Take motor control to the next level, effortlessly

Universal Motor Controller UMC100.3

- Intelligent data hub
- Safe and reliable
- Simple configuration

The Universal Motor Controller UMC100.3 delivers all the reliability and protection you expect while driving an intelligent data hub for predictive applications, maintenance and asset management. Outstanding user experience for smooth running of your operations, paired with unrivalled communication options, simple configuration and market leading software.

The UMC100.3 Motor Controller – future ready, and ready to take motor control to the next level.

Table of contents

Safe and reliable

Optimizes safe and reliable plant operations

Say hello to effortless motor control. Keep your plant running, with comprehensive protection and a modular design for simple expansion to suit your requirements.

Safe & Reliable

Protection at all times
With the UMC100.3, your motors are protected at all times, even if your control or communication system (Ethernet or Fieldbus) breaks down. Ideal for critical applications where any failure can incur substantial costs.

Detect problems early
Intelligent Motor Management Systems provide information about the motor and connected loads and its status. This information is transferred to the superior control system (DCS) and is directly available on the operator panel in the MCC. This allows you to detect upcoming problems and prevent plant standstills, as well as increase plant availability.

Easy expansion for higher functionality
Its modular design means that the UMC meets all motor management requirements, greatly simplifying planning, construction, and inventory. Easy-to-attach modules – such as digital expansion modules, analog and temperature modules, and voltage modules – give you complete flexibility and cover a wide range of applications.

Integrated and future ready

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An intelligent data hub for predictive applications

UMC100.3 takes motor control to the next level. Delivering unrivalled communication, integration, and fault detection, you're prepared for any eventuality.

Future ready

Wide range of communication protocols available
The UMC100.3 is compatible with more communication protocols than any other motor controller. Serial communication reduces wiring and installation, and provides much more data. This allows you to have software that enables predictive maintenance and acts as an intelligent data hub. And the more data you have, the quicker you can identify errors.

Integrated into distributed control systems (DCS)
The UMC100.3 fits into ABB System 800xA, acting as a gateway for ABB Ability™. Due to the support of many communication systems it fits also quite well to other control systems and programmable logic controllers (PLC).

Field Information Manager
With its Field Information Manager software, the UMC100.3 is the only universal motor controller that follows the Field Device Integration (FDI) standard. This easy-to-use, market leading software enables you to configure and integrate a field device, test settings and monitor status and diagnostics.

Unique local control
The control panel offers many features. Easy modifications of settings, monitoring all status, diagnosis and fault info, operating the motor. And this all with full text in many languages instead of cryptic codes.

Software configuration
The UMC100.3 can be configured from the control system by an integrated fieldbus or network configurator using the software provided by the control system supplier. This means that communication modules for the UMC aren't a one-way street: they provide information to the control system but are also used to parametrize the UMC.

Simple configuration

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Quality FDI software and operating panel

Configuration can be tricky. But not with the UMC100.3, which gives you simple synchronization and software configuration so that you're always in control.

Software tool FIM UMC edition
The FIM UMC Edition is the standard software that provides all the functionalities you need for effective use of the UMC100.3. Device parametrization, operating and monitoring modes allow a fast and easy configuration of UMC100.3, testing and online diagnosis. Project management is included for the handling of larger projects. And the localized software allows for multilingual use.

Easy to install

Main areas of application

Smooth running is guaranteed with the UMC100.3, whatever application you use it for

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01 Cement factories

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02 The oil and gas industry, chemical industry

—
03 Pulp and paper plants

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04 Mining

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05 Water supply and treatment

—
06 others

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01

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02

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03

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

The oil and gas industry, chemical industry
- Programmability
- Ground fault monitoring
- Undervoltage detection and configurable restart following voltage drops
- Protection of motors in hazardous environments (ATEX)
- Use in IT networks

Pulp and paper plants
- Modular design
- Flexible communication
- Versions with conformal coating available

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 2 x detection
- Own control logic e.g. for pump cleaning

Others
- Steel plants
- Ships

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04

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05

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Cloud integration with ABB Ability™
Process data monitoring and diagnostics

Providing full remote visibility of asset and electrical-system behavior, ABB Ability™ Energy Manager provides insights that help you minimize costs, risks and maximize performance as well as safety across your operations.

The UMC100.3 is enabled in ABB Ability™ Energy Manager. Thus, allowing access to process data monitoring and diagnostic messages.

The data received from UMC100.3 is organized in a user friendly widget for the remote condition monitoring of motors. ABB Ability™ Energy Manager allows tracking of, for example:

- Motor current
- Voltages
- Active and apparent power
- Energy
- Temperature

Additionally, the customer can read out maintenance counters and the motor status, for example:

- Motor (OFF, FWD run, REV run,..)
- Operational hours
- Standstill hours
- Number of available starts

On top of this, also diagnostic messages are available, which provide information in case of a fault/warning.

