CATALOG

Smart temperature monitoring relays

Set up these innovative temperature monitoring relays exactly as you need, either via a back-lit LCD or smartphone app. Parametrization and configuration are just one touch away with the ABB EPiC app – even in a non-powered state – reducing installation time by 80%.

By keeping an eye on temperatures – either from the cloud, in a control room, or locally – operators can help minimize cost and risk while maximizing performance and safety.

Smart monitoring relays
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One look, one touch – one device
Features and benefits

Set up these innovative temperature monitoring relays exactly as you need, either via a back-lit LCD or smartphone app. Parametrization and configuration are just one touch away with the ABB EPiC app – even in a non-powered state – reducing installation time by 80%. And with just one relay covering a wide range of application, stocks can be reduced significantly, making ABB's Smart monitoring relays a true game changer.

Easy to install

One look - back-lit LCD for easy reading and parametrization
Everything you need at a glance: the LCD at the front of the relay shows the currently measured values and maintenance data. And with just one push, the symbol-based menu structure can be accessed via the push-rotate button. Simply set the thresholds and parameters with the help of an intuitive and future-ready interface.

Optimum interface

One touch - NFC parametrization via smartphone app
One touch is all that is needed for fast, easy and intuitive configuration with the ABB EPiC smartphone app. Simply touch the relay with your mobile phone: parameter settings can be edited and stored in the app and then copied to different devices, even if they are not in the powered state. Available in a range of different languages, installation and configuration have never been so easy.

Continuous operation

One device - for thermal protection and condition monitoring
By providing early detection of unacceptable temperature rises and alerting the operator to the need for maintenance, temperature monitoring ensures that applications remain operational and asset lifetime is improved. Thermal protection and condition monitoring can also be accomplished remotely via a Modbus RTU and ABB Ability™ Energy Manager and ABB Ability™ Asset Manager*. Remote management improves safety as personnel no longer need access to the switchboard to read measurements.

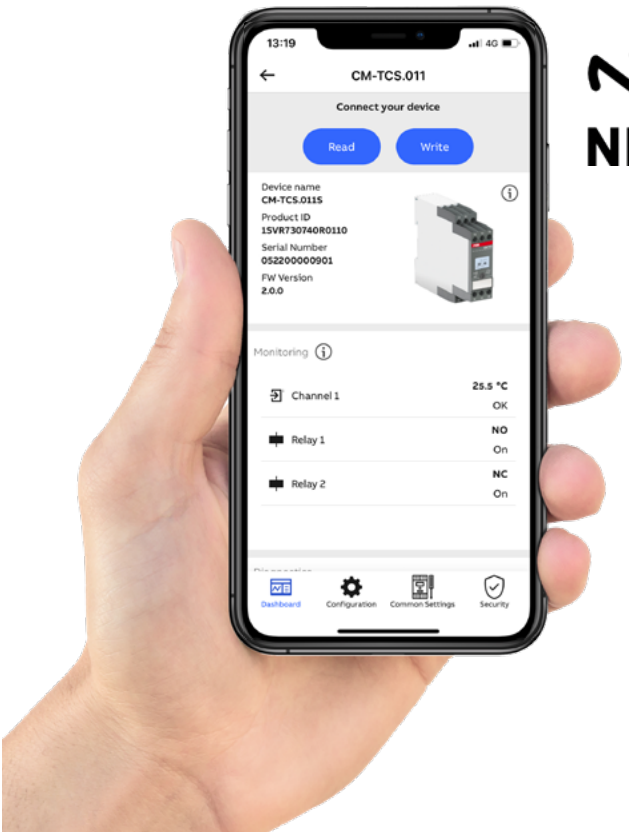
*Available with CM-TCN.012.

Smart temperature monitoring relays
Setup via display or smartphone app

The temperature monitoring relays can measure temperatures of solids, liquids and gaseous media in up to three sensor circuits using various types of sensors.

One...

look **to have the information needed**
the display shows the measured values and relay status at a glance. The symbol-based menu structure and presettings make parametrization simple.



NFC

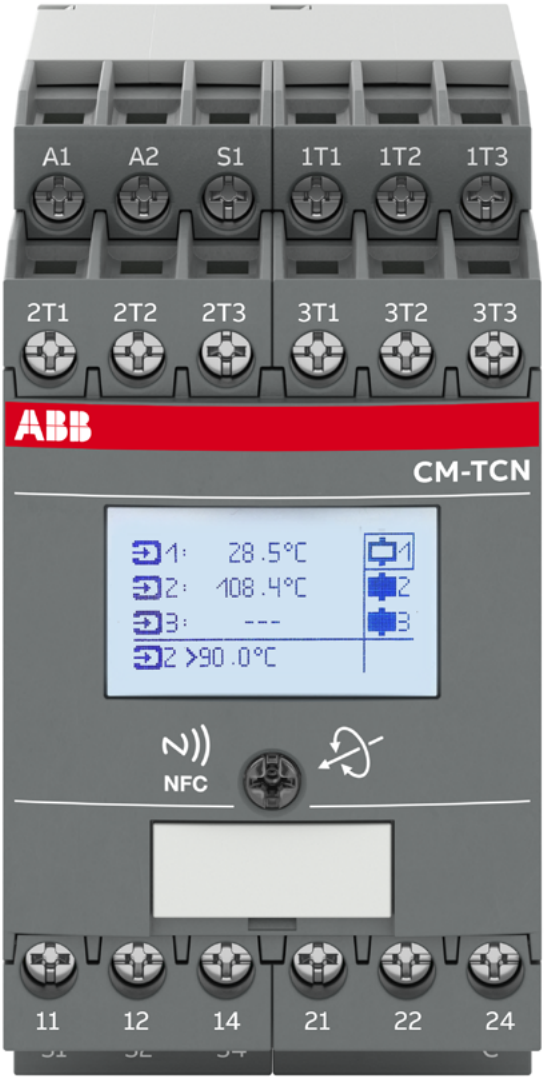
touch **for up to 80% faster setup**
for easy parametrization and copying of settings between multiple devices via NFC with the ABB EPiC smartphone app – even if the relay is not powered.

device **for thermal protection and condition monitoring**
Just one relay to cover many different applications, monitor their condition, improve safety and ensure uptime.

