MOTOR STARTING AND PROTECTION

Advanced digitalization, simplified

ABB Novolink™ smart modules for AF contactors

START

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.

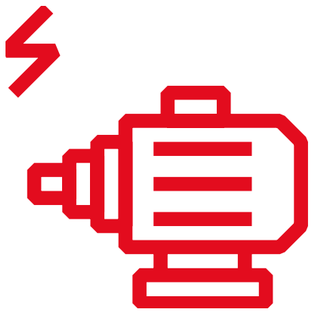
So to simplify engineering, optimize operations, save time and cut costs, think Novolink.

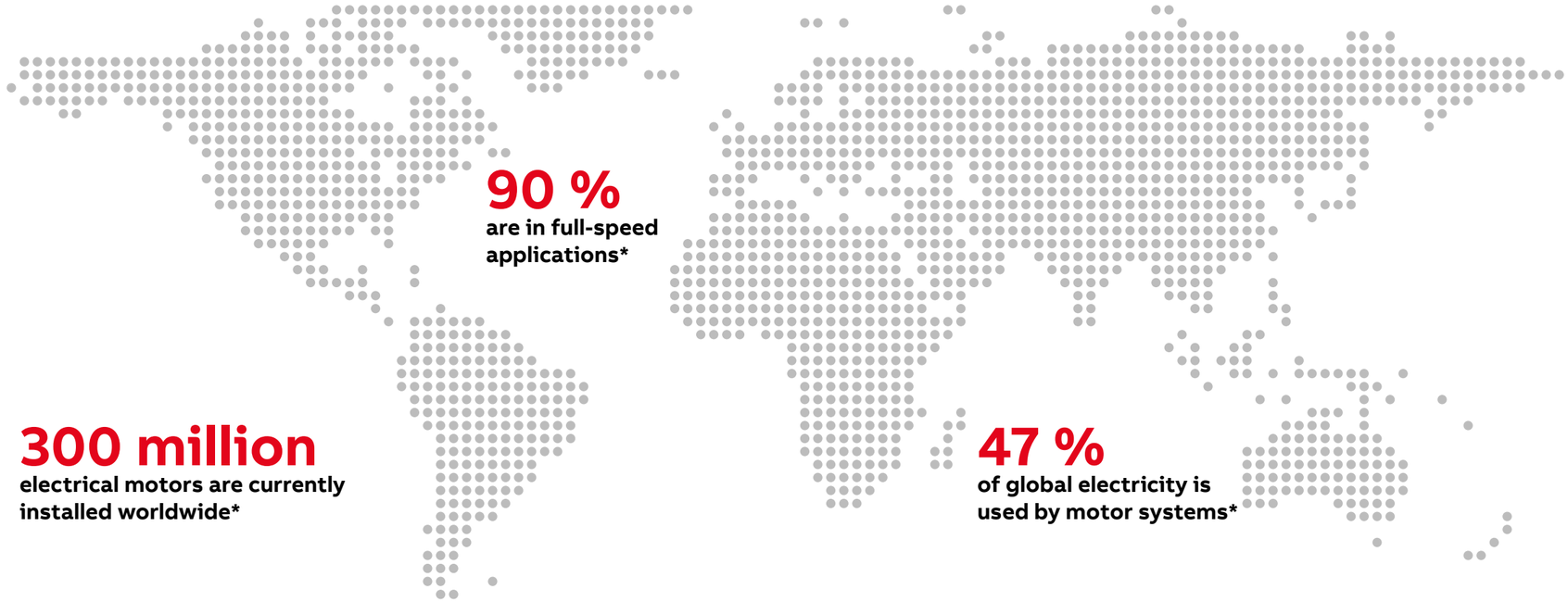
Table of contents

Motors - the key driver of world industry

An introduction to digitalization and its crucial role in motor maintenance

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.



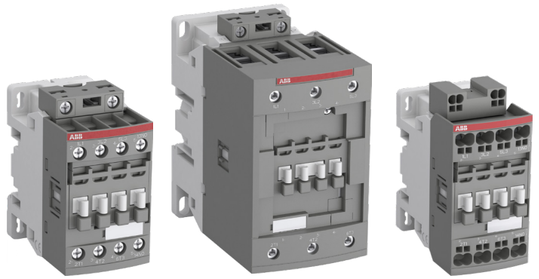


* own estimations

Digitalize one of the best motor starting portfolios on the market

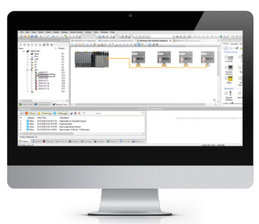
Decide for yourself how you want to digitize your motor starting solutions - with the new Novolink modules even advanced motor protection and equipment monitoring is fast and easy.

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.



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

PLC

Binary I/O signals

X2X

X2X

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

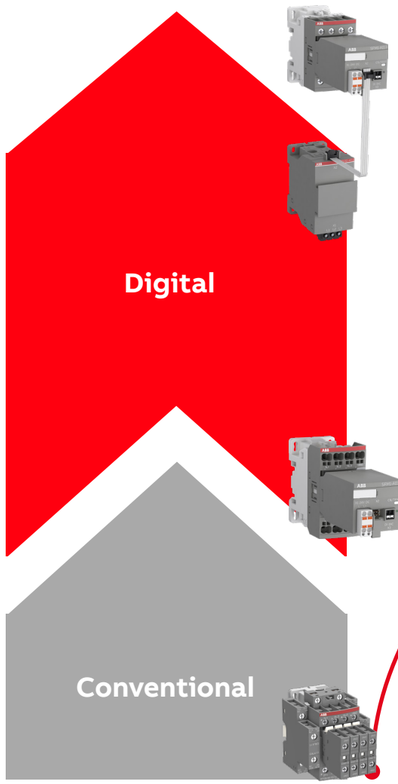
Level 2
Basic maintenance counters.
Integrated check-back monitoring.

Level 3
Advanced motor protection and connected equipment monitoring.

The choice is yours: select and mix as needed

From conventional to digital

With the Novolink devices' enhanced capabilities, you can move from corrective to predictive maintenance, continually optimizing your process.