The UMC100.3 can share the data with the platform using two options:

- Option A: External solution with ABB Ability™ Edge Industrial Gateway
- Option B: Emax 2, Ekip Up, Tmax XT and TruONE equipped with the Ekip Com Hub

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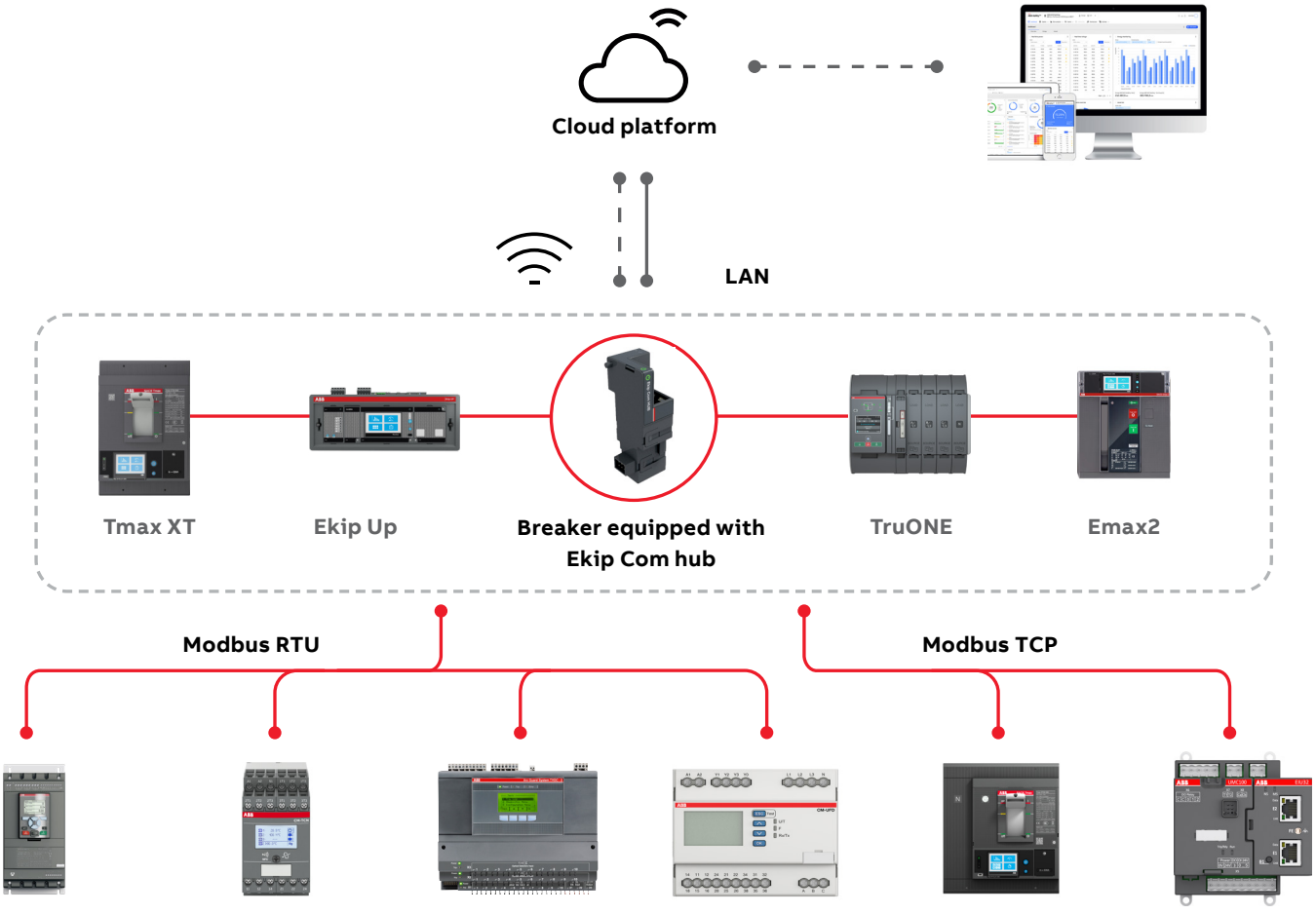
ABB Ability™ Energy Manager and ABB Ability™ Asset Manager

Example communication architecture

UMC100.3 ABB Ability™ Energy Manager enabled motor controller

ABB Ability™ Energy Manager is a state-of-the-art cloud solution that integrates energy management in a single intuitive dashboard.

