Rugged – Reliable – Reasonable
Our BLR CX was performing
tremendously for years.
We are constantly improving it, so it
does not stop becoming even better.

Power Factor Controller CX plus Keeping the well-proven, integrating Innovation

The Power Factor Controller CX plus is a further development of the BLR CX relay being sold more than 100 000 times. It offers everything for an uncomplicated operation of compensation systems.

The focus during further developments was on usability and elimination of errors, which can occur when using the device for the first time.

The user is given the opportunity to choose a user controlled initial setup when powering on the device. The CX plus algorithm guides the user through the menu items to query and set all necessary parameters for the regulation. A successful setup is now possible without a manual.

The more powerful processor of the CX plus leads to a significantly improved outcome during initial setup. This is necessary for a correct detection of the phase offset angle, which again is necessary for detection of measurement values and step sizes.

Power Factor Controller CX eco Power Factor Control – simple, reliable and robust

The Power Factor Controller CX eco is based on the CX plus, but the functionality is reduced to basic functions at a more economic price. Features like Transistor outputs, Digital input or Modbus communication are not available on the CX eco controller. The well-proven wide-range power supply known from the BLR CX is also used in the CX plus and CX eco with a voltage range of 90 – 550 V AC. The detected capacitor step sizes are verified and updated during operation so that it is always compensated with actual values. This way the ageing of the capacitors is detected and an alarm is given and the relevant capacitor stage locked preventively when dropping below a specific capacitance.

The patented Best Fit Algorithm delivers the best result of the power factor $\cos \phi$ with the lowest amount of switching cycles. When having capacitors of equal size, the switching times or the switching cycles are distributed evenly. This extends the life span of the capacitors and contactors, thus saving your investment.

Models:

CX plus with 6, 12 relay outputs
 (resp. 7, 13 outputs when using fan relay)
 CX plus with 6, 12 transistor outputs
 CX eco: with 6, 12 relay outputs
 (resp. 7, 13 outputs when using fan relay)

Options CX plus:

- MB Modbus RTU via RS485

Automatic Initialization

Advantage: During commissioning, only the CT ratio and the nominal voltage must be adjusted. The CX plus / eco regulates everything else automatically. Even the connected stages are automatically detected, and their sizes monitored during operation. A wrong connection of the current measurement is not possible due to the automatic phase correction. This prevents operating errors and drastically simplifies commissioning.

Wide-range power supply

Advantage: The device has a measurement and supply voltage range from 90 to 550 V AC, 50 - 60 Hz. One device type that can be used worldwide.

4 quadrant Operation possible

Advantage: Either capacitors or chokes can be used with the CX plus / CX eco. This makes the device universally applicable in classic compensations as well as in wind and solar power plants.

Best Fit Algorithm

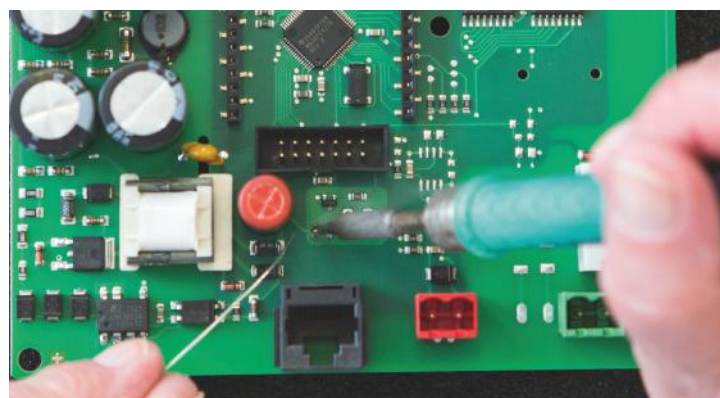
Advantage: Only those stages are switched immediately, which will achieve the best possible result. It does not matter, which step size is connected to which output. The patented Best Fit Algorithm brings the best result with the lowest number of switching cycles. For steps with the same size the switching cycles are distributed evenly. This prolongs the service life of capacitors and contactors and thus protects your investment.

Automatic step recognition

Advantage: The CX plus / eco automatically recognizes the size of the connected capacitors. The measured values are regularly monitored and updated, so that the power factor is always controlled with actual values. If the value falls below a preset threshold, an alarm is triggered and the relevant stage is blocked by the software of the reactive power controller.

Modbus Retrofit

Advantage: Every CX plus reactive power controller can be retrofitted with a Modbus communication in our factory. This eliminates the need for expensive replacement of the entire device when it is integrated into a Modbus RTU network.



Technical Data

Measuring- and supply voltage	90 - 550 V AC, single-phase, 45 - 65 Hz, 6 VA, max. fuse 6 A, VT ratio 1.0 - 350
Current measurement	5 mA - 5 A, single-phase, CT-ratio 1 - 9600
Relay outputs	6 or 12 output relays, common supply max. fuse 10 A, up to 400 V, normally open
Temperature measurement	Internal NTC
Fan control	Max. fuse 2 A, max. fuse 2 A, up to 250 V AC
	Can be used as additional relay output to connect a 7th or 13th stage.

BLR-CM

High-Tech Power Factor Controller reaching the target $\cos\phi$ fast with only a few switch operations.



Optional 3-Phase Measurement

In networks with asymmetric loads (e. g. office buildings), the BLR-CM can measure the current of each phase in this variant. In addition, the controller recognizes if a 1- or 3- phase capacitor is being used, whereby the intelligent controller algorithm generates the optimal result of reactive power compensation in asymmetric networks.