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

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

Control & supervision
- Remote control
- Condition monitoring

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

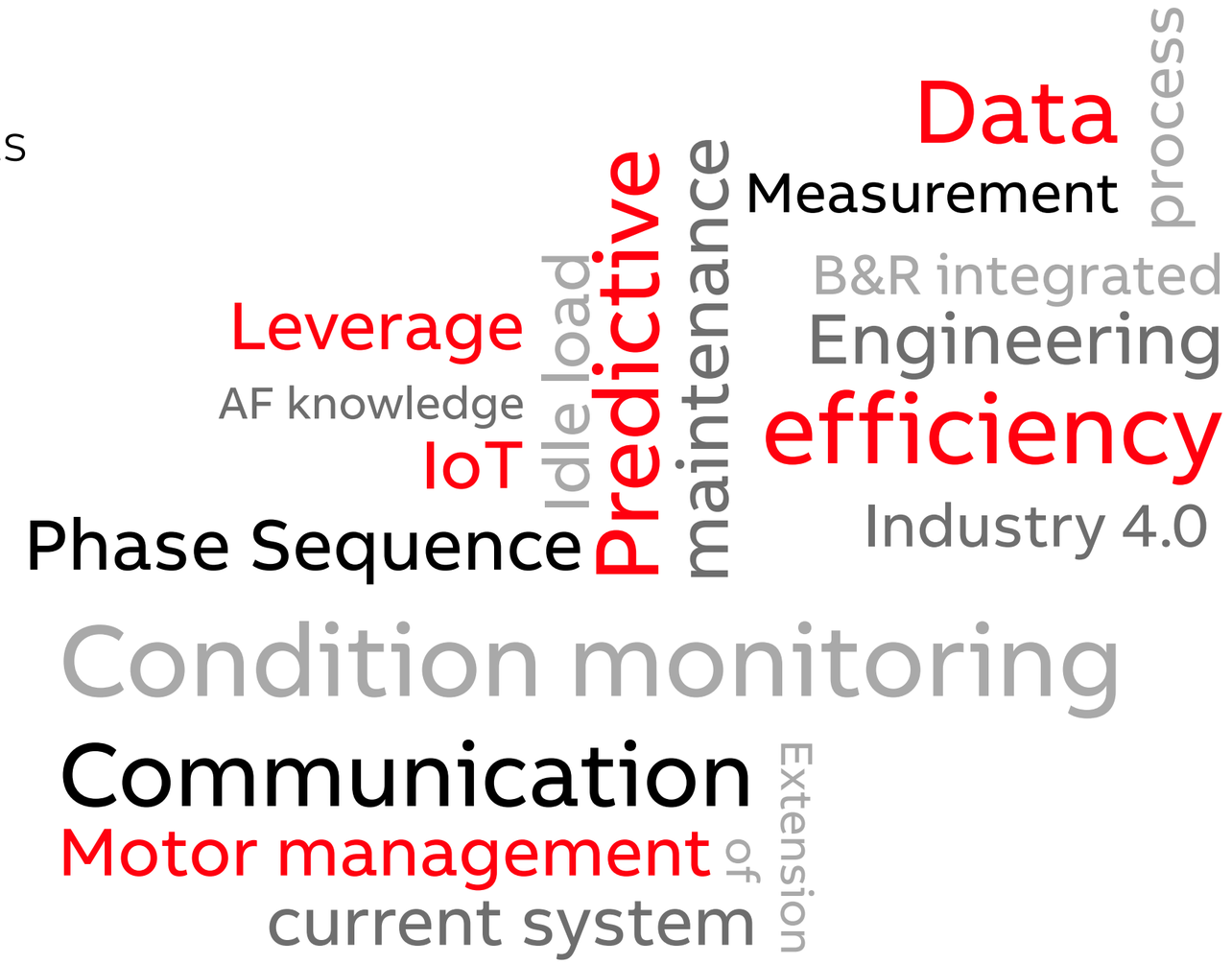
Digital capabilities to deliver Industry 4.0

Fire safety and general electronic requirements

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.



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

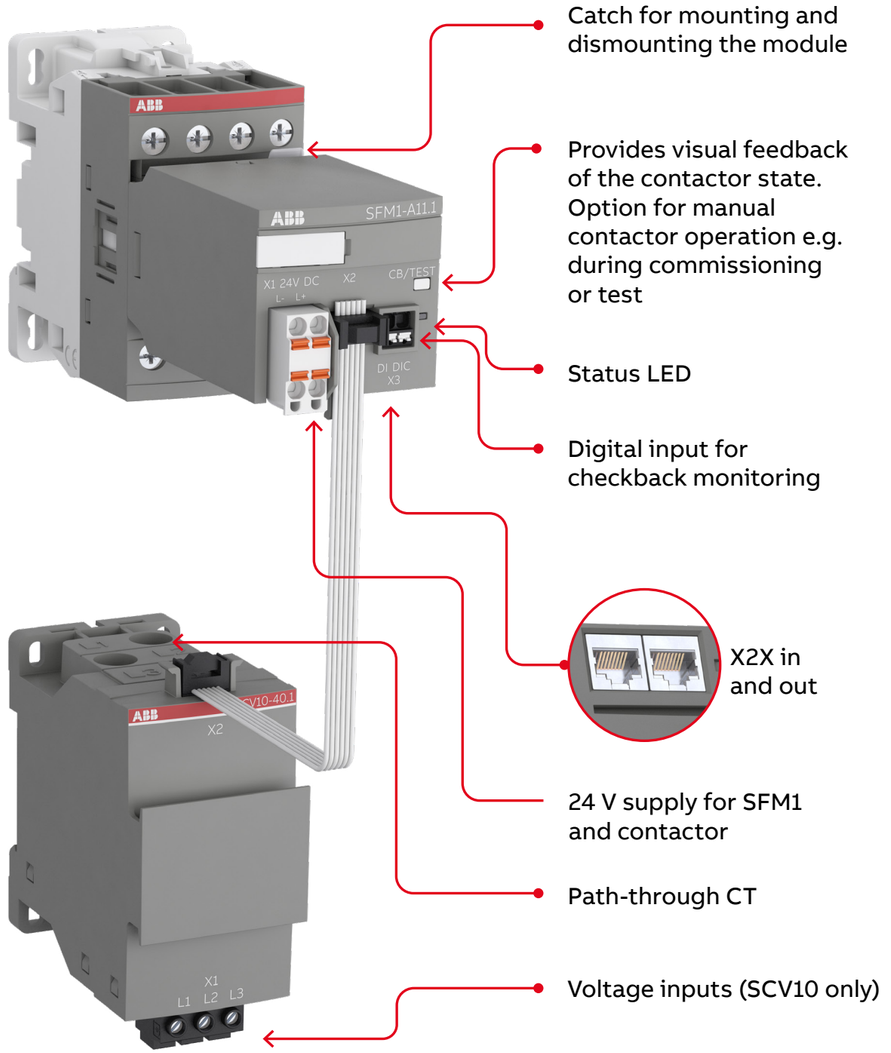
Smart function device SFM1
This contactor module snaps onto contactors from AF09 to AF96 with 24 V DC operated coil. It is seamlessly integrated into the B&R automation system via the X2X bus.

- 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 devices SCV10/SC10
These high-end motor protection devices provide an optional extension to the contactor module. They enable the status of the connected equipment to be assessed.

