

## Solutions for reactive power correction and power quality

### Requirement / Challenge:

Green Deal until 2050 climate neutrality

complete transfer to alternative energy sources, away from fossil energy production

Trend for sustainable energy production

Important point: Effective reactive power management to save Resources e.g. Transformer compensation

Decentralized supply in the low voltage network

Four quadrant operation / inductive / capacitive control / (Voltage controlled regulation  $Q(u)$  BLR-CM)

Smart Grid - Intelligent power grid

Master slave control / inductive capacitive

Smart Metering - Intelligent metering systems

Interfaces available

# How is reactive power generated?

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Reactive current is the part in an alternating current network who can not be converted into another form of energy.

It's generate as a result of transmission energy from the plant to the consumer.

But it is not inefficient because it is indispensable for the creation of magnetic fields.

Transformers, generators, electric motors, ballasts or capacitors work with it.

Only the active power P can be used effectively.

The total power or apparent power must always be taken when the cables are dimensioned or when fuses are installed in to the calculation.

$$S = \sqrt{P^2 + Q^2 + D^2}$$

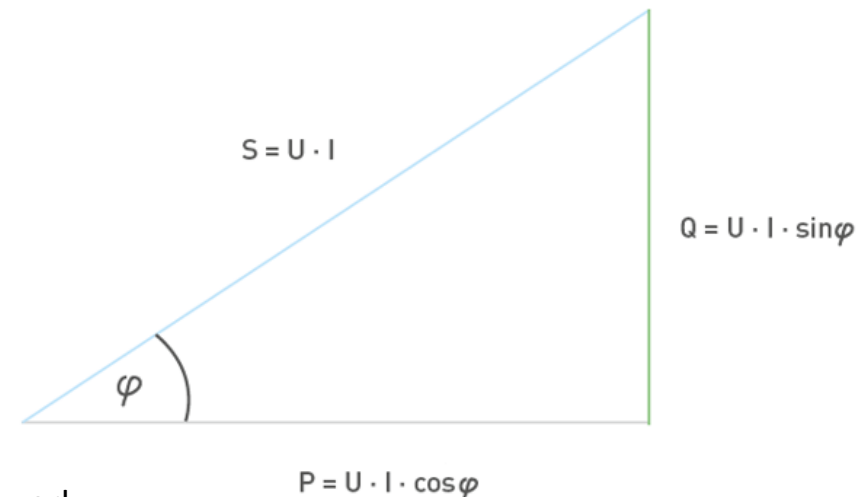
The offset factor  $\cos \varphi$  serves as ratio P to S:  $\cos \varphi = \frac{P}{S}$

For P = S applies Q = 0 kvar &  $\cos \varphi = 1,0!$

Reactive power has an effect on the power quality

Q capacitive -> increases the voltage in the network

Q inductive -> reduces voltage in the network Reactive current is the part in an alternating current network



# BLR-CXplus

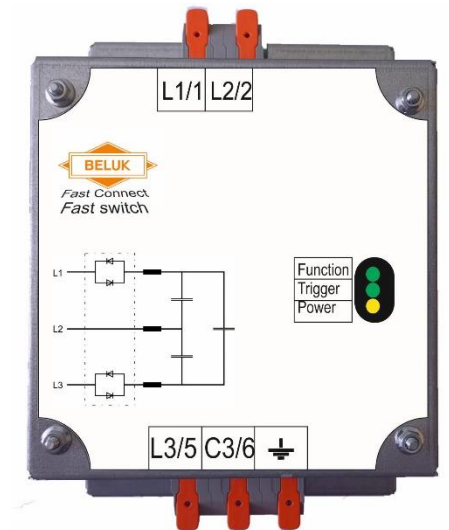
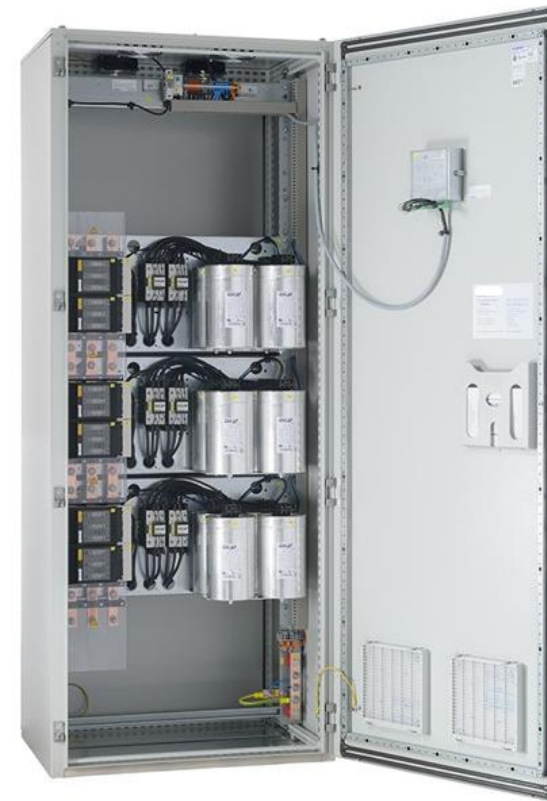
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Controls capacitive or inductive  
By controlling Contactors or Thyristorswitches,  
capacitors can be switched or choke coils.

