

Smart temperature monitoring relays

Reduced stocks, flexible adjustment
and easy setup: One relay for all applications.

One...



look

back-lit LCD for easy reading and setup



touch

NFC parametrization via smartphone



device

for a wide range of applications



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.



Table of contents



Features and benefits

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

touch

device

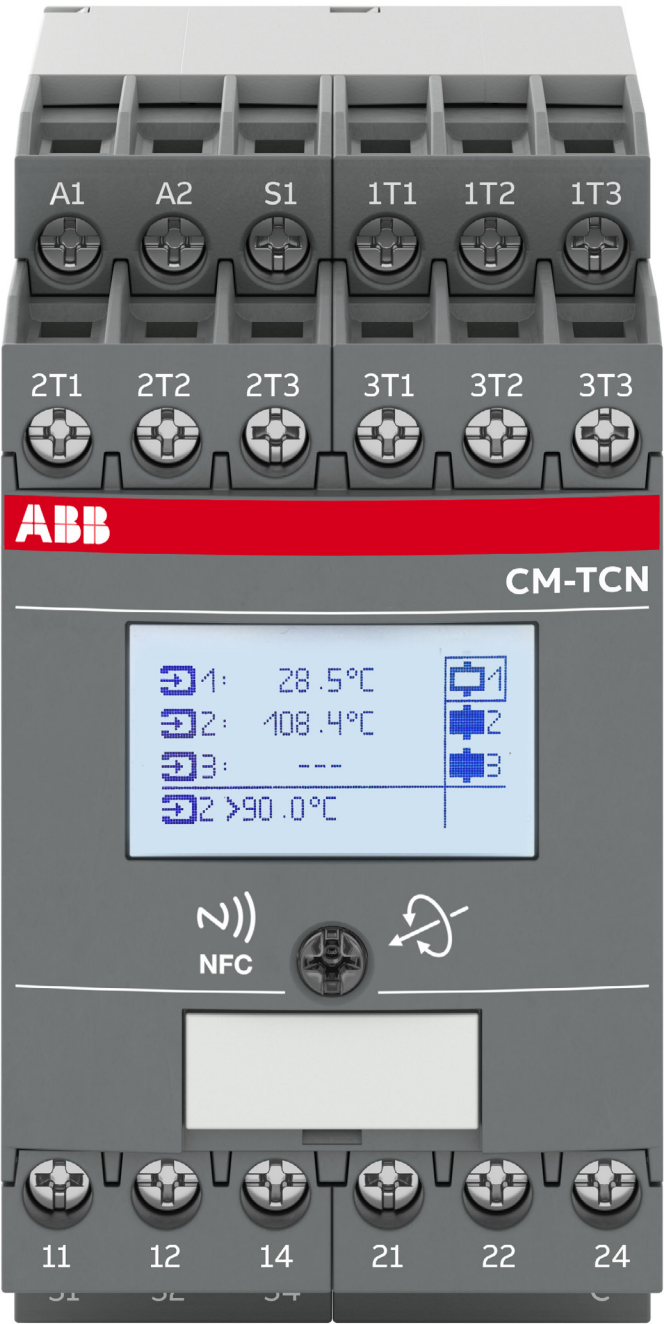


One look – back-lit LCD

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
- Symbol-based menu structure
- Pre- and user-defined settings
- Simulation mode
- Push-rotate adjustment
- Back-lit LCD
- Diagnostic data
- Password & 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)

