



Caution
Follow Safety and Installation Instructions!

Manufacturer

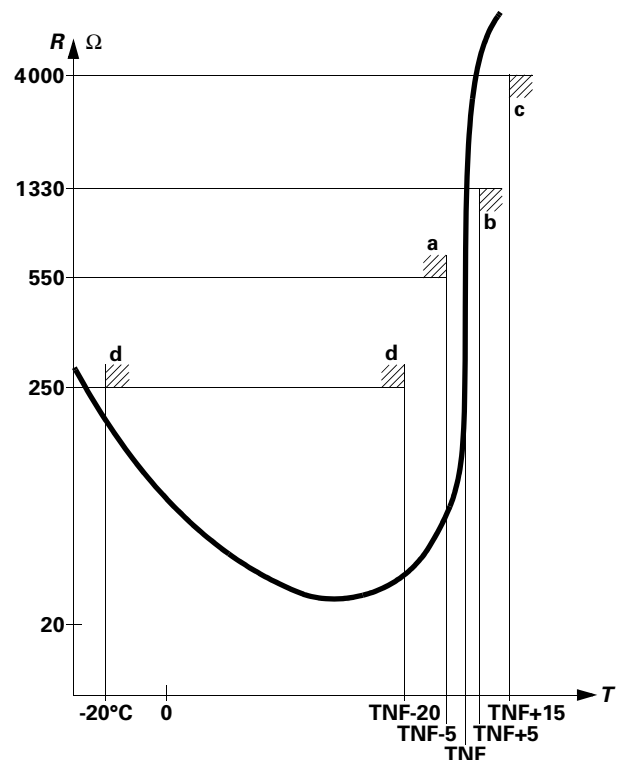
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General

3RN1 thermistor motor protection tripping units are thermal protective devices that can be used to monitor the temperature of electric drives, transformer windings, oils, bearings, air etc. in conjunction with type A PTC resistors.

If a type A temperature sensor is connected to a type A tripping unit, the working temperatures (tripping and reset) in accordance with IEC 60034-11-2 (DIN VDE 0660 Part 303) are observed.

The characteristics of type A temperature sensors are described in IEC 60034-11-2 (DIN VDE 0660 Part 303), DIN 44081 and DIN 44082.



Typical characteristic of a type A sensor
(logarithmic scale)

In addition to tripping units with automatic and manual reset functions, the 3RN1 device series also includes the *3RN1013-BW01* tripping unit with a bistable output relay, the *3RN1022* with two measuring circuits (this unit outputs an alarm signal if the first tripping threshold is exceeded and switches off the motor on reaching the second threshold) and the *3RN1062* tripping unit for multi-motor protection with six measuring circuits and centralized fault indication.

The tripping and reset temperatures referred to TNF (rated operating temperature of the sensor) are as follows, depending on the number of sensors:

	Tripping temperature	Reset temperature
3 sensors	TNF +4K	TNF -7K
6 sensors	TNF -5K	TNF -20K

(The specified temperatures are limit values)

Use in potentially explosive atmospheres

All 3RN1 devices are approved for group II, category (2) in the "G" area (area in which potentially explosive gas, vapor, mist or air mixtures are present).

PTB 01 ATEX 3218  II (2) G

The 3RN1011-.B, /-.G, 3RN1012-.B, /-.G and 3RN1013-....0 device variants are additionally approved for the "D" area (area with combustible dust).

PTB 01 ATEX 3218  II (2) GD

The increased hazard in potentially explosive atmospheres demands strict adherence to the Operating Instructions (Safety and Installation Instructions), assembly instructions and the **EN 60079-14** / VDE 0165 standard concerning electrical equipment for use in locations with explosive **gas** atmospheres or the **EN 50281-1-1** standard concerning electrical equipment for use in locations with explosive **dust** atmospheres.

All connection, commissioning and maintenance work must be carried out **by qualified, responsible** personnel. Improper handling may result in **serious personal injury and considerable material damage**.

The devices 3RN1 comply with the requirements of the following classes:

Device	Class
3RN1000, 3RN1010, 3RN1011-.C, 3RN1012-.C, 3RN1022, 3RN1062	DIN V 19250 EN 954-1 Requirement class 2 Category 1
3RN1011-.B, 3RN1011-.G, 3RN1012-.B, 3RN1012-.G, 3RN1013	Requirement class 3 Category 2

A risk analysis must be drawn up for the complete machine or plant. If this analysis yields a lower hazard potential (category 1), all 3RN1 thermal motor protection tripping units can be used providing the safety regulations are observed. If the plant or machine has a higher hazard potential, a device variant with integrated short-circuit detection in the sensor circuit is necessary.

