
Universal Motor Controller

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Keep motors running 24 hours a day

Secure uptime for your application

ABB's control products protect, control and automate critical business processes to make any application more productive. Rely on ABB as the partner to provide flexible, universal products. The Universal Motor Controller is an easy-to-use device that keeps your application running.



Continuous operation

The Universal Motor Controller (UMC) provides comprehensive, electronic motor protection. It ensures the motor is protected at all times, even if the control system or fieldbus breaks down. The precise electronic measurement system enables optimal utilization of the motors. Continuous trip behavior is supported by the long-term, high stability of the tripping characteristics. A comprehensive diagnostic system facilitates fault localization and rectification to help keep the system running and reduce downtime.



Speed up your projects

The system's modular approach means it can expand and adapt to provide the optimal solution for any situation, with an entry-level device that fulfills requirements for most applications. All of the control functions required in the field are integrated and easy to configure via parameters. Application-specific control functions can be readily achieved using the programmable logic system.



Easy to install

The universal and modular structure of the UMC benefits the entire planning, design and maintenance process. It significantly reduces the amount of wiring required, as all the necessary protection, monitoring and control functions are integrated into a single device. The complete range of currents and communication: fieldbuses and Ethernet is covered in a single version, simplifying planning, inventory and servicing.

The functions in detail

Universal Motor Controller UMC100.3



Motor protection

- The UMC provides comprehensive motor protection
- Overload protection for single and three-phase AC motors according to EN/IEC 60947-4-1
- Rated motor currents from 0.24 to 63 A with an integrated measuring system in a single version
- Rated motor currents up to 850 A with external current transformer CT4L/CT5L
- Selectable tripping classes 5E, 10E, 20E, 30E or 40E
- Locked rotor protection
- Phase failure, asymmetry and sequence protection
- Under-/ overcurrent protection
- Thermistor motor protection
- Ground leakage detection – internally or using CEM11-FBP.xxx sensors
- Limitation of motor starts per time
- Motor protection independent from bus communication

In combination with voltage module VI150/VI155-FBP.0

- Undervoltage/overvoltage protection
- Power supervision
- Power factor supervision ($\cos \varphi$)
- Voltage-based detection of phase failure, asymmetry and sequence



Motor control

- Integration of the most important motor control functions as ready, easily parameterizable blocks
- Direct, reversing, star-delta starters
- Pole changing/Dahlander Actuator mode
- Inching/jog mode
- Adjustable restart strategy (load shedding)

Extended motor control

- Freely programmable for special, application-specific control functions
- Simple adaptation to specified control functions
- Comprehensive library
- Blocks for logic, counters, timing
- Access to all I/Os and internal signals



Service data

- Counter for motor operating and standstill hours
- Number of starts
- Number of overload trips
- Energy

Diagnostic data

- Comprehensive and detailed error messages and warnings
- Log for previous 16 errors
- Plain text display on the control panel

Open communication

The UMC is a basic device that can use various communication methods; the communication protocol is selected by plugging-on the right fieldbus communication interface or connecting an Ethernet communication interface.



Control stations and operation modes

- Individual and flexible configuration
- Remote operation via DCS or PLC
- Local control via pushbuttons
- Local control via operations panel UMC100-PAN
- Force local via input signal

Motor status/communication

Quick and comprehensive access to all data via control station, fieldbus, Ethernet and/or laptop

Operating data

- Motor status
- Motor current
- Thermal load
- Maximum starting current
- Run-up time
- Time to trip
- Remaining cool-down time

Operating data with voltage module VI150/VI155-FBP.0

- Phase voltages
- Active power
- Apparent power
- Power factor
- Energy

Main areas of application

Benefit from ABB's Universal Motor Controller functionality in a wide variety of segments. Its flexibility, global recognition and comprehensive certification make it the top choice, no matter where you are.

— 01 Water supply and treatment plants

— 02 Mining facilities

— 03 Cement plants

Cement factories

- Robust and compact design
- Several inputs, e.g. for querying the position of the damper limit switches

Oil & gas, chemicals

- Programmability
- Ground fault monitoring
- Undervoltage detection and configurable restart following voltage restart
- Protection of motors in hazardous environments (ATEX)
- Use in IT networks

Pulp and paper

- Conformal coating
- Modular design
- Flexible communication

Mining

- Rated motor voltage of up to 1000 V
- Can be used at altitudes of up to 5000 m
- Ground fault monitoring

Water supply and treatment

- Pump controls as required
- Underload detection with Cos φ measuring
- Pump cleaning application

Others

- Steel plants
- Ships



01



02

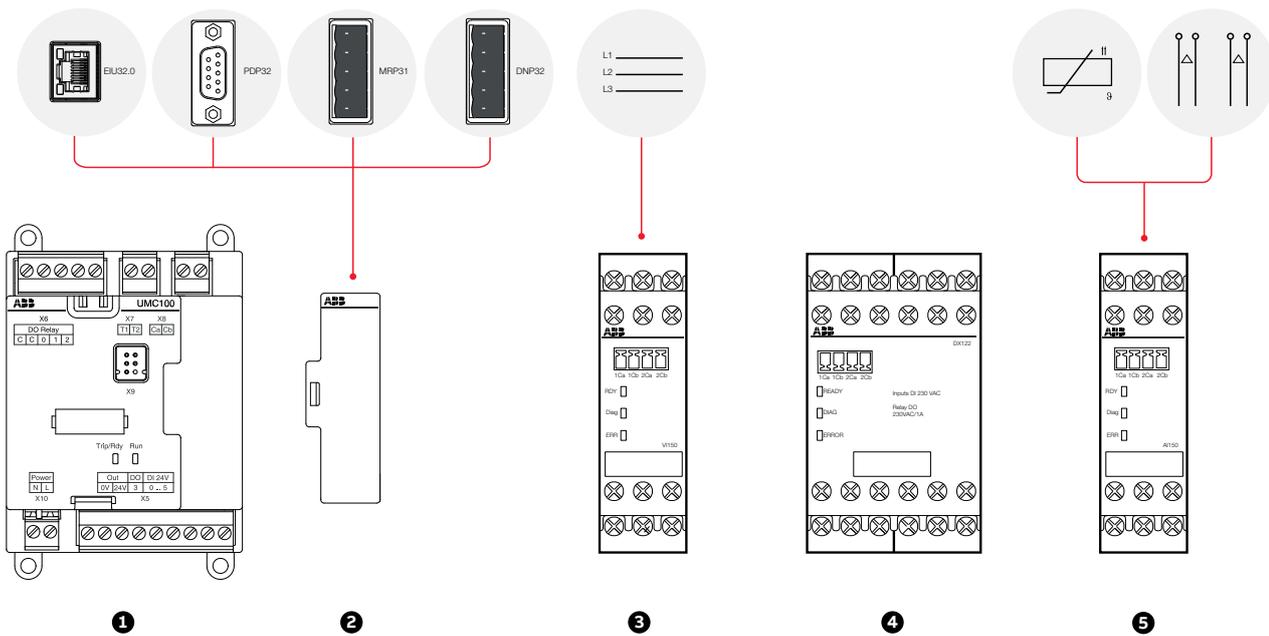


03

Components

The basic device can be expanded with several modules: digital expansion modules, analog and temperature modules, voltage modules and a range of communication interfaces, guaranteeing full flexibility and covering a wide range of applications.