ABB EPiC smartphone app

Easy visualization

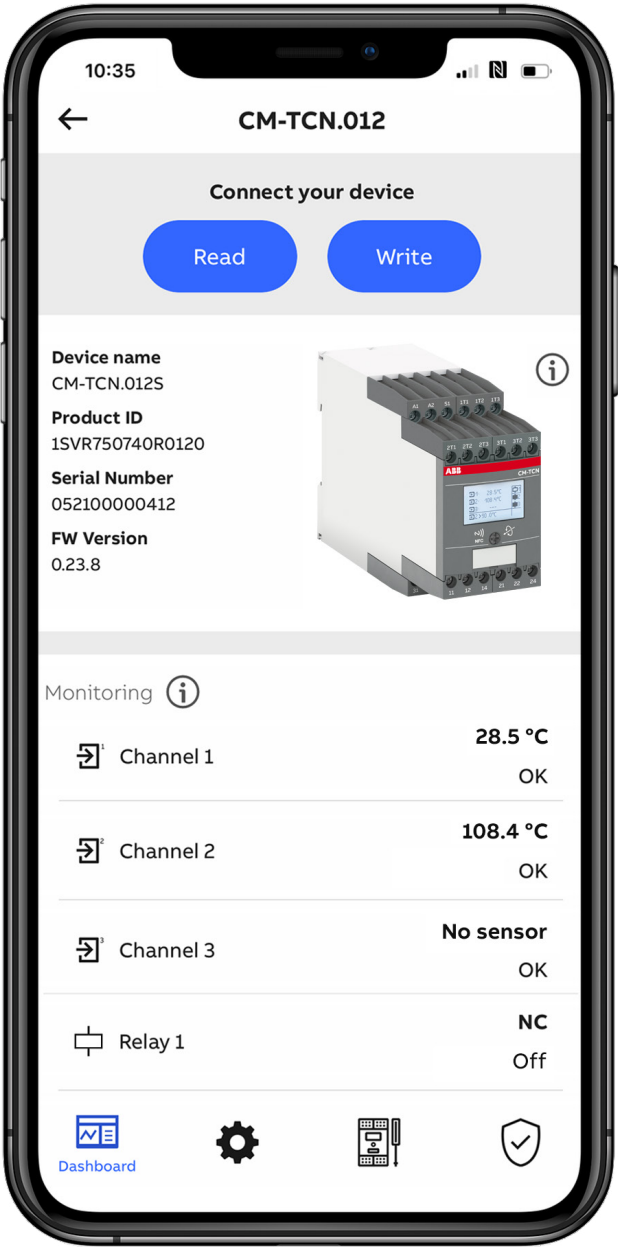
Store and send parameters

One touch setup

Event history

Powerless adjustment

Copy and paste functionality





One device – thermal protection

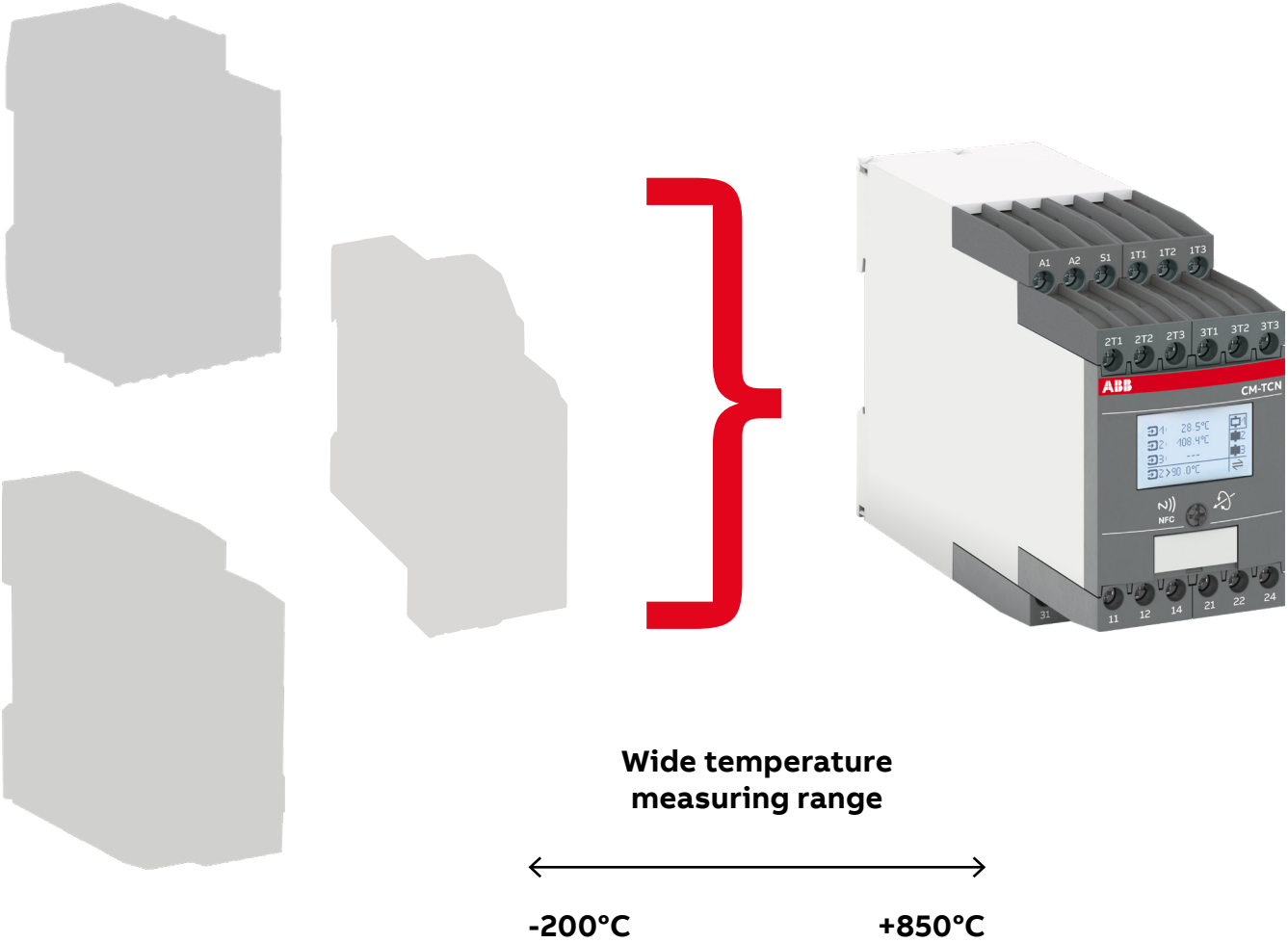
Flexible adjustment and condition monitoring