One look - back-lit LCD

Easy reading and setup with one push

Just one look is all it takes to see the status and measured values of the relay, easily navigate through the symbol-based menu and even configure the device with the new, back-lit LCD at the front of the relay.



Start screen
Know the status at one glance.

Symbol-based menu structure
Due to the symbol-based menu structure, there is no need for any translation, which helps avoid misunderstandings and dramatically increases efficiency in after sales support.

Pre- and user-defined settings
For frequently used applications, the device offers predefined settings to save installation time. Parameters can be individually set and saved in one of four user settings.

Simulation mode
Simulation of temperature values to test the relay configuration or simulation of the relays trip for commissioning or testing.

Push-rotate adjustment
Adjust the relay with a simple screw driver by pushing and rotating the potentiometer to navigate through the menu.

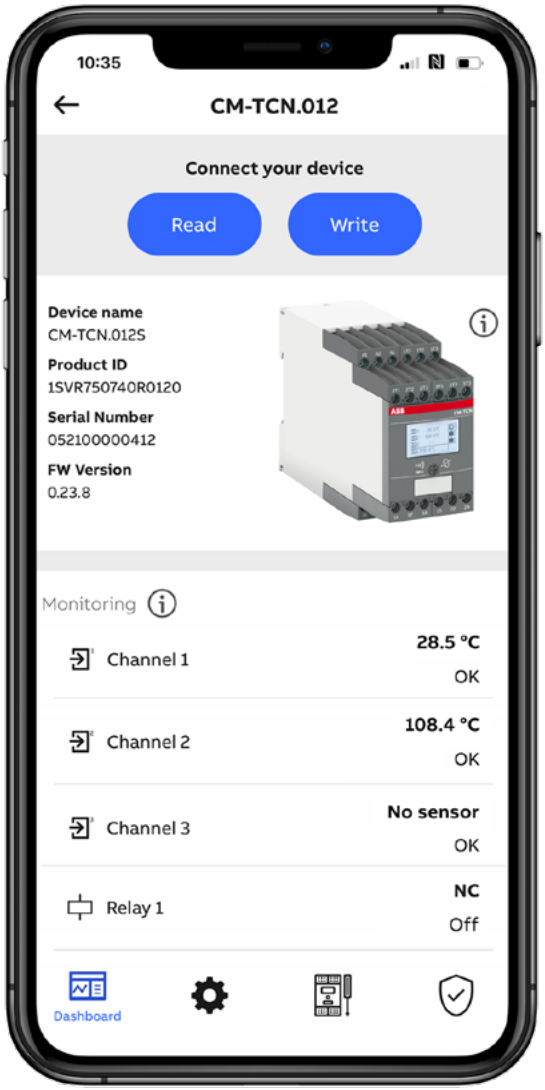
Diagnostic data
Event history, operating hours counter, statistics and others are easily accessible from the menu

Back-lit LCD
The back-lit LCD at the front of the relay shows the currently measured values and maintenance data and makes setup easy.

Password & parameter lock
Improved security is achieved through the password protection and parameter lock.

One touch - setup via smartphone app
Powerless configuration with NFC

Configuration and parametrization of temperature monitoring relays has never been simpler. One touch is all that is needed for fast, easy and intuitive configuration with the ABB EPiC mobile phone app.



Near Field Communication (NFC)
NFC is an international transmission standard based on radio-frequency identification technology for the contact-less exchange of data. This technology is already integrated into most electronic devices like tablets and smartphones and part of everyday life, e.g. for contactless payment.

ABB EPiC smartphone app
Electrification Products intuitive Configurator (EPiC) is a mobile application that makes it possible to configure and check the status of ABB low voltage products. The app is available for free - just download it and connect to your smart monitoring relays, circuit breakers and other devices.

Easy visualization
Monitor the status of the relay and read the measured values in the app.

Store and send parameters
Store a set of parameters in the app and distribute them globally and copy them to other devices.

Powerless adjustment
Parametrize and configure the relays even while not connected to a power supply, e.g. on office desks.

One touch setup
Handle the relays with just one touch- just hold the smartphone against the front of the relay.

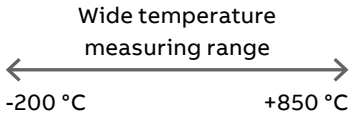
Copy and paste functionality
Simply copy the settings from one device to another–with just one touch to the relay.

Event history
Examine the history of the device and recent events.

One device - thermal protection
Flexible adjustment and condition monitoring

Knowing the status of your devices at all times: thanks to the smart monitoring relays, you are always up to date and flexible in controlling your devices. Remote monitoring via Modbus RTU and ABB Ability™ Energy Manager and ABB Ability™ Asset Manager also enables the early detection of potential errors and possible maintenance requirements.

Flexible adjustment
The smart monitoring relays are configurable over a wide setting range and can be adjusted flexibly no matter the thresholds, time values or other settings. For example, first relay can be assign as pre-alarm and second as alarm. Nine signals in CM-TCN and six signals in CM-TCS are available for assignment to allow various combination of tripping thresholds.



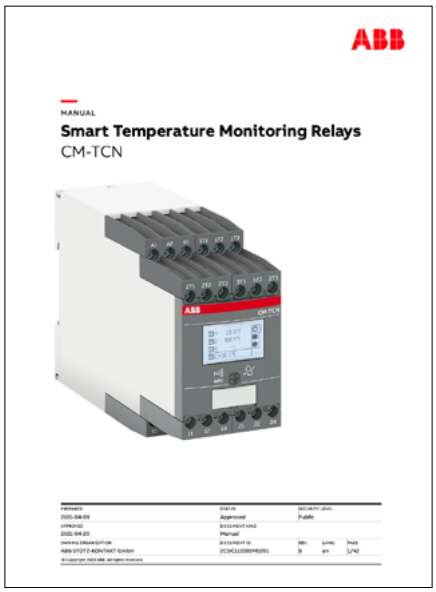
Early detection of potential fault and need for maintenance
Thanks to support of the most commonly used sensors (PTC, PT100, PT1000, NTC), the smart temperature relay can be used for temperature monitoring of busbars and cables allowing detecting the issues related to tightening, which results in the need for maintenance. In addition, the relay can be used for temperature monitoring of electrical motor's bearings and windings allowing to sense unacceptable temperature rise that shorten the lifetime of equipment.