Both types:
- Measure phase currents, frequency, earth fault, total harmonic distortions and other relevant parameters
- Feature an advanced thermal model of the motor which 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

SCV10 only:
- Additional integrated voltage measurement up to 690 V AC
- Cos-phi and real power allows to monitor and protect pumps and other connected loads



The link between motors and digitalization

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

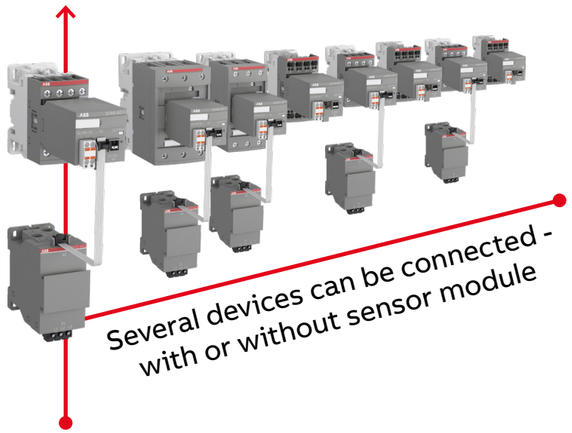
Asset management solutions

HMI Application

Audit Trail

ERP/MES

100 %
Data availability



1st
entirely B&R compatible motor starting solution

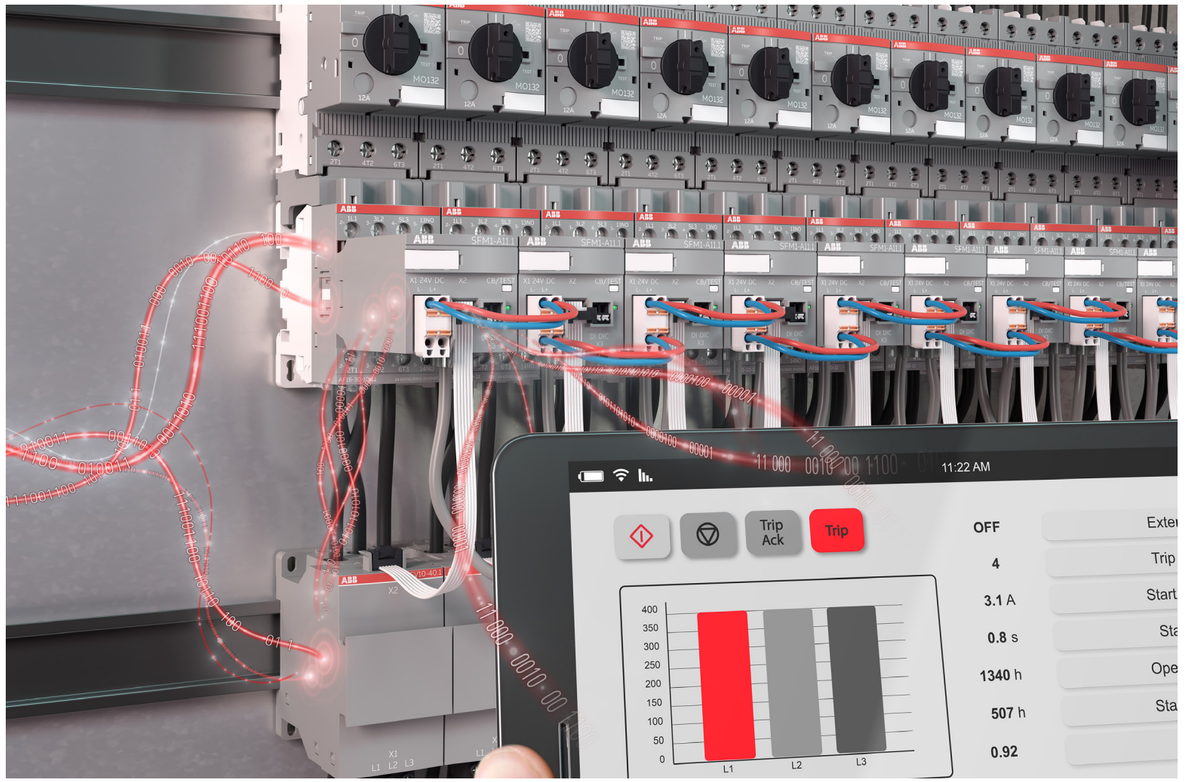
The link between motors and digitalization

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

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

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

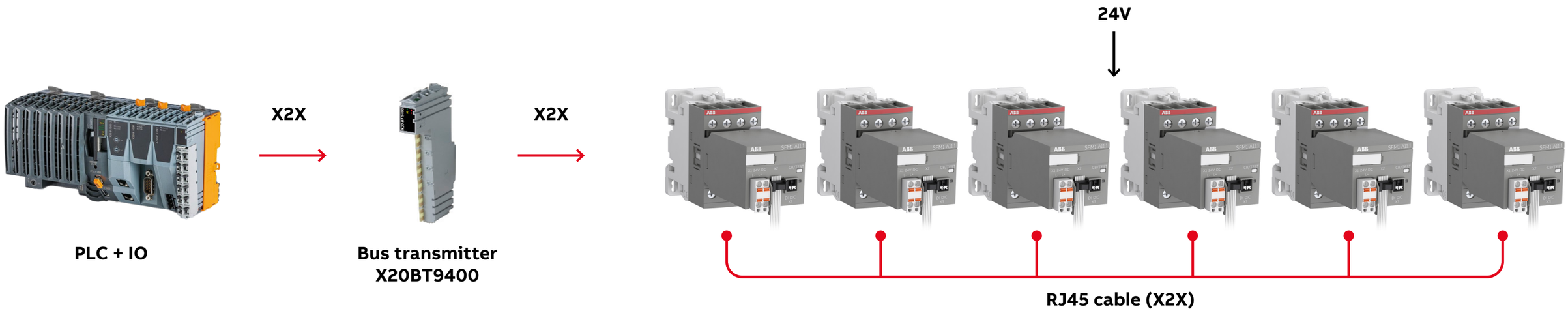


The link between motors and digitalization

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.