Option B: Architecture with ABB Ability™ Ekip Com hub



Softstarter
PSTX

Smart temperature monitoring relay
CM-TCN.012

Arc Flash active protection
TVOC-2

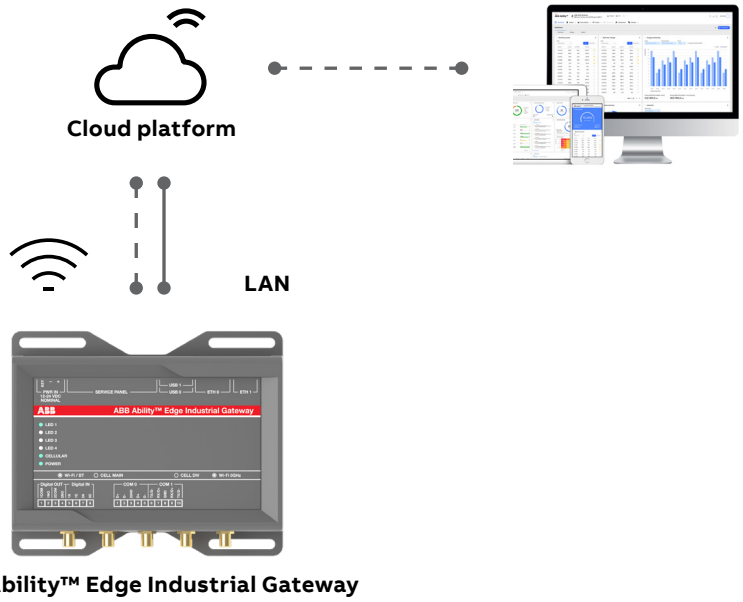
Grid feeding monitoring relay
CM-UFD

Molded case circuit breaker
Tmax XT

Universal motor controller
UMC100.3

Integrate a range of devices like circuit breakers, monitoring relay CM-TCN.012 and UMC100.3 motor controller into the ABB Ability™ Energy Manager. It is a state-of-the-art cloud solution that integrates energy and asset management in a single intuitive dashboard. Providing full remote visibility of asset and electrical-system behavior, ABB Ability™ Energy Manager provides insights that help you minimize cost and risk and maximize performance and safety across your operations.

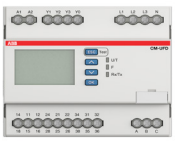
Option A: Architecture with ABB Ability™ Edge Industrial Gateway



Softstarter
PSTX

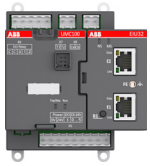
Smart temperature monitoring relay
CM-TCN.012

Arc Flash active protection
TVOC-2



Grid feeding monitoring relay
CM-UFD

Molded case circuit breaker
Tmax XT



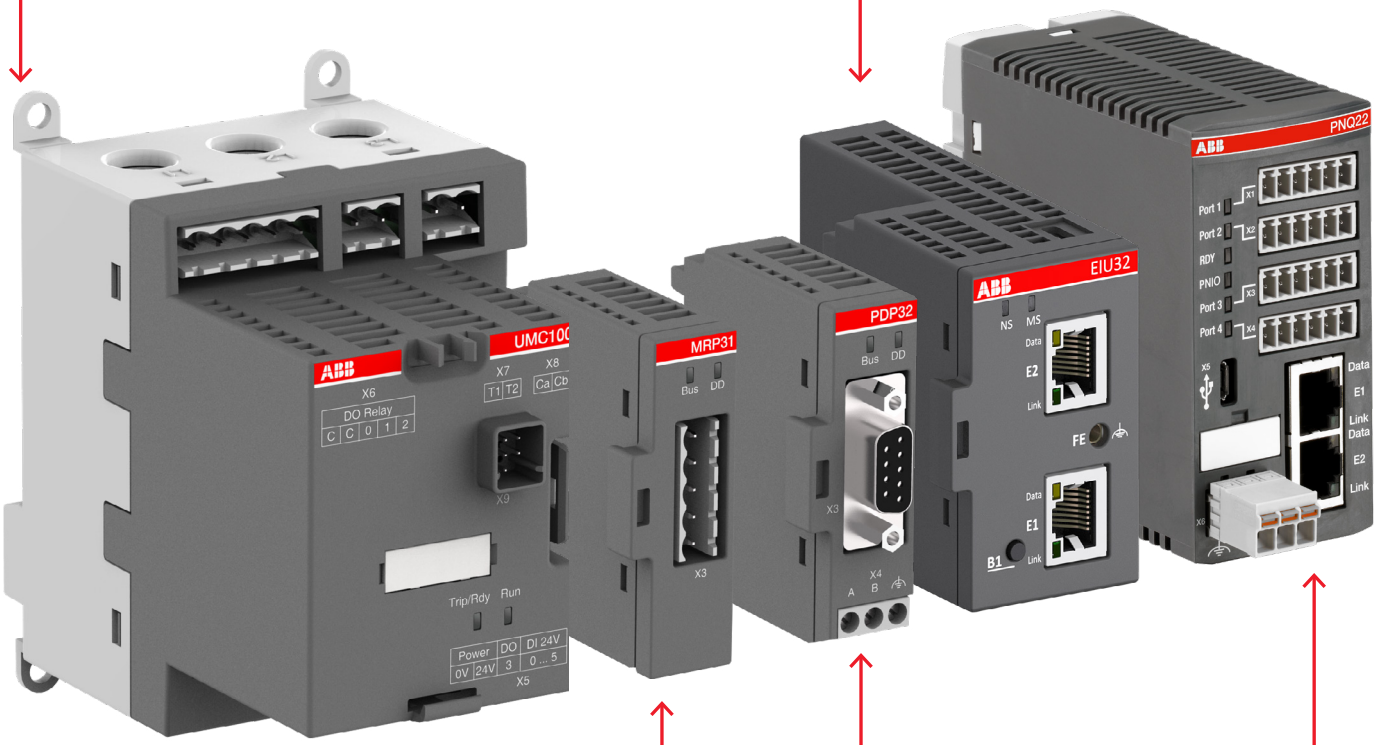
Universal motor controller
UMC100.3

Communication modules

Mount communication modules directly on the UMC simply by clipping them on or mounting them separately in the MCC's cable compartment