Improve safety
The smart monitoring relays improves safety thanks to remote temperature monitoring using Modbus RTU or ABB Ability™ Energy and ABB Ability™ Asset Manager. The personal no longer need to access to the switch-board to read the measurements*.

*Available with CM-TCN.012.

Built-in connectivity
Communication via embedded Modbus RTU

The smart temperature monitoring relay CM-TCN.012 supports the data transfer using the Modbus RTU communication protocol. The communication interface RS-485 is embedded in the relay and does not require installation of any accessories.



CM-TCN manual
Modbus communication map and information about the device configuration can be found in the CM-TCN user manual

The communication interface makes it possible to:

Read the temperature measurements, relays state and temperature sensors status.

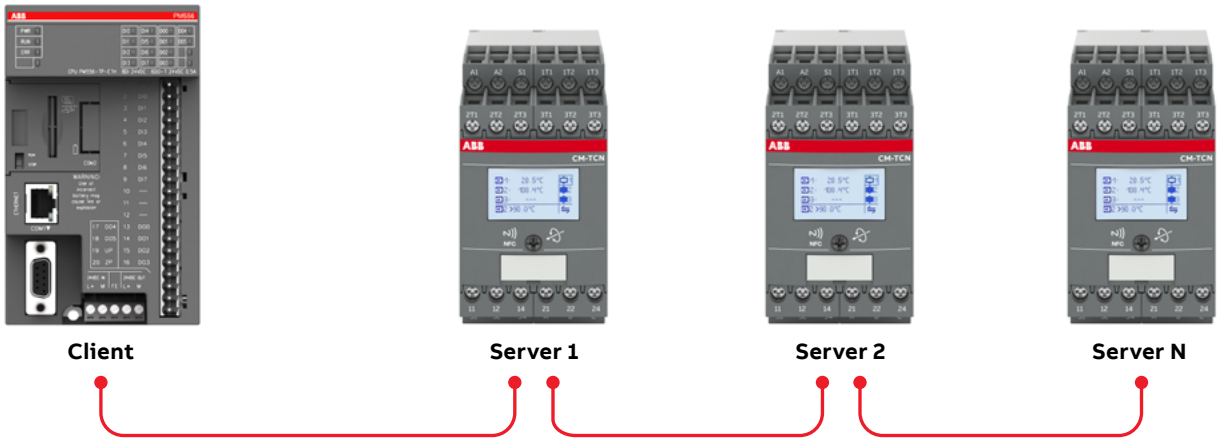
Reset the history and settings (trip counter, event history, etc)

Access the diagnostic data such as event history, operating hours counter, maintenance counter, statistics.

Read system information (serial number, firmware version)

Configure the smart monitoring relay remotely.

Control output relays and trigger them in case of the communication bus error



Cloud integration with ABB Ability™
Data monitoring and temperature trends

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

The CM-TCN.012 smart monitoring relay is enabled in ABB Ability™ Energy Manager and ABB Ability™ Asset Manager. Thus, allowing access to the data monitoring and temperature trends from the cloud solution.

The data received from CM-TCN.012 is organized in user friendly widget for the remote condition monitoring of assets such as a machine, motor, transformer or switchboard. The temperature trends can be compared between different measuring sensors giving you valuable insights about temperature behavior of your assets at the place of the sensors´ installation.

SMS or E-mail alerts to notify key personnel in case of the temperature relay tripping or sensors error. The periodic report with temperature values can also be scheduled.

CM-TCN.012 can be connected to the cloud-computing platform via Modbus RS-485 communication interface. The interface is embedded in the device and does not require any accessories.