MAIN COMPONENTS



1

UNIVERSAL MOTOR CONTROLLER UMC100.3

Basic device, expandable with different modules

- Voltage: max. 1000 V AC
- Tripping classes: 5E, 10E, 20E, 30E, 40E in accordance with IEC/EN 60947-4-1
- Built-in wide range measuring system, up to 63 A with one single version
- Supply voltages: 24 V DC, 110-240 V AC/DC
- Inputs: six digital inputs 24 V DC, one PTC input
- Outputs: four digital outputs



2

COMMUNICATION INTERFACES

Directly connect a variety of communication interfaces to the UMC

- Fieldbus interfaces:
 - PDP32.0: Profibus DP, DNP31.0: DeviceNet, MRP31.0: Modbus RTU
- Ethernet Interfaces:
 - MTQ22-FBP.0: Modbus TCP, PNQ22-FBP.0: Profinet IO, EIU32.0: EtherNet/IP™



3

VOLTAGE MODULES VI150/VI155-FBP.0

Voltage modules for determining phase voltages, power factor (cos φ), active power, apparent power, energy, harmonic content (THD)

- Supply voltage: 24 V DC
- 3-phase voltage measurement, up to 690 V in grounded and ungrounded networks
- Voltage dependent protection functions

A control panel with a backlit LDC display and a choice of nine different languages ensures easy operation of the UMC, wherever you are. Sensors detect earth leakages; current transformers increase the current measuring range.



DIGITAL MODULES DX111/DX122-FBP.0

Compact modules that increase the number of digital inputs and outputs

- Supply voltage 24 V DC
- Inputs: DX111 eight digital inputs 24 V DC, DX122 eight digital inputs 110/230 V AC
- Outputs: four digital relay outputs, one configurable analog output

4



ANALOG/TEMPERATURE MODULE AI111.0

Expand the UMC with analog and temperature inputs

- Supply voltage: 24 V DC
- Three analog inputs
- Configurable for temperature sensors and standard signals
- Two modules AI111 can be connected to one UMC

5

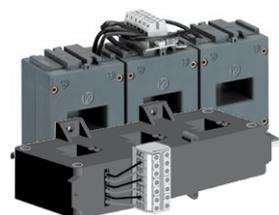
ACCESSORIES



OPERATING PANEL UMC100-PAN

Installation on the UMC or on the control cabinet door

- Graphics-enabled, backlit display with three LEDs for status indication
- Monitors all values, shows the status and diagnostic data
- Speaks your language - choice of nine menu languages
- USB-port for connection to a PC
- Up/download of parameters and custom application logic



CURRENT TRANSFORMERS CT4L/CT5L

Extend the integrated measuring system for larger motors

- For nominal motor currents > 63 A up to 850 A
- Linear transformer, 3-phase with terminal block, designed for connecting leads Cu 2.5 mm²



EARTH LEAKAGE SENSORS CEM11-FBP.XXX

Summation current transformer for connecting to a digital input. Mounting with bracket on DIN busbar or wall

- Four versions available with diameters from 20 mm to 120 mm
- Simple residual current adjustment with rotary switch, including test position
- Direct connected to a digital input of the motor controller
- Flexible mounting

Universal Motor Controller UMC100.3

Ordering details



UMC100.3

Description

Intelligent motor management system for single and three-phase motors with $I_e = 0.24 - 63 \text{ A}$ in a single device. Compact housing with integrated current transformer for cable cross sections up to 25 mm^2 (max. \varnothing with insulation 11 mm). Higher currents with additional external current transformer. Thermal overload protection according to EN/IEC 60947-4-1, selectable trip classes 5E, 10E, 20E, 30E, 40E. Some functions require an additional expansion module.

- Motor protection functions:
 - Over-/underload, over-/undercurrent, over-/undervoltage, rotor blocking, phase failure/imbalance/sequence
 - Earth fault detection integrated or with external sensor CEM11-FBP.0
 - Hot motor protection with thermistor or temperature measurement
- Motor control functions:
 - Easily configurable motor control functions: direct, reverse, star-delta starter, pole-changing, overload relay, actuator mode, softstarter mode. Additionally free programmable application specific logic with function blocks
- Service and diagnostic data:
 - Operating hours, number of motor starts and overload trips, energy, standstill and operation hours supervision, motor status, faults and warnings, fault history (16 events)
 - Motor current, phase voltages, thermal load, power factor ($\cos \varphi$), active power, apparent power, energy, total harmonic distortion (THD).
- Integrated I/Os: six digital inputs, one PTC input, four digital outputs. Maximum number of I/Os with expansion modules: 14 digital inputs, one PTC input, nine digital outputs, six analog inputs, one analog output
- Communication interfaces for fieldbuses and Ethernet networks, Interface for operator panel UMC100-PAN, bus interface for connection of expansion modules
- Versions for supply voltage 24 V DC and 110 – 240 V AC/DC, with ATEX approval and with ATEX plus conformal coating for applications in aggressive atmosphere

Description	Supply voltage	Type	Order code	Pkg qty	Weight (1 pce) kg
Universal Motor Controller	24 V DC	UMC100.3 DC	1SAJ530000R0100	1	0.275
Universal Motor Controller	110-240 V AC/DC	UMC100.3 UC	1SAJ530000R1100	1	0.315
Universal Motor Controller, ATEX	24 V DC	UMC100.3 DC EX	1SAJ530000R0200	1	0.275
Universal Motor Controller, ATEX	110-240 V AC/DC	UMC100.3 UC EX	1SAJ530000R1200	1	0.315
Universal Motor Controller, ATEX conformal coating	24 V DC	UMC100.3 DC EX Coated	1SAJ530000R0210	1	0.275
Universal Motor Controller, ATEX conformal coating	110-240 V AC/DC	UMC100.3 UC EX Coated	1SAJ530000R1210	1	0.315

Operating panel and cables

Ordering details



UMC100-PAN

2CDC341008W0014

Description

Operating panel for Universal Motor Controller UMC100.3. Backlit graphical and multilingual full-text display, LEDs for status display. Assembly directly on UMC100.3 or on the control cabinet door via door mounting set (includes the connection cable).

Functions

- Monitor: Shows motor status, diagnostics and maintenance data
- Operate: Start, stop, fault reset
- Parametrize: Setting and changing of all motor and fieldbus parameters (password protection possible); all settings are performed in the selected language
- Memory: Copy settings from one UMC100.3 to another
- USB port for up/download of parameters and logic from PC with PBDM software

Supports nine languages: English, Finnish, French, German, Italian, Polish, Portuguese, Russian, Spanish

The protection cap UMC100-PAN increases the degree of protection for the operator panel from IP52 to IP54. It consists of transparent and flexible silicone material making it easy to read text messages, checking the LED status and use the buttons. It is removable to access the micro-USB port for parameter up/download.



UMC100-PAN CAP

2CDC341001V0017

Description	Type	Order code	Pkg qty	Weight (1 pce) kg
Operating panel	UMC100-PAN	1SAJ590000R0103	1	0.047
0.7 m ext. cable with door mounting set	UMCPAN-CAB.070	1SAJ510003R0002	1	0.070
1.5 m ext. cable with door mounting set	UMCPAN-CAB.150	1SAJ510004R0002	1	0.088
3 m ext. cable with door mounting set	UMCPAN-CAB.300	1SAJ510002R0002	1	0.176
Protection cap for operating panel	UMC100-PAN CAP	1SAJ510005R0001	10	0.013

Expansion modules

Ordering details



DX111-FBP.0

2CDC34100550009



DX122-FBP.0

2CDC34100450009



VI150-FBP.0

2CDC34100150011



AI111.0

2CDC34100150015

Description

Up to four expansion modules can be connected to one UMC100.3:

- One digital expansion module DX111-FBP.0 or DX122-FBP.0
- One voltage expansion module VI150-FBP.0 or VI155-FBP.0
- Two analog/temperature expansion modules AI111.0

The supply voltage is 24 V DC; the 110-240 V AC/DC version of the UMC100.3 provides the 24 V DC supply for expansion modules

DX111-FBP.0

I/O-expansion module with eight digital inputs 24 V DC, four relay outputs, one analog output 0/4-20 mA or 0...10 V

DX122-FBP.0

I/O-expansion module with eight digital inputs 110/230 V AC, four relay outputs, one analog output 0/4-0 mA or 0-10 V.

VI15x-FBP.0

Voltage modules for the determination of phase voltages, power factor ($\cos \varphi$), apparent power, energy, total harmonic distortion (THD). For use in grounded networks (VI150-FBP.0) or in all networks (VI155-FBP.0), 150-690 V AC.