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

Early detection of potential fault and need for maintenance

Improved safety

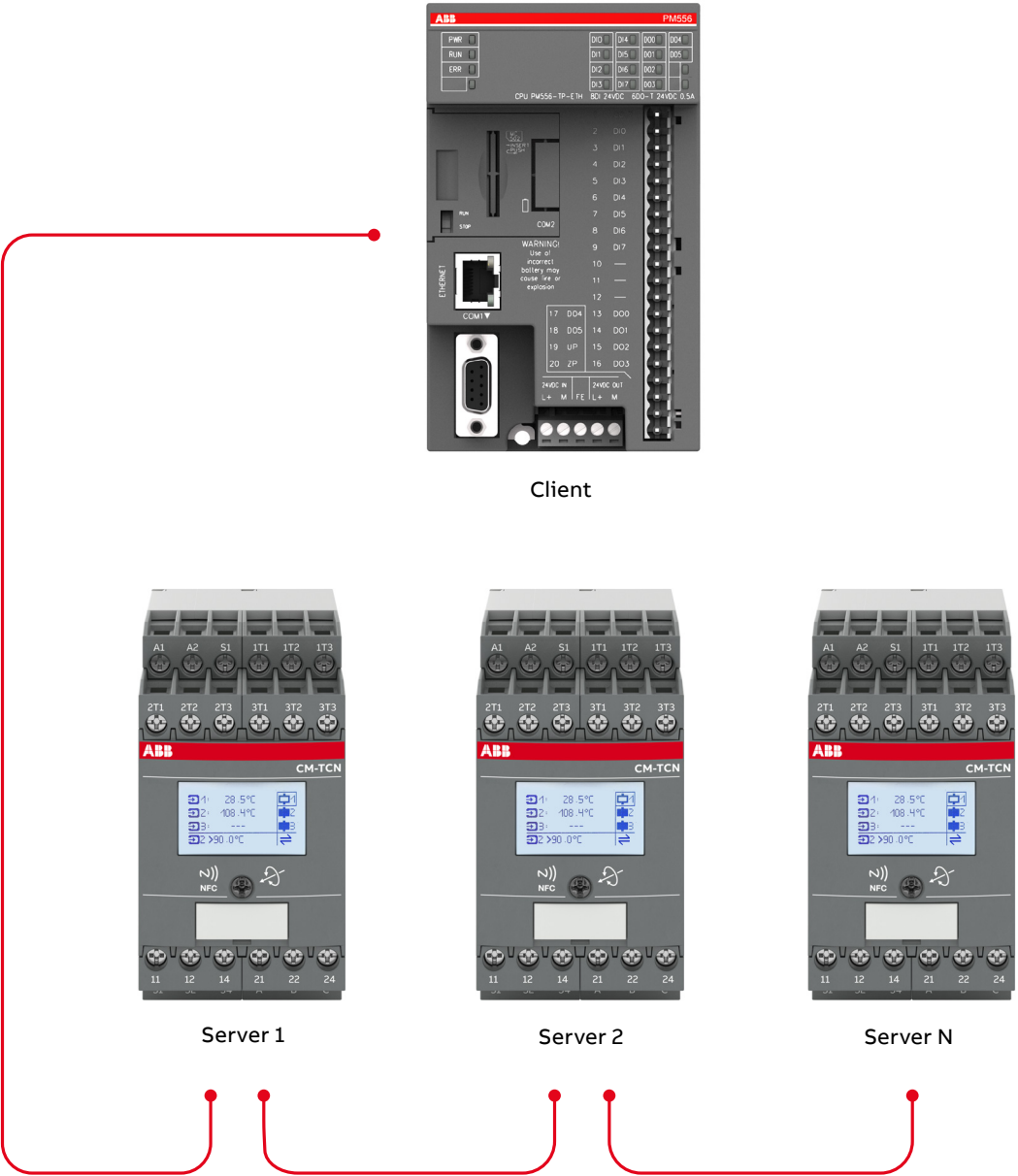


Built-in connectivity

Communication via embedded Modbus RTU

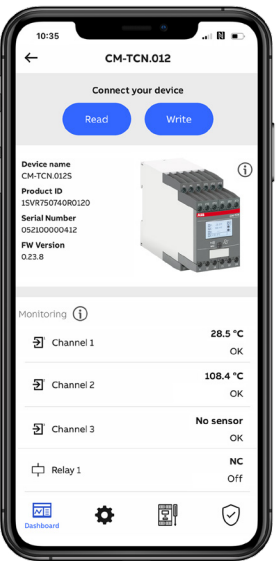