UNIVERSAL MOTOR CONTROLLER UMC100.3
Basic device, expandable with different modules
- For motors up to 1000 V AC
- Tripping classes: 5E, 10E, 20E, 30E, 40E
- Built-in wide-range measuring system
- Supply voltages: 24 V DC, 110-240 V AC/DC
- Inputs: six digital inputs 24 V DC, one PTC input
- Outputs: three relay outputs, one digital transistor output

COMMUNICATION MODULE
EIU32.0 - EtherNetIP™
PNU32.0 - Profinet IO (S2)



COMMUNICATION MODULE
MRP31.0 - Modbus® RTU

Modbus®

COMMUNICATION MODULE
PDP32.0 - PROFIBUS® DP

PROFIBUS PROCESS FIELD BUS

COMMUNICATION MODULE
MTQ22-FBP.0 - Modbus® TCP
PNQ22-FBP.0 - PROFINET® IO

Modbus®

PROFINET INDUSTRIAL ETHERNET

Expansion modules

Flexibility is assured with a wide variety of expansion modules

ANALOG / TEMPERATURE MODULE AI111.0
Expand the UMC with analog and temperature inputs

DIGITAL MODULES DX1XX.0
Compact modules that increase the number of digital inputs and outputs

- Inputs: DX111.0 eight digital inputs 24 V DC, DX122.0 eight digital inputs 110/230 V AC
- Outputs: four digital relay outputs, one configurable analog output

VOLTAGE MODULES VI150.0/VI155.0
Voltage modules for determining phase voltages, power factor (cos φ), active active power, apparent power, energy, harmonic content (THD)

Accessories

Get even more from the UMC with the operating panel, current transformers, and earth leakage sensors

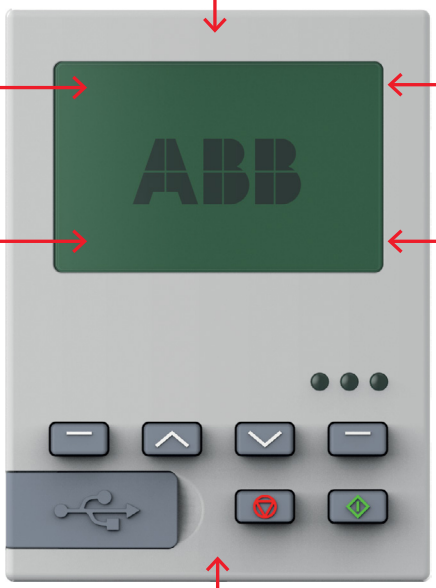
Installation:
- simple clip-on function directly on the UMC
- or on the panel door or the drawer, via screws

User-defined diagnosis messages

Status of the application is displayed on the LCD display

Intuitive and self-explanatory menu navigation and operation

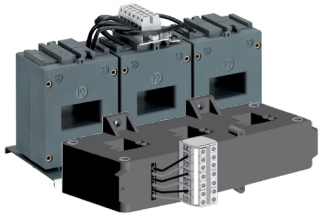
Localized software for multilingual use (German, English, French, Italian, Polish, Portuguese, Spanish, Russian)



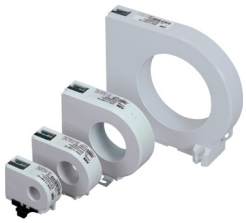
Indication of operational states is shown by 3 LEDs

USB port to parametrize UMCs via a PC via a simple USB cable. No additional interface or special cable required.

Synchronization of parameters between UMC and display. If parameters are changed via the bus, the parameters are still included in the display.



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



EARTH LEAKAGE SENSORS CEM11
Summation current transformer for connecting to a digital input, mounting with a bracket on a DIN rail or wall
- Four versions available with diameters from 20 mm to 120 mm
- Simple residual current adjustment with rotary switch, including test position
- Flexible mounting

FIM UMC Edition

Configuration tool for UMC100.3

Based on the latest device integration standard, Field Device Integration (FDI), this innovative software combines the benefits of two major technologies – EDD and DTM. Whether it's used on Windows tablets, laptops or PCs, it is user-friendly and easy to maintain.

Easy to install, use and maintain on Windows tablets, laptops or PCs.

Scans, identifies and enables access to device within just three minutes.

Connect to UMC100.3 via a simple serial link (control panel with USB port) or Profibus DP.

