Advanced digitalization, simplified
ABB Novolink™ smart modules for AF contactors

- Easy design and commissioning
- Innovation through digitalization
- Optimized operations and maintenance
The all-new ABB Novolink™ devices help digitalize your motor starting solutions and gain insights into the connected loads. They're easy to design into existing wiring plans and connect to standard AF contactors.

Installation is fast and simple, thanks to reduced wiring and fewer components, so your engineering efforts are minimized.

Novolink devices enable predictive maintenance to reduce downtime, as well as increasing efficiencies and boosting cost savings. They're fully integrated into the B&R automation system. And the possibilities open up even more with full remote access to your data, creating new maintenance service and revenue opportunities.

So to simplify engineering, optimize operations, save time and cut costs, think Novolink.
Motors - the key driver of world industry

Motors make the industrial world go round. With the latest digitalization innovations, the control of your motors can achieve even higher levels of efficiency with benefits such as real-time data monitoring and predictive analytics.

90% are in full-speed applications*

300 million electrical motors are currently installed worldwide*

47% of global electricity is used by motor systems*

Zero need to replace existing AF contactors

ABB’s market-leading contactors have an advanced, electronically-controlled magnet system that covers the complete power range. Our contactors are complemented by a full list of accessories. Novolink devices are compatible with 24 V DC coil contactors – from AF09 up to AF96 in screw & from AF09 up to AF38 in Push-In Spring.

Digitalize one of the best motor starting portfolios on the market

Decide for yourself how you want to digitize your motor starting solutions - with the new Novolink modules even advanced motor protection and equipment monitoring is fast and easy.

Easy drag and drop integration in B&R automation studio.

Level 1 Auxiliary contactors to build local control logic and realize connection to a PLC via I/O signals.

Level 2 Basic maintenance counters. Integrated check-back monitoring.

Level 3 Advanced motor protection and connected equipment monitoring.

The choice is yours: select and mix as needed
From conventional to digital

With Novolinks’ enhanced capabilities, you can move from corrective to predictive maintenance, continually optimizing your process.

Digital capabilities to deliver Industry 4.0

Digitalization is no longer optional. Novolink devices offer a smart, competitive edge, improving reliability and reducing maintenance costs.

Smart devices enhance traditional control gear with digital capabilities. They enable the predictive maintenance, remote control, fault diagnostics and data analytics required for Industry 4.0. Monitoring is taken to a new level, using collected information to analyze performance data – including current levels, operating cycles and load levels.

This allows operation and maintenance managers to effectively improve reliability and reduce maintenance costs. With B&R PLCs, monitoring can even be managed from a remote location, eliminating the need for maintenance personnel to conduct regular on-site checks.

Limited to
- Hard-wired remote control
- Protection and metering functions with conventional devices

Collecting data
- Measurements such as current, voltage, power
- Diagnosis information and maintenance counters

Delivering solutions
- Enabling predictive maintenance, data analysis and new business models
- Analyze and adapt throughout machine’s lifecycle to improve long-term performance
- Cloud connectivity via B&R solutions for remote service and access

Connection
- Seamless integration into the B&R automation studio
- Built-in X2X communication

Control & supervision
- Remote control
- Condition monitoring

Data
- AF knowledge
- IoT
- B&R integrated
- Engineering
- Fully Industry 4.0

Efficiency
- Load
- Predictive maintenance
- Idle load
- Phase Sequence
- Monitoring
- Communication
- Extension of current system

Leverage
- Condition monitoring
- Measurement
- Process
- AF knowledge
Novolink devices in low voltage motor applications

Explore a world of potential, from control to distribution panels.

Novolink’s ease of commissioning and functionality creates enormous opportunities for a wide range of industrial applications. Applications include:

- Pump
- HVAC
- Hoisting
- Agitator
- Fans
- Heating
- Lighting
- Conveyors

A closer look at smart devices

Smart function device SFM1
This contactor module snaps onto contactors from AF09 to AF96 with 24 V DC operated coil. It is seamlessly integrated into the B&R automation system via the X2X bus.