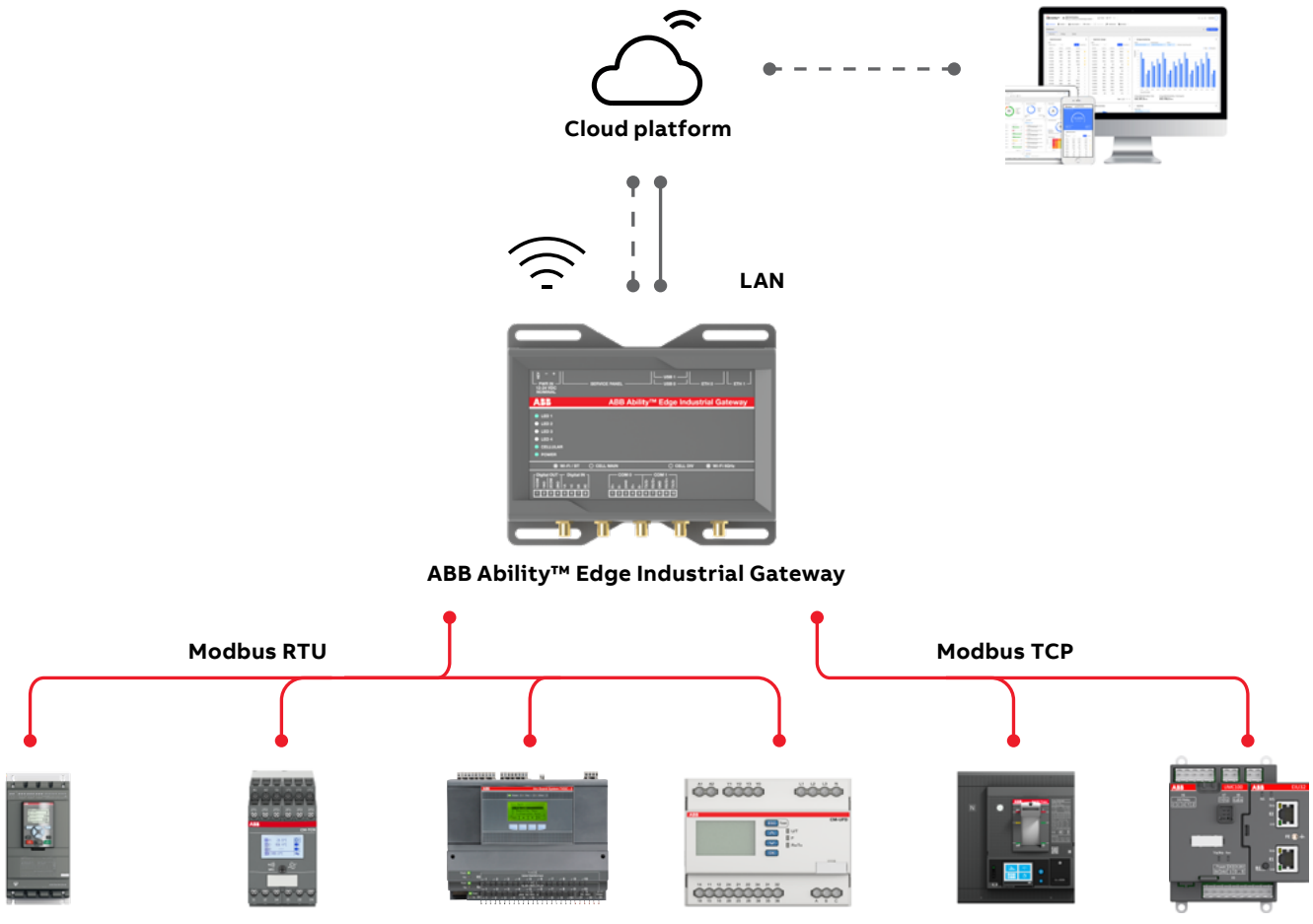
The smart relay can share the data with the platform using two options:
- Option A: Emax 2, Ekip Up, Tmax XT and TruONE equipped with the Ekip Com Hub
- Option B: External solution with ABB Ability™ Edge Industrial Gateway

ABB Ability™ Energy Manager and ABB Ability™ Asset Manager

Example communication architecture
ABB Ability™ Energy Manager enabled relay

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

Option B: 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

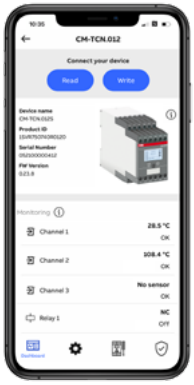
Integrate a range of devices like circuit breakers, motor controllers and the new CM-TCN.012 monitoring relay into the ABB Ability™ Energy Manager and ABB Ability™ Asset Manager. It is a state-of-the-art cloud solution that integrates energy and asset management in a single intuitive dashboard. Providing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

Applications

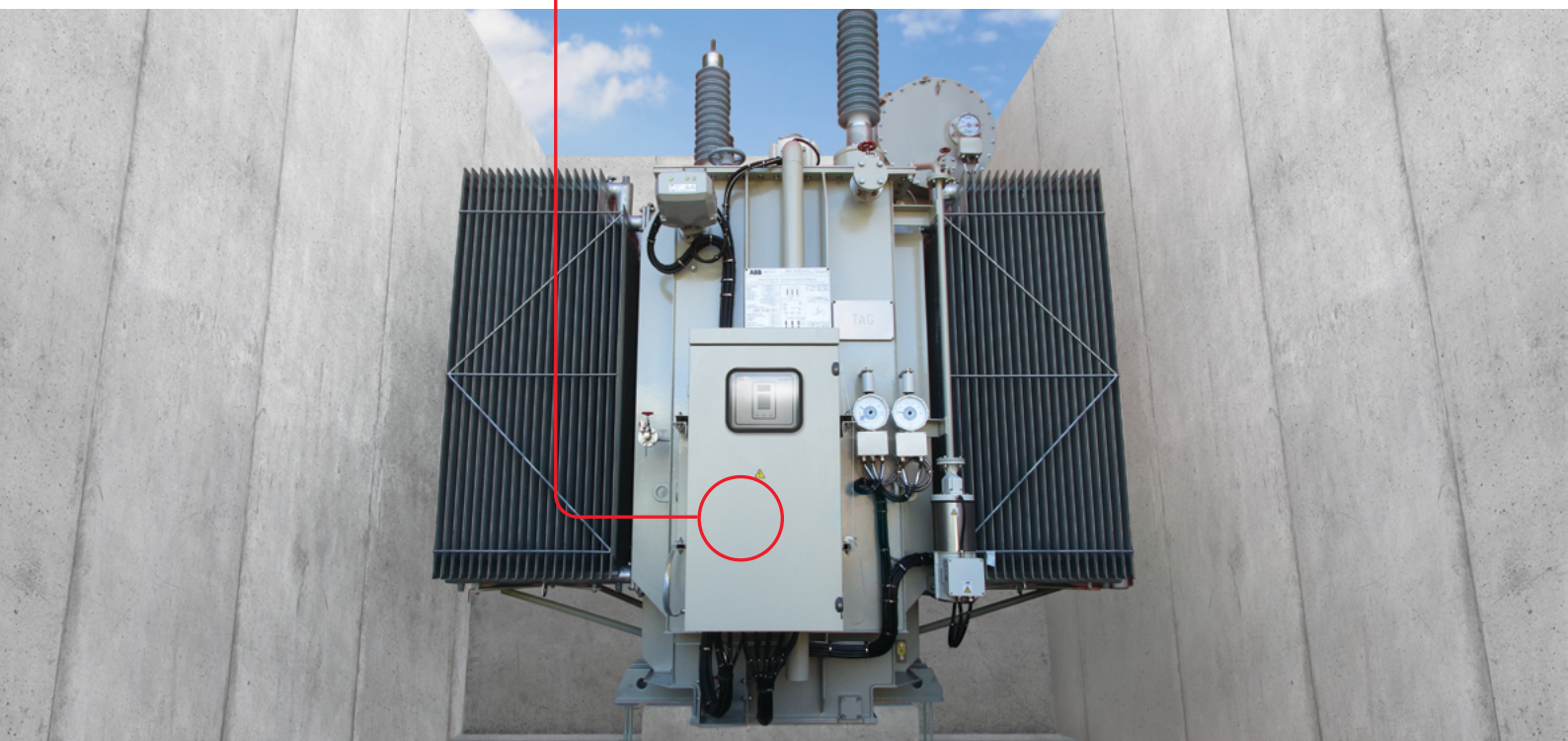
Temperature monitoring relays are used in a wide array of applications. In conjunction with temperature sensors, such as PT100 or PTC sensors, they monitor motor temperature, control cabinet temperature and protect transformers from overheating.