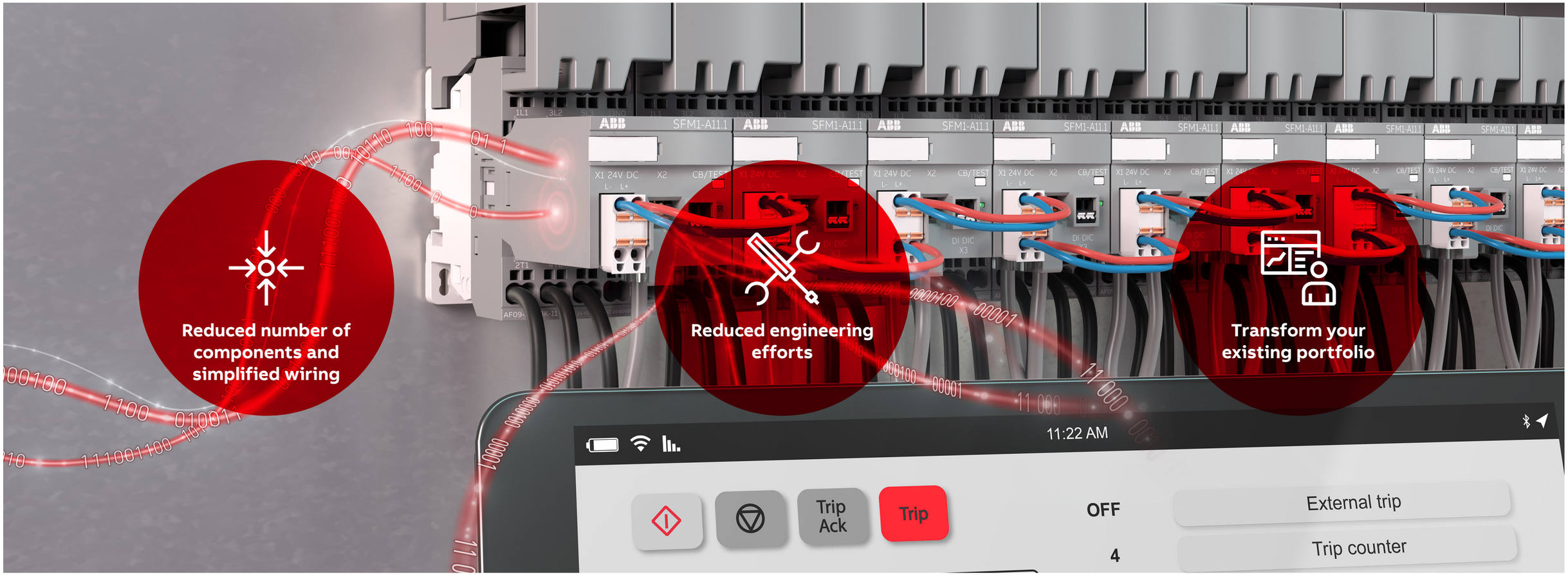
Transform your existing portfolio with B&R Automation Studio
The B&R Automation Studio offers an integrated software development environment with tools for every project phase. This includes a wide selection of diagnostics for system optimization. You can access extensive target system information via 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
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.



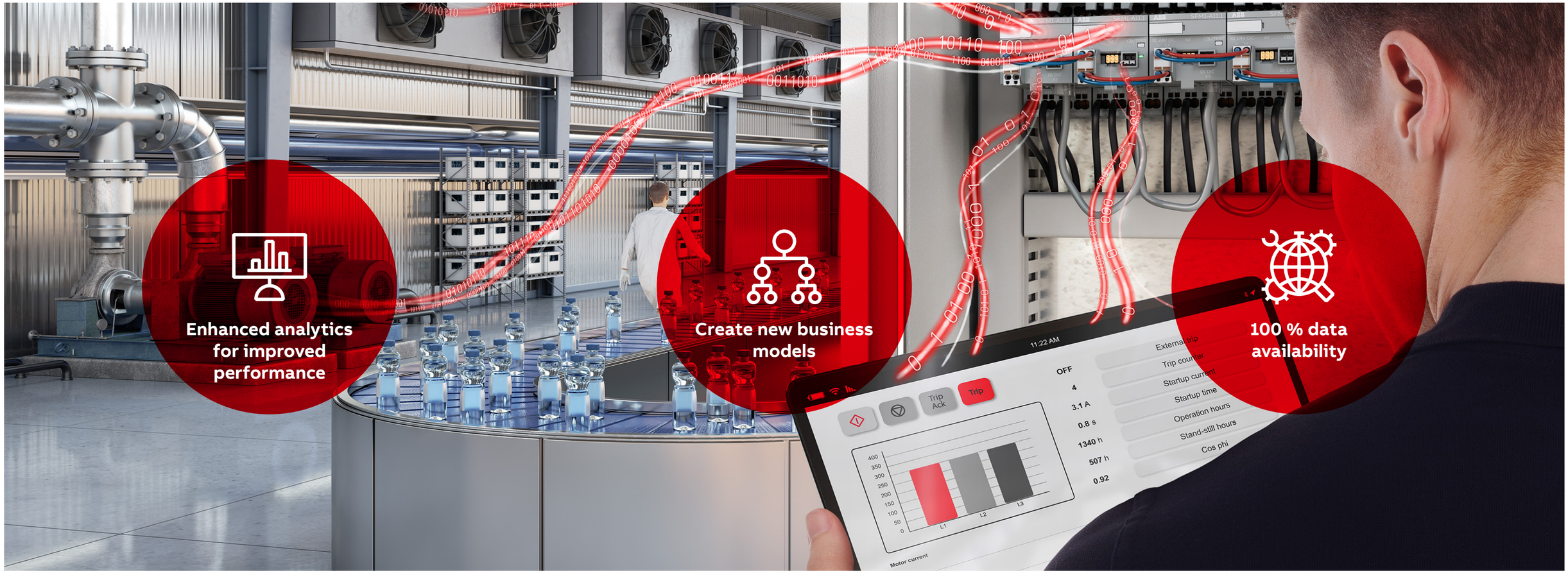
Ease of design and commissioning

A closer look at the key benefits



Innovation through digitalization

Guiding you on your journey to a digital future



Optimized operations and maintenance

Increase your efficiency through innovation

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.

Safe solutions

Reaches the highest level of safety (up to PL e/Cat 4). Certified, verified & reliable safety solutions. Extensive fault detection. Several different types of safety sensors and devices available to suit all safety needs.

The advantages of DYNlink

The DYNlink signal significantly reduces the required number of cables and safe input channels which leads to more cost-effective solutions.

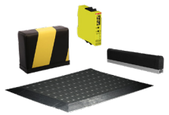
Developed with installation in mind
Easy connection with M12 connectors. A wide range of adapters and connectors to simplify wairing. Minimum amount of cabling simplifies installation.

Sensors, switches and locks

Optical safety devices

Control devices

Emergency stops and pilot devices



Pressure sensitive devices

Tina adapters

X20 CPU

X20 I/O modules

X20 SafeLOGIC safety controller

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)

Dry contacts (potential free/zero volt)
B&R supports all ABB Jokab Safety products with dry contacts. For this use case, the B&R safe I/O module provides a unique pulse signal which ensures best cable diagnostic.

OSSD

B&R supports all ABB Jokab Safety products with OSSD interface. For this use case, the B&R safe I/O module provides a filter to avoid influencing the application by the OSSD low phase.

DYNlink

B&R supports all ABB Jokab Safety products with DYNlink interface. (Available and TÜV-certified in B&R mapp Safety from version 5.12)

Do you think about safety?

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

Ordering details


SFM-CAB-RJTB.1-500


SFM-CAB-S.1-50


SFM-CAB-S.1-25


SFM1-A11.1


SCV10-40.1


SC10-40.1

Description
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.