- Provides relevant maintenance counters like motor operating hours, trip counters and more
- Allows monitoring of short circuit protection devices using a digital input
- Helps to detect problems in load, supply and feeder side in order to solve problems as quickly as possible

Smart current voltage device SCV10
This high-end motor protection device provides an optional extension to the contactor module. This allows assessment of the status of connected equipment.

- Measure line voltages, phase currents, power, frequency, total harmonic distortions and other relevant parameters
- An advanced thermal model of the motor is calculated for selectable trip classes from 5E - 30E. Time to trip, time to cool and the actual thermal load level are available for optimized control
- Integrated current transformers up to 40 A nominal current
- Integrated voltage measurement up to 690 V AC
- Cos-phi and real power allows to monitor and protect pumps and other connected loads
- Earth fault and frequency measurement
- Measures load situation in each phase

Catch for mounting and dismounting the module
Provides visual feedback of the contactor state. Option for manual contactor operation e.g. during commissioning or test

Status LED
Digital input for checkback monitoring

24 V supply for SFM1 and contactor
Path-through CT
Voltage inputs
X2X in and out

Explore a world of potential, from control to distribution panels.

Novolink’s ease of commissioning and functionality creates enormous opportunities for a wide range of industrial applications. Applications include:

- Pump
- HVAC
- Hoisting
- Agitator
- Fans
- Heating
- Lighting
- Conveyors

A closer look at smart devices

Smart function device SFM1
This contactor module snaps onto contactors from AF09 to AF96 with 24 V DC operated coil. It is seamlessly integrated into the B&R automation system via the X2X bus.

- Provides relevant maintenance counters like motor operating hours, trip counters and more
- Allows monitoring of short circuit protection devices using a digital input
- Helps to detect problems in load, supply and feeder side in order to solve problems as quickly as possible

Smart current voltage device SCV10
This high-end motor protection device provides an optional extension to the contactor module. This allows assessment of the status of connected equipment.

- Measure line voltages, phase currents, power, frequency, total harmonic distortions and other relevant parameters
- An advanced thermal model of the motor is calculated for selectable trip classes from 5E - 30E. Time to trip, time to cool and the actual thermal load level are available for optimized control
- Integrated current transformers up to 40 A nominal current
- Integrated voltage measurement up to 690 V AC
- Cos-phi and real power allows to monitor and protect pumps and other connected loads
- Earth fault and frequency measurement
- Measures load situation in each phase

Catch for mounting and dismounting the module
Provides visual feedback of the contactor state. Option for manual contactor operation e.g. during commissioning or test

Status LED
Digital input for checkback monitoring

24 V supply for SFM1 and contactor
Path-through CT
Voltage inputs
X2X in and out
The link between motors and digitalization

By effortlessly connecting the factory floor to the cloud, Novolink is essential to increase overall equipment effectiveness.

**B&R advanced application integration**
Data from the Novolink devices can be used directly with a wide range of B&R system applications including SCADA, HMI application, audit trail, ERP/MES and cloud infrastructure.

**Transform your existing portfolio with the B&R Automation Studio**
The B&R Automation Studio offers an integrated software development environment with tools for every project phase. This includes a wide selection of diagnostics for system optimization. You can access extensive target system information via the web with the System Diagnostics Manager. Better still, the controller, drive, communication and visualization are all configurable in one environment, reducing integration time and maintenance costs.

**Effortless commissioning with B&R PLCs**
Novolink devices can connect easily to X20BT9400 with ready-made SFM-CAB-RJTB cables. On one side, the SFM-CAB-RJTB cable has a cable shield clamp which connects to the terminal block (containing all the required wires), while the other side has an RJ45 plug which connects to the SFM1 module. Novolink devices can be connected in a daisy chain with multiple devices working in a sequence by simply using standard Ethernet cables.

**Engineering efficiency** - only two configurable components cover a wide range of applications, reducing devices where otherwise auxiliary devices are needed.

**Preventive machine maintenance** uses live data from relevant motor parameters.

**Digitalization allows remote contactor control and condition monitoring**

**Speed of installation**
Reduction of control side wiring. Integration of multiple functions into one device. Reduction of required PLC I/O signals.