Wiring

The measuring circuit cables must be laid as separate control cables. It is not permissible to use wires belonging to the motor supply cables or to any other main circuit cables. If parallel power cables are likely to cause extreme inductive or capacitive interference, shielded control cables must be used.

Maximum length of sensor circuit cables:

Cable cross-section	Cable length for tripping units	
	without short-circuit detection	with short-circuit detection ¹⁾
	3RN1000, 3RN1010, 3RN1011 - .C, 3RN1012 - .C, 3RN1022, 3RN1062	3RN1011 -.B/ -.G, 3RN1012 -.B/ -.G, 3RN1013
2,5 mm ²	2 x 2800 m	2 x 250 m
1,5 mm ²	2 x 1500 m	2 x 150 m
0,5 mm ²	2 x 500 m	2 x 50 m

¹⁾ Short-circuits in the sensor circuit are detected up to this maximum cable length.

Technical data

Rated operational voltage U_e	AC/DC 24 V to AC/DC 240 V
Rated insulation voltage U_i	300 V
Rated frequency	50 / 60 Hz
Permissible ambient temperature	-25 to +60 °C
Storage temperature	-40 to +80 °C
Resistance to extreme climates	In acc. with DIN 50017
Degree of protection	IP20
Conductor cross-sections	In acc. with EN 60947-1
Approvals	EEx e, EEx d (PTB), CSA, UL
Marine classification	GL, LRS, BV

Technical data of the integrated auxiliary contacts

Conventional thermal current I_{th}	5 A
Rated operational current I_e	
AC15 to 240 V	3 A
DC13 to 24 V	
3RN1	1 A
3RN1010/11/12-.C	2 A
Short-circuit protection gL/gG	6 A

Installation and commissioning

Install as described in Assembly Instructions No.: 3ZX1012-0RN10-1AA1 (enclosed with each device).

3RN1 devices are suitable for snap-on mounting onto a 35 mm standard rail in accordance with EN 50022 or for screw mounting with an adapter (accessory).

They can be mounted in any position.

If the device has a "manual reset" function, the test function can be activated and tripping simulated by pressing the blue test/reset button > 2 s.

Check that the protection function is working correctly prior to starting up the machine or plant.

Maintenance and repair

The devices require no maintenance.

All repairs to the devices must be carried out by the manufacturer.

Warranty

All warranty claims are subject to compliance with these Operating Instructions (Safety and Installation Instructions) and Assembly Instructions No.: 3ZX1012-0RN10-1AA1.

Important

- The machine or plant must also be shut down immediately if the thermistor motor protection tripping unit is tripped in conjunction with a frequency converter. This must be taken into account in the circuit design.
- 3RN1 thermistor motor protection tripping units are suitable for protecting motors and machines with the EEx e type of protection. They have been tested and approved by the *Physikalisch Technische Bundesanstalt (PTB) in Braunschweig* (German Federal Testing Laboratory (PTB) in Brunswick).
- The devices are only allowed to be assembled and installed by suitably trained persons in accordance with the relevant standards and regulations!
- The 3RN10 is not intended for installation in potentially explosive atmospheres. If it needs to be installed in a potentially explosive atmosphere, the 3RN1 must be provided with a flameproof enclosure.
- Devices with AC/DC 24 V control voltage must be provided with electrical isolation in the form of a battery system or a safety isolating transformer in accordance with DIN VDE 0551.
- Devices with an "Auto RESET" function are automatically reset when the cooling time expires. In this case, an external interlock (latching with a separate ON/OFF button) must be provided to ensure that the monitored machine does not start up again independently.
- Devices with an "Auto RESET" function are not allowed to be used in applications where serious injury to persons or considerable damage to materials could ensue if the machine or plant starts up again unexpectedly.
- If a device without a short-circuit detection function is used, the sensor resistance must be measured with a suitable instrument when the machine or plant is started up as well as after all modifications or maintenance work (assembly/dismantling). The sensor circuit must be tested for short-circuiting if the resistance is < 50 ohms.
- If a *3RN1000* is used to protect EEx e motors, it is advisable to monitor the control voltage separately because there is **no** "Ready" LED to indicate that this voltage is present.
- If a *3RN1013-BW01* is used to protect EEx e motors, it is advisable to monitor the control voltage separately because the output state of the auxiliary contact elements does not change (using bistable relays) if this voltage fails.

For more information about the 3RN1, please consult the Siemens Low-Voltage Control-gear, Switchgear and Systems Catalogue or visit

<http://www.ad.siemens.de/csi/cd>