—
Temperature sensor, e.g. PT100

—
Smart temperature monitoring relay



—
ABB EPiC smart-phone app



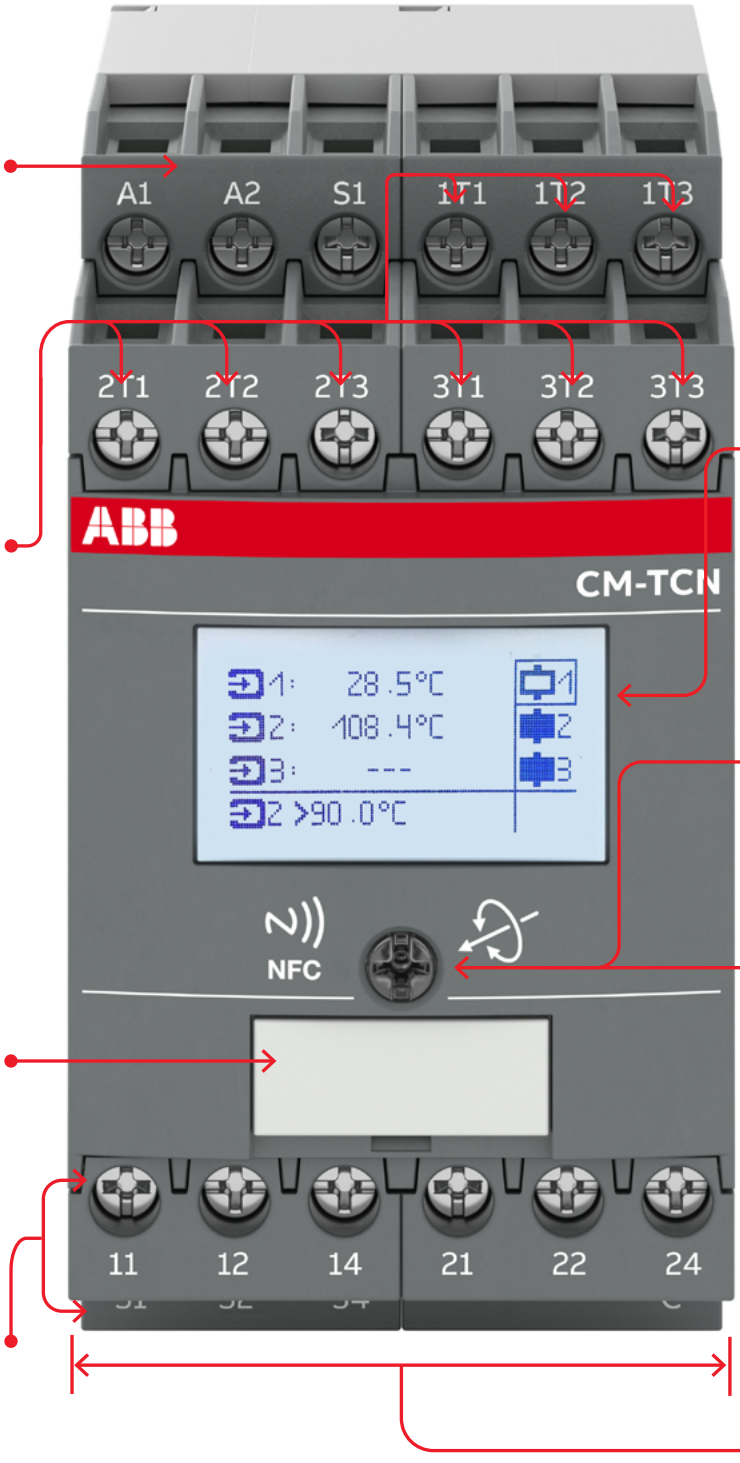
Operating controls CM-TCN

Push-in and screw terminals

3 measuring inputs
PT100, PT1000, PTC, NTC, bi-metal switch

Marker label

Connection terminals
Wide terminal spacing allows connection of wires: 2 x 1.5 mm² (2 x 16 AWG) with wire end ferrules or 2 x 2.5 mm² (2 x 14 AWG) without ferrules.



Back-lit LCD
Symbol-based menu structure

Push-rotate button
Intuitive operation with just one button

LED status indication

Output circuits
3 c/o (SPDT) contacts configurable

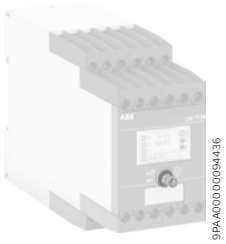
Width 45 mm


A1
A2
T1
T2
T3
ABB
CM-TCS
25.5°C
>20.0°C
NFC
11
12
14
21
A1
A2
S1
1T1
1T2
1T3
2T1
2T2
2T3
3T1
3T2
3T3
ABB
CM-TCN
1: 28.5°C
2: 108.4°C
3: ---
2 >90.0°C
NFC
11
12
14
21
22
24

Smart monitoring relays
Ordering details

CM-TCS

CM-TCN



OPR.01

Description

The temperature monitoring relays CM-TCS and CM-TCN are able to measure temperatures of solids, liquids and gaseous media using different types of sensors, such as PT100, PT1000, PTC, NTC or bi-metal switch. CM-TCN allows to connect up to three sensor circuits, different types of sensors, e.g. PT100 and PTC sensors, can be monitored simultaneously. CM-TCS allows to connect one sensor circuit. The temperature is obtained by the sensors in the medium, evaluated by the device and monitored to determine whether it is within an operating range (range monitoring function) or has exceeded or fallen below a threshold. Depending on the parametrization, output relays signalize the changes in the measuring circuits.

