

BELUK

MPFC SERIES



Developed and produced in Germany

To find out more about the equipment or any of its features, please click on the relevant link or image.

BELUK

MPFC-PF



CPR-1



MPFC FAMILY

[Event Data Recorder](#)

[Modbus](#)

[Harmonics up to 63](#)

[IEC 61850](#)

[Supply Inputs](#)

[User-programmable alarms](#)

[Configurable CT input](#)

[Display](#)

EMM6

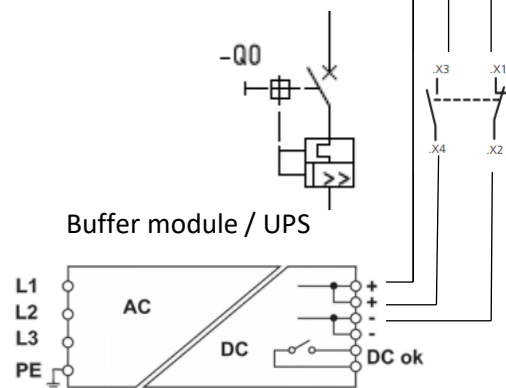
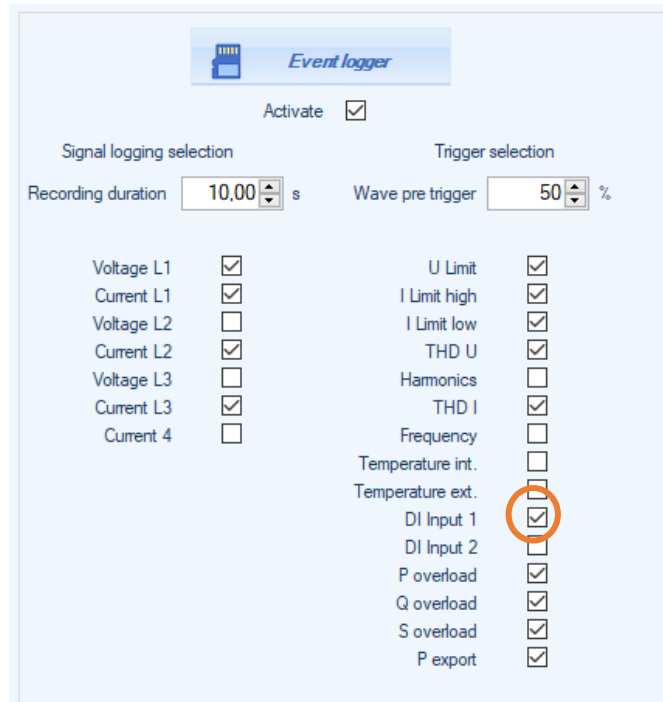
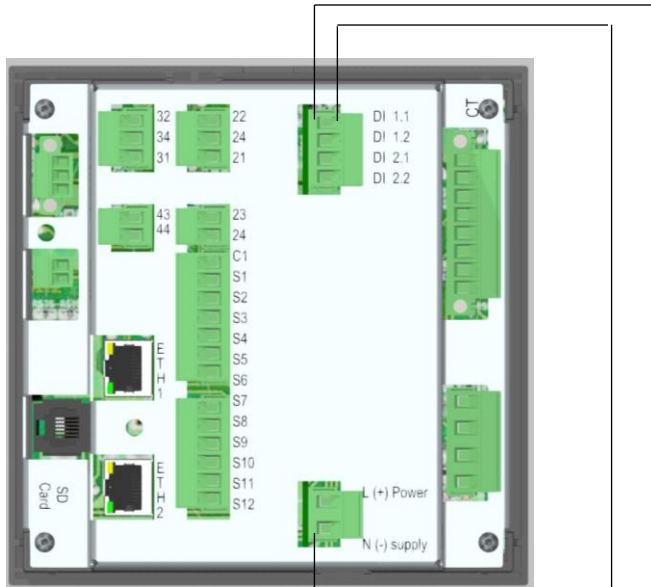


MPFC-UB



[Any questions?](#)