Graphic LCD Display

The operator can browse the menus and adjust the settings via softkeys (keys with variable functions); the adjustments and measurement values are displayed in a back-lit graphical display in high resolution, using plain text messages. The controller will support either English, German and French languages or English, Spanish and Portuguese language.

Suitable for MV and HV Applications

The BLR-CM can be ordered with a pre-set reaction time of 8 seconds. This will be enough time for a vacuum contactor to switch. After this switching time the controller will re-measure to register the effective changes in load.

Real-Time Algorithm

Equipped with a real-time algorithm and transistor outputs, the BLR-CM is ideal for triggering thyristor switches (in dynamic compensations). Deviations are determined immediately (about 1 ms) after measurement of one cycle. Thus, a reaction time of about 20 ms can be achieved in grids smaller than 50 Hz.

Data Memory Optional

Optionally the BLR-CM can be equipped with a data memory, which will store all alarms with time stamp, as well as measurement values in adjustable intervals and work counters. The data output is via a TTL interface in CSV MS Excel compatible format.

Best Fit Algorithm

The BLR-CM range of controllers have the patented and proven Best Fit Algorithm. Both capacitive steps and inductive steps can be used simultaneously for PF control. Therefore, the BLR-CM can react to and control both inductive as well as capacitive loads.

BLR CM Controller with Q(U) Regulation Characteristics

The target parameter of the BLR Q(U) is the voltage of electric power plants, which has to be maintained. In case the measured voltage deviates from the target voltage (undervoltage or overvoltage) the $\cos\phi$ will be adapted dynamically. Then the controller will switch capacitors or chokes accordingly.

The demand for inductive or capacitive reactive power will be calculated by the controller with the help of an adjustable characteristic curve. The advantage of this adjustable curve against a static $\cos\phi$ is, that the regulation target is adjusted dynamically according to the target voltage.

High-Tech Power Factor Controller with the aim to reach the target $\cos\phi$ as fast as possible and with the minimum amount of switch cycles. The various regulating algorithms of the BLR-CM

(real-time algorithm / mixed algorithm / Best Fit Algorithm) are the brain in this powerful PFC. With all the different options and wide range of alarms it is adaptable to all challenging regulating tasks, like dynamic compensations.

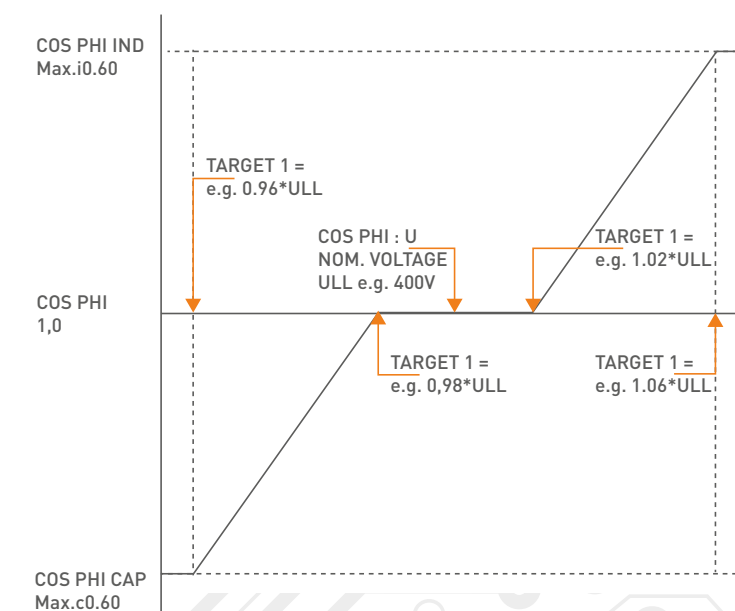
The regulating characteristic Q(U), which was especially designed for applications that have to provide reactive power depending on the grid voltage, especially exported active power, makes the BLR-CM suitable for controlling and maintaining grid voltage of power generation facilities. The system can be used in generator plants controlling either capacitors or inductors as required.

Relay or Transistor outputs

The BLR-CM controller offers 6 or 12 transistor outputs (option -T) for controlling thyristor switches. Also available: 6 relay outputs plus 6 transistor outputs (option -RT). The relay outputs are used to control static load components, the transistor outputs to control dynamic load components. For this purpose, 2 different algorithms of the hybrid controller work in parallel.

Automatic Step Recognition

No matter if reactor or capacitor- the BLR-CM recognizes the size automatically. It does not matter, which output is connected to a reactor or a capacitor. There are no limitations regarding sequence and size of the connected stages.



Technical Data

Measuring- and supply voltage	50 – 530 V AC, 45 – 65 Hz, PT ratio 1 – 350, 100 – 132 V / 207 – 253 V, 45 – 65 Hz, max. fuse 6 A
Current measuring	0 – 5 A, sensitivity 15 mA, burden 15 mOhm (option -3 A: 3x 0 – 5 A) overload 20 % continuous, CT-ratio 1 – 6500
Control exits	6 R, 12 R, 6 T, 12 T, 12 RT, relays: N/O, one common point, max. fuse 6 A
Breaking capacity	250 V AC / 5 A, 400 – 415 V AC / 2 A, 110 V DC / 0.4 A, 30 V DC / 5 A
Static outputs	Open-collector, breaking capacity: 8 – 48 V DC / 100 mA
Alarm output	Alarm relay C/O, voltfree, programmable, max. fuse 6 A, breaking capacity 250 V AC / 5 A
Data-logger	Optional