Smart temperature monitoring relays

Rated control supply voltage	Terminal type	Number of measuring circuits	Modbus RTU	Temperature sensor	Width mm	Type	Order code	Weight (1 pc) kg (lb)
24-240 V AC/DC	Screw	1	no	PT100, PTC, PT1000, NTC	22.5	CM-TCS.011S	1SVR730740R0110	0.172 (0.379)
	Push-in					CM-TCS.011P	1SVR740740R0110	0.172 (0.379)
	Screw	3			45	CM-TCN.011S	1SVR750740R0110	0.293 (0.646)
	Push-in					CM-TCN.011P	1SVR760740R0110	0.293 (0.646)
	Screw		yes			CM-TCN.012S	1SVR750740R0120	0.299 (0.659)
	Push-in					CM-TCN.012P	1SVR760740R0120	0.299 (0.659)

Accessories

Description	for type	Width mm	Type	Order code	Pkg qty	Weight (1 pc) g (oz)
Operating element for push-rotate button	CM-TCS.011 CM-TCN.01x		OPR.01	1SVR730007R0100	10	15 (0.53)
Adapter for screw mounting	CM-N.S/P	45	ADP.02	1SVR440029R0100	1	36.7 (1.30)
	CM-S.S/P	22.5	ADP.01	1SVR430029R0100	1	18.4 (0.65)
Marker label	CM-S.S/P CM-N.S/P		MAR.01	1SVR366017R0100	10	0.19 (0.007)
Sealable transparent cover	CM-N.S/P	45	COV.12	1SVR750005R0100	1	7.0 (0.247)
	CM-S.S/P	22.5	COV.11	1SVR730005R0100	1	4.0 (0.129)

Smart monitoring relays
Technical data

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

Type		**CM-TCS.011**	**CM-TCN.011**	**CM-TCN.012**
Input circuit		**A1-A2**		
Rated control supply voltage U_s		24-240 V AC/DC*		
Rated control supply voltage U_s tolerance		-15 ... +10 %		
Rated frequency	AC	50 - 60 Hz		
Frequency range	AC	45 - 66 Hz		
Typical current consumption	24 V DC	typ. 25 mA / max. 36 mA	typ. 30 mA / max. 40 mA	
	115 V AC	typ. 25 mA / max. 20 mA	typ. 16 mA / max. 20 mA	
	230 V AC	typ. 25 mA / max. 15 mA	typ. 13 mA / max. 15 mA	
Power failure buffering time		min. 20 ms		
Measuring circuits		**T1, T2, T3**	**xT1, xT2, xT3**	
Number of meausiring circuits		1	3	
Sensor type		PT100, PT1000**, PTC, NTC (type: B57227K), bi-metal switch		
Connection of the sensor	2-wire	yes, jumper xT2 - xT3		
	3-wire	yes, use terminal xT1, xT2, xT3		
Interrupted wire detection		yes		
Short-circuit detection		yes		
Measuring ranges	PT100	-200 °C ... +850 °C / -328 °F ... +1562 °F		
	PT1000	-200 °C ... +850 °C / -328 °F ... +1562 °F**		
	NTC	+80 °C ... +155 °C / +176 °F ... +311 °F		
	PTC	max. total resistance of connected resistors in cold state <750 Ohm		
Monitoring functions		undertemperature, overtemperature, window monitoring		
Measuring input range		-200 ... +850 °C / -328 ... +1562 °F		
Hysteresis related to the threshold values		1 ... 99.9 °C / 1.8 ... 179.8 °F		
Measuring principle		continuous current		
Typical current in the sensor circuit	PT100	0.5 mA		
	PT1000	0.5 mA		
Maximum current in sensor circuit		0.5 mA		
Measuring accuracy		± 0.5 K (-50 ... +200 °C / -58 ... +392 °F) ± 1 K (< -50 °C / -58 °F and > 200 °C / 392 °F)		
Accuracy within the rated control supply voltage tolerance		< 0.05 % full scale/1 V		
Accuracy within the temperature range		< 0.05 % full scale/1 K		
Repeat accuracy (constant parameters)		± 0.07 % full scale		
Maximum measuring cycle		< 2 s		
Maximum cable length		500 m / 1 mm^2 (shielded cable)		
Control circuits				
Type of triggering		-	volt-free triggering	
Control function	S1	-	remote reset	
Maximum input current		-	< 1.5 mA	
Maximum no-load voltage at the control inputs		-	< 15 V	
Minimum control pulse length		-	150 ms	
Maximum cable length at the control inputs		-	100 m - 100 pF/m	

* CM-TCN.011: supply voltage 24-240 V AC/DC for revision G or later and supply voltage 24 V AC/DC for revision F or earlier.
** When CM-TCN is used with PT1000 sensors, a bridge must be installed between terminals xT2 and xT3 of unused measuring circuits. The bridge must also be installed between open terminals xT2 and xT3 when CM-TCN is used with one or two PT1000 in combination with PTC or NTC or bimetal switch.