Event Data Recorder

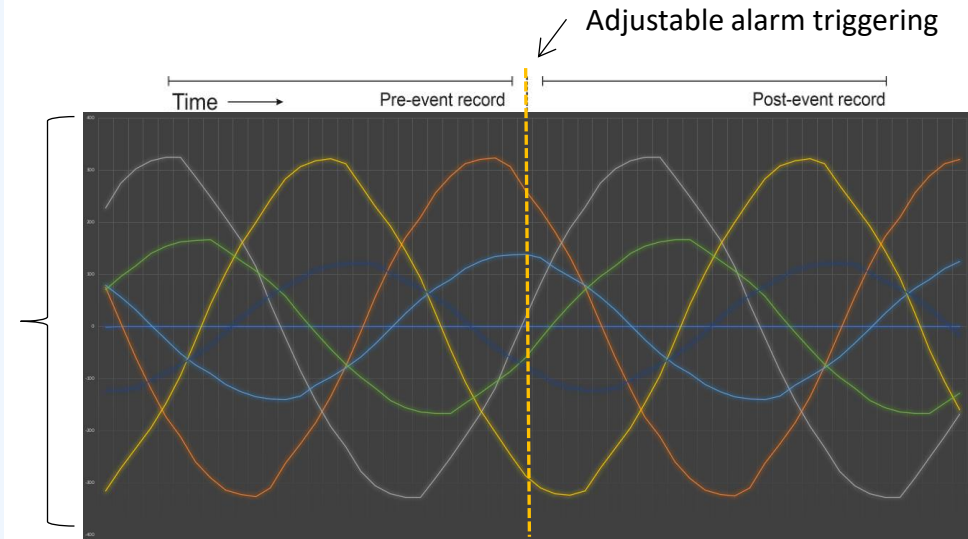


The Event Data Recorder (EDR) in the switchgear is responsible for recording important long-term data. This data is specifically saved for the time immediately before and during an alarm event. After the alarm, it can be retrieved. An SD card is required for this.

e.g. position signal load-break switch

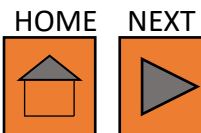
5 seconds **before** alarm event

5 seconds **from** alarm event



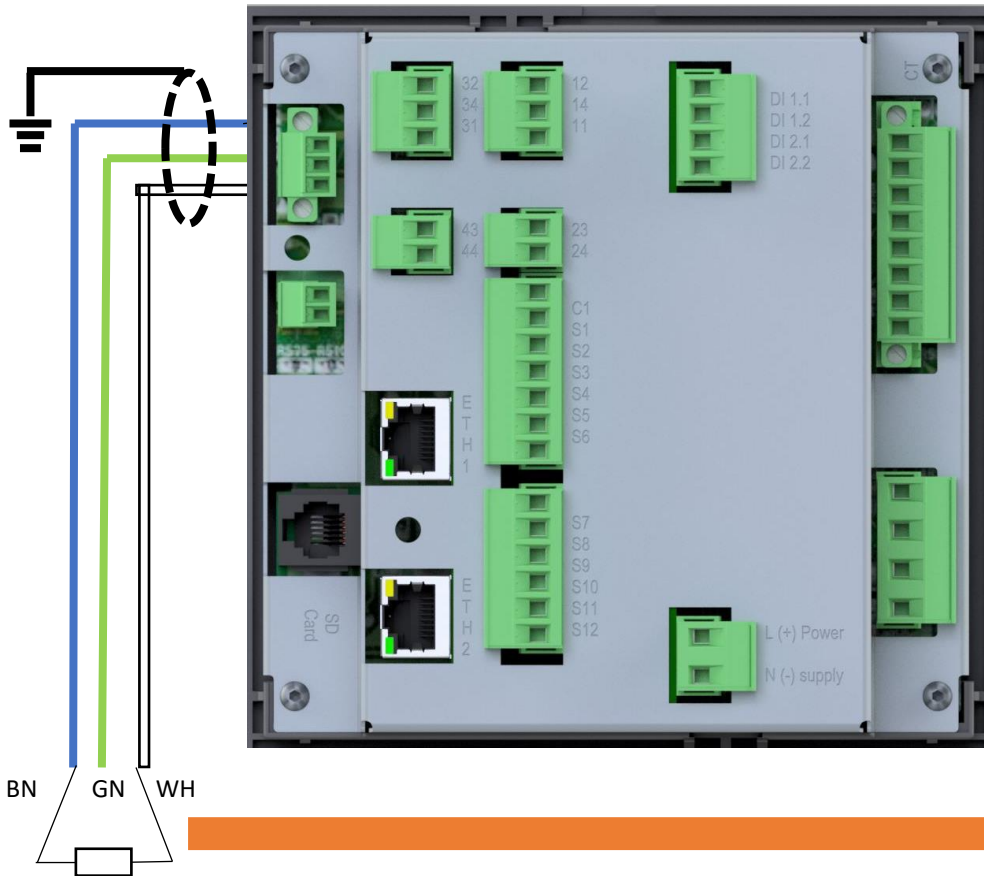
Movable recording window e.g. 10 seconds

Selectable recording data
up to a
Sampling rate of **1600 Hz**

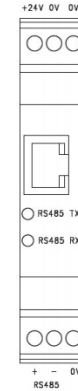


Modbus

120 Ohm
Terminating resistor

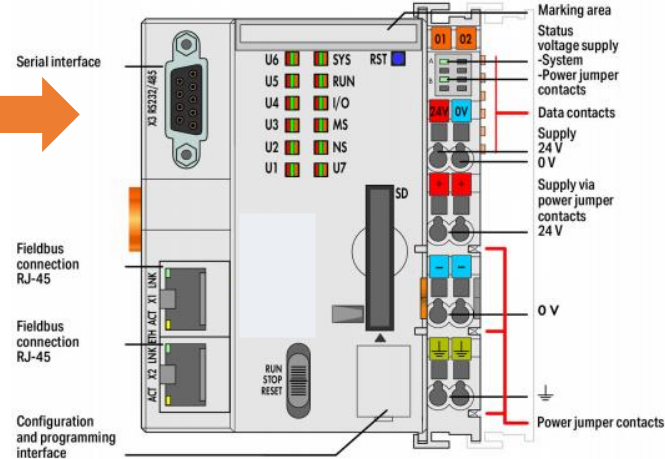


Converter



Converts RS 485 interface to RJ45 Ethernet
Modbus RTU Protocol – Modbus TCP/IP Protocol