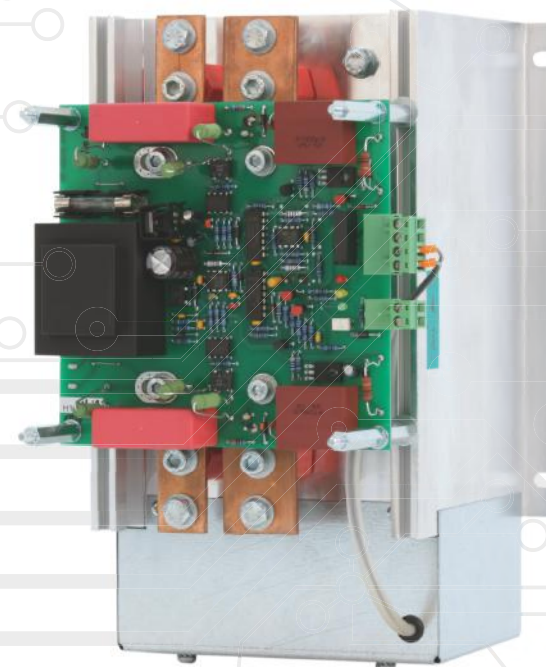
BEL-TS

A powerhouse with high speed and many options.



BELUK thyristor switches are known for their robust design and long service life. Since the response time to the trigger signal is in the millisecond range, thyristor switches are the ideal choice for applications with fast load changes. In contrast to contactors, the switching operations of thyristor controllers are fast and wear-free. The minimization of transients protects the connected capacitors and prolongs their service life.

The BEL-TS is available in two different series. The classic BEL-TS devices are exclusively for switching capacitive loads. The new series consists of microprocessor-controlled devices, that can switch either inductors or capacitors. This series covers a range from 50 to 200 kvar.



Smooth switching

No matter whether an inductive or capacitive load is connected, the control electronics of the BEL-TS always switches in the best moment. This limits wear and tear and causes practically no feedback effects in the grid.

Fast

The BEL-TS typically switches 10 ms after the trigger signal is received from the controller. This is ideal for rapidly fluctuating loads, such as cranes, lifts, welding equipment, but also for wind turbines, drilling rigs or in the automotive industry.

Robust

All thyristor modules have a blocking voltage of 1800 V or higher and are designed for a long lifetime. A permanent overload of 30 % is possible at an ambient temperature of 25 °C.

Protected

As soon as the temperature value of the heat sink exceeds 85 °C, the BEL-TS switches off the load in order to prevent overheating damage. Therefore, external influences have no lasting effect on the switchgear. Even if a cabinet fan fails or the temperature in the cabinet is too high, your investment remains undamaged.

Smart

The microprocessor-controlled thyristor controllers enable the user to read measured values and write parameters via Modbus RTU.

Low maintenance

Thyristor switches of the BEL-TS series only require a check for contamination of the cooling fins and, if necessary, the fan. Further maintenance is not necessary. The thyristor switch indicates the current operating status via LEDs.

Compact

The BEL-TS thyristor switches are very compact in their dimensions. This results in a larger number of arrangement variants in the cabinet in which the thyristor controllers have little or no thermal interference.

Nominal Voltage/ Losses	25 kvar	50 kvar	65 kvar	75 kvar	100 kvar	125 kvar	130 kvar	200 kvar
400 V	36 A / 68 W	72 A / 122 W		109 A / 205 W	144 A / 250 W			289 A / ca. 520 W
440 V	33 A / 61 W	66 A / 111 W		99 A / 184 W	131 A / 244 W			262 A / ca. 460 W
480 V	30 A / 52 W	60 A / 104 W		90 A / 172 W	120 A / 224 W	150 A / 261 W		241 A / ca. 420 W
525 V				72 A / 122 W				144 A / 250 W
690 V		42 A / 75 W			84 A / 145 W			

Technical Data

Recovery time	Typically after 1 period
Controlled Phases	2, semi-controlled
Supply Voltage	Direct from the power connection (separate power supply optional available)
Consumption of supply	Max. 9 VA
Voltage Trigger- signal	8 - 30 V DC
Consumption Trigger signal	2 mA at 12 V DC
Auto shut-off temperature	85 °C

KSR1



This is how uncomplicated and reasonable protection for your capacitors looks like

The KSR1 is a modern single-phase unbalance protection relay. Capacitors in MV or HV compensations use oil as dielectric, which could catch fire in case of a damage. A permanent supervision of the state of the capacitors is therefore essential.

The KSR1 offers many ways to protect the capacitors against internal faults, and can warn and switch off if required (alarm/ trip).



Wide Range Power Supply

The KSR1 can be connected to any power supply from 40 to 250 V AC as well as 40 to 300 V DC. It is therefore capable to work with normal mains connection or with battery power. There is no need to make a selection.

2 Measuring Inputs

The imbalance can be monitored either by using a separate current or voltage measuring input. Permissible currents range from 15 mA to 5 A, permissible voltages from 0,1 to 20 V AC. A wide range of typical monitoring scenarios is covered with the KSR1.