Parametrize

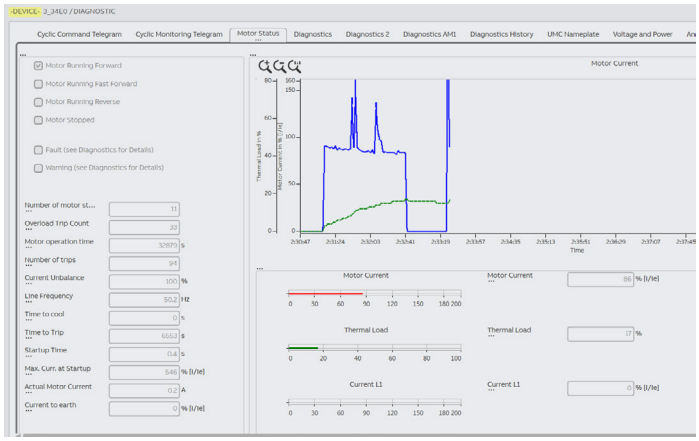
All required functions for a fast device setup are included and easy-to-use. Enter parametrization mode for configuring the UMC100.3, including the Custom Application Editor for creating individual motor control functions to suit your application.

Monitor

Monitor all relevant data like motor status, current, voltage and many more. Comprehensive diagnosis for faults and warnings are included out of the box and make the FIM UMC edition an intelligent data hub for predictive applications.

Operate

Operate mode ensures easy testing of a setup. It includes start, stop and fault reset commands and shows the most important data. On and offline modes, bulk functions as well as project management are included.



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Graphical user interface

Not convinced yet?
Test the trial version.

Functions in detail
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 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 sensor
- Limitation of motor starts per time
- Motor protection independent from bus communication

In combination with voltage module VI150/ VI155.0
- Undervoltage/overvoltage protection
- Power supervision
- Power factor supervision (cos φ)
- 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 operatings 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/ VI155.0
- Phase voltages
- Active power
- Apparent power
- Power factor
- Energy

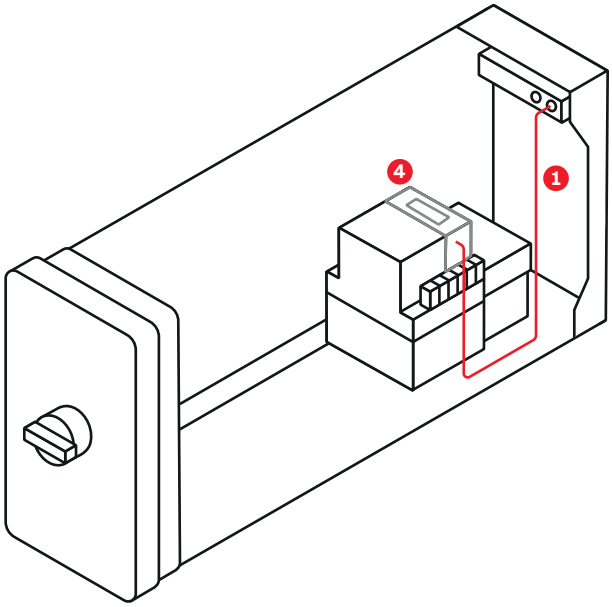
Direct and separate mounting

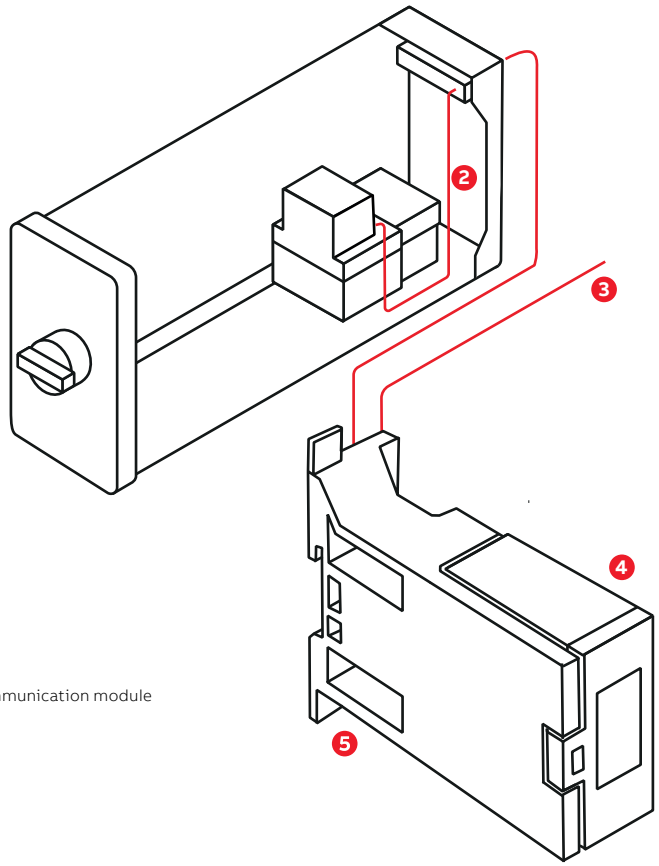
Direct or separate mounting, a single version of the motor controller is suitable for any kind of communication.