**Data availability**
Several devices can be connected - with or without sensor module.

**Asset management solutions**

**HMI Application**

**Audit Trail**

**ERP/MES**

**24V**

**RJ45 cable (X2X)**

**PLC + IO**

**Bus transmitter X20BT9400**

**X2X**

**RJ45 cable (X2X)**
Ease of design and commissioning
A closer look at the key benefits

Reduced number of components and simplified wiring
In an increasingly fast-paced world, the need for rapid, effective integration with existing systems is essential.

Simply mount the device on an AF contactor to digitalize operations, without increasing the width of your contactor. Novolink devices are cost-effective and even allow for the retrofitting of an existing 24 V DC supplied AF contactor. In such a case often only the control wiring needs to be changed.

Reduced engineering efforts
An industrial environment is a complex space, which is why Novolink devices were expertly engineered to streamline high-grade motor monitoring and protection. Its out-of-the-box functionality ensures simplicity on the factory floor and beyond.

The standard controls are ready to use without additional engineering and there is no need for expensive specialist cabling or additional training. Programming is drastically simplified because all data is available from a single node representing the feeder. Your motor protection is customizable to the need of your application.

Transform your existing portfolio
Novolink uses standard components like AF contactors, to take your existing solution to another level of innovation. With no need for extensive training, the Novolink opens up new possibilities for your expertise.
Create new business models

With Novolink, you can offer clients digital services like cloud-based predictive maintenance to pinpoint potential faults with speed and accuracy. An increase in overall equipment effectiveness provides added value for your customers.

Enhanced analytics brings machine builders and OEMs closer to their customers and enables more efficient re-stocking via online data.

Enhanced analytics for improved performance

Optimize the performance of your machine in real time with data-driven decision making.

The Novolink's fully digitalized approach means that data trends can be analyzed over the long term so processes can be adapted to maximize performance.

100% data availability

Through integrated connectivity and seamless integration into B&R solutions, relevant information can be derived from raw data.

Integration into other systems is easily possible with B&Rs OPC-UA server solutions and other gateways.

Innovation through digitalization

Guiding you on your journey to a digital future
Optimized operations and maintenance

Increase your efficiency through innovation

Reduce downtime
Use Novolink’s remote monitoring capabilities to reduce costs and increase overall uptime. Operatives can immediately isolate problem areas (such as a malfunctioning load) and suggest solutions before disruption is caused. For ease of use, all control, monitoring and diagnostic signals are fully visible and there is clear fault localization.

Service-on-demand
Avoid unnecessary scheduled servicing by moving from fixed service cycles with Novolink devices. Advanced diagnostic capabilities make it easier to address issues on demand, from switching off idle processes to saving energy through optimizing parameters. You can combine real-time diagnostics with long-term data trend analysis to unlock new service modules.

Enable preventive maintenance
Getting ahead of faults and problems is key to consistent uptimes, maintaining the longevity of equipment and ensuring the ongoing flow of production.

With Novolink, you can set thresholds and receive pre-warnings before equipment failure to reduce energy consumption through optimized operation parameters.
Smart and safe manufacturing with ABB safety products and B&R solutions

B&R provides industrial automation solutions and is the global center for machine and factory automation within ABB since 2017. B&R offers PLCs with integrated safety for processing lines or machines automated with B&R.

Compatible safety products from ABB Jokab Safety

The safety products from ABB Jokab Safety are tested, verified and certified to be connected directly to the B&R safety system. This makes ABB able to offer well-tried and proven safety solutions together with B&R.

B&R safety controller

In order to supervise ABB safety sensors using B&R controllers the following units are required:

- SafeLOGIC safety controller
- X20 CPU (since the SafeLOGIC is not a stand-alone PLC)
- Safe X20 I/O modules (to connect the safety devices)

Do you think about safety?

ABB does - find more information on the ABB Jokab Safety offer, details about the products and their applications online.

Smart and safe manufacturing with ABB safety products and B&R solutions

B&R provides industrial automation solutions and is the global center for machine and factory automation within ABB since 2017. B&R offers PLCs with integrated safety for processing lines or machines automated with B&R.