PLC



Substation

System Monitoring
Energy Management

Modbus RTU
IEC60870-104 protocol - IEC 61850 Protocol
Master PLC – Slave Power Factor Controller



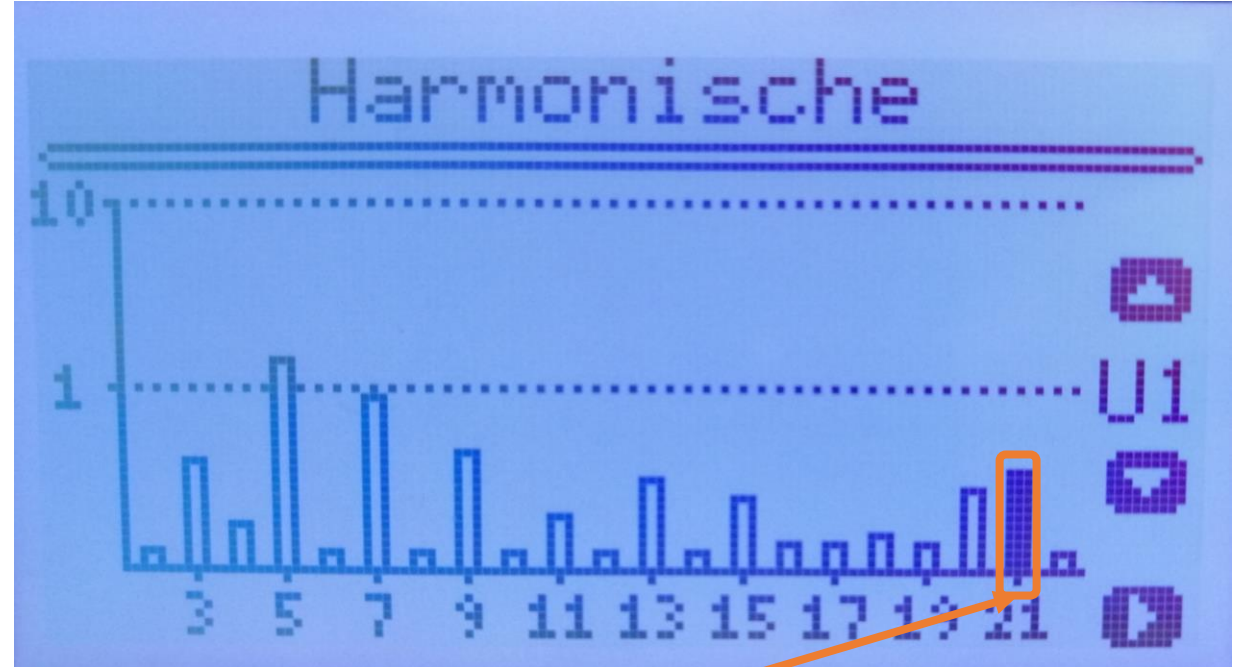
Harmonics up to 63

Application

Limit value exceeded

Mains quality EN50160 or
NRS048-2

The harmonics U1, U2, U3
THDI and THDU



If the limit value defined in EN50160 for a single harmonic is exceeded,
the corresponding harmonic in the
Bar graph completely colored.

IEC 61850

IEC 61850 is an international standard for communication and automation in electrical substations for MV and HV, enabling fast and reliable transmission of event data and control commands through the GOOSE protocol (Generic Object-Oriented Substation Event).

Data Set:

MeasVal Report

- DS MeasVal
- DA PFC/MMXU1.MX.Hz.mag.f
- DA PFC/MMXU1.MX.PPV.phsAB.cVal.mag
- DA PFC/MMXU1.MX.PhV.phsA.cVal.mag.f
- DA PFC/MMXU1.MX.A.phsA.cVal.mag.f
- DA PFC/MMXU1.MX.A.phsB.cVal.mag.f
- DA PFC/MMXU1.MX.A.phsC.cVal.mag
- DA PFC/MMXU1.MX.W.phsA.cVal.mag.f
- DA PFC/MMXU1.MX.W.phsB.cVal.mag.f
- DA PFC/MMXU1.MX.W.phsC.cVal.mag.f
- DA PFC/MMXU1.MX.VAr.phsA.cVal.mag
- DA PFC/MMXU1.MX.VAr.phsB.cVal.mag.f
- DA PFC/MMXU1.MX.VAr.phsC.cVal.mag.f
- DA PFC/MMXU1.MX.VA.phsA.cVal.mag
- DA PFC/MMXU1.MX.VA.phsB.cVal.mag.f
- DA PFC/MMXU1.MX.VA.phsC.cVal.mag.f
- DA PFC/MMXU1.MX.PF.phsA.cVal.mag.f
- DA PFC/MMXU1.MX.PF.phsB.cVal.mag.f
- DA PFC/MMXU1.MX.PF.phsC.cVal.mag.f