Communication modules
Fieldbus interfaces are available for Profibus DP, DeviceNet and Modbus RTU. Ethernet interfaces are available for EtherNetIP™, Modbus TCP and Profinet IO. They meet all relevant standards, are tested and approved by relevant certification bodies to ensure a proper function with the control system.
The modules can be mounted in two ways:

- directly on the UMC
- separately in the cable chamber of an MCC

ABB's communication modules can be mounted either directly onto the UMC or separately. Choose the option that best suits your needs.





1 Fieldbus cable
2 Connection between UMC and communication module
3 Communication module supply
4 Communication module
5 Single mounting kit

—
01 Direct mounting

—
02 Separate mounting

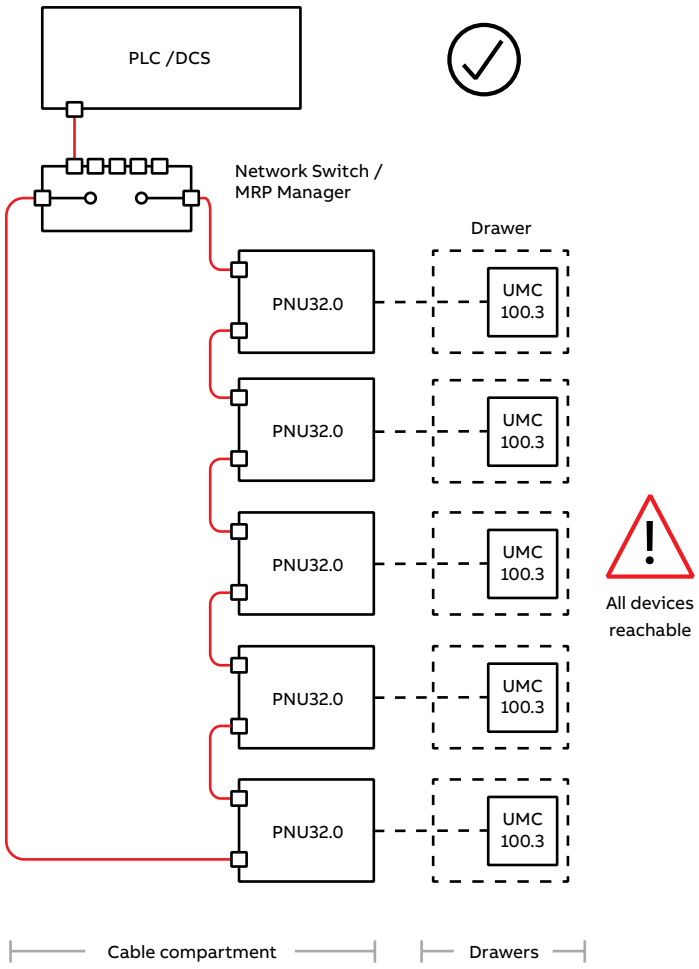
Direct mounting
The most simple way to mount a communication module directly on the UMC. In this case the interface is powered by the UMC and the combination behaves like a motor controller with integrated communication. This solution is especially convenient for projects using fixed installations.

Separate mounting
The communication modules can also be mounted separately from the UMC in the cable chamber of a MCC with the help of a single mounting kit. The connection to the UMC is via a simple serial link cable. This solution has several advantages in commonly used withdrawable installations:

- avoiding droplines on the fieldbus which typically reduce the performance and baud rate
- fast replacement of a drawer due to automatic slave addressing

The Ethernet advantage

ABB´s uniquely designed system concept ensures unparalleled communication reliability and continuity. Facilitate superior data availability and continuous operations by overcoming the limitations of Fieldbus systems with Ethernet communication modules.



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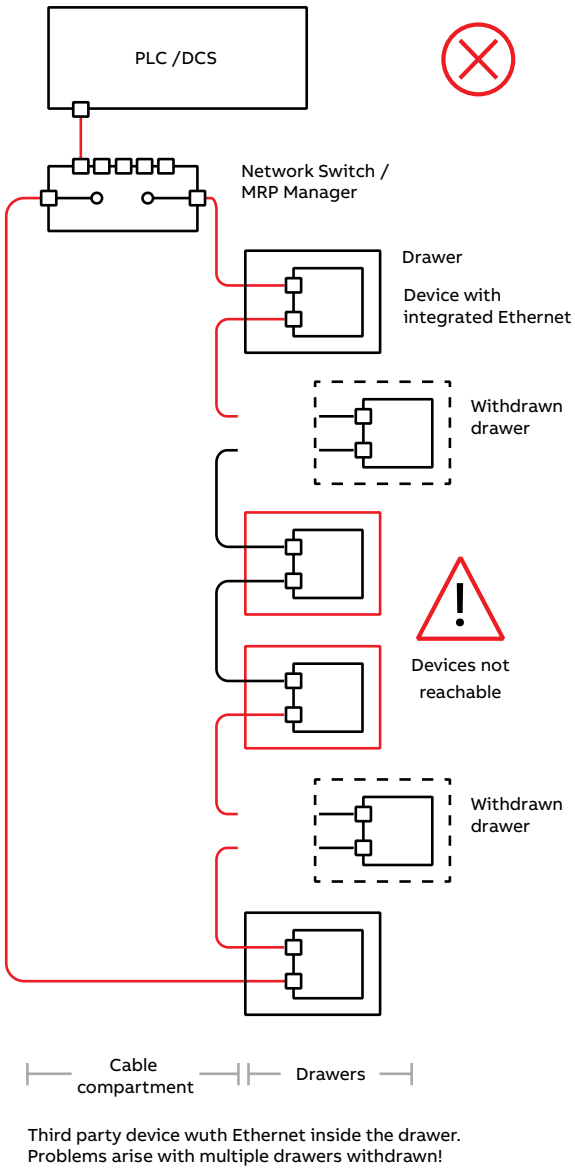
01 ABB solution