Compatible safety products from ABB Jokab Safety

The safety products from ABB Jokab Safety are tested, verified and certified to be connected directly to the B&R safety system. This makes ABB able to offer well-tried and proven safety solutions together with B&R.

B&R safety controller

In order to supervise ABB safety sensors using B&R controllers the following units are required:

- SafeLOGIC safety controller
- X20 CPU (since the SafeLOGIC is not a stand-alone PLC)
- Safe X20 I/O modules (to connect the safety devices)

Do you think about safety?

ABB does - find more information on the ABB Jokab Safety offer, details about the products and their applications online.

Smart and safe manufacturing with ABB safety products and B&R solutions

B&R provides industrial automation solutions and is the global center for machine and factory automation within ABB since 2017. B&R offers PLCs with integrated safety for processing lines or machines automated with B&R.

Compatible safety products from ABB Jokab Safety

The safety products from ABB Jokab Safety are tested, verified and certified to be connected directly to the B&R safety system. This makes ABB able to offer well-tried and proven safety solutions together with B&R.

B&R safety controller

In order to supervise ABB safety sensors using B&R controllers the following units are required:

- SafeLOGIC safety controller
- X20 CPU (since the SafeLOGIC is not a stand-alone PLC)
- Safe X20 I/O modules (to connect the safety devices)

Do you think about safety?

ABB does - find more information on the ABB Jokab Safety offer, details about the products and their applications online.

Smart and safe manufacturing with ABB safety products and B&R solutions

B&R provides industrial automation solutions and is the global center for machine and factory automation within ABB since 2017. B&R offers PLCs with integrated safety for processing lines or machines automated with B&R.

Compatible safety products from ABB Jokab Safety

The safety products from ABB Jokab Safety are tested, verified and certified to be connected directly to the B&R safety system. This makes ABB able to offer well-tried and proven safety solutions together with B&R.

B&R safety controller

In order to supervise ABB safety sensors using B&R controllers the following units are required:

- SafeLOGIC safety controller
- X20 CPU (since the SafeLOGIC is not a stand-alone PLC)
- Safe X20 I/O modules (to connect the safety devices)

Do you think about safety?

ABB does - find more information on the ABB Jokab Safety offer, details about the products and their applications online.

Smart and safe manufacturing with ABB safety products and B&R solutions

B&R provides industrial automation solutions and is the global center for machine and factory automation within ABB since 2017. B&R offers PLCs with integrated safety for processing lines or machines automated with B&R.

Compatible safety products from ABB Jokab Safety

The safety products from ABB Jokab Safety are tested, verified and certified to be connected directly to the B&R safety system. This makes ABB able to offer well-tried and proven safety solutions together with B&R.

B&R safety controller

In order to supervise ABB safety sensors using B&R controllers the following units are required:

- SafeLOGIC safety controller
- X20 CPU (since the SafeLOGIC is not a stand-alone PLC)
- Safe X20 I/O modules (to connect the safety devices)

Do you think about safety?

ABB does - find more information on the ABB Jokab Safety offer, details about the products and their applications online.

Smart and safe manufacturing with ABB safety products and B&R solutions

B&R provides industrial automation solutions and is the global center for machine and factory automation within ABB since 2017. B&R offers PLCs with integrated safety for processing lines or machines automated with B&R.

Compatible safety products from ABB Jokab Safety

The safety products from ABB Jokab Safety are tested, verified and certified to be connected directly to the B&R safety system. This makes ABB able to offer well-tried and proven safety solutions together with B&R.

B&R safety controller

In order to supervise ABB safety sensors using B&R controllers the following units are required:

- SafeLOGIC safety controller
- X20 CPU (since the SafeLOGIC is not a stand-alone PLC)
- Safe X20 I/O modules (to connect the safety devices)

Do you think about safety?

ABB does - find more information on the ABB Jokab Safety offer, details about the products and their applications online.

Smart and safe manufacturing with ABB safety products and B&R solutions

B&R provides industrial automation solutions and is the global center for machine and factory automation within ABB since 2017. B&R offers PLCs with integrated safety for processing lines or machines automated with B&R.