Ordering details

Description	Type	Order code	Weight (1 pc) kg (lb)
Connection cable from PLC to first SFM1 module	SFM-CAB-RJTB.1-500	1SVM823000R0500	0.192 kg (0.423 lb)
Connection cable from SFM1 to SCV10, length 50 cm	SFM-CAB-S.1-50	1SVM811000R0050	0.015 kg (0.0331 lb)
Connection cable from SFM1 to SCV10, length 25 cm	SFM-CAB-S.1-25	1SVM811000R0025	0.008 kg (0.0176 lb)
Smart current and voltage sensor module	SCV10-40.1	1SVM320010R0000	0.23 kg (0.507 lb)
Smart current sensor module	SC10-40.1	1SVM310010R0000	0.195 kg (0.429 lb)
Smart function module	SFM1-A11.1	1SVM120012R0000	0.11 kg (0.243 lb)

Technical details

Smart function module

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

Smart function module	
X2X Interface (X4, X5)	
Rated control supply voltage U_s	according to B&R X20 system specification
Rated control supply voltage U_s tolerance	according to B&R X20 system specification
Typical current / power consumption (delivered by X2X link power supply output from X20BT9400)	30 mA / 600 mW
Recommended RJ45 cable	Cat 5e SF/UTP AWG 26 / 1:1 connection Cat 6 S/FTP AWG 27 / 1:1 connection
Max. distance between nodes Max. distance from X20-BT9400 to first SFM1	20 m
Max. number of nodes on one X20-BT9400	8
Max. length of total network from start to last module with 8 modules	160 m
Grounding	according to B&R X20 system specification, the accessory SFM-CAB-RJTB provides the required grounding of shield
Minimum cycle time 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.	300 us
Contactor supply circuit SFM1	
Rated control supply voltage U_s	24 V DC
Rated control supply voltage U_s tolerance	22 … 31.2 V incl. ripple It must be ensured that the minimum supply voltage is available at the last contactor in a supply chain.
Typical current / power consumption (AF coil current not considered)	20 mA / 480 mW (SCV40-10 module) 20 mA / 480 mW (SC40-10 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	1	
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	
Mounting	Snapping on AF09 – AF96	
	AF09(Z)...-nn	AF40...-11
	AF12(Z)...-nn	AF52...-11
	AF16(Z)...-nn	AF65...-11
	AF26(Z)...-nn	AF80...-11
	AF30(Z)...-nn	AF96...-11
	AF38(Z)...-nn	
	nn = 11, 21, 30	
Mounting position	on AF contactor. 1-4, 5: max. current = AC-3 current of contactor	
Minimum distance to other units	0 mm for side to side mounting 5 mm to metal parts (e.g. control panel wall)	
Material of housing	UL 94 V0	
Degree of protection	IP20	

Technical details

Smart function module & Smart voltage and current sensor modules

Electrical connection X1, X3		X1	X3
Push-In	1x	0.2...2.5 mm² 24...12 AWG	0.2...1.5 mm² 24...16 AWG
	1x	0.25...2.5 mm²	0.2...1.5 mm²
	1x	0.25...2.5 mm²	0.2...0.75 mm²
	1x	0.2...2.5 mm² 24...12 AWG	0.2...1.5 mm² 24...16 AWG
Spring	1x	0.2...2.5 mm² 24...12 AWG	0.2...1.5 mm² 24...16 AWG
	1x	0.25...2.5 mm²	0.2...1.5 mm²
	1x	0.25...2.5 mm²	0.2...0.75 mm²
Screwdriver type		0.6 x 3.5 mm	0.4 x 2.5 mm
Tightening torque		10 mm	8 mm
Electrical connection X2		use ready-made cables, see accessories.	
Max cable length		0.5 m	
Basic insulation		300 V	

Ensure safe distance from motor wires and other high voltage cables.

Smart voltage and current sensor modules

Input circuit		SCV10-40	SC10-40
Nominal frequency		50/60 Hz (45 ... 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 I_e ... 15 x I_e	
Nominal voltage range	3 phase	150 to 690 V AC ± 10 %	-
	1 phase	90 to 400 V AC ±10 %	-

Input circuit		SCV10-40	SC10-40
Measurement accuracy given at Ta=25 °C, 50/60 Hz	I_{rms} (range 0.2 * $I_e \leq$ 0.75*I_e)	±3 %	
	I_{rms} (range 0.75 * $I_e \leq$ 2*I_e)	±1,5 %	
	I_{rms} (range >2 * $I_e \leq$ 15*I_e)	±3 %	
	U_{rms}	±1.5 %	-
	power factor ≥ 0.5 (inductive)	typ. ±1.5% (I_{rms} > 3 A)	-
	apparent power	typ. ±3 %	-
	active power (cos phi > 0.5)	typ. ±5 %	-
	frequency (50/60 Hz)	±1.5 %	-
	current imbalance	typ ±10 % (condition: I_{mot} > 150 mA)	
	voltage imbalance	±10 %	-
	voltage total harmonic distortion (THD)	±5 %	-
	current total harmonic distortion (THD)	±10 % (condition: I_{mot} > 1A)	
Measurement range of earth fault current		> 20% of I_e	
Earth fault current		I_e < 1.0 A : ±25 % (condition: I_{mot} > 100 mA and I_{earth} > 80 mA) I_e >1.0 A : ±10 % (condition: I_{mot} > 200 mA and I_{earth} > 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 CurrPhaseLossDelayPar. adjustable from 0 ... 25.5 s	
Load per phase		approx. 30 mΩ	
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/soc/	
Max cross-section of wires. Use isolated wires only!		16 mm²	

Technical details

Smart voltage and current sensor modules

Input circuit		SCV10-40	SC10-40
Conductor holes in the current transformers		13 mm	
Performance under short-circuit conditions Coordination type 2 I_q: Rated conditional short circuit current	Iq	100 kA	80 kA
		500 V AC	690 V AC
	fuse	200 A gG	200 A gG
Additional information relating to cULus approval		suitable for use on circuits capable of delivering not more than 100 kA rms, symmetrical, 600 V AC maximum, when protected by 100 A, class K5/RK5 fuses, use fuses only	
Electrical connection X1			
Connecting capacity	1x	0.2...2.5 mm² 24...12 AWG	
	1x	0.2...2.5 mm² 24...12 AWG	
	1x	0.2...2.5 mm²	
	1x	0.2...2.5 mm²	
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