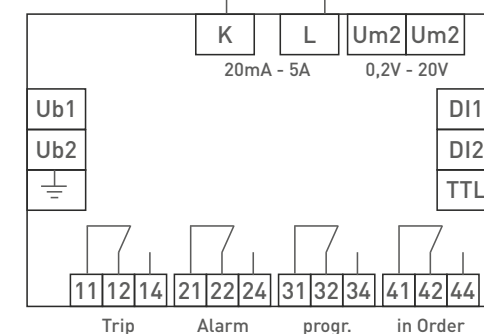
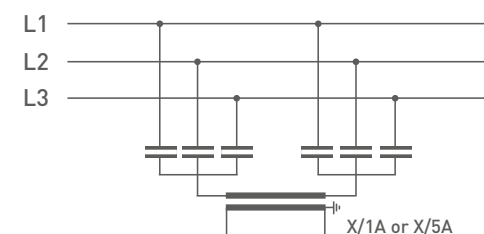
Programmable Outputs

Each of the 3 output relays has its own parameters. After expiration of the programmed delay time, the corresponding relay will be triggered. After the alarm causing situation is over, the respective relay will be reset automatically or must be reset manually.

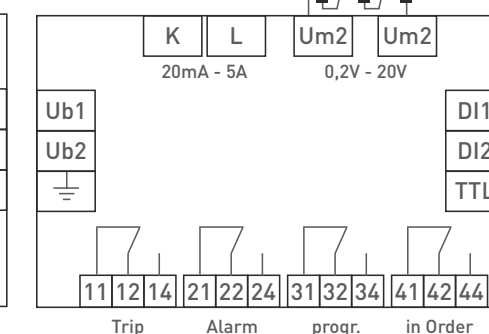
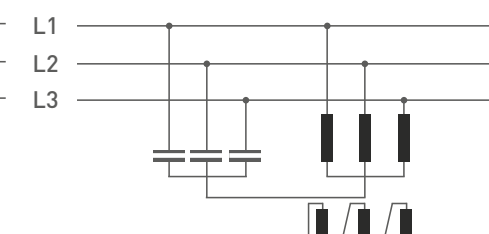
Option Modbus

Retrofitting the KSR1 with Modbus communication is very simple. A Modbus module can be attached to the back of the relay casing and connected by cable. There is no need to exchange the entire relay if there is a requirement to integrate the KSR1 to a Modbus communication.

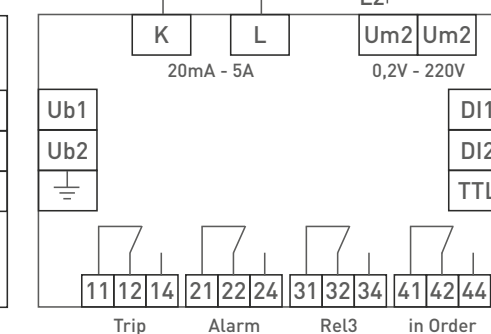
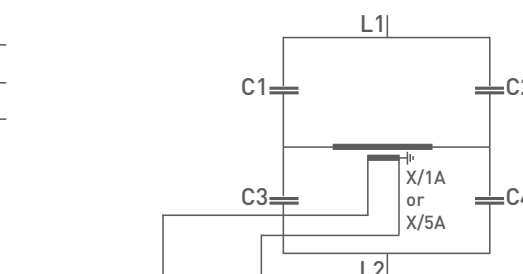
Double-Star Connection



Voltage Monitoring



H-Bridge Connection



Technical Data

Supply voltage	40 – 250 V AC, 45 - 65 HZ / 40 – 300 V DC, 5 VA; max. fuse 6 A
Measuring Voltage	0.1 – 20 V; burden 240 kOhm, with low-pass filter, Vt- ratio adjustable 1 - 350, Short term overload: 500 V for 10 seconds
Accuracy	0.5 % of upper range value.
Current measurement	15 mA – 5 A; burden 20 mOhm; Ct ratio adjustable 1 - 4000, Continuous overload: 25 A; short term: 100 A / 1 sec
Relay outputs	4 relays, c/o, voltfree, max. fuse 6 A
Functions	Relay 1: Trip, Relay 2: Alarm, Relay 3: programmable (Alarm / Trip / both) Relay 4: Device working OK
Max. output rating AC	1250 VA, max. switching voltage: 440 V AC
Max. output rating DC (ohmic)	30 V / 5 A; 60 V / 1 A; 110 V / 0.5 A; 220 V / 0.3 A

KSR



The capacitor protection relay KSR protects your expensive assets reliably, and this at a very competitive price.

7 Measurement Channels

There are 3 voltage and 4 current measuring channels in the KSR, so the range of possible connections for monitoring capacitors is very versatile. The KSR has 3 voltage and 4 current measuring channels. In addition to the 3 phase voltages and currents, the 4th current input is available for monitoring the asymmetry between 2 star points. A structural imbalance can be compensated.

Sophisticated Measuring and Monitoring System

The measurement system of the KSR offers a total of 7 input channels (3 for voltage, 4 for currents). The CT ratio is programmable in a range of 1 – 10000. Current input 1 to 3 share the same CT ratio, whereas channel 4 can be programmed with a different CT ratio.

In total there are 32 protection settings available. A total of 6 relays is available for alarm signals, among them 2 c/o and 4 n/o relays. These relays can be "or" linked so that they are dependent on several alarm conditions. In addition to the alarm relays, also alarm messages can be displayed on the LCD display.