AI111.0

Analog/temperature expansion module, three inputs PT100, PT1000, KTY83, KTY84, NTC, 0-10 V, 0/4-20 mA one or two modules AI111.0 can be connected to an UMC100.3.

Description	Type	Order code	Pkg qty	Weight (1 pce) kg
I/O module for UMC100, 24 V DC digital input	DX111-FBP.0	1SAJ611000R0101	1	0.220
I/O module for UMC100, 110 - 230 V AC digital input	DX122-FBP.0	1SAJ622000R0101	1	0.220
3-phase voltage module for grounded networks	VI150-FBP.0	1SAJ650000R0100	1	0.110
3-phase voltage module for all networks	VI155-FBP.0	1SAJ655000R0100	1	0.110
Analog/temperature module 3 analog inputs	AI111.0	1SAJ613000R0101	1	0.116
Connection cable UMC100 - I/O module, length 0.3 m	UMCIO-CAB.030	1SAJ691000R0001	1	0.011
Connection cable IO-module - IO-module, length 0.3 m	IOIO-CAB.030	1SAJ692000R0001	1	0.011
Terminal set for UMC100.3 DC (spare parts)	UMCTB-FBP.0	1SAJ929160R0001	1	0.043
Terminal set for UMC100.3 UC (spare parts)	UMCTB.1	1SAJ929160R0002	1	0.045

Fieldbus interfaces

Ordering details



PDP32.0



MRP31.0



DNP31.0



PDR31.0

Description

Fieldbus communication interfaces enable the UMC100.3 to communicate via fieldbus. The interfaces can be used in two ways:

- Mounted directly on an UMC100.3 – the interface is supplied from the UMC100.3 and no additional accessory is required
- Mounted separately on a SMK3.0 adapter in the cable chamber of an MCC, the interface plugged on SMK3.0 requires a 24 V DC supply. Ready-made cables for applications in withdrawable systems are available, as well as terminal blocks for other cables:
 CDP18.150: Cable for use inside the drawer CDP24.150: Cable from SMK3.0 to drawer outside

PDP32.0

- Communication interface for PROFIBUS DP; supports the protocols PROFIBUS DP/V0 and V1
- PNO-certified PROFIBUS slave
- Data transfer rate up to 12 Mbit/s
- Diagnostic LEDs
- Fieldbus connection via nine-pole Sub-D connector or terminal blocks
- GSD download from UMC100.3 webpage

MRP31.0

- Communication interface for Modbus RTU
- Data transfer rate up to 57.6 kbit/s
- Diagnostic LEDs
- Fieldbus connection via terminal blocks

DNP31.0

- Communication interface for DeviceNet
- ODVA-certified DeviceNet slave
- Data transfer rate up to 500 kbit/s
- Diagnostic LEDs
- Fieldbus connection via terminal blocks
- EDS download from UMC100.3 webpage

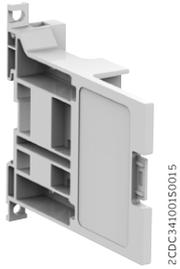
PDR31.0

- External active fieldbus termination for Profibus DP; the PDR31.0 needs to be mounted on a SMK3.0 adapter and supplied by 24 V DC

Description	Type	Order code	Pkg qty	Weight (1 pce) kg
Profibus DP communication interface	PDP32.0	1SAJ242000R0001	1	0.050
Modbus RTU communication interface; terminal block for fieldbus connection included	MRP31.0	1SAJ251000R0001	1	0.039
DeviceNet communication interface; terminal block for fieldbus connection included	DNP31.0	1SAJ231000R0001	1	0.039
Profibus DP active bus termination	PDR31.0	1SAJ243000R0001	1	0.030

Adapter and accessories

Ordering details



SMK3.0



CDP18.150



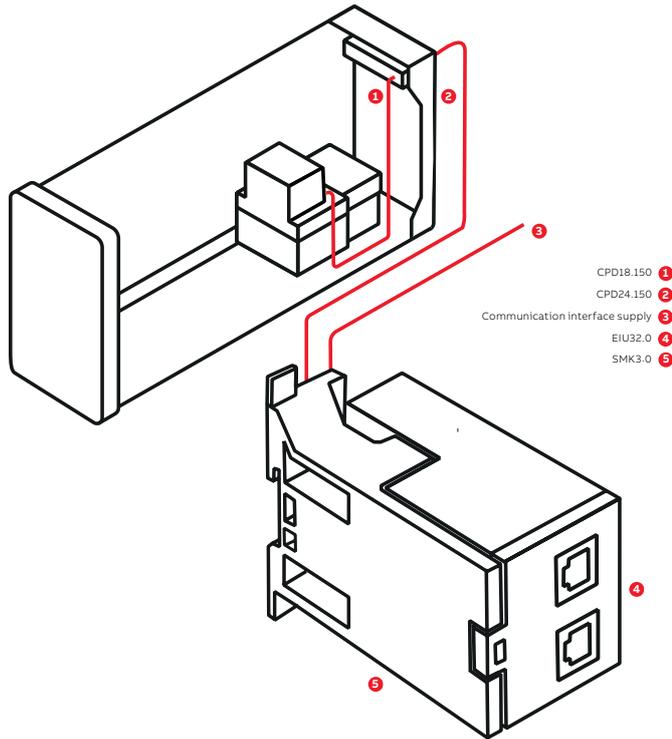
PDP32.0 on SMK3.0



EIU32.0 on SMK3.0

Adapter and ready-made cables

Adapter SMK3.0 for external mounting of a fieldbus or EtherNet/IP™ interface EIU32.0 outside a drawer. SMK3.0 can be mounted on a DIN-rail or fixed by screws. 24 V DC supply is required. Ready-made cables for inside and outside the drawer, including a terminal block on one side and open end on the other. Terminal blocks are also separately available for making own cables.



Separate wiring of the EtherNet/IP™ communication interface EIU32.0

Description	Type	Order code	Pkg qty	Weight (1 pce) kg
Adapter for separate mounting of a communication interface; terminal block for 24 V DC supply included	SMK3.0	1SAJ929600R0001	1	0.038
Cable for use inside drawer, length 1.5 m	CDP18.150	1SAJ929180R0015	1	0.060
Cable from SMK3.0 to drawer's outside, length 1.5 m	CDP24.150	1SAJ929240R0015	1	0.060
Terminal block 2-pole for SMK3.0 supply (spare parts)	SMK3-X2.10	1SAJ929610R0001	10	0.017
Terminal block 5-pole for SMK3.0 comm. (spare parts)	SMK3-X1.10	1SAJ929620R0001	10	0.041

Ethernet interfaces

Ordering details



MTQ22-FBP.0

2CDC34100950012



PNQ22-FBP.0

2CDC34100150014



EIU32.0

2CDC34100990018

Description

Ethernet communication interfaces enable the UMC100.3 to communicate via an Ethernet network. There are two types of interfaces:

Interfaces for the connection of one to four Universal Motor Controllers UMC100.3:

- MTQ22-FBP.0 for Modbus TCP
- PNQ22-FBP.0 for Profinet IO

Interface for a single universal motor controller UMC100.3:

- EIU32.0 for EtherNet/IP™

MTQ22-FBP.0

- Protocol Modbus TCP
- For one to four UMC100.3
- Master supervision with timeout control for up to four masters
- Micro USB-port for configuration via PC (configuration software downloaded from UMC100.3 webpage)
- Integrated Ethernet switch
- Supports all network topologies
- Ring topology with redundancy (MRP protocol)
- Easy to use in withdrawable applications
- No special Ethernet connectors required in MCCs
- 24 V DC supply voltage
- DIN-rail mounting