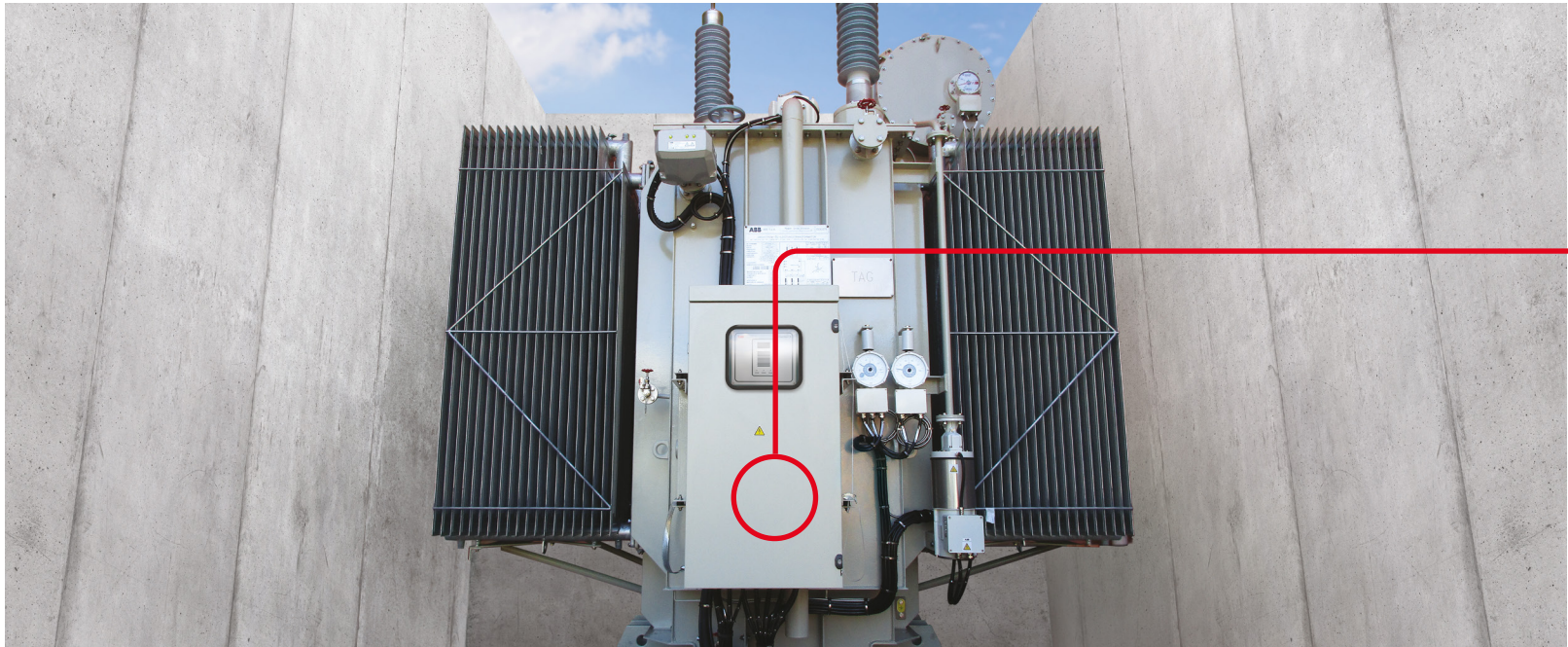
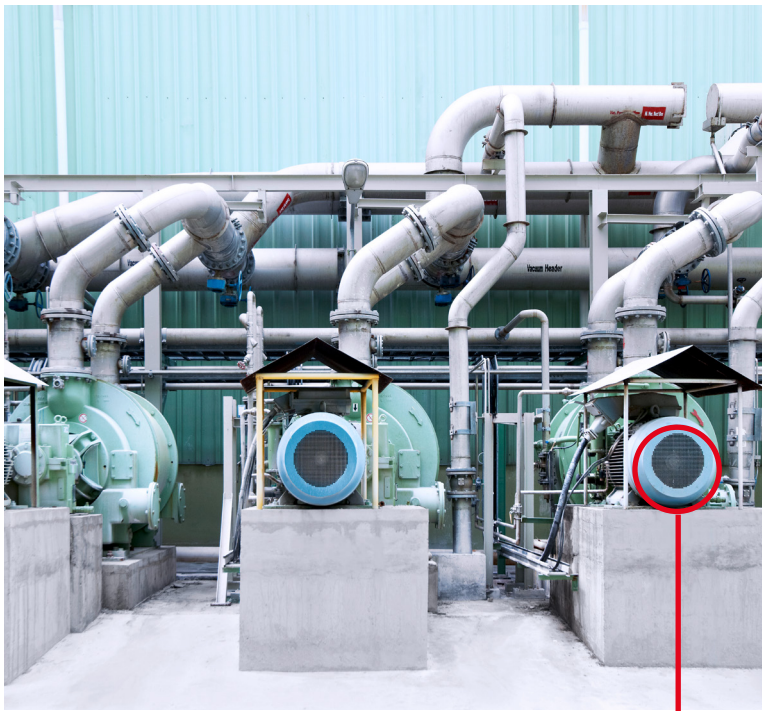
The smart temperature monitoring relay CM-TCN.012 supports the data transfer using the Modbus RTU communication protocol. The communication interface RS-485 is embedded in the relay and does not require installation of any accessories.

