

BELUK MPFC Product Family

Smart Solutions for Reactive Power Management
and Power Quality

OCTOBER 2026



One Platform. Three Application Areas.

The MPFC-Product family combines reactive power control, grid monitoring and protection in a compact, modular device platform.

01

Control

Dynamic compensation for public and industrial distribution grids.

02

Monitor

Measurement values, alarms, and power quality transparent at all times.

03

Integrate

Modern interfaces for energy management and smart grids.

Three

for control, measurement and protection

Products

Three Variants, clearly positioned

PF controls • EM measures • UB protects

	MPFC-PF	MPFC-EM	MPFC-UB
Core Function	Control + Protection	Measurement + Visualization + Protection	Control + Protection
System	Medium- and Low-Voltage Applications	Medium- and Low-Voltage Applications	Medium Voltage
Main Application	Compensation Systems	Energie- und Leistungsdatenerfassung	MV compensation and MV filter systems
Switching / Measurement	Controls using inductors, capacitors and electronic sources	Measures and monitors more than 200 grid parameters	Adjusts using compensation levels and monitors unbalance
Interfaces	RS-485; optional IEC 61850	RS-485; optional IEC 61850	RS-485; optional IEC 61850
Storage Option	32GB microSD / Data storage / Event Recorder	32GB microSD / Data storage / Event Recorder	32GB microSD / Data storage / Event Recorder

MPFC-PF

Control & Protection

Dynamic reactive power compensation for stable power quality. The MPFC-PF measures U, I, P, Q, and $\cos \varphi$ and controls C/L stages as needed. Additionally, the MPFC-PF protects the stages and the system through adjustable limit values for all relevant grid parameters.

BEST FIT - Q(u) - Q(p) - staticQ - Hybrid

Advanced control algorithms

Power factor and ground fault protection Overcurrent and overvoltage monitoring Switching of vacuum contactors with extended measurement pause IEC 61850 · Modbus RTU for diagnostics and substation automation

TECHNICAL FEATURES

4 current measurement inputs (1 A / 5 A)
THD-U and THD-I (% / A)
4-quadrant operation





MPFC-EM

Measurement & Visualization

Transparent power quality measurement for diagnostics and visualization. MPFC-EM continuously records electrical parameters, identifies loads early on, and reports them.

Peak Load Calculation - $I_{thermal}$ - $P_{thermal}$

Advanced Power System Analysis

TECHNICAL SPECIFICATIONS

True RMS for U and I Measurement up to the 63rd harmonic

40 selectable alarms according to ANSI

Modbus RTU · Status and event diagnostics

Sampling rate of 6.4 kHz (128 samples/period)

Rotating-field display for U and I

Measurement of I_{th} and P_{th} (average value over an adjustable time constant)

Peak load calculation

MPFC-UB

Control & Protection

Protection and monitoring for medium-voltage capacitor banks. MPFC-UB monitors power factor, overload, and unbalanced conditions (star/delta connection or H-bridges) and switches the required stages on and off—for reliable warning and shutdown in critical conditions.

2 in 1

Intelligent control meets comprehensive protection

Power factor and ground fault protection Overcurrent and overvoltage monitoring, unbalance monitoring IEC 61850 Modbus RTU for diagnostics and substation automation

TECHNICAL FEATURES

Separate measurement and supply voltages

Current measurement range 10 mA – 6 A



One platform. A common technical foundation.

PF, EM, and UB use the same MPFC system logic—with clearly separated functions for control, measurement, and protection

MEASUREMENT $U \cdot I \cdot P \cdot Q \cdot \cos \varphi$

True RMS measurement and power quality data as a common basis. Depending on the model, up to the 63rd harmonic and with 40 selectable alarms.

COMMUNICATION Modbus RTU · RS-485 · IEC 61850

Open interfaces for parameterization, diagnostics, substation automation, and integration into higher-level control systems.

OPERATE HMI directly on the device

Color display, status messages, and parameterization make operating conditions and interventions transparent right on-site.

INTEGRATE Modular depending on the task

PF controls, EM measures, and UB controls and protects. Shared platform data connects the products—the functions remain distinct.

Control algorithms: from measured value to the appropriate switching stage

The MPFC continuously evaluates grid values and determines which compensation stage should be switched on or off next

BEST FIT / PROGRESSIV

The control system selects the stage that most closely matches the required reactive power value. Result: precise compensation with as few switching operations as possible.

CHARACTERISTIC CURVES

The required compensation power follows the voltage curve or active power curve. In this way, the control system stabilizes the voltage and responds to changing grid loads.

HYBRID

The control system measures consumption and feed-in, controls the inverter as needed, and provides the reactive power that conventional compensation stages cannot cover—for an optimal $\cos \varphi$.

PRIORITY

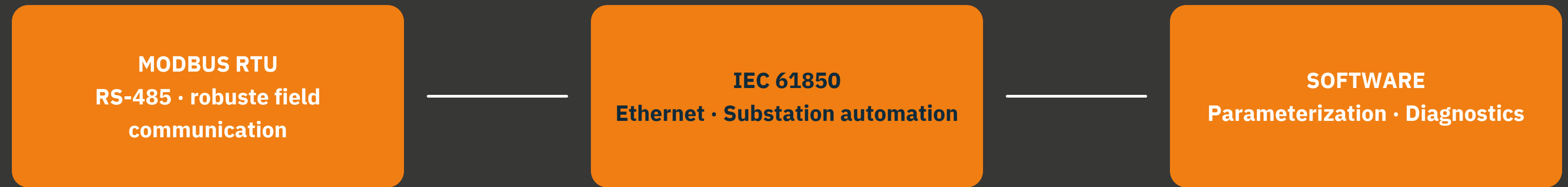
Priorities can be set to match the system strategy and stage characteristics.

LIFO UP / LIFO DOWN / FIFO

MPFC-PF uses these control logics · MPFC-EM makes their effects visible · MPFC-UB simultaneously protects the connected capacitor stages.

From the field device to the smart grid

Open protocols connect measurement, control, and supervisory systems -for end-to-end energy management and traceable events.



Configuration on a PC

Free software
Save and load settings

EXPANDABLE

Event logger and additional
control algorithms as options

Why MPFC?

A family of solutions for stable, efficient, and transparent networks.

1

**Intelligent control for
multiple grid levels**

2

**Protection +
Measurement
including harmonics**

3

**Open Communication
for Modern EMS**

4

**Modular and future-
proof**

5

**Made in Germany
Quality + Reliability**

Grid quality starts with the right system.

We support you with the design, integration, and project management of the right MPFC solution.

BELUK GmbH
Sales & Support

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