PNQ22-FBP.0

- Protocol Profinet IO
- PNO-certified
- For one to four UMC100.3 devices
- Integrated Ethernet switch
- Supports all network topologies
- Ring topology with redundancy (MRP protocol)
- Easy to use in withdrawable applications
- No special Ethernet connectors required in MCCs
- Fully integrated into ABB 800xA
- Time-stamped events with ABB 800xA
- 24 V DC supply voltage
- DIN-rail mounting
- GSDML downloaded from UMC100.3 webpage

EIU32.0

- Protocol EtherNet/IP™
- ODVA-certified
- For one motor controller UMC100.3
- Mounting directly on an UMC100.3 (supplied by UMC100.3) or remotely on a SMK3.0 adapter (24 V DC supply required)
- Integrated Ethernet switch
- Supports all network topologies
- DLR (Device Level Ring) function for redundancy
- Easy to use in withdrawable applications
- No special Ethernet connectors required in MCCs
- EDS download from UMC100.3 webpage

Description	Type	Order code	Pkg qty	Weight (1 pce) kg
Ethernet Modbus TCP interface	MTQ22-FBP.0	1SAJ260000R0100	1	0.172
Ethernet Profinet IO interface	PNQ22-FBP.0	1SAJ261000R0100	1	0.172
EtherNet/IP™ interface	EIU32.0	1SAJ262000R0100	1	0.110

Ready-made cables, terminal blocks

Ordering details



CDP18.150

2CDC341007F0018



Terminal blocks ETHTB-FBP.xx

2CDC341008F0018

Ready-made cables

Ready-made cables are available for application in withdrawable systems as well as for fixed installations. Cables include ready-mounted terminal blocks. All connectors are also available as spare parts for creating individual cable connections.

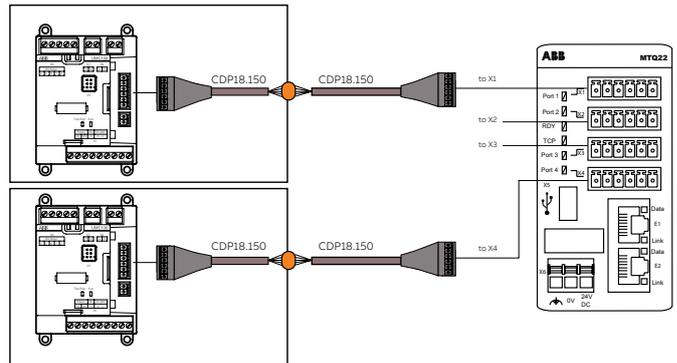
Terminal blocks for making own cables are also available:

MTQ22-FBP.0, PNQ22-FBP.0

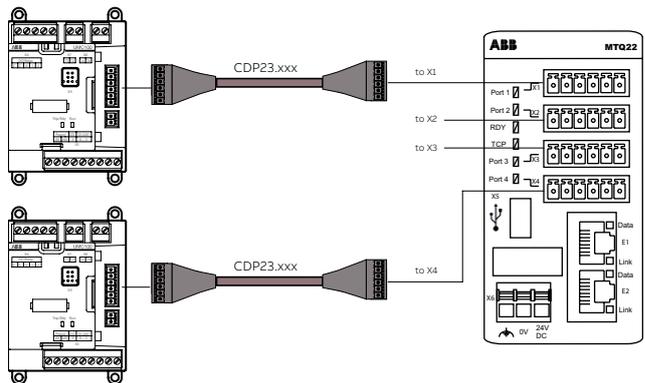
- CDP18.150 cable for use inside and outside a drawer
- CDP23.150, CDP23.300 cables from Ethernet interface to UMC100.3

EIU32.0

- CDP18.150 cable for use inside a drawer
- CDP24.150 cable for use outside a drawer and connection to a SMK3.0 adapter



UMC100.3, withdrawable application with MTQ22-FBP.0/PNQ22-FBP.0



UMC100.3, fix mounted application with solution MTQ22-FBP.0/PNQ22-FBP.0

Description	Type	Order code	Pkg qty	Weight (1 pce) kg
Cable for inside and outside drawer, length 1.5 m	CDP18.150	1SAJ929180R0015	1	0.060
Cable Ethernet interface - UMC100.3, length 1.5 m	CDP23.150	1SAJ929230R0015	1	0.100
Cable Ethernet interface - UMC100.3, length 3 m	CDP23.300	1SAJ929230R0030	1	0.160
Cable from SMK3.0 to drawer's outside, length 1.5 m	CDP24.150	1SAJ929240R0015	1	0.060
Terminal blocks for MTQ22/PNQ22 X1...X4	ETHTB-FBP.4	1SAJ929200R0001	4	0.015
Terminal blocks for MTQ22/PNQ22 X1...X4	ETHTB-FBP.50	1SAJ929200R0002	50	0.015

Configuration software

Ordering details



Configuration software example

FIM UMC EDITION configuration software for the UMC100.3 motor management system

The FIM UMC Edition is based on the Field Device Integration (FDI) standard. This latest standard combines the benefits of both major former technologies, EDD and FDT/DTM. It is the perfect tool for configuration of the UMC100.3 universal motor controller in large applications in the process industry and also in smaller projects such as the water industry. The FIM UMC Edition is equipped with a high-performance graphical user interface which is quick to install. It scans, identifies and enables access to devices within three minutes. It provides effective basic functionality for configuration, diagnosis and maintenance, during commissioning, in the workshop or as second master in a Profibus network of a process control system.



Overview of features

- Online/offline configuration and parameterization of UMC100.3
- Maximum number of tags is 2500
- Reading parameterization and configuration information from the device
- Online display of measuring, status and diagnostics data
- Online operation and error acknowledgment
- Creation of custom application logics
- Archiving



UTP22-FBP.0

2CDC341004F001

Supported languages

FIM basic package	Chinese, English, German
UMC100.3 Device Package	Chinese, English, Spanish, German, Italian, Polish, Portuguese, Russian
UMC100.3 Custom Application Editor	English

System requirements

- Windows 7 (64 bit)/Windows 8.1, Windows 10, admin rights
- 10 GB storage space
- Minimum of 1 GB RAM

Connection to UMC100.3 can be done either via PROFIBUS DP or as a point-to-point connection

Connection to Profibus DP network: UTP22-FBP.0

Connection to UMC100.3: With micro-USB cable via control panel UMC100-PAN

A trial version with limited functionality can be downloaded from <https://new.abb.com/control-systems/fieldbus-solutions/fim>

The single user license in the FIM UMC Edition package upgrades the trial version to a full version

Description	Type	Order code	Pkg qty	Weight (1 pce) kg
USB interface for Profibus networks	UTP22-FBP.0	1SAJ924013R0001	1	0.261
FIM UMC Edition, Single user license	PBDTM-FBP.0	1SAJ925000R0001	1	n.a.

Earth fault monitors, current transformers

Ordering details



CEM11-FBP.xxx

2CDC34501F0006

Earth fault monitors CEM11-FBP.xxx for use with the Universal Motor Controller UMC100.3

The CEM11-FBP.xxx device monitors if the sum of the currents flowing through it is zero (factorial addition). If the sum is zero, no residual current is present. If the residual current is above an adjusted threshold value, the output signal of the CEM11-FBP.xxx changes. It can be used in motor feeders to detect leakage currents, as well as ground faults, caused for example by insulation breakdowns.

- CEM11-FBP.xxx is connected to a digital input of the UMC100.3
- Earth fault current threshold can be set in eight steps with a screwdriver
- Test position for easy control of the wiring

CEM11-FBP.xxx is delivered with adapters for DIN-rail or wall mounting.
CEM-11.FBP.120 is for wall-mounting only.