Measuring method: True RMS  
Determination of the  $\cos \varphi$  related to the fundamental wave

1 phase voltage connection  
Voltage range: 90 - 550 V AC, 45 - 65 Hz  
Current range: 5 mA - 5 A  
Cos phi: 0.70 c - 0.70 i

Load: 20 mOhm  
Display: EN / FR/ RU



# Features:

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- Autonomic menu navigation (AI)
- Best fit algorithm protects the capacitors thoroughly regular distribution of the switching cycles and operating hours
- Progressive (control) Measurement of the total power requirement - switches the necessary steps quickly - in combination with our thyristor controller (option -T) even faster and more effective.
- works in 4 quadrant operating mode (import/export)
- Security level Password protected
- Alarm configuration for maintenance work in case of e.g. loss of power or exceeding of switching cycles
- Avoidance of overcompensation through reduced switch-off
- Defect level detection

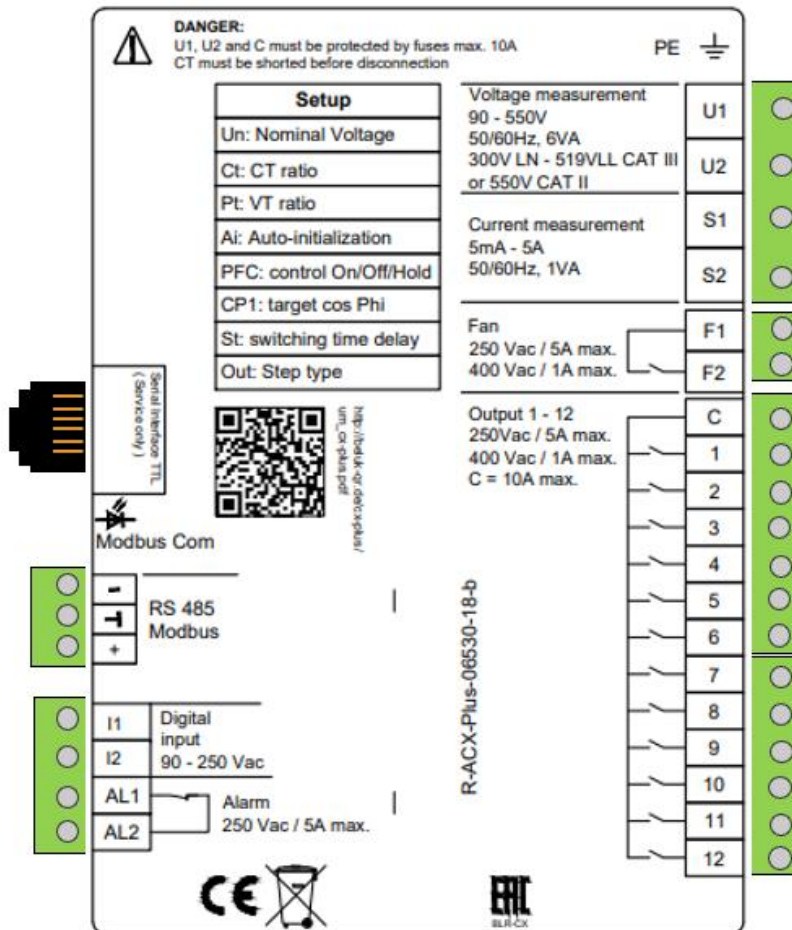
# Interesting facts:

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- High Lifetime and experience with > 100000 devices Worldwide
- Product designed and made in Germany
- Optional Modbus-RTU interface RS 485 (Modbus slave) therefore fulfills the open communication standard according to IEC 60870
- Optional configuration tool
- Compensation of a transformer, for which there is no fixed stage, can be solved with the CX plus in two ways (offset reactive power or medium voltage-side current measurement)
- It is possible to use an external alarm contact (potential-free, normally open contact 250V AC/5A max.), e.g. for a signal lamp, an external temperature sensor, etc.
- A further normally open contact is available as a fan relay or as a +1 step
- Digital input (adjustable logic: HIGH- or LOW-active / input signal: 90 - 250V AC) to switch target cos phi 1 and 2 or to suppress the I-Low alarm (DI)
- TÜV and UL certified
- Dimensions / cutout: 144 x 144 mm/ 135 x 135 mm

# Backside:

**BELUK**



ZERTIFIKAT ♦ CERTIFICATE ♦ CERTIFICADO ♦ CERTIFICAT



## EU-Type Examination Certificate

No. E6A 17 12 15997 003

**Holder of Certificate:** Beluk GmbH  
Taubenstr. 1  
86986 Schongau  
GERMANY

**Product:** Controller  
Power Factor Controller

**Model(s):** CX plus

**Description of Object:** AC supply  
Nominal: 230/400 V  
Minimum: 90 V  
Maximum: 550 V  
Nominal frequency: 50/60 Hz

**Tested according to:** EN 61326-1:2013 (industrial requirements)  
EN 61326-2-2:2013  
EN 55011:2009/A1:2010 (group 1, class B)  
EN 61000-3-2:2005/A1:2009  
EN 61000-3-3:2013

This EU-Type Examination Certificate is issued according to the Directive 2014/53/EU relating to electromagnetic compatibility. It confirms that the listed apparatus complies with such aspects of the requirements of the EMC directive as specified by the manufacturer or his authorized representative in the European Community and applies only to the sample and its technical documentation submitted for testing and certification. This Type Examination does not contain any statements pertaining to the EMC protection requirements governed by other laws which serve to implement EU Directives other than the aforementioned Directive 2014/53/EU. See also notes overleaf.

**Evaluation Report No.:** 516189-20155-01



**Date:** 2017-12-21

(Jochen Rold)

TUV SUD Product Service GmbH is notified Body to the Directive 2014/53/EU relating to electromagnetic compatibility with the identification number 0123.

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TUV®

# BLR-CXplus

The BELUK logo is a stylized orange diamond shape with a white border, containing the word "BELUK" in white capital letters.

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