Technical details
Common technical data

Common technical data

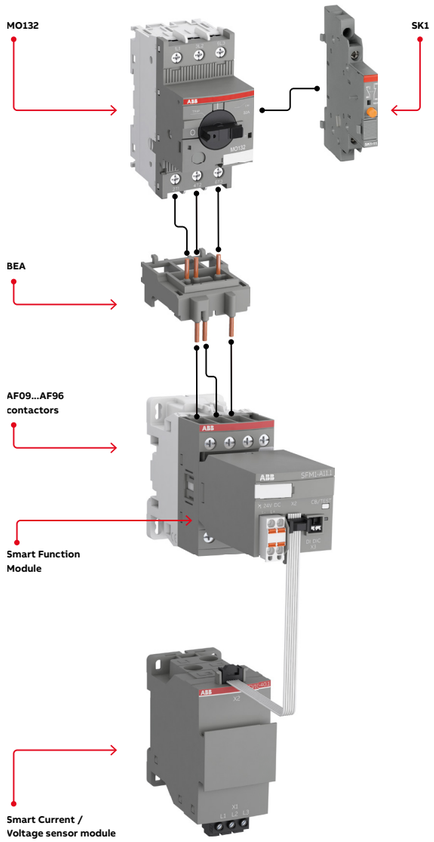
Environmental data (common)			
		SFM1	**SCV10-40/ SC10-40**
Ambient temperature ranges	operation	-25 to +60°C	
	storage	-40 to +70°C	
Damp heat, cyclic (IEC/EN 60068-2-30)		6 x 24 h cycle, 55 °C, 95 % RH	
Climatic class IEC/EN 60721-3-3		3K3 (no condensation, no ice formation) Relative humidity 5 % - 95 %, no condensation	
Vibration, sinusoidal		4 g, 5-300 Hz	
Shock		15 g, 11 ms	
Isolation data of contactor module in combination with contactor (and sensor module)			
Rated insulation voltage U_i	acc. to IEC 60947-4-1	690 V	
	acc. to UL / CSA	600 V	
Rated impulse withstand voltage U_{imp} SFM: Control supply, bus / mains contactor SCN: X2 (voltage input) to control supply, bus		6 kV	
Basic insulation		according to technical data of contactor	
Protective separation pollution degree 3		L/N: 277 V AC L/L: 480 V AC	
Protective separation pollution degree 2		L/N: 400 V AC L/L: 690 V AC	
Pollution degree		3	
Overvoltage category		III	
Installation altitude without derating		max. 2000 m	
Deratings at high altitudes		on request	

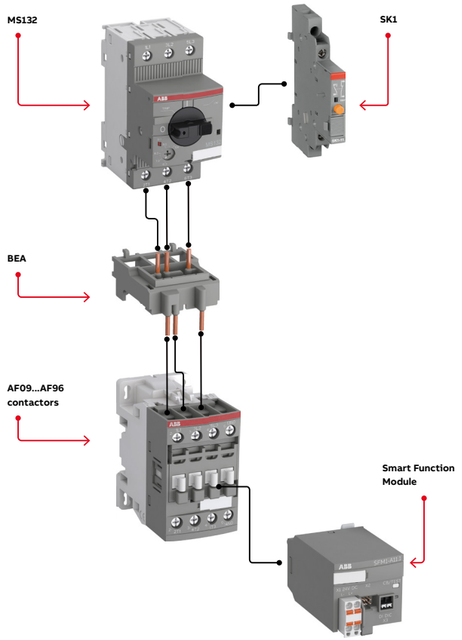
According to the current interpretation of applicable Chinese law the Novolink devices described in this document are imported as industrial automation equipment (they cannot be used without a PLC) and do not need CCC certification.

Standards / Directives				
Standards			IEC/EN 60947-1:2020 (Ed. 6.0) / EN 60947-1:2007 + A1:2011 + A2:2014 IEC/EN 60947-4-1:2019 UL 60947-4-1:2014 (Ed. 3) UL 60947-1:2013 (Ed. 5)	
Low Voltage Directive			no. 2014/35/EU	
EMC directive			no. 2014/30/EU	
RoHS directive			no. 2011/65/EU incl. 2015/863/EU	
Electromagnetic compatibility				
Emission requirements	radio interference voltage	EN 61000-6-4	X	
		EN 61000-6-3		X
	radio interference field strength	CISPR 11	class A	class B
Immunity requirements	electrostatic discharge	EN 61000-4-2	6 kV contact 8 kV air	
	radiated, radio frequency electromagnetic field amplitude modulated	EN 61000-4-3	10 V/m (80-6000 MHz)	
	electrical fast transients (burst)	EN 61000-4-4	2 kV (power supply lines) 1 kV (signal lines)	
	surge, unsymmetrical / symmetrical	EN 61000-4-5	1 kV / 0.5 kV (DC-supply) 2 kV / 1 kV (measurement lines)	
	conducted disturbance, induced by radio frequency, common mode, amplitude modulated	EN 61000-4-6	10 V	
Performance data				
Cycle time in contactor module: “switch on signal” received via X2X until contactor control voltage set to 24 V DC			typ. 5 ms	
Update rate of measurement values provided from sensor module and available for X2X communication			typ. 25 ms	

Technical diagrams

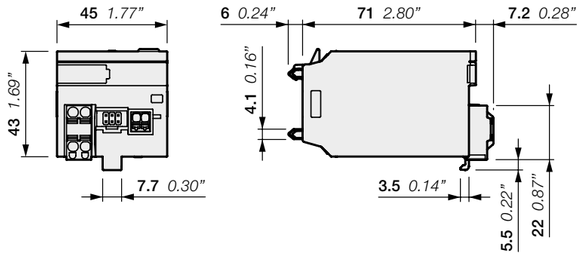
Assembly



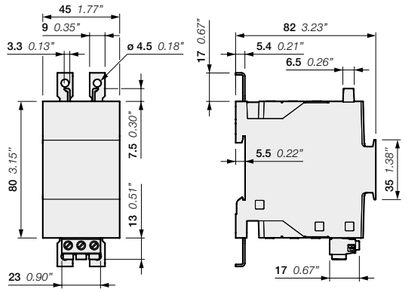


Technical diagrams

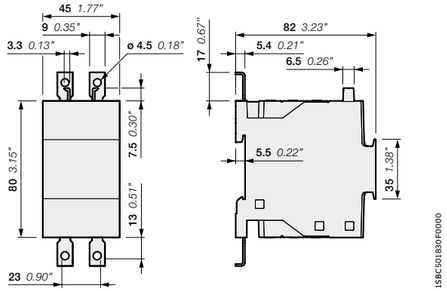
Dimensional drawings
in **mm** and inches



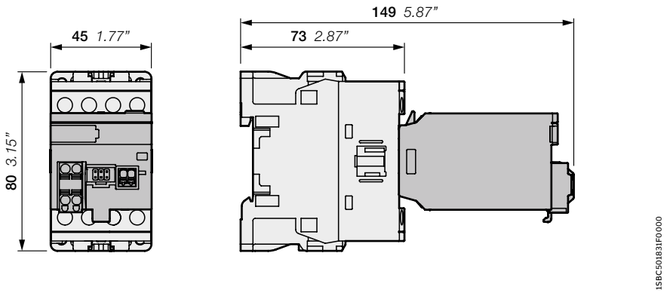
Smart Function Module SFM1



Smart Current and Voltage Sensor Module SCV10-40



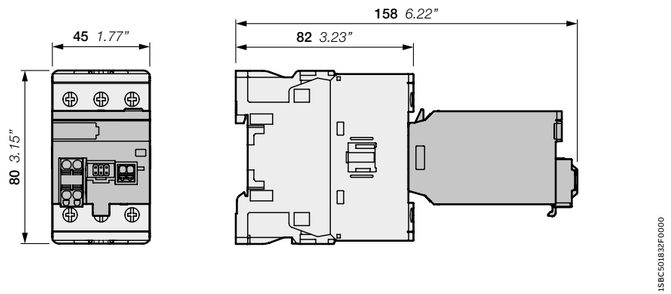
Smart Current Sensor Module SC10-40



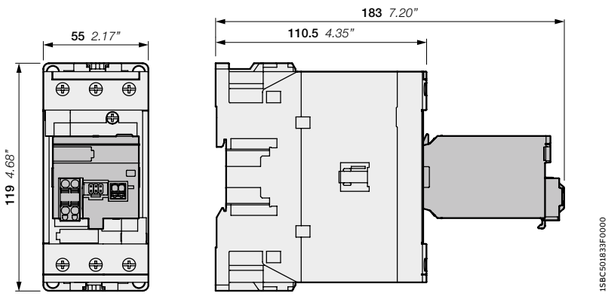
Smart Function Module SFM1 together with AF09...AF16 contactors