CT4L185R/4, CT4L310R/4

2CDC34100150012



CT5L500R/4, CT5L850R/4

2CDC34100250012

Earth fault currents [mA]	Through-hole diameter	Type	Order code	Pkg qty	Weight (1 pce) kg
80 ¹⁾ , 300, 550, 750, 1000, 1200, 1500, 1700	20 mm	CEM11-FBP.20	1SAJ929200R0020	1	0.130
100 ¹⁾ , 500, 1000, 1400, 2000, 2400, 3000, 3400	35 mm	CEM11-FBP.35	1SAJ929200R0035	1	0.200
120 ¹⁾ , 1000, 2000, 2800, 4000, 4800, 6000, 6800	60 mm	CEM11-FBP.60	1SAJ929200R0060	1	0.330
300 ¹⁾ , 2000, 4000, 5600, 8000, 9600, 12000, 13600	120 mm	CEM11-FBP.120	1SAJ929200R0120	1	0.940

¹⁾ Lower values have higher inaccuracy

Current transformers for use with the Universal Motor Controller UMC100.3

Linear type three-phase transformers, for use with the UMC100.3 and nominal motor currents >63 A. Terminal blocks for conductors Cu 2.5 mm² for wiring on the UMC100.3 side.

Description	Recommended current range	Type	Order code	Pkg qty	Weight (1 pce) kg
Current transformer	60...185 A AC	CT4L185R/4	1SAJ929500R0185	1	1.600
Current transformer	180...310 A AC	CT4L310R/4	1SAJ929500R0310	1	1.500
Current transformer	300...500 A AC	CT5L500R/4	1SAJ929501R0500	1	1.700
Current transformer	500...850 A AC	CT5L850R/4	1SAJ929501R0850	1	1.900

UMC100-FBP.0 and FBP system accessories are being phased out. Please contact your local ABB contact for spare parts or retrofit solutions.

Universal Motor Controller UMC100.3

Technical data

Control voltage circuit

Type	UMC100.3 DC	UMC100.3UC
Supply voltage	24 V DC (+30 % ... -20 %) (19,2 ... 31,2 V DC) including ripple	110V - 240V AC/DC -15% / +10%
Total power dissipation Conditions: all digital inputs high, all relay outputs activated*	min. 3 W	min P: 3.5 W / S: 8 W
Reverse polarity protection	yes	not relevant

Controller unit

LEDs	Red: Motor has been tripped due to a thermal overload condition or another fault Yellow: Motor is running Green: Ready for operation
------	--

Digital inputs

Number of digital inputs	6 (DI0 ... DI5) Type 1 accord. to EN 61131-2
Supply for digital inputs	24 V DC
Isolation	No
Input signal bounce suppression	Typ. 2 ms
Signal 0 range including ripple	-31.2 ... +5 V
Signal 1 range including ripple	+15 ... +31.2 V
Input current per channel (24 V DC)	Typ. 6.0 mA
Input resistor to 0 V	3.9 k Ω
Cable length	Unshielded max. 600 m Shielded max. 1000 m

Relay outputs

Number of relay outputs	3 x monostable with one common root
Voltage range of contacts	12-250 V AC/DC
Lowest switched power for correct signals	1 W or 1 VA
Switching capacity per relay contact according to EN 60947-5-1 (electromagnetic load)	AC-15 240 V AC max. 1.5 A AC-15 120 V AC max. 3 A DC-13 250 V DC max. 0.11 A DC-13 25 V DC max. 0.22 A DC-13 24 V DC max. 1 A
Short circuit protection	6 A gG
Rated impulse withstand voltage U_{imp}	4 kV
Switching of inductive power	Inductive loads need additional measures for spark suppression Diodes for DC voltage and varistors / RC elements for AC voltage are suitable Some DC coil contactors contain rectifiers which suppress sparks perfectly
Relay contact service life	Mechanical 500 000 switching cycles Electrical (250 V AC): 0.5 A; 100 000 cycles 1.5 A 50 000 switching
Internal clearance and creepage distances relay contacts to 24 V circuits	> 5.5 mm (safety insulation up to 250 V AC) (EN 60947-1, Pollution degree 2)
Pollution degree terminals	3
Supply power down/up, behaviour: Valid for all motor control functions, except transparent and overload relay	Whenever the supply voltage of the UMC is switched off and on, the starting of the motor needs a new RUN signal

*Please refer to the product manual for more detailed information.

Universal Motor Controller UMC100.3

Technical data

Transistor output

Type	UMC100.3 DC	UMC100.3 UC
Max. output current	200 mA	50 mA
Short circuit protected	Yes	Yes
Output voltage if high	UMC100.3 supply voltage, nominal 24 V DC	nominal 24 V DC
Isolation	No	Yes, to AC mains

Thermistor motor protection (PTC - binary) type A

Broken wire resistance	> 4.8 k Ω
Voltage at broken wires between terminals T1/T2	12 V DC (typ.)
Response resistance	3.4-3.8 k Ω
Reset resistance	1.5-1.65 k Ω
Short circuit resistance	< 21 Ω
Current at short circuit conditions	1.5 mA (typ.)
Response time	800 ms
Max. cold resistance of PTC sensor chain	< 1.5 k Ω
Line length	2.5 mm ² : 2 x 250 m 1.5 mm ² : 2 x 150 m 0.5 mm ² : 2 x 50 m
Isolation	No

Environmental and mechanical data

Type	UMC100.3 DC	UMC100.3 UC
Mounting	On DIN-rail (EN 50022-35) or with four screws M4	
Mounting position	Any	
Dimensions (W x H x D)	70 x 105 x 106 mm	
Net weight	0.3 kg	0.35 kg
Tightening torque	\varnothing 3.5 mm / 0.138 in ; 0.5 Nm, 4.5 in.lb	
Wire size with wire end ferrule	1 x 0.2-2.5mm ² (1 x 28 ... 12 AWG)	
Wire size with rigid	1 x 0.2-2.5mm ² (1 x 28 ... 12 AWG)	
Tightening torque for screw mounting	0.8 Nm	
Degree of protection	IP20	
Temperature range storage	-25 ... +70 °C	
Temperature range operation	0 ... +60 °C with two output relays activated	0 ... +60°C with two relay outputs activated and 24 V DC supply output loaded with 200 mA 0 ... +50°C with two relay outputs activated and 24 V DC supply output loaded with 400 mA

Performance data

Reaction time UMC100 DI to UMC100 Relay Output (incl. hardware delays)	typ. 10 ms (Transparent Control Function)
Reaction time UMC100 DI to DX111 Relay Output (incl. hardware delays)	typ. 10 ms (Transparent Control Function)
Reaction time from DX111 DI to UMC100 Relay Output (incl. hardware delays)	typ. 14 ms (Transparent Control Function)
Number of supported function blocks	See 2CDC135014D02xx

Digital expansion modules DX111-FBP.0, DX122-FBP.0

Technical data

Digital inputs

Type	DX111-FBP.0	DX122-FBP.0
Number of inputs	Eight inputs in two groups of common reference potential (One group with five inputs, one group with three inputs) Insulation: Type 1 acc. to EN 61131-1	Eight inputs in two groups of common reference potential (One group with five inputs, one group with three inputs) Insulation: Type 2 acc. to EN 61131-1
Input voltage	24 V DC	110 V AC ... 240 V AC
Input delay	6 ms typ.	20 ms typ.
Signal levels	0 state - 31.2 ... + 5 V 1 state + 15 ... + 31.2 V	0 ... 40 V AC 74 ... 265 V AC
ON current per channel	6.0 mA typ. (24 V DC)	10.0 mA typ. (230 V AC)
Input resistance against 0 V	3.9 k Ω	
Frequency range		45 ... 65 Hz

Digital output

Number of digital outputs	4 relay outputs with 2 common supplies (1DO0 & 1DO1 by 1DOC; 2DO2 & 2DO3 by 2DOC)
Voltage switching capacity	12 ... 250 V AC/DC
Load current via common	$I_{max} = 6 \text{ A gL} / \text{gG}$ per common supply (1DOC, 2DOC)
Minimum load for proper switching	1 W or 1 VA
Contact wiring for inductive load	Free-wheeling diode for direct current, varistors/VDRs for alternating current
Current switching capacity per relay	EN 60947-5-1
	240 V AC (AC-15) max. 1.5 A
	120 V AC (AC-15) max. 3 A
	250 V DC (DC-13) max. 0.11 A
	125 V DC (DC-13) max. 0.22 A
	24 V DC (DC-13) max. 1 A
Relay contact lifetime	> 500.000 switching cycles – mechanical, > 100.000 switching cycles – at 250 V AC, 0.5 A > 50.000 switching cycles – at 250 V AC, 1.5 A