Third party device wuth Ethernet inside the drawer.
Problems arise with multiple drawers withdrawn!

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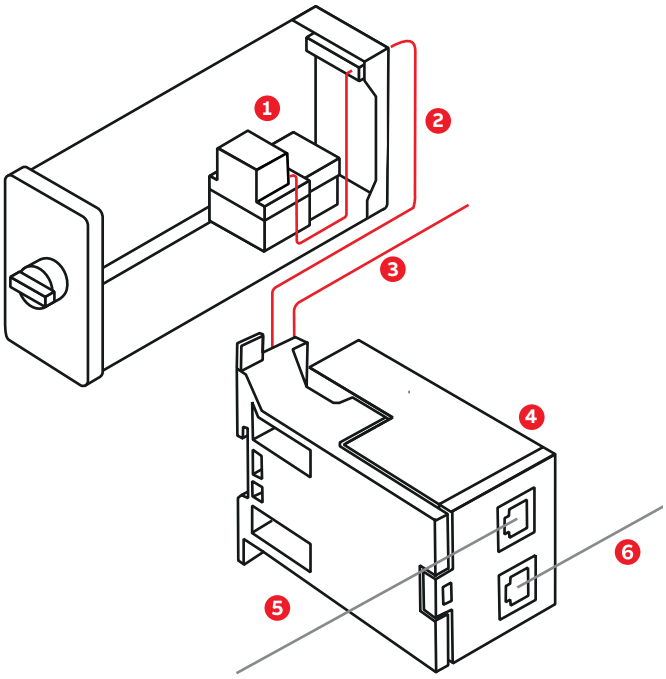
02 Conventional motor controller with integrated communication

Fieldbus systems are applied worldwide in large plants and have proven their benefits in countless projects, but growing customer requirements are pushing fieldbus systems to their limits. Ethernet systems are guiding the way to the future and are more and more used as the standard technology making their way from a control system straight into to the motor control center. There are three Ethernet communication interfaces that provide the connection to Ethernet using the protocols EtherNetIP™, Modbus TCP and Profinet IO.

Up to four UMCs can be connected to one Ethernet interface MTQ22-FBP.0 or PNQ22-FBP.0 by using simple serial connection cables. An integrated switch supports usage in different network topologies like Star, Bus and Ring. Redundancy can be supplied due to standardized redundancy protocols. Only ABB allows mounting of communication modules outside the drawer to avoid critical high-speed communication inside the drawer.
The great benefit of this solution is that no costly and error-prone connectors for the drawers are required.

1. UMC inside the drawer
2. Standard cable connection between UMC and communication module
3. Communication module supply
4. EIU32.0 Ethernet module in the cable compartment
5. Single mounting kit
6. Ethernet cable connecting the communication modules to the Ethernet switch



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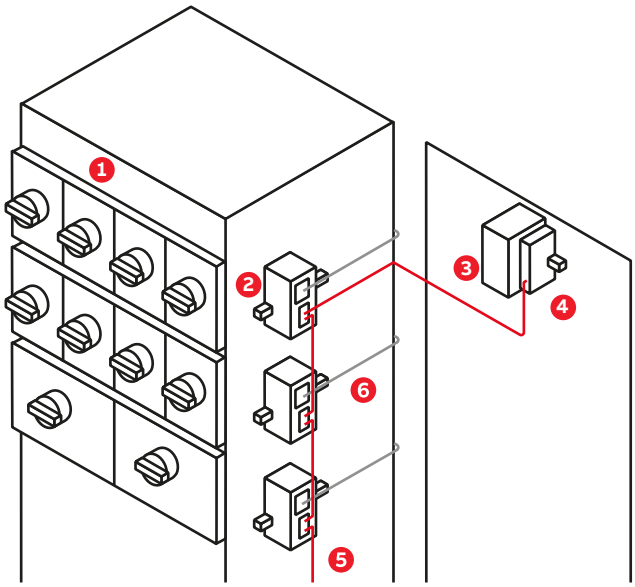
01 Separate mounting of the EIU32.0 or PNU32.0 Ethernet module

1. UMC inside the drawer
2. MTQ22/PNQ22-FBP.0 Ethernet modules in the cable compartment
3. Power supply for the communication modules
4. Ethernet switch
5. Ethernet cable connecting the communication modules to the Ethernet switch
6. Standard cable connection between UMC and communication module