Technical diagrams

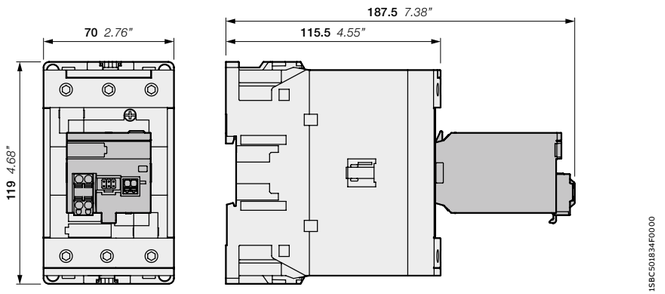
Dimensional drawings
in **mm** and inches



Smart Function Module SFM1 together with AF26...AF38



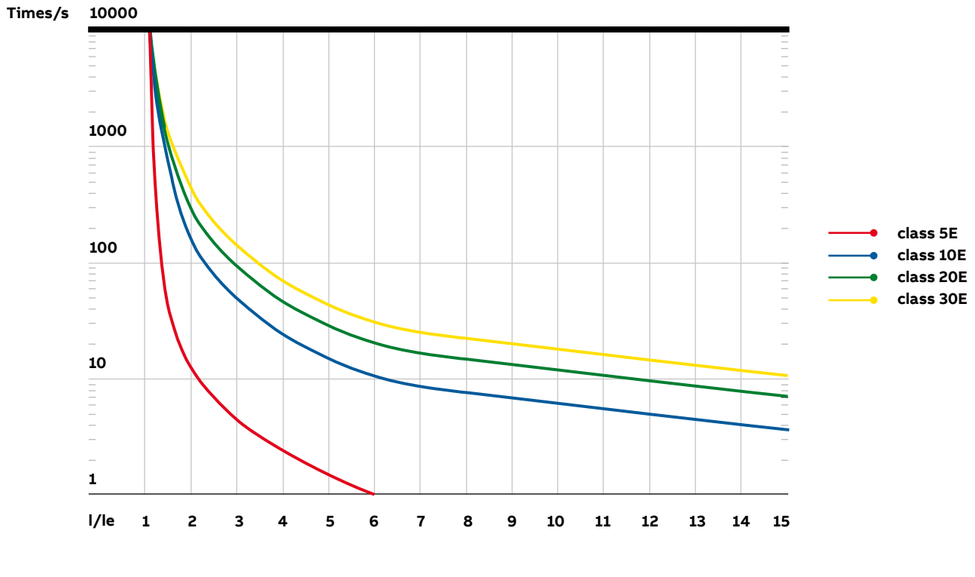
Smart Function Module SFM1 together with AF40...AF65 contactors



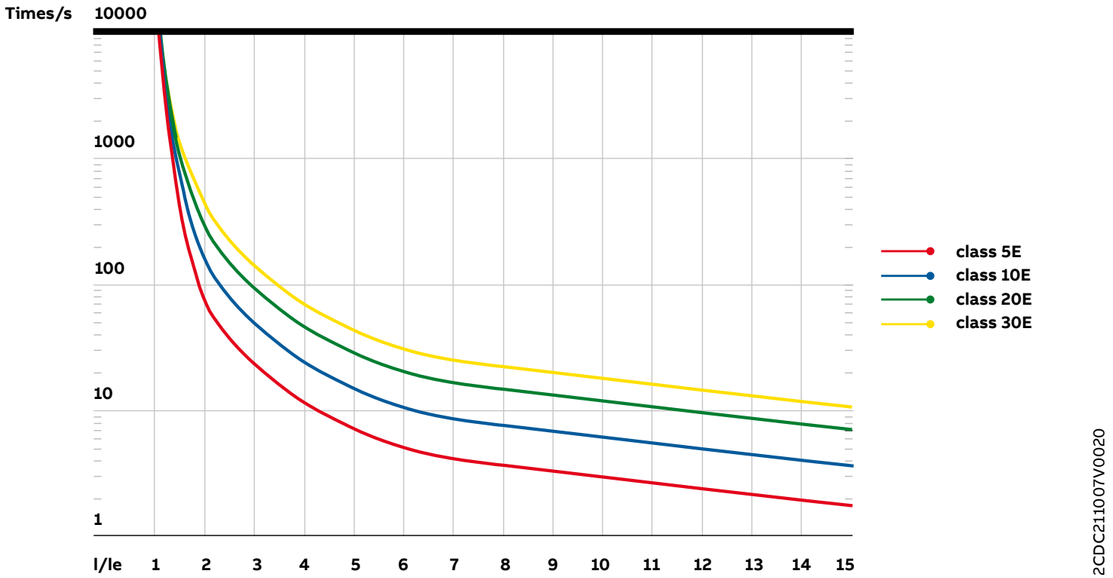
Smart Function Module SFM1 together with AF80, AF96 contactors

Technical diagrams

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



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



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

1SAC200109W0001 Rev. B (01/2022)

Technical details
Smart function module

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

Smart function module

X2X Interface (X4, X5)		
Rated control supply voltage U_s	according to B&R X20 system specification	
Rated control supply voltage U_s tolerance	according to B&R X20 system specification	
Typical current / power consumption (delivered by X2X link power supply output from X20BT9400)	30 mA / 600 mW	
Recommended RJ45 cable	Cat 5e SF/UTP AWG 26 / 1:1 connection Cat 6 S/FTP AWG 27 / 1:1 connection	
Max. distance between nodes Max. distance from X20-BT9400 to first SFM1	20 m	
Max. number of nodes on one X20-BT9400	8	
Max. length of total network from start to last module with 8 modules	160 m	
Grounding	according to B&R X20 system specification, the accessory SFM-CAB-RJTB provides the required grounding of shield	
Minimum cycle time 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.	300 us	
Contactor supply circuit SFM1		
Rated control supply voltage U_s	24 V DC	
Rated control supply voltage U_s tolerance	22 … 31.2 V incl. ripple It must be ensured that the minimum supply voltage is available at the last contactor in a supply chain.	
Typical current / power consumption (AF coil current not considered)	20 mA / 480 mW (SCV40-10 module) 20 mA / 480 mW (SC40-10 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	1	
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	
Mounting	Snapping on AF09 – AF96	
	AF09(Z)...-nn	AF40...-11
	AF12(Z)...-nn	AF52...-11
	AF16(Z)...-nn	AF65...-11
	AF26(Z)...-nn	AF80...-11
	AF30(Z)...-nn	AF96...-11
	AF38(Z)...-nn	
	nn = 11, 21, 30	
Mounting position	on AF contactor. 1-4, 5: max. current = AC-3 current of contactor	
Minimum distance to other units	0 mm for side to side mounting 5 mm to metal parts (e.g. control panel wall)	
Material of housing	UL 94 V0	
Degree of protection	IP20	