Galvanically Isolated Current Inputs

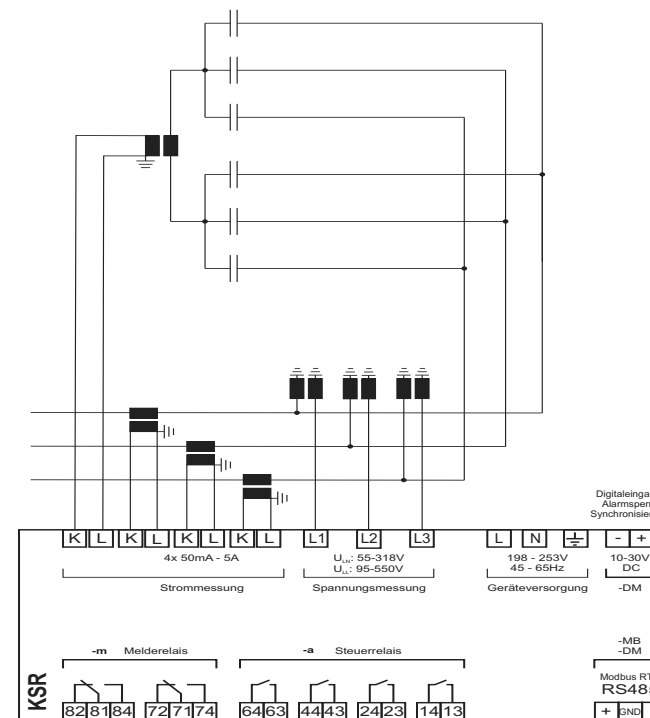
The current input of the KSR is galvanically isolated- this protects the device against damage through accidental overcurrent. An input current of 200 A for 1 second will not harm the KSR. In case of an overcurrent at the current input, the device stays intact and your investment is protected.

Data Memory and Modbus RS485 Communication (Optional)

The KSR can be equipped with a fault recorder. Every fault or alarm is recorded with its source, date/ time, limit and max value. The option "-DM" also comes with Modbus communication interface, and a digital input for blocking alarms. The capacitor protection relays KSR monitor and protect your valuable property at a very competitive price. The KSR will measure, warn and if needed switch off capacitors before major damage will occur. With 7 measuring channels and the product variations, the KSR is fit for almost any application.

Product- Variation „Z“

The KSR-Z offers factory pre-programmed protection settings, which are based on tripping curves following ANSI (American National Standards Institute) standards. An alarm will be dependent on the violation of a trigger value and the time of the violation according to the tripping curve. Nothing has to be adjusted by the operator, since everything is pre-programmed. This makes commissioning work easy and fast; no additional software is needed. Following parameters can be adjusted, each with a trip and an alarm value: OL (Overload), Olth (Overload thermal), Olf (Overload fundamental), UL (Underload), OV (Overvoltage), UV (Undervoltage), UB (Unbalance), EF (Earth Fault), VA (Voltage Assymmetric) By default the KSR-Z comes with a fault recorder, Modbus interface and a digital input. Same as the standard KSR, 3 voltage measurement channels and 4 current measurement channels are available.



Product- Variation „V“

The KSR-V has a total of seven Voltage measuring Channels. 3 of those are used to measure the mains voltage, and 4 channels measure imbalances. Again, the proven monitoring system of the classical KSR is used here:

32 possible protection settings can be programmed, and again written alarm messages in the display of the unit are available next to 2 c/o plus 4 n/o contacts as output relays.

Technical Data KSR

Supply voltage	207 – 253 V, 45 – 65 Hz, max. fuse 6 A (AC type), 80 – 132 V (DC- type). Other voltages upon request.
Voltage measurement	L-N 55 V .. 318 V, L-L 95 V .. 550 V, 45 – 65 Hz, Vt ratio 1 – 4000
Current measurement	50 mA – 5 A (Type 55) or 20 mA – 1 A (Type 11), burden 15 mΩ, CT required CT ratio 1 – 10000, Current Overload: 20 % continuous, 200 A for 1 sec. (Option -E)
Power consumption	<1 VA
Switching outputs	2 c/o contacts, voltfree, Switching power: 250 V AC / 5 A, 30 V DC / 5 A (ohmic) 4 n/o contacts, voltfree, Switching Power: 250 V AC / 5 A, 30 V DC / 5 A (ohmic) Alternatively: 4 Opto-couplers, voltfree, Open-collector, Switching Power: 250 V DC / 0,1 A
Digital input	10 - 30 V DC
Fan control	Temperature sensor on the back of the device. Programming of outputs for fan control possible

Technical Data KSR-Z

Voltage measurement	55 / 95 V – 318 / 550 V, 45 - 65 Hz, Vt- ratio 1 – 4000
Current measurement	50 mA – 5 A (Type 55) or 20 mA – 1 A (Type 11), burden 15 mΩ, CT required, CT ratio 1 – 10000
Current overload	20 % continuous, 200 A for 1 Second

Technical Data KSR-V

Voltage measurement	55 / 95 V – 318 / 550 V, 45 - 65 Hz, Vt- ratio 1 – 4000
Voltage measurement for	
Imbalance monitoring	0 – 20 V min sensitivity 0,5 V, max. 120 V continuous.
Switching outputs	2 c/o contacts, voltfree, max. fuse 6 A, 4 n/o contacts, voltfree, max. fuse 6 A