Counter CounterReport

- DS Counter
- DA PFC/impMMTR1.ST.TotWh.actVal
- DA PFC/impMMTR1.ST.TotVArh.actVal
- DA PFC/expMMTR1.ST.TotWh.actVal
- DA PFC/expMMTR1.ST.TotVArh.actVal

BankInfo Report BankInfoReport

- DS Bankinfo
- DA PFC/ZCAP1.SP.NumSubIntv.setVal
- DA PFC/ZCAP1.ST.Health.stVal
- DA PFC/ZCAP2.ST.Health.stVal
- DA PFC/ZCAP2.SP.NumSubIntv.setVal
- DA PFC/ZCAP3.ST.Health.stVal
- DA PFC/ZCAP3.SP.NumSubIntv.setVal
- DA PFC/ZCAP4.ST.Health.stVal
- DA PFC/ZCAP4.SP.NumSubIntv.setVal

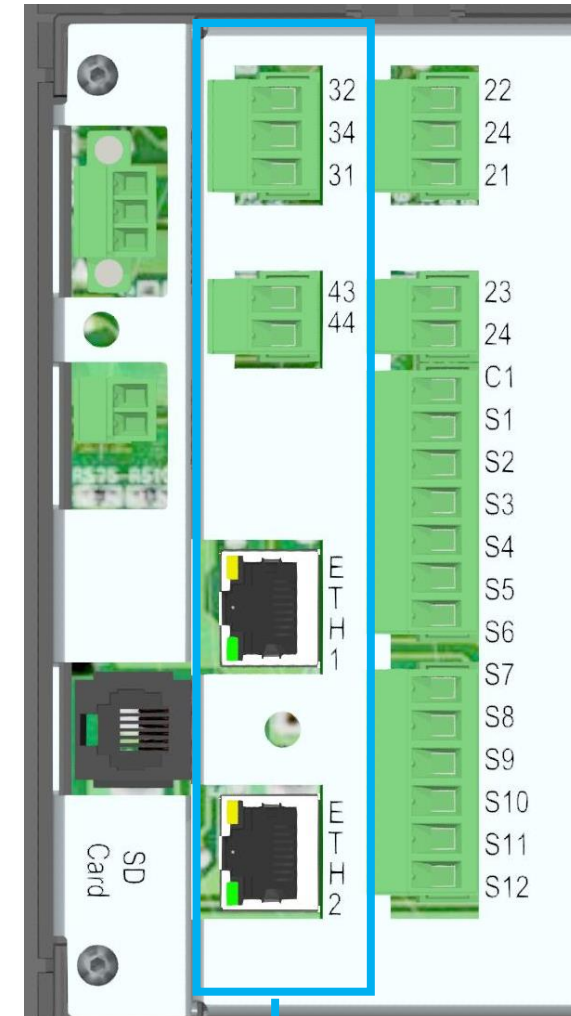
Error Error Report

- DS Error
- DA PFC/genPTRC1.ST.Tr.general
- DA PFC/PUPF1.ST.Str.general
- DA PFC/PUPF1.ST.Op.general
- DA PFC/POPF1.ST.Op.general
- DA PFC/POPF1.ST.Str.general
- DA PFC/activePowPDUP1.ST.Str.general
- DA PFC/activePowPDUP1.ST.Op.general
- DA PFC/reactivePowPDOP1.ST.Op.general
- DA PFC/reactivePowPDOP1.ST.Str.general
- DA PFC/activePowPDOP1.ST.Op.general
- DA PFC/activePowPDOP1.ST.Str.general
- DA PFC/curPHAR1.ST.Str.general
- DA PFC/volPHAR1.ST.Str.general
- DA PFC/phsPTUC1.ST.Op.general
- DA PFC/phsPTUC1.ST.Str.general
- DA PFC/phsPTOC1.ST.Op.general
- DA PFC/phsPTOC1.ST.Str.general
- DA PFC/PTUV1.ST.Op.general
- DA PFC/PTUV1.ST.Str.general
- DA PFC/PTOV1.ST.Str.general
- DA PFC/PTOV1.ST.Op.general