The communication interface makes it possible to:



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.

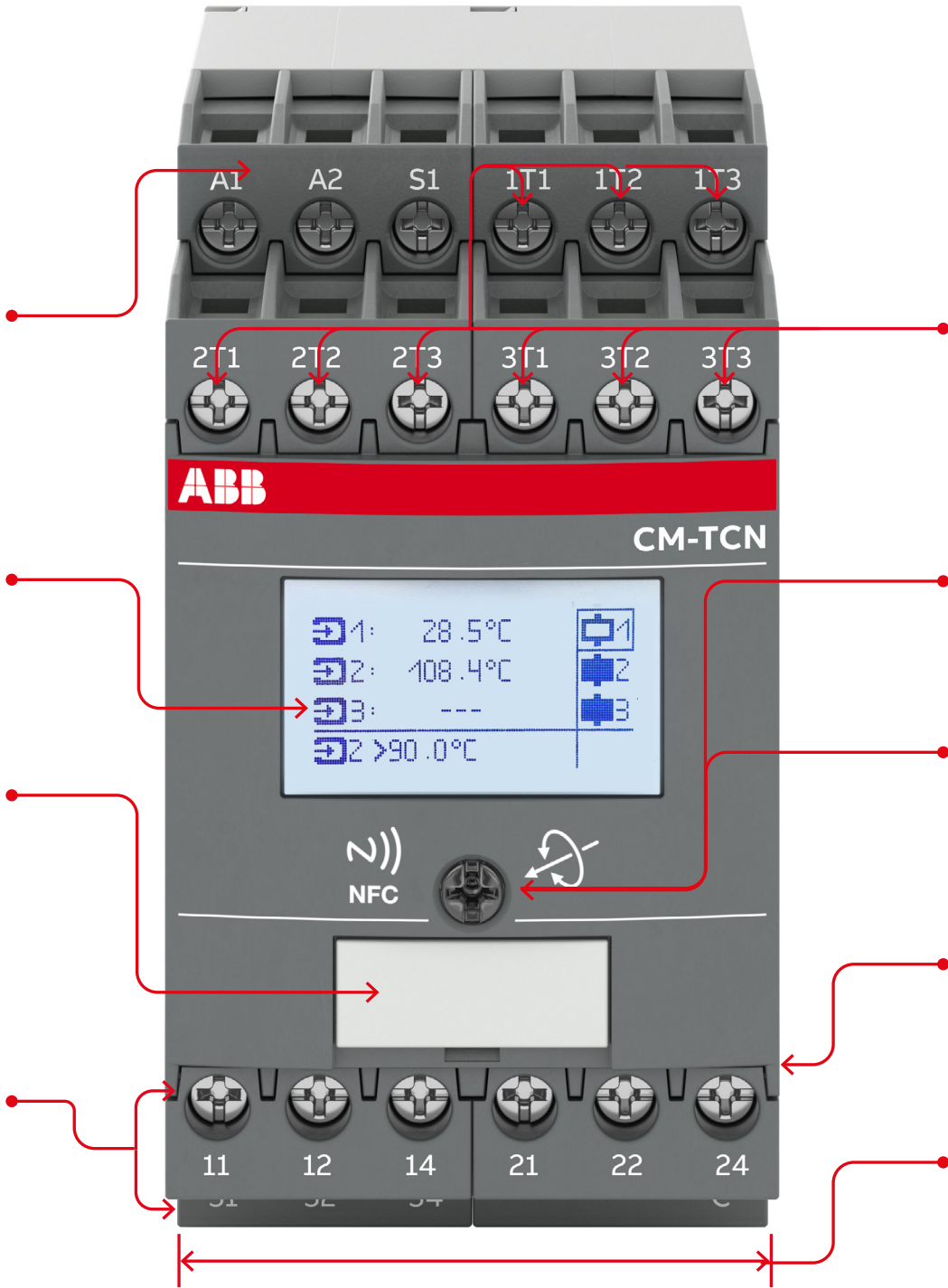


Temperature sensor, e.g. PT100

Smart temperature monitoring relay

ABB EPiC smartphone app

Operating controls



Output circuits
3 c/o (SPDT) contacts
configurable

Ordering details

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

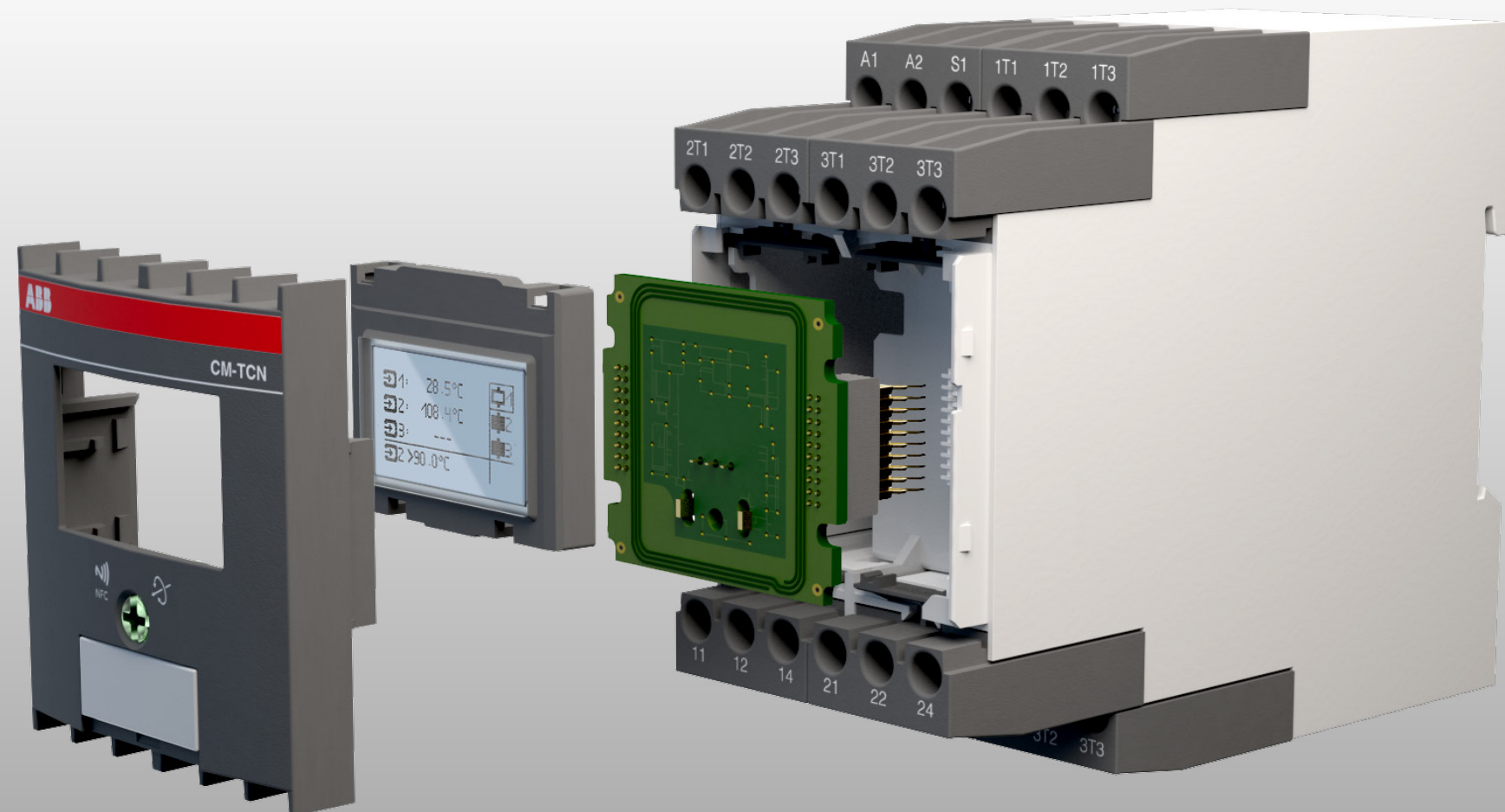
Rated control supply voltage	Terminal type	Number of measuring circuits	Modbus RTU	Temperature sensor	Width mm	Type	Order code	Weight (1 pc) kg (lb)
24-240 V AC/DC	Screw	1	no	PT100, PTC, PT1000, NTC	22.5	CM-TCS.011S	1SVR730740R0110	0.172 (0.379)
	Push-in					CM-TCS.011P	1SVR740740R0110	0.172 (0.379)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



Technical details





Technical details

Technical data

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

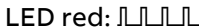



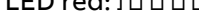
Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
Input circuit		A1-A2		
Rated control supply voltage U _s		24-240 V AC/DC*		
Rated control supply voltage U _s tolerance		-15 ... +10 %		
Rated frequency	AC	50 - 60 Hz		
Frequency range	AC	45 - 66 Hz		
Typical current consumption	24 V DC	typ. 25 mA / max. 36 mA	typ. 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, 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		