Analog output

Number of analog outputs	1
Connection type	2-wire, for motor current indication on an external analog instrument
Output ranges	Configurable: 0/4 ... 20 mA or 0 ... 10 V
Cable specification	< 30 m outside the control cabinet; >30 m if shielded
Max. output voltage	10 V
Accuracy	< 5%
Output load	500 Ω max. if configured for 0/4 ... 20 mA output; 1 k Ω min. if configured for 0 ... 10 V output
Resolution	8 bits
Short-circuit detection	Yes, if configured for 0 ... 10 V output
Wire break detection	Yes, if configured for 4 ... 20 mA output
Insulation	none

Interfaces

Interface for I/O expansion	1 for connection to UMC100 and/or other expansion modules
Integrated diagnostic functions	Green LED: Device ready for operation, Yellow LED: Wire break or short circuit indication Red LED: Error (loss of communication, failure, ...)

Digital expansion modules DX111-FBP.0, DX122-FBP.0

Technical data

General data

Type	DX111-FBP.0	DX122-FBP.0
Supply voltage	24 V DC (+ 30%, – 20%) (19.2 ... 31.2 V DC incl. residual ripple)	
Conductor cross section	max. 2 x 0.75 - 2.5 mm ²	
Mounting	Snap-on mounting on DIN rail, any mounting position	
Dimensions	45 x 77 x 100 mm (without communication plug)	
Weight	0.220 kg	
Degree of protection	IP20	
Temperature range	Storage: -25 ... +70 °C	Storage: -25 ... +70 °C
	Operation: 0 ... +60 °C	Operation: 0 ... +55 °C
Approvals	ATEX, CCC, CE, cUL, EAC (other approvals on request) Shipping ABS, DNV, GL	

Voltage expansion modules VI150-FBP.0, VI155-FBP.0

Technical data

Type	VI150-FBP.0	VI155-FBP.0
Application	only in grounded networks	in grounded and ungrounded networks

Electrical data

Type	VI150-FBP.0	VI155-FBP.0
Supply voltage	24 V DC (+ 30 %, - 20 %) (19.2 ... 31.2 V DC including ripple)	
Current consumption relay energized	max. 40 mA	max. 55 mA
Voltage input	L1, L2, L3	L1, L2, L3
Overvoltage category	III in grounded networks	
		II in ungrounded networks
Nominal voltage input range (phase to phase)	90 - 690 V AC	
U_{imp}	8 kV	
Accuracy voltage	+/- 2% in nominal input range	
Accuracy power factor	+/- 3.5 % in range 0.4 ... 0.95, I > 0.75 A	
Accuracy real power kW	+/- 5 % typ.	
Accuracy energy kWh	+/- 5 % typ.	
Total Harmonic Distortion THD	in %	
Rated operational voltage U_e	690 V AC	
Voltage supply cables	connection cables for voltage measurement may require additional cable protection	

Digital output

Number	1 relay output	
Voltage switching capacity	12 ... 250 V AC/DC	
Current switching capacity	EN 60947-5-1	
	240 V AC (AC-15)	max. 1.5 A
	120 V AC (AC-15)	max. 3 A
	250 V DC (DC-13)	max. 0.11 A
	125 V DC (DC-13)	max. 0.22 A
	24 V DC (DC-13)	max. 1 A
Minimum load for proper switching	1 W or 1 VA	
Contact wiring for inductive load	Free-wheeling diode for DC, Varistors/VDRs for AC	
Relay contact lifetime	> 500.000 switching cycles – mechanical > 100.000 switching cycles – at 250 V AC, 0.5 A > 50.000 switching cycles – at 250 V AC, 1.5 A	

Interfaces

Interface for I/O expansion	1 for connection to UMC100.3 and/or other expansion modules	
Integrated diagnostic functions	Green LED: Device ready Yellow LED: Diagnostics Red LED: Fault	

General data

Type	VI150-FBP.0	VI155-FBP.0
Conductor cross section	2 x 0.75 - 2.5 mm ² max.	
Mounting	Snap-on mounting on DIN-rail, any mounting position Min. 10 mm distance left and right to the L1 and L3 terminals required for voltages > 230 / 400 V	
Dimensions (W x H x D)	22.5 x 77 x 100 mm (excl. communication connector)	
Weight	0.110 kg	
Degree of protection	IP20	
Temperature range	Storage: - 25 ... + 70 °C, operation:: 0 ... + 60 °C	
Operation altitude above sea level	Max. 2000 m	Max. 4000 m without derating
Approvals	ATEX, CCC, CE, cUL,EAC (other approvals on request) Shipping: ABS, DNV, GL	

Analog/temperature expansion module AI111.0

Technical data

General

Type	AI111.0
Mounting	On DIN rail (EN 50022-35)
Mounting position	Any
Dimensions (W x H x D)	See dimensions of expansion modules
LEDs: Red/yellow/green	Red: Hardware error of module Yellow: Diagnosis available Green: Ready for operation
Supply voltage	24 V DC (+30 % ... -20 %) (19.2 ... 31.2 V DC) including ripple
Supply current	Max. 40 mA (at 19.2 ... 31.2 V DC)
Tightening torque for the communication terminals	See section DX1xx
Tightening torque for the input, output and supply terminals	See section DX1xx
Net weight	0.118 kg (0.260 lb)
Degree of protection	IP20
Temperature range	Storage -25 ... +70 °C Operation 0 ... +60 °C
Marks, Approvals	CE, cUL Further in preparation. Ask your local sales representative for other marks/approvals.
Functional isolation between analog inputs and 24 V DC supply / communication interface	Yes
Individual configuration of each analog input	Yes
U _{imp} sensor analog inputs	0.5 kV
Pollution degree terminals	3
Operation altitude above sea level	Up to 5000 m

Temperature inputs

Type	AI111.0
Type of connection	2 or 3 wire
Number of input channels	3 (one AI111.0) / 6 (two AI111.0)
Type of temperature inputs (adjustable per channel)	PT100 -50 °C...+400 °C PT100 -50 °C...+70 °C PT1000 -50 °C...+400 °C KTY83-110 -50 °C...+175 °C KTY84-130 -40 °C...+300 °C NTC +80...+160 °C [B75227-K333-A1]
Accuracy at 20 °C (T20)	≤ ± 2 K
Temperature coefficient	0.1 K per K deviation from T20
Out of range detection	Yes
Max. cable length	Max. cable resistance: 50R (single wire) [e.g. with copper wire 1.5 mm ² : 1900 m cable length]
Cable shielding	Recommended for up to 30 m and outside the switchgear cabinet; shielding mandatory for cables over 30 m
Update rate	Typ. 600 ms
Sensor current (typ.)	PT100 1 mA PT1000/KTY83/KTY84/NTC 0.2 mA

Analog/temperature expansion module AI111.0

Technical data

Analog inputs

Type	AI111.0
Number of inputs	3 (one AI111.0) / 6 (two AI111.0)
Type of analog inputs (adjustable)	0/4 mA - 20 mA / 0-10 V
Resolution	15 Bit

Measuring ranges

Type	AI111.0
0...20 mA and 0...10 V	0 27648 dec (6C00 hex)
4...20 mA	0 27648 dec (6C00 hex)
Max. input current for 0/4-20 mA	60 mA (destruction limit)
Accuracy at 20 °C (T20)	±1 % from full scale value
Temperature coefficient	0.05 / K deviation from T20
Input resistance	≤ 300 Ohm at 0/4 -20 mA ≥ 10 k Ohm at 0-10 V
Wire break detection	In operation mode: 4 mA - 20 mA
Cable shielding	Recommended for up to 30 m and outside the switchgear cabinet; shielding mandatory for cables over 30 m