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Communication card

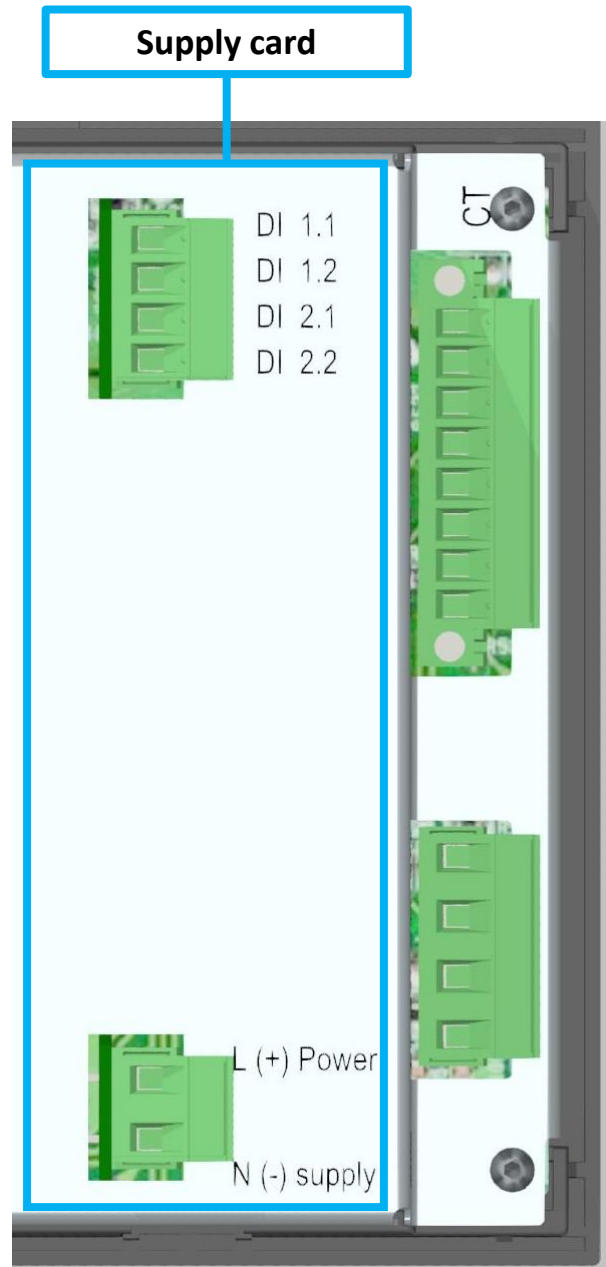
IEC61850 protocol
1 x additional
changer
1 x additional
Closers



Communication
card



Supply inputs



Supply card

Variant 1:

90-550 V AC

Overvoltage category

CAT II

Phase - Neutral: 300 – 317V AC

Phase – Phase: 519 – 550V AC

CAT III

Phase - Neutral: < 300V AC

Phase - Phase: < 519V AC

Variant 2:

40 - 220 V DC

Overvoltage category

CAT III

40 – 240 V DC

2 x programmable digital inputs

User-programmable alarms

Device Configuration Settings Help Screenshot

ALARM

<ul style="list-style-type: none"> Basic-Setup Measurement Control Step Unbalance Earth fault DTC Modbus Alarm Tariff change Reset System Datalogger Overview Step Info Alarm Info Measured values 	U Limit	On <input type="checkbox"/>	A-Rel. 1 <input type="checkbox"/>	A-Rel. 2 <input type="checkbox"/>	MU-Rel. 1 <input type="checkbox"/>	MU-Rel. 2 <input type="checkbox"/>	Alm. Text <input type="checkbox"/>	Ctrl. Off <input type="checkbox"/>	Ctrl. Hold <input type="checkbox"/>	cos(φ) 2 <input type="checkbox"/>	blocked by DI1 DI2 <input type="checkbox"/>	Min <input type="text" value="-10.0"/> %	Max <input type="text" value="10.0"/> %	Delay <input type="text" value="60.0"/> s	Auto Reset delay <input type="text" value="5.0"/> s
	I Limit high	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max <input type="text" value="1000.0"/> A	Delay <input type="text" value="60.0"/> s	Reset <input type="text" value="Manual"/>	
	I Limit low	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Min <input type="text" value="0.0"/> A	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	THD U	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max <input type="text" value="8.0"/> %	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	Harmonics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nom <input type="text" value="EN50160"/>	Reduction <input type="text" value="0.0"/> %	Delay <input type="text" value="0.0"/> s	<input type="text" value="Manual"/>
	THD I	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max <input type="text" value="20.0"/> %	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	Frequency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Min <input type="text" value="49.5"/> Hz	Max <input type="text" value="50.5"/> Hz	Delay <input type="text" value="10.0"/> s	<input type="text" value="Manual"/>
	Temp. int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fan <input type="text" value="30"/> °C	Max <input type="text" value="50"/> °C	Hsyt. <input type="text" value="4"/> °C	<input type="text" value="Manual"/>
	Temp. ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fan <input type="text" value="30"/> °C	Max <input type="text" value="50"/> °C	Hsyt. <input type="text" value="4"/> °C	<input type="text" value="Manual"/>
	DI Input 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Edge <input type="text" value="Rising"/>	Delay <input type="text" value="0.0"/> s	<input type="text" value="Manual"/>	
	DI Input 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Edge <input type="text" value="Rising"/>	Delay <input type="text" value="0.0"/> s	<input type="text" value="Manual"/>	
	P overload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max <input type="text" value="10000"/> kW	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	Q overload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cap. <input type="text" value="-10000"/> kvar	Ind. <input type="text" value="10000"/> kvar	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>
	S overload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max <input type="text" value="10000"/> kVA	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	P export	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	Control alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	Faulty step	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nominal value <input type="text" value="50"/> %	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	Step warning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nominal value <input type="text" value="70"/> %	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>	
	Step service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hours <input type="text" value="1000"/> h	Cycles <input type="text" value="1000"/>	<input type="text" value="Manual"/>	
	cos (φ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cap. <input type="text" value="-0.80"/>	Ind. <input type="text" value="0.80"/>	Delay <input type="text" value="60.0"/> s	<input type="text" value="Manual"/>
Tampering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