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02 Separate mounting of the MTQ22/PNQ22-FBP.0 Ethernet modules in the cable compartment

Benefits
- Integrated two-port Ethernet switch
- Ring topology provides cable redundancy on Ethernet side
- No network disconnection when drawers are taken out
- No Ethernet cables inside the drawer
- Simple wiring in withdrawable applications

EtherNet/IP™
- Mountable on the UMC100.3 or single mounting kit
- DLR redundancy protocol
- ODVA certified

Profinet IO
- Standardized system integration via GSDML
- Timestamping and sequence of events in ABB DCS AC800xA
- MRP redundancy protocol
- S2 redundancy (PNU32.0)
- PNO certified

Modbus TCP
- Supports multimaster functionality
- Master supervision with timeout control
- MRP redundancy protocol

Safety first

Protect your installation – and your employees – with the UMC's safe disconnection feature

— 01 Disconnection with process control and safety system

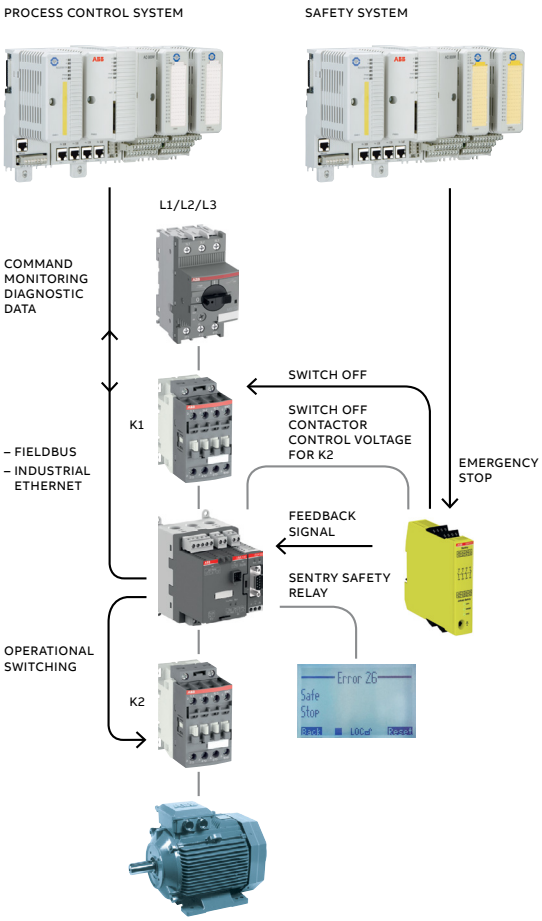
— 02 Disconnection with process control system only

The requirements for safety-oriented applications becoming more important in process automation. New regulations and specifications are making the safe disconnection of motors for the protection of people, the machine, and the environment more and more important.

The UMC, together with the flexible Sentry safety relay from ABB, meets these requirements and complies with standards EN 62061:2005 and EN ISO 13849-1:2015 for functional safety up to SIL 3 and PL e.

The emergency stop signal can come from either a separate safety system or from an emergency stop switch on site.

- Coordinated operating and safety functions
- Message texts on the control panel enable rapid diagnosis on site
- Clear diagnostic message to the process control system



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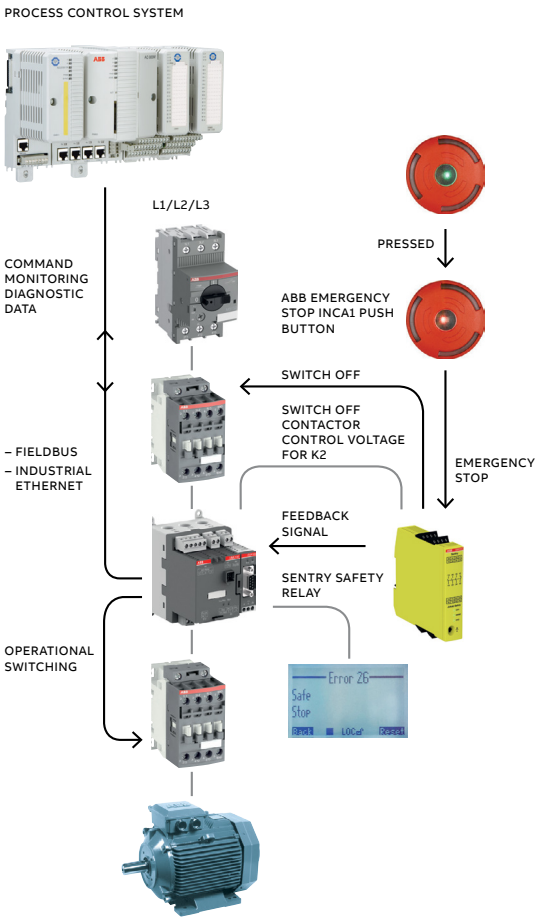

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ABB STOTZ-KONTAKT GmbH
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You can find the address of your local sales organization on the ABB homepage

abb.com/lowvoltage

Additional information
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