Compatible safety products from ABB Jokab Safety

The safety products from ABB Jokab Safety are tested, verified and certified to be connected directly to the B&R safety system. This makes ABB able to offer well-tried and proven safety solutions together with B&R.

B&R safety controller

In order to supervise ABB safety sensors using B&R controllers the following units are required:

- SafeLOGIC safety controller
- X20 CPU (since the SafeLOGIC is not a stand-alone PLC)
- Safe X20 I/O modules (to connect the safety devices)

Do you think about safety?

ABB does - find more information on the ABB Jokab Safety offer, details about the products and their applications online.
ABB`s Novolink devices consist of the smart function module SFM1 and the sensor module SCV10-40. They allow the remote control and monitoring of AF contactors via X20 bus from within a B&R PLC. The sensor module SCV10-40 is optional and can be connected to the SFM1 module and provides functions for motor and application protection. It provides data for measuring voltage, current, frequency and further derived physical quantities such as cos phi, real power etc.

The SFM1 can be snapped onto AF09...AF96 contactors with 24 V DC coil voltage. The module is equipped with two X2X interfaces for incoming and outgoing connections (daisy chain). The module and contactor are supplied via 24 V DC that are also used for the SCV10-40 module.

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Order code</th>
<th>Weight (kg / lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection cable from PLC to first SFM1 module</td>
<td>SFM-CAB-RJTB.1-500</td>
<td>1SVM823000R0500</td>
<td>0.192 kg (0.423 lb)</td>
</tr>
<tr>
<td>Connection cable from SFM1 to SCV10, length 50 cm</td>
<td>SFM-CAB-S.1-50</td>
<td>1SVM811000R0050</td>
<td>0.015 kg (0.033 lb)</td>
</tr>
<tr>
<td>Connection cable from SFM1 to SCV10, length 25 cm</td>
<td>SFM-CAB-S.1-25</td>
<td>1SVM811000R0025</td>
<td>0.008 kg (0.017 lb)</td>
</tr>
<tr>
<td>Smart current and voltage sensor module</td>
<td>SCV10-40.1</td>
<td>1SVM120010R0000</td>
<td>0.21 kg (0.463 lb)</td>
</tr>
<tr>
<td>Smart function module</td>
<td>SFM1-A11.1</td>
<td>1SVM120012R0000</td>
<td>0.23 kg (0.507 lb)</td>
</tr>
</tbody>
</table>
## Technical details

### Smart function module

**Data at Ta = 25 °C and rated values, unless otherwise indicated**

<table>
<thead>
<tr>
<th><strong>Smart function module</strong></th>
<th><strong>X2X Interface (X4, X5)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated supply voltage Ue</td>
<td>according to B&amp;R X20 system specification</td>
</tr>
<tr>
<td>Rated control supply voltage Ust</td>
<td>according to B&amp;R X20 system specification</td>
</tr>
<tr>
<td>Typical current / power consumption (delivered by X2X link power supply output from X20BT9400)</td>
<td>30 mA / 600 mW</td>
</tr>
<tr>
<td>Recommended X45 cable</td>
<td>Cat 5e SF/UTP AWG 26 / 1:1 connection Cat 6 SF/FTP AWG 27 / 1:1 connection</td>
</tr>
<tr>
<td>Maximum distance between nodes</td>
<td>20 m</td>
</tr>
<tr>
<td>Maximum distance from X20-BT9400 to first SFM1</td>
<td>10 m</td>
</tr>
<tr>
<td>Maximum number of nodes on one X20-BT9400</td>
<td>6</td>
</tr>
<tr>
<td>Maximum length of total network from start to last module with 8 modules</td>
<td>80 m</td>
</tr>
<tr>
<td>Grounding</td>
<td>according to B&amp;R X20 system specification, the accessory SFM-CAB-RJTB provides the required grounding of shield</td>
</tr>
<tr>
<td>Minimum cycle time</td>
<td>100 us</td>
</tr>
<tr>
<td>The minimum cycle time defines how far the bus cycle can be reduced without communication errors occurring. Note that very fast cycles decrease the idle time available for handling monitoring, diagnostics and acyclic commands.</td>
<td></td>
</tr>
</tbody>
</table>