Alarm block

Alarms

Alarm reaction

Limits

Configurable CT input

1-9600 adjustable on the primary side

1 or 5 can be set as secondary

MPFC Configuration-Tool V2.1 (Device readout *)

Device Configuration Settings Help Screenshot 11.12.2024 11:23:16

MEASUREMENT

Basic-Setup

Measurement

Control

Step

Unbalance

Earth fault

DTC

Modbus

Alarm

Tariff change

Reset

System

Datalogger

Overview

Step Info

Alarm Info

Measured values

Rated voltage (L-L) 400 v

Current transformer factor L1 1000,0 / 5 L2 1000,0 / 5 L3 1000,0 / 5 N 1000,0 / 5

Swap CT connection

Voltage transformer factor L1 1,0 L2 1,0 L3 1,0

Type of connection U-LN

Compensation angle 0 °

Auto init. - Modbus N/A -

Frequency Auto Hz

Temperature offset internal 0 °C

Temperature offset external 0 °C

Emission factor reactive 8,5 g/kvarh

Connected

Read from MPFC Write to MPFC

Swap of K and L



Display

- Plain text menu
- Measured value display
- Status display
- Alarm display
- Memory function
- Date and time



Option to personalise the alarm text, for example by adding a phone number

Device Configuration Settings Help Screenshot

SYSTEM

Basic-Setup
Measurement
Control
Step
Unbalance
Earth fault
DTC
Modbus
Alarm
Tariff change
Reset
System
Datalogger
Overview
Step Info
Alarm Info
Measured values

Date Dienstag , 10. Dezember 2024 System Set date

MPFC date

Time 11:57:33 System Set time

MPFC time

Alarm text -> put in customizable alarm text here !
Finalize alarm text with enter key !

Multiuse output 1 (MU1) NO

Digital input 1 Alarm

Digital input 2 Alarm



MPFC-PF

Power factor controller

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MPFC-PF
1 phase/ 3phase



Control:

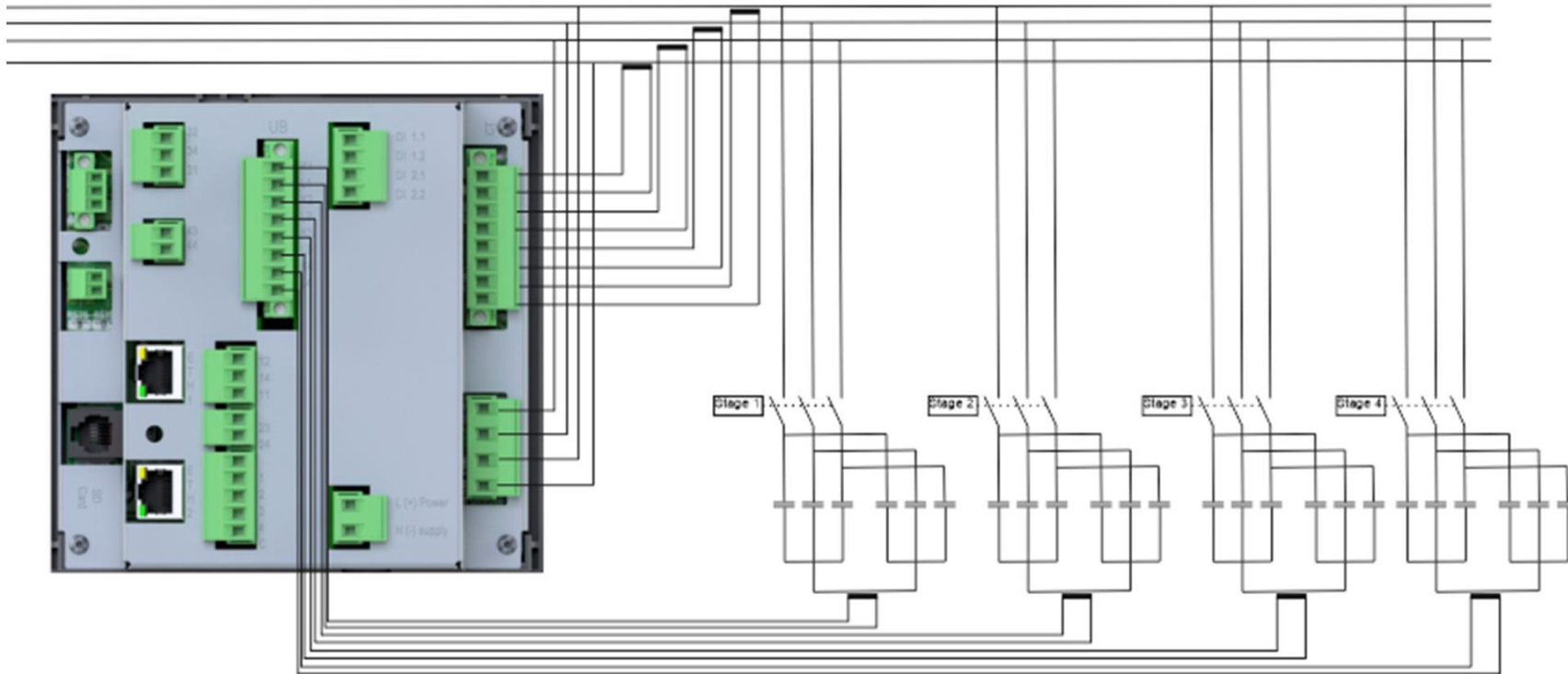
- Q-Algorithmen Option:
 - Cos phi (U)
 - Cos phi (P)
 - Q(U)
 - Static Q
- Optional self-consumption measurement available
- Slave operation for coupled transformers
- Separate detection of solar systems
- Inductive and capacitive stages
- Up to 26 Steps