Technical details
Smart voltage and current sensor modules

Electrical connection X1, X3		X1	X3
Push-In	1x	0.2...2.5 mm² 24...12 AWG	0.2...1.5 mm² 24...16 AWG
	1x	0.25...2.5 mm²	0.2...1.5 mm²
	1x	0.25...2.5 mm²	0.2...0.75 mm²
	1x	0.2...2.5 mm² 24...12 AWG	0.2...1.5 mm² 24...16 AWG
Spring	1x	0.2...2.5 mm² 24...12 AWG	0.2...1.5 mm² 24...16 AWG
	1x	0.25...2.5 mm²	0.2...1.5 mm²
	1x	0.25...2.5 mm²	0.2...0.75 mm²
Screwdriver type		0.6 x 3.5 mm	0.4 x 2.5 mm
Tightening torque		10 mm	8 mm
Electrical connection X2		use ready-made cables, see accessories.	
Max cable length		0.5 m	
Basic insulation		300 V	
Ensure safe distance from motor wires and other high voltage cables.			

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Smart voltage and current sensor modules

Input circuit		SCV10-40	SC10-40
Nominal frequency		50/60 Hz (45 ... 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 I_e ... 15 x I_e	
Nominal voltage range	3 phase	150 to 690 V AC ± 10 %	-
	1 phase	90 to 400 V AC ±10 %	-
Measurement accuracy given at Ta=25 °C, 50/60 Hz	I_{rms} (range 0.2 * $I_e \leq$ 0.75*I_e)	±3 %	
	I_{rms} (range 0.75 * $I_e \leq$ 2*I_e)	±1,5 %	
	I_{rms} (range >2 * $I_e \leq$ 15*I_e)	±3 %	
	U_{rms}	±1.5 %	-
	power factor ≥ 0.5 (inductive)	typ. ±1.5% (I_{rms} > 3 A)	-
	apparent power	typ. ±3 %	-
	active power (cos phi > 0.5)	typ. ±5 %	-
	frequency (50/60 Hz)	±1.5 %	-
	current imbalance	typ ±10 % (condition: I_{mot} > 150 mA)	
	voltage imbalance	±10 %	-
	voltage total harmonic distortion (THD)	±5 %	-
	current total harmonic distortion (THD)	±10 % (condition: I_{mot} > 1A)	
Measurement range of earth fault current		> 20% of I_e	
Earth fault current		I_e < 1.0 A : ±25 % (condition: I_{mot} > 100 mA and I_{earth} > 80 mA) I_e >1.0 A : ±10 % (condition: I_{mot} > 200 mA and I_{earth} > 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 CurrPhaseLossDelayPar. adjustable from 0 ... 25.5 s	
Load per phase		approx. 30 mΩ	
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/soc/	
Max cross-section of wires. Use isolated wires only!		16 mm²	

Technical details
Smart voltage and current sensor modules

Input circuit		SCV10-40	SC10-40
Conductor holes in the current transformers		13 mm	
Performance under short-circuit conditions Coordination type 2 I_q: Rated conditional short circuit current	Iq	100 kA	80 kA
		500 V AC	690 V AC
	fuse	200 A gG	200 A gG
Additional information relating to cULus approval		suitable for use on circuits capable of delivering not more than 100 kA rms, symmetrical, 600 V AC maximum, when protected by 100 A, class K5/RK5 fuses, use fuses only	
Electrical connection X1			
Connecting capacity	1x	0.2...2.5 mm² 24...12 AWG	
	1x	0.2...2.5 mm² 24...12 AWG	
	1x	0.2...2.5 mm²	
	1x	0.2...2.5 mm²	
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	

Technical details
Common technical data

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Common technical data

Environmental data (common)				
			SFM1	**SCV**
Ambient temperature ranges		operation	-25 to +60°C	
		storage	-40 to +70°C	
Damp heat, cyclic (IEC/EN 60068-2-30)			6 x 24 h cycle, 55 °C, 95 % RH	
Climatic class IEC/EN 60721-3-3			3K3 (no condensation, no ice formation) Relative humidity 5 % - 95 %, no condensation	
Vibration, sinusoidal			4 g, 5-300 Hz	
Shock			15 g, 11 ms	
Isolation data of contactor module in combination with contactor (and sensor module)				
Rated insulation voltage U_i		acc. to IEC 60947-4-1	690 V	
		acc. to UL / CSA	600 V	
Rated impulse withstand voltage U_{imp} SFM: Control supply, bus / mains contactor SCN: X2 (voltage input) to control supply, bus			6 kV	
Basic insulation			according to technical data of contactor	
Protective separation pollution degree 3			L/N: 277 V AC L/L: 480 V AC	
Protective separation pollution degree 2			L/N: 400 V AC L/L: 690 V AC	
Pollution degree			3	
Overvoltage category			III	
Installation altitude without derating			max. 2000 m	
Deratings at high altitudes			on request	
Standards / Directives				
Standards			IEC/EN 60947-1:2020 (Ed. 6.0) / EN 60947-1:2007 + A1:2011 + A2:2014 IEC/EN 60947-4-1:2019 UL 60947-4-1:2014 (Ed. 3) UL 60947-1:2013 (Ed. 5)	
Low Voltage Directive			no. 2014/35/EU	
EMC directive			no. 2014/30/EU	
RoHS directive			no. 2011/65/EU incl. 2015/863/EU	
Electromagnetic compatibility				
Emission requirements	radio interference voltage	EN 61000-6-4	X	
		EN 61000-6-3		X
	radio interference field strength	CISPR 11	class A	class B
Immunity requirements	electrostatic discharge	EN 61000-4-2	6 kV contact 8 kV air	
	radiated, radio frequency electromagnetic field amplitude modulated	EN 61000-4-3	10 V/m (80-6000 MHz)	
	electrical fast transients (burst)	EN 61000-4-4	2 kV (power supply lines) 1 kV (signal lines)	
	surge, unsymmetrical / symmetrical	EN 61000-4-5	1 kV / 0.5 kV (DC-supply) 2 kV / 1 kV (measurement lines)	
	conducted disturbance, induced by radio frequency, common mode, amplitude modulated	EN 61000-4-6	10 V	
Performance data				
Cycle time in contactor module: “switch on signal” received via X2X until contactor control voltage set to 24 V DC			typ. 5 ms	
Update rate of measurement values provided from sensor module and available for X2X communication			typ. 25 ms	

According to the current interpretation of applicable Chinese law the Novolink devices described in this document are imported as industrial automation equipment (they cannot be used without a PLC) and do not need CCC certification.