Smart monitoring relays
Technical data

Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
Timing functions				
Power-on delay		2-999.9 s		
ON-delay*		0-6553.5 s		
OFF-delay*		0-6553.5 s		
Cyclic switching function	On time	1 min - 1 day		
	cycle time	10 min - 1 year		
Indication of operational states				
Control supply voltage applied		LED green		
Cyclic switching function running		LED orange		
Internal fault		LED red on		
Short circuit		LED red: ⎍⎍⎍⎍		
Wire break		LED red: ⎍⎍⎍⎍		
Overtemperature / Measurement value exceeds high limit		LED red: ⎍⎍⎍		
Undertemperature / Measurement value exceeds low limit		LED red: ⎍⎍⎍⎍		
Parameter error		Orange and red LEDs alternate		
NFC pairing		LED orange: ⎍⎍⎍		
For details see the message on the display				
Display				
Technology		LCD		
Backlight	on	press button		
	off	switch-off delay adjustable, 10 s -1 h (default 10 s)		
Resolution		64 x 48 pixel	128 x 64 pixel	
Display size		12.14 x 12.78 mm	25.58 x 12.78 mm	
Operating controls				
Push-rotate button		Operable with screw driver: PZ1 DIN ISO 8764-1		
Near field communication (NFC)				
Standards		ISO/IEC 14443 Part 2+3 NFC Forum Type 2 tag compliant		
Communication interface				
Communication protocol		-		Modbus RTU
Physical interface		-		two-wire RS-485
Integrated termination resistors		-		no
Possible bus addresses		-		1 ... 247
Baud rates		-		1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 B/s
Typical response time		-		< 30 ms
Bus master supervision time / Timeout		-		adjustable 1 … 255 s in steps of 1 s
Frame		-		8 data, Even, 1 stop 8 data, Odd, 1 stop 8 data, None, 2 stop 8 data, None, 1 stop

* If the selected ON-delay or OFF-delay is less than 2 s, the maximum measuring cycle should be taken into account.

Smart monitoring relays

Technical data

Type			**CM-TCS.011**	**CM-TCN.011**	**CM-TCN.012**
Output circuits					
Kind of outputs		11-12/14	relay R1, c/o (SPDT) contact		
		21-22/24	relay R2, c/o (SPDT) contact		
		31-32/34	-	relay R3, c/o (SPDT) contact	
Operating principle		open- or closed circuit principle*	configurable		
Contact material			AgNi alloy, Cd-free		
Maximum switching voltage / maximum switching current			see "Load limit curves"		
Rated operational voltage U_e and rated operational current I_e		AC-12 (resistive) at 230 V	4 A		
		AC-15 (inductive) at 230 V	3 A		
		DC-12 (resistive) at 24 V	4 A		
		DC-13 (inductive) at 24 V	2 A		
Mechanical lifetime			30 x 10^6 switching cycles		
Electrical lifetime		at AC-12, 230 V AC, 4 A	0.1 x 10^6 switching cycles		
Maximum fuse rating to achieve short-circuit protection		n/c contact	6 A fast-acting		
		n/o contact	10 A fast-acting		
Conventional thermal current I_{th}			4 A		
General data					
MTBF			on request		
Duty cycle			100 %		
Dimensions			see "Dimensional drawing"		
Mounting			DIN rail (IEC/EN 60715) TH 35-7.5 and TH 35-15, snap-on mounting without any tool		
Mounting position			any		
Minimum distance to other units		horizontal	not necessary		
Material of housing			UL 94 V-0		
Degree of protection		terminals	IP20		
Electrical connection			**CM-TCS.011S, CM-TCN.011S, CM-TCN.012S**		**CM-TCS.011P, CM-TCN.011P, CM-TCN.012P**
Connecting capacity	fine-strand with/ without wire end ferrule	A1, A2, R1, R2, R3, S1, C	1x 0.5-2.5 mm² (1x18-14 AWG) 2 x 0.5-1.5 mm² (2x18-16 AWG)		2x0.5-1.5 mm² (2x18-16 AWG)
		xT1, xT2, xT3, A, B, C	1x 0.2-2.5 mm² (1x24-14 AWG) 2 x 0.2-1.5 mm² (2x24-16 AWG)		2x0.2-1.5 mm² (2x24-16 AWG)
	rigid	A1, A2, R1, R2, R3, S1, C	1x 0.5-4 mm² (1x20-12 AWG) 2 x 0.5-2.5 mm² (2x20-14 AWG)		2x0.5-1.5 mm² (2x20-16 AWG)
		xT1, xT2, xT3, A, B, C	1x 0.2-4 mm² (1x24-12 AWG) 2 x 0.2-2.5 mm² (2x24-14 AWG)		2x0.2-1.5 mm² (2x24-16 AWG)
Stripping length			8 mm (0.32 in)		-
Tightening torque		< 0.5 mm²	0.5 Nm (4.43 lb.in)		-
		≥ 0.5 mm²	0.6 - 0.8 Nm (7.08 lb.in)		-

* Closed-circuit principle: Output relay de-energizes if a fault is occurring
Open-circuit principle: Output relay energizes if a fault is occurring