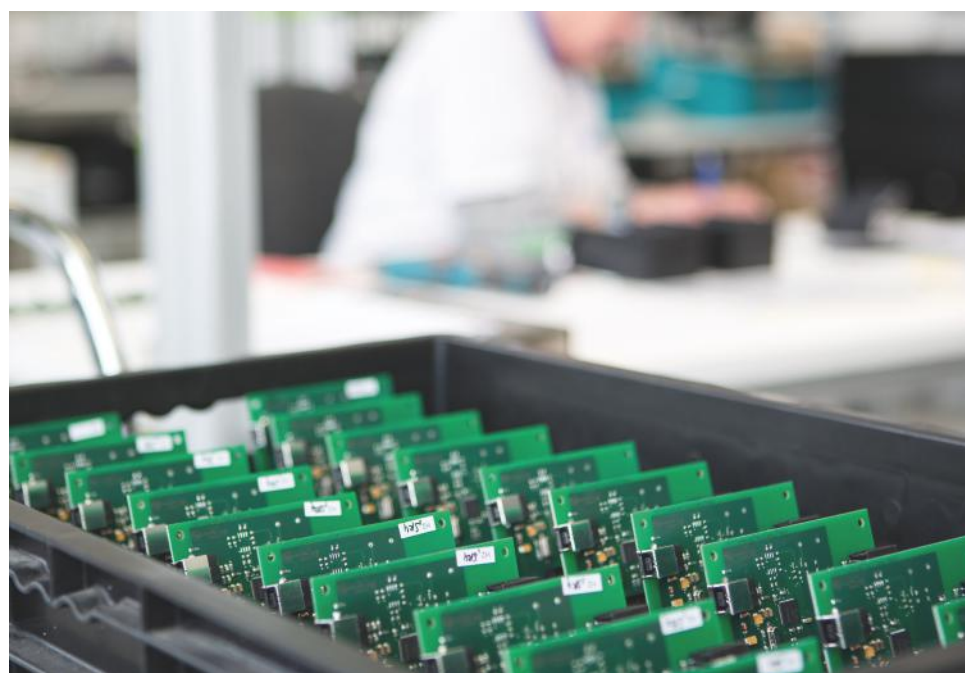
EMM-5



Not even the slightest deviation will be missed. Precise and reliable.

The EMM-5 is a power analyzer, monitoring various trigger values in a network and counting active and reactive power per phase. The user can select the upper or lower limits

for 52 different measuring values. This can be used to program a total of 32 protection settings.



Models:

MB RS485 Modbus RTU
DM RS485 Modbus RTU, data recorder, event recorder, real time clock, digital input

Options:

m 2 c/o contacts
am 2 c/o contacts
4 c/o contacts
lm 2 c/o contacts
4 impulse outputs

Complex Measurement – Easy Operation

The EMM-5 power analyzer has been designed to provide a great variety of information from the power distribution system it supervises. It contains a powerful measurement system, that is able to provide high precision values from 3-phase systems.

A large liquid crystal display with backlight provides a good visibility even in poor light conditions.

Four adaptive soft-keys provide easy and intuitive usage also in complex situations.

All measurement values of the EMM-5 are arranged on several pages of the display. Using the "auto roll" function, the power analyzer will scroll through all pages in 10 second intervals. This way the information is presented in a very clear and orderly way, without any action from the user.

Variable Output System

Next to Alarm messages on the display of the device, alarms can also be used for an external alarm using the relay outputs on the EMM-5. External counters for both active and reactive power can be addressed using the 4 output relays. Of course a Modbus Interface is available, available as well as a Data Memory.

Counter System with 32 Counters

The EMM-5 can be supplied with a two tariff option. Tariffs can be changed over either by a daily time switch, or by means of an external signal connected to the digital input. The order code for this version is -DM. Per tariff following counters are available:

Active Power Import (L1, L2, L3, total)
Active Power Export (L1, L2, L3, total)
Reactive Power Inductive (L1, L2, L3, total)
Reactive Power Capacitive (L1, L2, L3, total)
All phases are displayed separately, therefore the EMM-5 has 32 counters available.

Multi Source and Multi Target Alarms

A single relay can be actuated by one, but also from more alarm situations (multi source). In the later case, the conditions are linked by "or" function: Only one signal is enough to trigger the alarm.

In the same way one alarm condition can also have more than one relay as target (multi target). If the alarm condition is reached, all relays assigned are operated.

Technical Data

Supply voltage	207 - 253 V, 45 - 65 Hz, max. fuse 6 A, Voltage measurement L-N 55 V .. 318 V, L-L 95 V .. 550 V, 45 - 65 Hz, Vt factor: 1 - 4000
Current measurement	0 - 5 A, min. 50 mA, Power consumption <1 VA CT required, Ct ratio: 1 - 10000, Current overload 20 % continuous, 50 A for 1 second
Current measurement	Option -E: 200 A for 1 second
Relay outputs	4 n/o, voltfree, max. fuse 6 A (galvanically isolated current inputs) 2 c/o, voltfree, max. fuse 6 A
Breaking capacity	250 V AC / 5 A, 30 V DC / 5 A (ohmic), 110 V DC / 0,4 A (ohmic), 110 V DC / 0,3 A (inductive)
Impulse outputs (optional)	Transistor outputs, galvanic isolation by opto-coupler, Switching voltage: max. 250 V DC, switching current max. 100 mA, Switching frequency: max. 4 Hz, tON ≥ 50 ms / tOFF ≥ 50 ms
Digital input	On request
Fan control	Temperature measurement on rear of device, programming of relay outputs for fan control possible