MPFC-UB

Unbalanced relays

- For automatic power factor correction up to 4 stages
- Unbalance monitoring for double star
- Monitoring of the mains voltage for voltage harmonics and overvoltage or undervoltage



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Channel 1

CT - Factor: 1000,0 / 5 Swap

Natural unbalanced current: Set 0,000 A Save Del.

	Alarm	Trip
On	<input type="checkbox"/>	<input type="checkbox"/>
Compensated unbalanced current	2,00 A	3,00 A
Delay	0,0 s	0,0 s
A-Relay 1	<input type="checkbox"/>	<input type="checkbox"/>
A-Relay 2	<input type="checkbox"/>	<input type="checkbox"/>
MU-Relay 1	<input type="checkbox"/>	<input type="checkbox"/>
MU-Relay 2	<input type="checkbox"/>	<input type="checkbox"/>
Alarm text	<input type="checkbox"/>	<input type="checkbox"/>
Ctrl. Off	<input type="checkbox"/>	<input type="checkbox"/>
Ctrl. Freeze	<input type="checkbox"/>	<input type="checkbox"/>
cos(φ 2)	<input type="checkbox"/>	<input type="checkbox"/>
D11 blocked by D12	<input type="checkbox"/>	<input type="checkbox"/>
Reset	Manual	Manual
Auto Reset delay	0,0	



EMM6

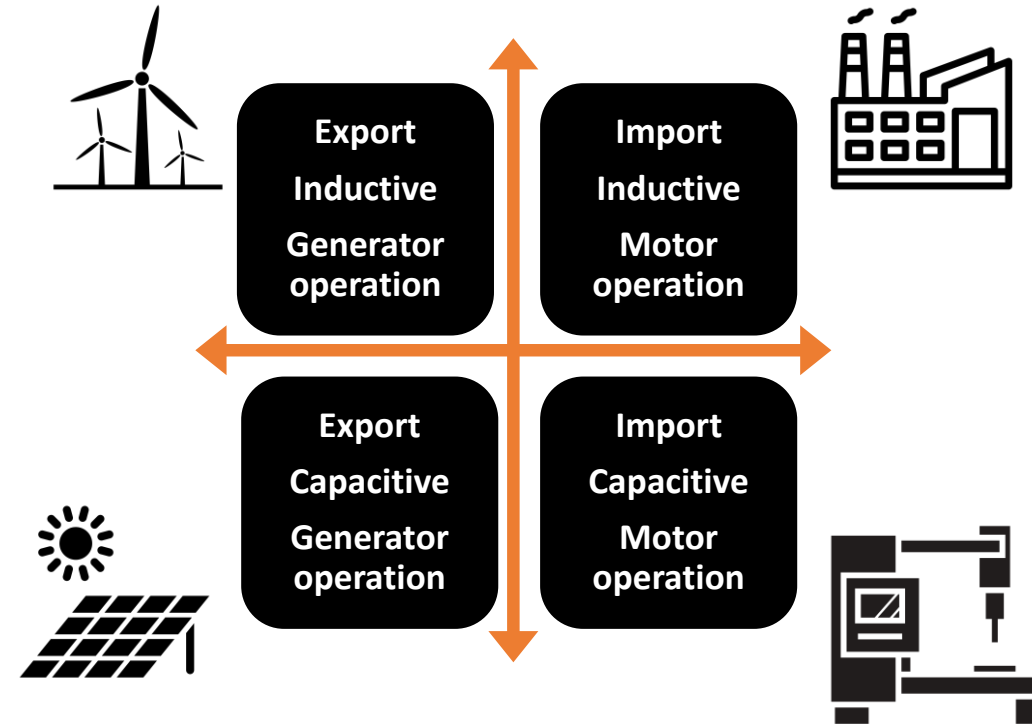
Measurement device

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Comparison

Differences at a glance:

- Colored status display
- Status detection at a glance
- Increase measurement class to Cat 4
- Low response threshold
- External temperature monitoring via NTC22K
- EEPROM ring memory
- Data logger
- Event recorder (sampling rate max. 1600 Hz) in connection with memory expansion with SD card 32GB
- Installation depth (20mm deeper than the EMM5)
- Higher measured value resolution (sampling rate 6.4 kHz)
- IEC61850 communication module
- Ethernet 100 Mbit communication interface