* 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.

Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
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 mm² (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	

Technical details

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				

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

Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
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	



Technical details

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		

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

Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
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		

Technical details

Technical data

Type			CM-TCS.011	CM-TCN.011	CM-TCN.012
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 mm ² (1x18-14 AWG) 2 x 0.5-1.5 mm ² (2x18-16 AWG)		2x0.5-1.5 mm ² (2x18-16 AWG)
		xT1, xT2, xT3, A, B, C	1x 0.2-2.5 mm ² (1x24-14 AWG) 2 x 0.2-1.5 mm ² (2x24-16 AWG)		2x0.2-1.5 mm ² (2x24-16 AWG)
	rigid	A1, A2, R1, R2, R3, S1, C	1x 0.5-4 mm ² (1x20-12 AWG) 2 x 0.5-2.5 mm ² (2x20-14 AWG)		2x0.5-1.5 mm ² (2x20-16 AWG)
		xT1, xT2, xT3, A, B, C	1x 0.2-4 mm ² (1x24-12 AWG) 2 x 0.2-2.5 mm ² (2x24-14 AWG)		2x0.2-1.5 mm ² (2x24-16 AWG)
Stripping length			8 mm (0.32 in)		-
Tightening torque	< 0.5 mm ²		0.5 Nm (4.43 lb.in)		-
	≥ 0.5 mm ²		0.6 - 0.8 Nm (7.08 lb.in)		-
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		

Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
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		

Technical details

Technical data

Type	CM-TCS.011	CM-TCN.011	CM-TCN.012
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		

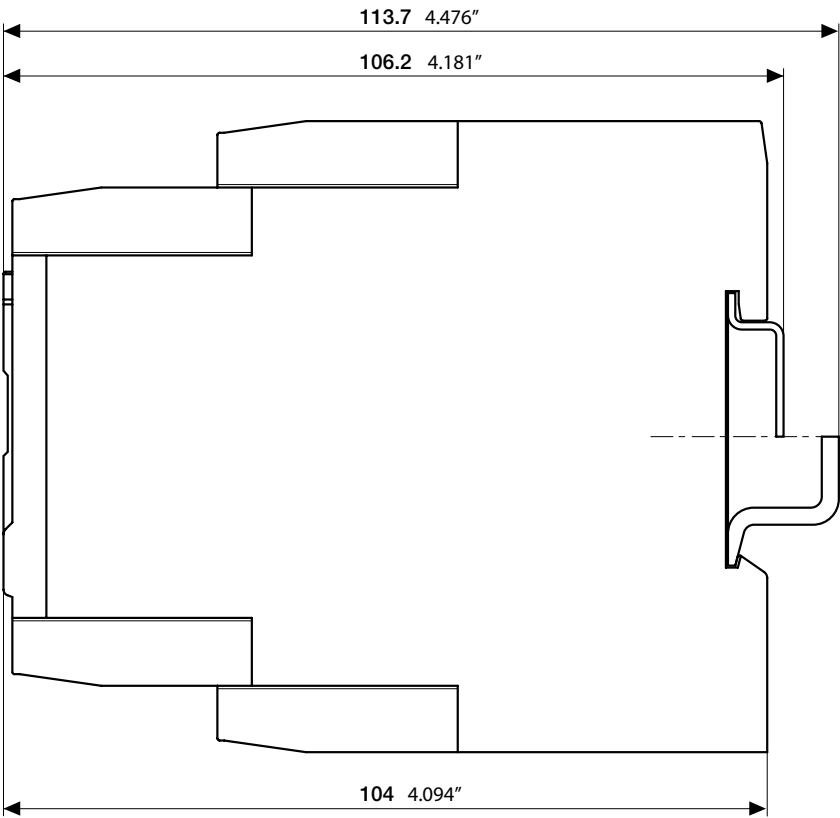
Type		CM-TCS.011	CM-TCN.011	CM-TCN.012
Electromagnetic compatibility				
Interference immunity to		IEC/EN 60947-5-1		
electrostatic discharge	IEC/EN 61000-4-2	level 2, 4 kV contact discharge, 8 kV air discharge		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	level 3, 10 V/m		
electrical 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)		



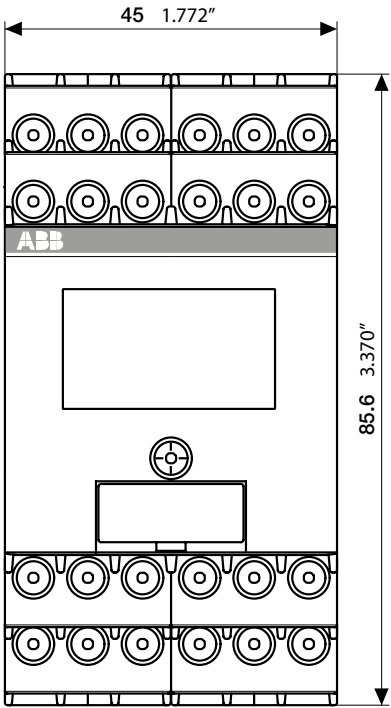
Technical details

Technical diagrams

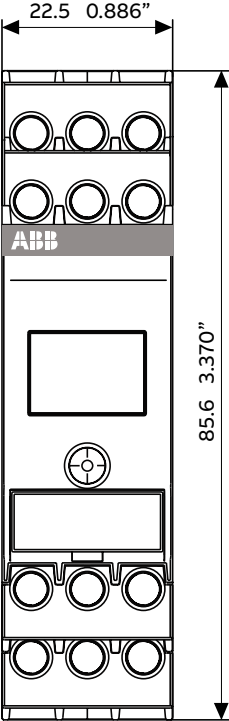
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Dimensional drawings
in **mm** and inches