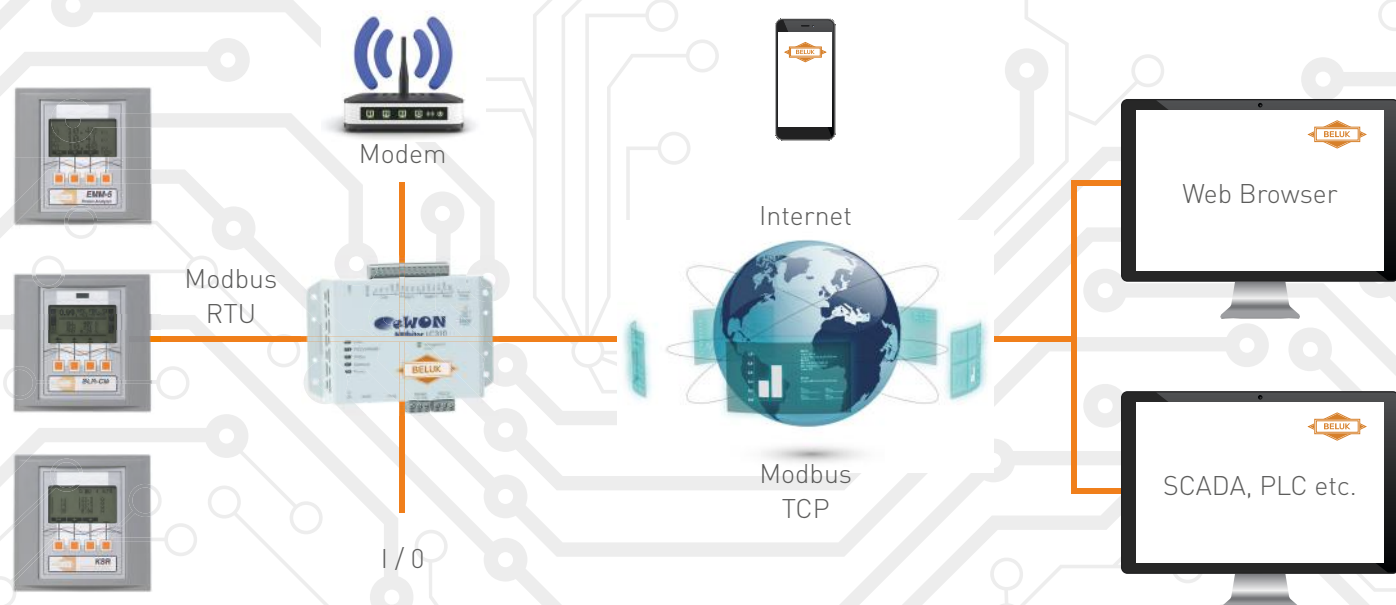
MINISCADA LC 310



Small but communicative: Our MiniSCADA LC310. It connects what needs to be connected.

The BELUK MiniSCADA LC 310 is an easy-to-use web based SCADA system for local and remote control of any electrical devices, which are connected to it. The BELUK MiniSCADA hardware has a built-in web-server that operates when customizing the graphical user web interface. Everything is done by clicking your way through the onboard web pages using a standard web browser on any computer.

Therefore no Windows tools or HTML editors are needed. No license fees or royalties have to be paid. Connect the Modbus devices and select the desired data. Data, which has been configured, is shown automatically on the integrated webpage.



Web-Server

The gateway acts as a web interface to one and up to 32 Modbus RTU devices (slaves). The gateway holds an embedded web server with corresponding web pages integrated. The operator can configure the required data registers which should be monitored and controlled through the onboard web pages. When the configuration is saved, the Modbus data will start updating immediately on the web pages.

Alarms by email and text message

The user can configure up to 64 alarms and the conditions needed to trigger an alarm. The alarm can be sent by email or text message (external GSM modem required), where the user can decide who should receive the alarm messages. Of course the user can configure the text in the email or text message. All alarms are additionally stored in an alarm history.

Data Logging with historical trend graphs

The device can log up to 64 parameters with selectable sample rate (10 sec to 60 min). The parameters are stored into the built-in memory and they are also displayed with trend graphs. Collected data can be downloaded to the PC as CSV file.

Modbus TCP

The gateway acts as pure transparent connection between serial Modbus RTU devices to the standard Ethernet protocol Modbus TCP, used in all major SCADA systems or PLCs.

Security

To ensure safe communication the product supports different levels of security. For example, an authorized user can only log on with the correct user name and a password, assigned by the administrator. The product also holds several functions to keep the database consistent in case of power loss.

Analog inputs

Four analog inputs can be configured as current inputs with an input range from 0 - 20 mA or otherwise as voltage inputs with an input range from 0 - 10 V. Two out of the four inputs can also be used for RTD purposes with connection to a PT100 thermal sensor.

Digital inputs

Two digital inputs (dry contacts) can be used for free external signal detection.

Technical Data

Ethernet protocols	Modbus TCP
Ethernet functions	http, SMTP, FTP, SNMP
Ethernet interface	10 / 100 Mbit/s
Serial interface 1	RS232 / RS485 for Modbus RTU / ASCII up to 115.2 kbit/s
Serial interface 2	RS485 for Modbus RTU/ASCII up to 115.2 kbit/s
Network baudrate	Configurable up to 115.2 kbit/s
Power supply	9 - 32 V AC/DC
Power consumption	2.5 W/ 24 V
Operation temperature	-40 ... +60 °C
Certifications	CE, CULUS, RCM
Humidity	5 - 93 % RH, non-condensing
Housing	Metal
Wall mounting	Screw mount or DIN rail using optional mounting kit, IP20
Dimensions	92 mm x 135 mm x 27 mm

BELUK SWITCHGEAR DESIGN

TECHNICAL DATA



Switchgear Division

A wide range of prestigious customers trust our quality and reliability as supplier of switchgear products for more than four decades. This is based on a wide spectrum of technologically well-designed switchgear.