Fieldbus communication interfaces PDP32.0, MRP31.0, DNP31.0, PDR31.0

Technical data

General data

Type	PDP32.0	MRP31.0	DNP31.0	PDR31.0
Supply voltage	24 V DC -20 ... +30% (19.2 ... 31.2 V DC) incl. ripple	24 V DC -20% / - 20% (19.2 ... 31.2 V DC) incl. ripple	24 V DC (11 ... 24,7 V DC) according to DeviceNet specification	24 V DC -20 ... +30% (19.2 ... 31.2 V DC) incl. ripple
Current consumption	55 mA (excl. load on 5 V supply for termination resistors)	Typ. 30 mA	Typ. 18.5 mA (from DeviceNet)	28 mA
Communication protocol	Profibus DP-V0/DP-V1	Modbus RTU	DeviceNet	Active Profibus DP termination
Certificate	Yes, PNO	-	Yes, ODVA	-
Fieldbus connection	9-pole Sub-D connector or terminal blocks	Removable 5-pole terminal blocks	Removable 5-pole terminal blocks	9-pole Sub-D connector or terminal blocks
Integrated termination resistors	No	No	No	Yes
Possible bus addresses (set via UMC100.3)	1 ... 125	1 ... 125	0 ... 63	-
Max. baud rate	12 MBit/s	57.6 kbaud	500 kbaud	-
Isolated +5 V supply available for bus termination circuitry (X3 pins 5 and 6)	30 mA max. -	-	-	-

Standards / directives

Type	PDP32.0	MRP31.0	DNP31.0	PDR31.0
EMC Directive	2014/30/EC	2014/30/EC	2014/30/EC	2014/30/EC
RoHS Directive	2011/65/EU	2011/65/EU	2011/65/EU	2011/65/EU

Environmental and mechanical data

Type	PDP32.0	MRP31.0	DNP31.0	PDR31.0
Mounting	On UMC100.3 or SMK3.0 adapter	On UMC100.3 or SMK3.0 adapter	On UMC100.3 or SMK3.0 adapter	On SMK3.0 adapter
Mounting position	Any	Any	Any	Any
Ambient air temperature	Operation	0 ... +60 °C	0 ... +60 °C	0 ... +60 °C
	Storage	-25 ... +70 °C	-25 ... +70 °C	-25 ... +70 °C
Vibration (sinusoidal) acc. to IEC/EN 60068-2-6 (Fc)	0.7 g / 10 150 Hz	0.7 g / 10 150 Hz	0.7 g / 10 150 Hz	0.7 g / 10 150 Hz
Shock (half-sine) acc. to IEC/EN 60068-2-27 (Ea)	15 g / 11 ms	15 g / 11 ms	15 g / 11 ms	15 g / 11 ms
Degree of protection	IP20	IP20	IP20	IP20
Pollution degree	3	3	3	3
Operation altitude above sea level	4000 m	4000 m	4000 m	4000 m
Duty cycle	100 %	100 %	100 %	100 %
Weight	0.051 kg	0.039 kg	0.042 kg	0.047 kg

Ethernet communication interfaces MTQ22-FBP.0, PNQ22-FBP.0, EIU32.0

Technical data

General data

Type	MTQ22-FBP.0	PNQ22-FBP.0	EIU32.0
Supply voltage	24 V DC -20 ... +30% (19.2 ... 31.2 V DC) incl. ripple	24 V DC -20 ... +30% (19.2 ... 31.2 V DC) incl. ripple	24 V DC -20 ... +30% (19.2 ... 31.2 V DC) incl. ripple
Current consumption	Max. 180 mA	Max. 180 mA	Typ 90 mA, max. 130 mA
Total power dissipation	Max. 3.5 W	Max. 3.5 W	Typ. 2.2 W, max. 2.5 W
Short circuit protection at port 1 ... 4	PTC resistor	Yes, PTC resistor	-
Connection between Ethernet interface and UMC100.3	Max. 3 m	Max. 3 m	Max. 3 m
Communication protocol	Modbus TCP	Profinet IO	EtherNet/IP™
Certificate	-	Yes, PNO	Yes, ODVA
Integrated Ethernet switch	Yes	Yes	-
Supported bit rates	10 / 100 Mbit/s	100 Mbit/s	10 / 100 Mbit/s
Network redundancy protocol	MRP client acc. to EN/IEC 62439-2	MRP client acc. to EN/IEC 62439-2	DLR (Device Level Ring)
USB port	For configuration via PC and software tool	Reserved	Reserved

Standards / directives

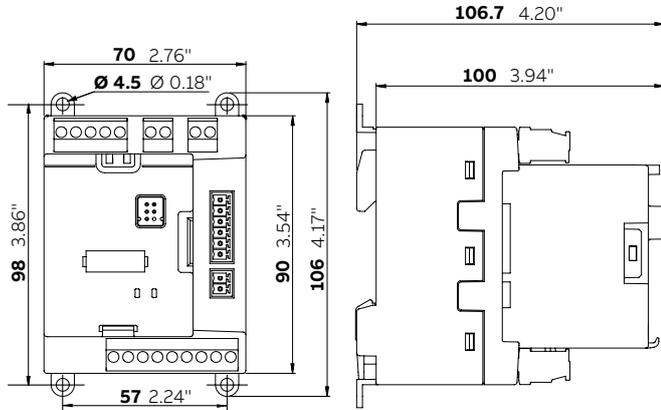
Type	MTQ22-FBP.0	PNQ22-FBP.0	EIU32.0
EMC Directive	2014/30/EC	2014/30/EC	2014/30/EU
RoHS Directive	2011/65/EU	2011/65/EU	2011/65/EU

Environmental and mechanical data

Type	MTQ22-FBP.0	PNQ22-FBP.0	EIU32.0
Mounting	DIN-rail	DIN-rail	Directly on the UMC100.3 or remotely on SMK3.0 adapter
Mounting position	Any	Any	Any
Ambient air temperature	Operation 0 ... +60 °C Storage -25 ... +70 °C	Operation 0 ... +60 °C Storage -25 ... +70 °C	Operation 0 ... +60 °C Storage -25 ... +70 °C
Dimensions (W x H x D)	45 mm x 90 mm x 96 mm	45 mm x 90 mm x 96 mm	42.5 mm x 64 mm x 96 mm
Vibration (sinusoidal) acc. to IEC/EN 60068-2-6 (Fc)	0.7 g / 10 ... 150 Hz	0.7 g / 10 ... 150 Hz	0.7 g / 10 ... 150 Hz (mounted on UMC100.3/SMK3.0)
Shock (half-sine) acc. to IEC/EN 60068-2-27 (Ea)	15 g / 11 ms	15 g / 11 ms	15 g / 11 ms
Degree of protection	IP20	IP20	IP20
Pollution degree	3	3	3
Operation altitude above sea level	2000 m	2000 m	2000 m
Duty cycle	100 %	100 %	100 %
Weight	0.172 kg	0.172 kg	0.110 kg