**Contactor supply circuit SFM1 (X1)**

| Rated supply voltage Ue | 24 V DC |
| Rated control supply voltage Ust | |
| Typical current / power consumption (AF coil current not considered) | 20 mA / 480 mW (digital input closed, without sensor module) 20 mA / 480 mW (sensor module) |
| Reverse polarity protection | no |
| Short circuit protection of contactor control outputs | yes |
| Max. load current for AF contactor | coordinated with supported AF contactor types |
| Min. power failure buffering time | 10 ms |

**Digital Input (X3)**

| Number of digital inputs | 8 |
| Supply for digital inputs | Internal |
| Isolation | no |
| Input signal bounce suppression | configurable (see module parameters) |
| Typical input current at nominal supply | 7.5 mA |
| Max. voltage loss at closed external auxiliary contact | max. 2 V |
| Max. cable length | 10 m |

**General data**

| MTBF | on request |
| Duty time | 100 % |
| Dimensions | see dimensional drawings |
| Weight | 0.11 kg |

### Smart voltage and current sensor module

**Input circuit**

| Nominal frequency | 50/60 Hz (55 … 65 Hz) |
| Measurement method | true RMS (up to 13th harmonics) |
| Number of phases | 1/3 |
| Nominal measuring range current | 0.2 to 40 A AC |
| Measured current range | 0.2 x Ie, 15 x Ie |
| Nominal voltage range | 3 phase 310 to 690 V AC ± 10 % |
| Measurement accuracy given at Ta=25 °C, 65/60 Hz | |
| Ie | ±3 % |
| Imm (range 0.2 * Ie, 0.75 * Ie) | ±1.5 % |
| Imm (range 0.75 * Ie, 2 * Ie) | ±1.5 % |
| Imm (range >2 * Ie, <15 * Ie) | ±15 % |
| power factor > 0.5 (inductive) | typ. 0.5 % Ue > 3 A |
| apparent power | typ. 1.5 % |
| active power (cos phi > 0.5) | typ. 15 % |
| frequency (50/60 Hz) | 51.5 % |
| current imbalance | typ 510 % (condition: Ie = 150 mA) |
| voltage imbalance | ±10 % |
| voltage total harmonic distortion (THD) | ±15 % |

**Current total harmonic distortion (THD)**

| (condition: Ie = 1A) |

**Measurement range of earth fault current**

> 20% of Ie

**Earth fault current**

Ie = 1.0 A: 525 % (condition: Ie = 100 mA and Ie > 80 mA) Ie = 1.0 A: 410 % (condition: Ie = 200 mA and Ie < 200 mA)

**Supported network types**

1/3 phase, grounded networks

**Trip classes, selectable by parameter**

5E, 10E, 20E, 30E

**Tripping time for phase loss**

determined by parameter CurPhaseLossDelayDelay adjustable from 0 to 25 s

**Load per phase**

approx. 30 ms

**Short-circuit protection**

provided by external short-circuit protection device, e.g. MO, MCB, MCCB or fuse. Refer also to ABB coordination tables available here: www.lowvoltage-tools.abb.com/toc/

**Max cross-section of wires. Use isolated wires only!**

16 mm²
## Technical details

### Smart voltage and current sensor module

**Input circuit**
- Conductor holes in the current transformers: 13 mm
- Performance under short-circuit conditions: $I_{\text{S}} = 100 \text{ kA}$, $80 \text{ kA}$
- Coordination type 2: $I_{\text{N}} = 500 \text{ V AC}$, $600 \text{ V AC}$
- Rated conditional short circuit current: fuse $200 \text{ A gG}$, $200 \text{ A gG}$

**Additional information relating to cULus approval**
- Suitable for use on circuits capable of delivering not more than $100 \text{ kA rms}$, $600 \text{ V AC}$ maximum, when protected by $100 \text{ A}$, class $K5/RK5$ fuses, use fuses only.