Medium-Voltage Switchgear

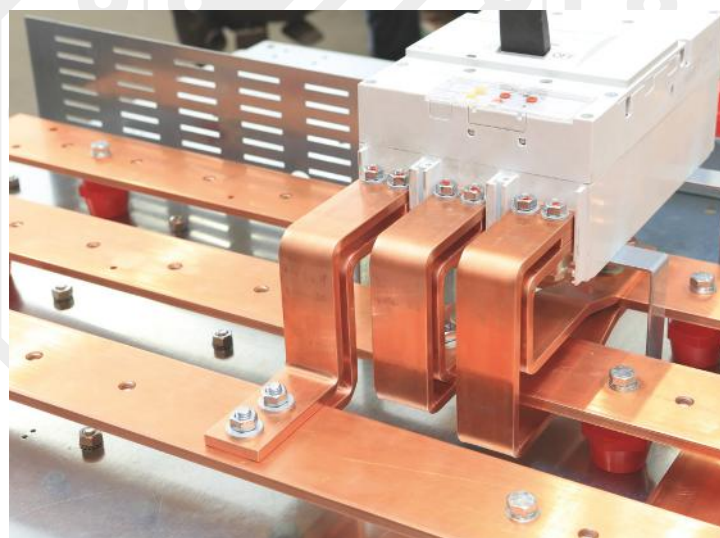
We offer air-insulated medium voltage control panels for circuit-breaker switchgear in various sizes and variations.

Low-Voltage Switchgear

Our low-voltage switchgear is supplied either as free-standing distribution in open and closed versions, or as wall-mounted distribution in a modular framework structure. They are used for standard applications as well as specialized solutions.

Turnkey Transformer Substations / Installation Works

We engineer and deliver turnkey transformer substations to you, equipped with products of renowned manufacturer or from our own product line. Our highly trained installation staff executes modifications, retrofits and extensions of existing switchgear quickly and dependably.



Technical Data	CX plus / CX eco	BLR CM	KSR1
Ambient temperature operation	-20 °C – 70 °C	-20 °C – 70 °C	-20 °C – 70 °C
Ambient temperature storage	-40 °C – 85 °C	-30 °C – 85 °C	-40 °C – 85 °C
Humidity	0 % - 95 %, no condensation allowed	0 % - 95 %, no condensation allowed	0 % - 95 %, no condensation allowed
Overvoltage class	II, pollution degree 3 (DIN VDE 0110, part 1 / IEC60664-1)	II, pollution degree 3 (DIN VDE 0110, part 1 / IEC60664-1)	II, pollution degree 3 (DIN VDE 0110, part 1 / IEC60664-1)
Protection class front	IP 50	IP 54	IP 50
Protection class rear	IP 20	IP 20	IP 20
Conformity and listing	CE, UL, cUL, GOST-R	CE, UL, cUL, EAC	CE, EAC
Standards			IEC 60255-1 Oscillatory Waves IEC 60255-2 Oelectrostatic Discharge IEC 60255-3 RF Electromagnetic Fields IEC 60255-4 Electrical fast transients IEC 60255-5 Impulse Test (Surge)
Terminals	Pluggable Terminal blocks, screw type, max. 2,5 qmm	Pluggable Terminal blocks, screw type, max. 2,5 qmm	Pluggable Terminal blocks, screw type, max. 2,5 qmm
Casing front	Plastic, self extinguishing (UL94-V0)	Plastic, self extinguishing (UL94-V0)	Plastic, self extinguishing (UL94-V0)
Casing rear	Metal	Metal	Metal
Weight	approx. 0.6 kg	approx. 0.8 kg	approx. 0.6 kg
Dimensions	144 x 144 x 58 mm h x w x d	144 x 144 x 58 mm h x w x d	144 x 144 x 58 mm h x w x d
Technical Data	KSR	EMM 5	
Ambient temperature operation	-20 °C – 70 °C	-20 °C – 70 °C	
Ambient temperature storage	-20 °C – 85 °C	-20 °C – 85 °C	
Humidity	0 % - 95 %, no condensation allowed	0 % - 95 %, no condensation allowed	
Overvoltage class	II, pollution degree 3 (DIN VDE 0110, part 1 / IEC60664-1)	II, pollution degree 3 (DIN VDE 0110, part 1 / IEC60664-1)	
Protection class front	IP 54	IP 54	
Protection class rear	IP 20	IP 20	
Conformity and listing	CE, UL, cUL, EAC	CE, UL, cUL, EAC	
Standards	IEC 60255-1 Oscillatory Waves IEC 60255-2 Oelectrostatic Discharge IEC 60255-3 RF Electromagnetic Fields IEC 60255-4 Electrical fast transients IEC 60255-5 Impulse Test (Surge)		
Terminals	Pluggable Terminal blocks, screw type, max. 2,5 qmm	Pluggable Terminal blocks, screw type, max. 2,5 qmm	
Casing front	Plastic, self extinguishing (UL94-V0)	Plastic, self extinguishing (UL94-V0)	
Casing rear	Metal	Metal	
Weight	approx. 0.65 kg	approx. 0.65 kg	
Dimensions	144 x 144 x 58 mm h x w x d	144 x 144 x 58 mm h x w x d	

Subject to change without prior notice. Amendments and errors may occur. Edition 03/2019. BELUK GmbH.



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