CM-TCN.011



CM-TCS.011



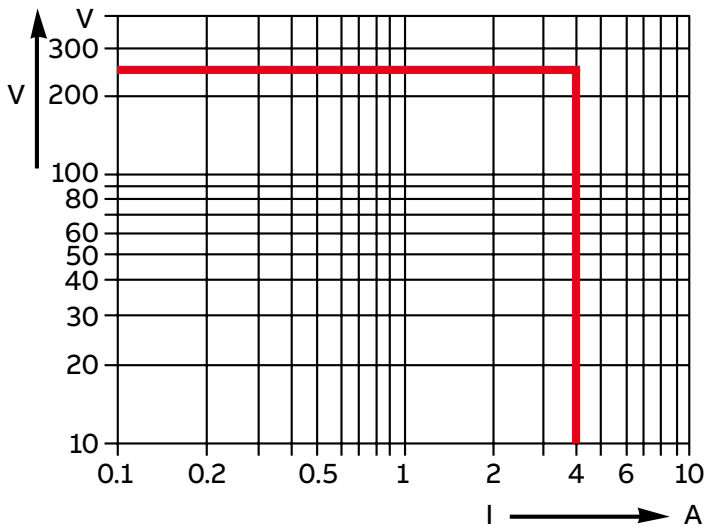


Technical details

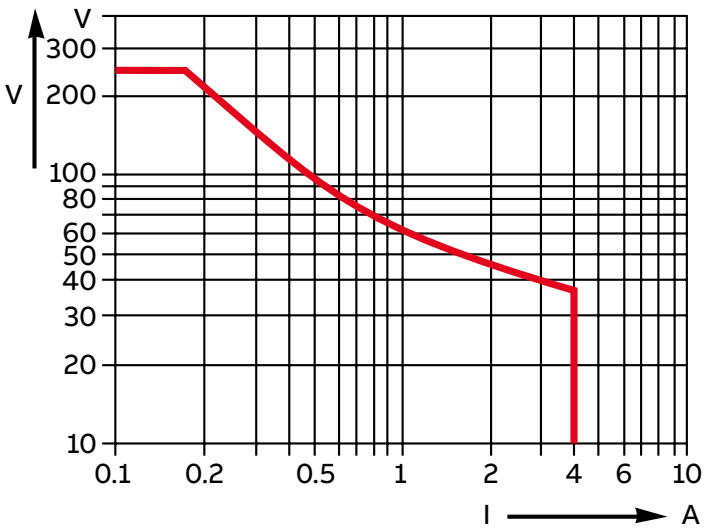
Load limit curves



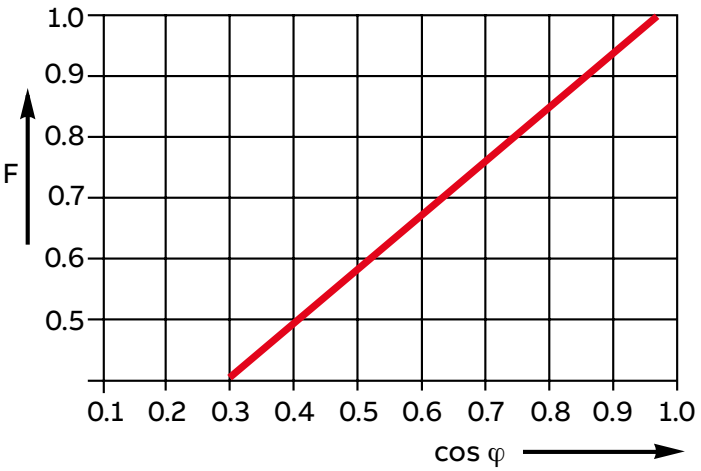
Load limit curves



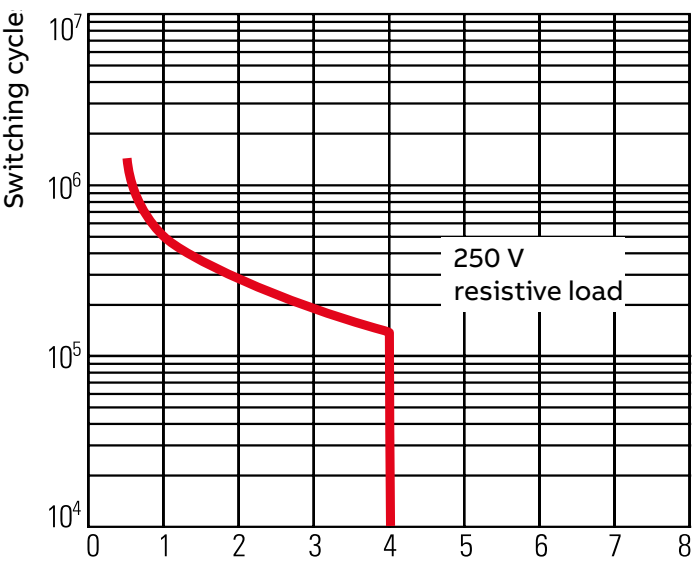
AC load (resistive)



DC load (resistive)



Derating factor F for inductive AC load



Contact lifetime

ABIB