**Electrical connection X1**
- Connecting capacity:
  - 1x: 0.2...2.5 mm$^2$ 24...12 AWG
  - 1x: 0.2...2.5 mm$^2$ 24...12 AWG
  - 1x: 0.2...2.5 mm$^2$ 24...12 AWG
  - 1x: 0.2...2.5 mm$^2$ 24...12 AWG
- Stripping length: 8 mm
- Screwdriver type: 0.6 x 3.5 mm
- Tightening torque: 0.5...0.6 Nm

### General data
- MTBF: on request
- Duty time: 100 %
- Dimensions: see dimensional drawings
- Weight: 0.23 kg
- Mounting:
  - DIN rail (IEC/EN 60715), snap-on mounting without any tool
  - screw mounting with mounting clips
  - screw mounting with screws (M4)
- Mounting position: any
- Minimum distance to other units: -
- Material of housing: UL 94 V2
- Degree of protection: IP20

### Common technical data

**Environmental data (common)**

<table>
<thead>
<tr>
<th>SFMI</th>
<th>SCV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature ranges:</td>
<td></td>
</tr>
<tr>
<td>operation: $-25$ to $+60^\circ$C</td>
<td></td>
</tr>
<tr>
<td>storage: $-40$ to $+70^\circ$C</td>
<td></td>
</tr>
<tr>
<td>Damp heat, cyclic (IEC/EN 60068-2-30):</td>
<td></td>
</tr>
<tr>
<td>6 x 24 h cycle, $55^\circ$, 95 % RH</td>
<td></td>
</tr>
<tr>
<td>Climatic class (IEC/EN 60721-3-3):</td>
<td></td>
</tr>
<tr>
<td>3K1 (no condensation, no ice formation)</td>
<td></td>
</tr>
<tr>
<td>Relative humidity: 5 % - 95 %, no condensation</td>
<td></td>
</tr>
<tr>
<td>Vibration, sinusoidal:</td>
<td></td>
</tr>
<tr>
<td>4 g, 5-300 Hz</td>
<td></td>
</tr>
<tr>
<td>Shock: 15 g, 11 ms</td>
<td></td>
</tr>
</tbody>
</table>

**Isolation data of contactor module in combination with contactor (and sensor module):**

<table>
<thead>
<tr>
<th>Rated insulation voltage $U_{\text{acc}}$:</th>
<th>acc. to IEC 60947-4-1</th>
<th>600 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>acc. to UL / CSA</td>
<td>600 V</td>
<td></td>
</tr>
<tr>
<td>Rated impulse withstand voltage $U_{\text{imp}}$:</td>
<td>6 kV</td>
<td></td>
</tr>
<tr>
<td>SFMI: Control supply, bus / mains contactor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCV: X2 (voltage input) to control supply, bus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic insulation:</td>
<td>according to technical data of contactor</td>
<td></td>
</tr>
<tr>
<td>Protective separation pollution degree 3:</td>
<td>L/N: 277 V AC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L: 480 V AC</td>
<td></td>
</tr>
<tr>
<td>Protective separation pollution degree 2:</td>
<td>L/N: 400 V AC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L: 690 V AC</td>
<td></td>
</tr>
<tr>
<td>Pollution degree:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Overvoltage category:</td>
<td>III</td>
<td></td>
</tr>
<tr>
<td>Installation altitude without derating: max. 2000 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deratings at high altitudes:</td>
<td>on request</td>
<td></td>
</tr>
</tbody>
</table>
Technical diagrams

Tripping curves for warm motor for three-phase and single-phase symmetrical loads

Times/s

<table>
<thead>
<tr>
<th>Times/s</th>
<th>10000</th>
<th>1000</th>
<th>100</th>
<th>10</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Class 5E
Class 10E
Class 20E
Class 30E

Tripping curves for cold motor for three-phase and single-phase symmetrical loads

Times/s

<table>
<thead>
<tr>
<th>Times/s</th>
<th>10000</th>
<th>1000</th>
<th>100</th>
<th>10</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Class 5E
Class 10E
Class 20E
Class 30E

Digitalize motor starting solutions with the all-new ABB Novolink™ motor modules while simplifying engineering and optimizing operations.