HOME

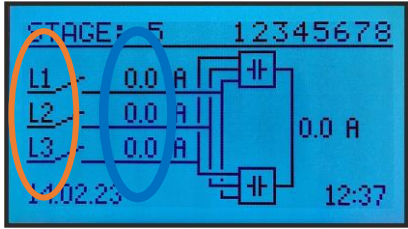


NEXT

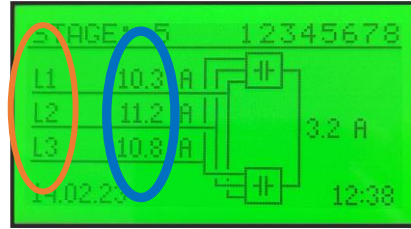


CPR-1

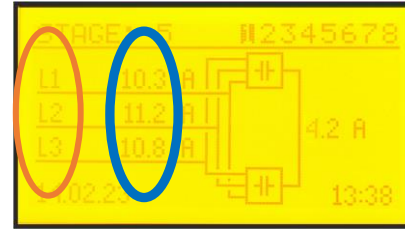
Protection device



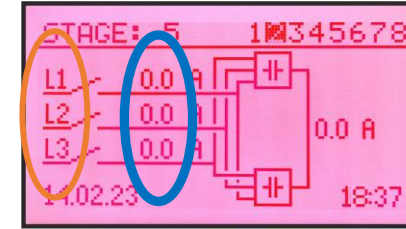
Inactive



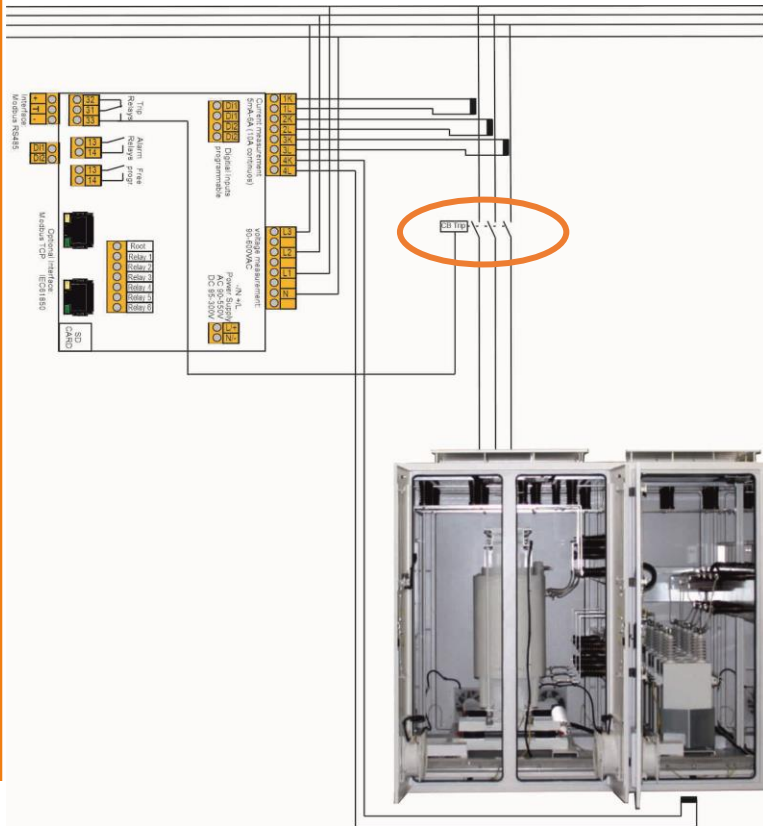
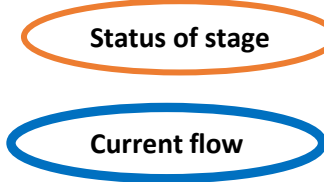
Active



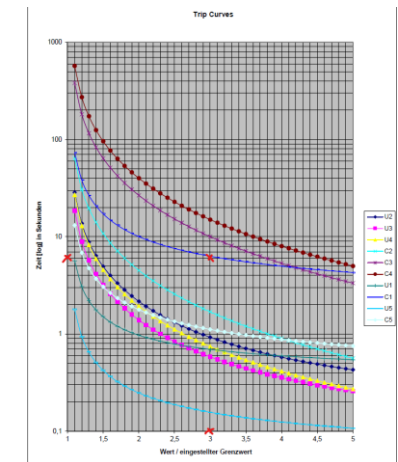
Alarm



Trip



Monitored Values	Alarm settings	Event Delay time
<ul style="list-style-type: none"> • OL Overload -> ANSI27 • OLth Overload thermal -> ANSI49 • OLf Overload fundamental • UL Underload -> ANSI37 • OV Overvoltage -> ANSI59 • UV Undervoltage -> ANSI27 • UB Unbalance • Earth Fault • VA Voltage Asymmetric -> ANSI60P 	<ul style="list-style-type: none"> • Threshold adjustable for each alarm / trip. • Repetitive threshold violation monitoring 	<ul style="list-style-type: none"> • Fixed adjustable time in sec. • Tripping characteristic ANSI U1-U5 C1-C5



MPFC SERIES

BELUK

If you have any questions, please do not hesitate to contact us.

The Power Quality Team looks forward to your inquiries and will be happy to advise you!



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HOME