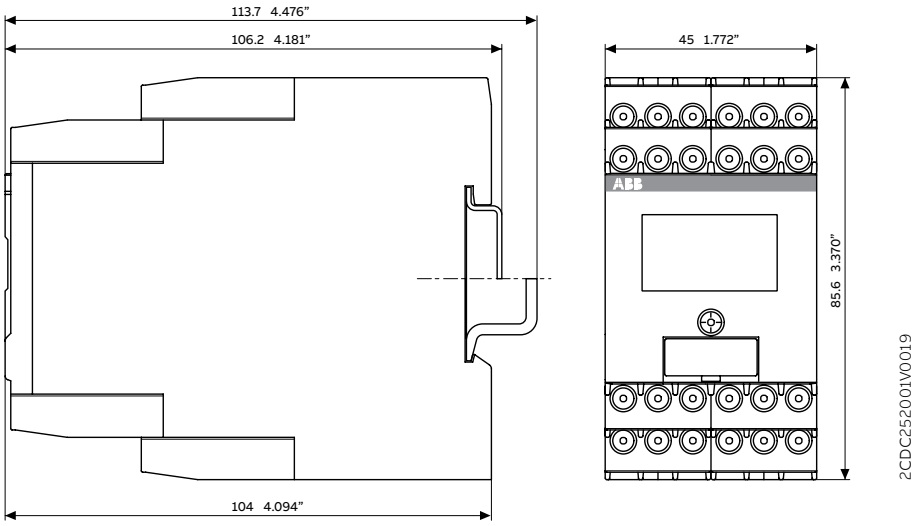
Smart monitoring relays

Technical data

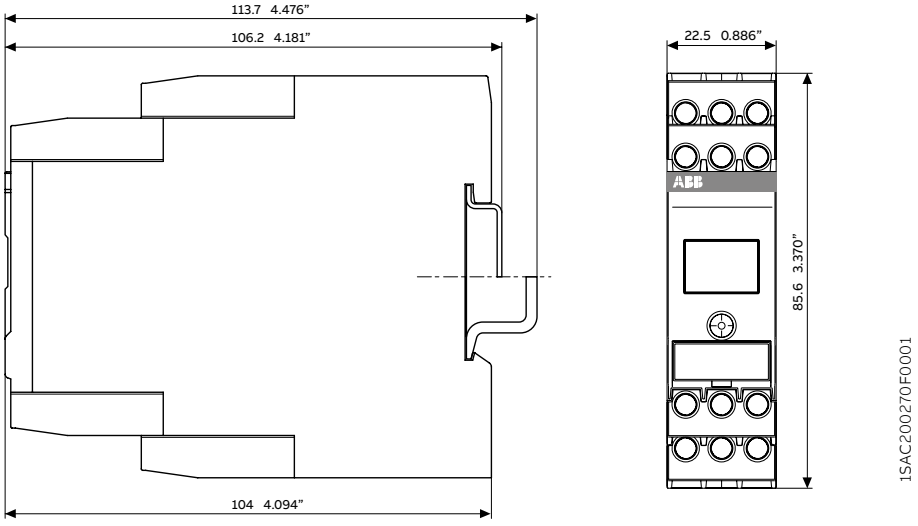
Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
Environmental data				
Ambient temperature ranges	operation	-25 °C...+60 °C (-13...+140 °F)		
	storage	-40 °C...+85 °C (-40...+185 °F)		
Damp heat, cyclic	IEC/EN 60068-2-30	6 x 24 h cycle, 55 °C, 95 % RH		
Climatic class	IEC/EN 60721-3-3	3K5 (no condensation, no ice formation)		
Vibration, sinusoidal		class 1		
Shock		class 1		
Isolation data				
Rated impulse withstand voltage (U_{imp}) EN/IEC60664-1	supply circuit / measuring circuit and modbus / output circuits (relay)	6 kV		
	output circuit 1 / output circuit 2 / output circuit 3	4 kV		
Rated insulation voltage U_i Basic insulation	supply circuit / measuring circuit and modbus / output circuits (relay)	600 V		
	output circuit 1 / output circuit 2 / output circuit 3	300 V		
Protective separation IEC/EN 61140	supply circuit / measuring circuit and modbus / output circuits (relay)	300 V		
	output circuit 1 / output circuit 2 / output circuit 3	150 V		
Pollution degree		3		
Overvoltage category		III		
Standards/Directives				
Standards		IEC/EN 60947-5-1		
Low Voltage Directive		2014/35/EU		
EMC Directive		2014/30/EU		
RoHS Directive		2011/65/EU incl. 2015/863/EU		
WEEE Directive		2012/19/EU		
RED Directive		2014/53/EU		
Electromagnetic compatibility				
Interference immunity to		IEC/EN 60947-5-1		
electrostatic discharge	IEC/EN 61000-4-2	level 2, 4 kV contact discharge, 8 kV air discharge		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	level 3, 10 V/m		
electrical fast transient / burst	IEC/EN 61000-4-4	level 3 / 2 kV, 5 kHz		
surge	IEC/EN 61000-4-5	supply circuit: level 3; L-L 1 kV, L-PE 2 kV relay circuit: level 3; L-PE 2 kV measuring circuit, remote S1: level 2; L-PE 1 kV		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	level 3, 10 V		
voltage dips, short interruptions and voltage variations	IEC/EN 61000-4-11	class 3		
Interference emission		IEC/EN 60947-5-1		
high-frequency radiated		fulfilled (environment A and B)		
high-frequency conducted		fulfilled (environment A and B)		

Smart monitoring relays
Technical diagrams

Dimensional drawings
in **mm** and inches

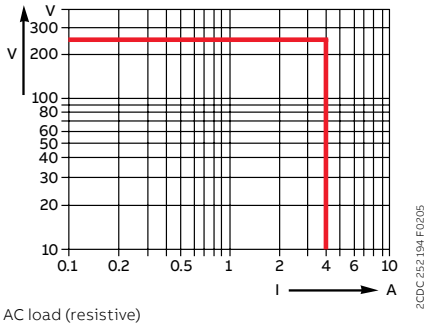


CM-TCN.011 and CM-TCN.0 12

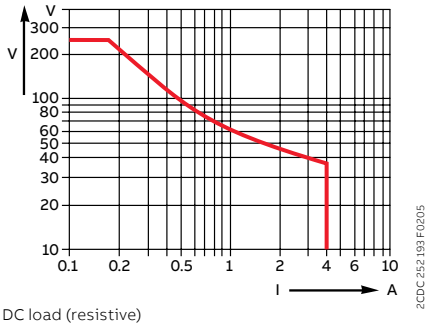


CM-TCS.011

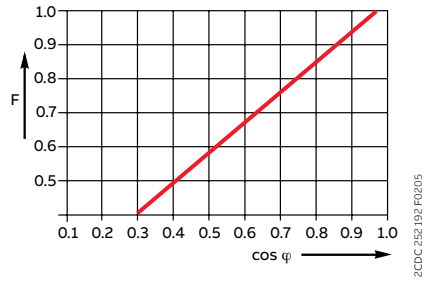
Load limit curves



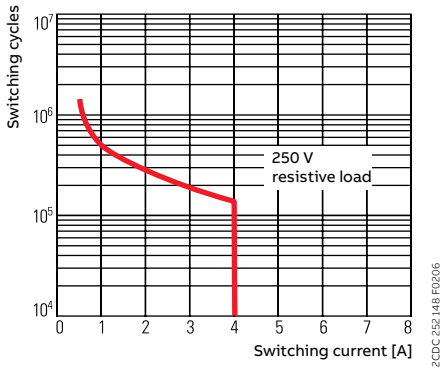
AC load (resistive)



DC load (resistive)



Derating factor F for inductive AC load



Contact lifetime

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You can find the address of your local sales organization on the ABB homepage

abb.com/lowvoltage

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