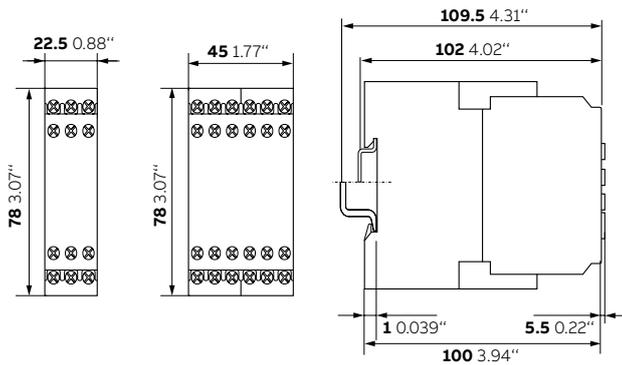
Dimensional drawings

Universal Motor Controller UMC100.3



UMC100.3

Expansion modules

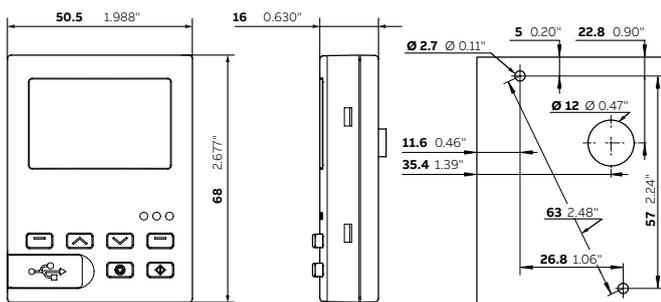


VI150-FBP.0
VI155-FBP.0
AI111.0

DX111-FBP.0,
DX122-FBP.0

DX111-FBP.0, DX122-FBP.0
VI150-FBP.0, VI155-FBP.0
AI111.0

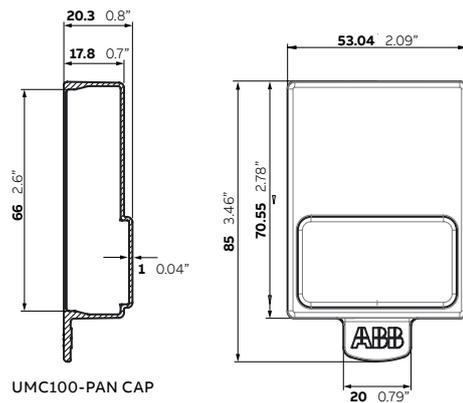
Operating panel



UMC100.3-PAN

UMC100.3-PAN
drilling instruction

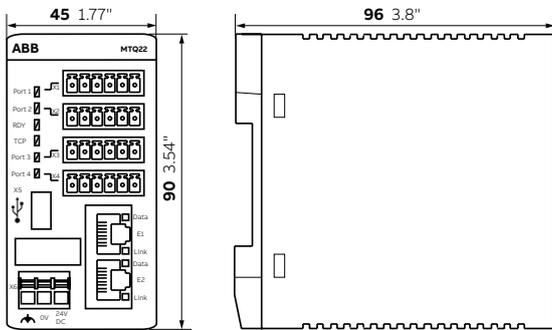
Operating panel protection cap



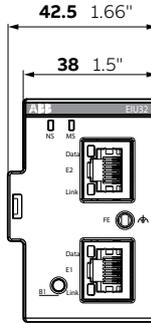
UMC100-PAN CAP

Dimensional drawings

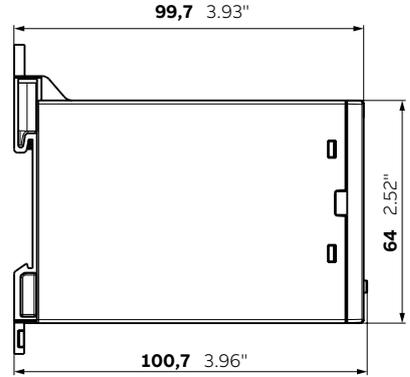
Ethernet communication interfaces



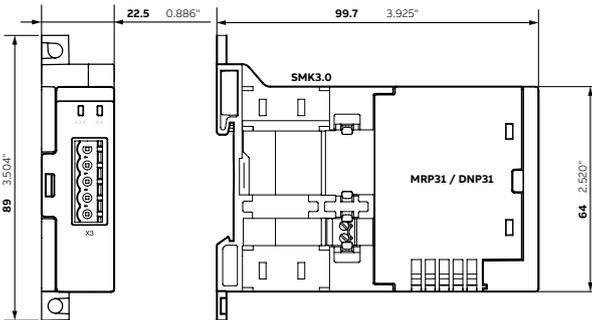
MTQ22-FBP.0
 PNQ22-FBP.0



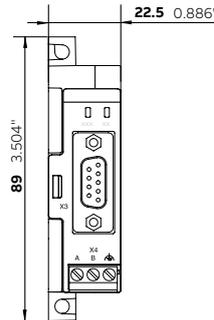
EIU32.0



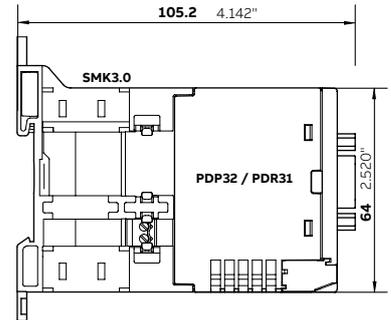
Fieldbus communication interfaces



DNP31.0, MRP31.0, SMK3.0

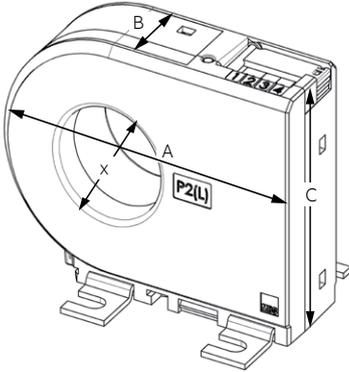


PDP32.0, PDR31.0



Dimensional drawings

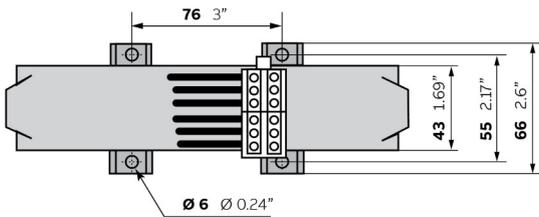
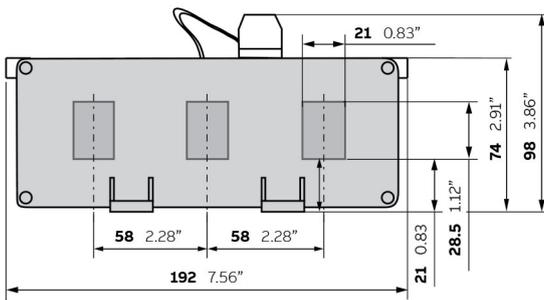
Earth fault monitor



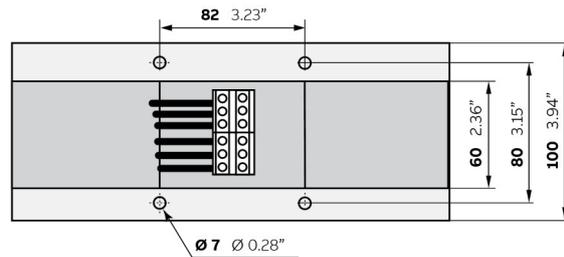
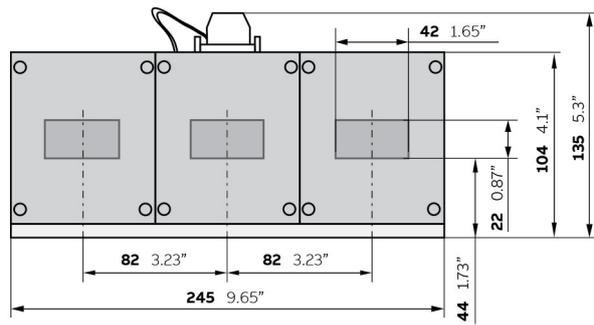
Type	Width (A)	Depth (B)	Height (C)	Ø
CEM11-FBP.20	76.4 (3.01)	30 (1.18)	56 (2.20)	20 (0.79)
CEM11-FBP.35	99.5 (1.38)	30 (1.18)	79 (3.11)	35 (1.38)
CEM11-FBP.60	135 (5.31)	38 (1.46)	116 (4.57)	60 (2.36)
CEM11-FBP.120	210 (8.27)	38 (1.46)	190 (7.48)	120 (4.72)

CEM11-FBP.xx

Current transformer



CT4L185R/4, CT4L310R/4



CT5L500R/4, CT5L850R/4

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Notes

A large rectangular area filled with a grid of small, light gray dotted lines, intended for handwritten notes.