

# Limit-value switch for temperature, input NTC thermistor



RH5..

Limit-value switches

- Straightforward application
- Suitable for severe operating conditions
- Compact construction
- Switching point freely adjustable by drum scale
- Anti-tamper seal for drum scale
- Meet high EMC-requirements
- **CE** requirements
- Volt-free output as make-and-break contact
- Open-circuit or closed-circuit variants available
- Short circuit monitoring of input signal
- Broken-wire monitoring of input signal
- Operating characteristics displayed by integrated LEDs
- Flame-inhibiting and self-extinguishing body
- Suitable temperature sensors are available (NORIS sensors TH.1, TH.2)

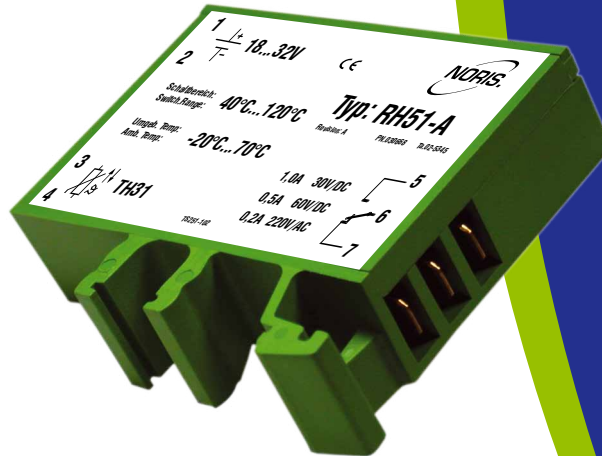


Image RH51-A



## Limit-value switches of series 5

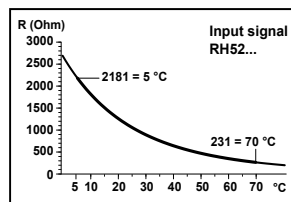
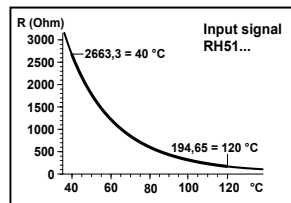
Limit value switches of the series 5 are designed to monitor and process electric measured variables.

Working principle: When the actual value of the measuring signal supplied reaches the setpoint, the built-in relay will operate. The switching status of the relay contact may, for instance, be monitored or individually processed by a machine controller.

## General notes on Type RH5..

### Description RH5..

The Type RH5.. is designed for the temperature monitoring with NTC (negative temperature coefficient) thermistors whose resistance decreases as the temperature is increased. Basically, any NTC-thermistor sensor can be used that possesses a characteristic that fits the limit-value switch. The use of NORIS sensors is recommended because they are matched to the limit-value switches. Settings of the switching point are made at the short top side of the switch by means of a drum scale. The scale is graduated in degrees Celsius to suit the specific measuring range of 40 ... 120 °C or 5 ... 70 °C. Any value on the drum scale can be selected as the switching point.



### Monitoring for short circuit and circuit integrity

The RH5.. type series comes equipped for monitoring sensors for short circuits and integrity. In the event of a short circuit, the maximum limit value is exceeded, causing the relay output to oper-

ate, the red LD lighting up just as when the limit value is exceeded in regular operation.

In the case of a wire break occurring in the sensor, the maximum value of the sensor signal will be exceeded, causing the relay output to operate and the red LED to light up. To identify sensor failure, the green LED will be flashing to signal a broken-wire condition.

### Volt-free relay contact, closed-circuit or open-circuit version

A volt-free relay contact is provided as a make-and-break contact for outputting and further processing. In addition, there is a choice between closed-circuit and open-circuit devices.

In the case of closed-circuit devices, the output relay is pulled up in the normal state of operation with the operating voltage applied. It drops off upon the limit-value being exceeded or if the operating voltage fails.

In the open-circuit variant, the output relay pulls up when the limit-value is exceeded with the operating voltage applied. Failure of the voltage will not result in any switching function below the switching point.

## Technical Data

Series RH5..	
Operating voltage	$U_o = 18 \dots 32 \text{ V/DC}$ , $U_R = 24 \text{ V/DC}$
Ripple	$< 20\% U_o$
Reverse voltage protection	Integrated
Overvoltage	2.5 times $U_R$ up to 2 ms
Voltage drops	100% up to 10 ms
Power consumption	Approx. 40 mA (24 V/DC)
Input signal	NORIS NTC thermistor TH.1, TH.2
Input current	$< 7 \text{ mA}$
Output contact	Volt-free make-and-break contact, closed circuit or open circuit
Maximal switching capacity	30 W (1 A at 30 V/DC; 0.5 A at 60 V/DC) 40 W (0.2 A at 220 V/AC)
Switching point	Adjustable on tamper-proof drum scale between 5 ... 70 °C for RH52..., 40 ... 120 °C for RH51..
Reproducibility	$< \pm 0.2\%$
Linearity of scale	$< \pm 1.5\%$
Hysteresis	Approx. 1.5%
Sensor monitoring	Short-circuit at $R_t > 36 \text{ k}\Omega$
Error class	IEC51-1 1.5%
Temperature sensitivity	$< \pm 0.1\% \text{ je } 10^\circ \text{K}$
Voltage sensitivity	$< \pm 0.1\%$ for 10% change in operating voltage
Measuring suppression	Approx. 2 s after turning on the operating voltage
Vibration resistance	IEC60068-T2-6 15g increased strain, characteristic 2 (10 ... 100 Hz)
Shock resistance (impact)	DIN IEC60068-T2-27 300 m/s <sup>2</sup> with 18 ms dwell time
Climatic test	IEC60068-T2-30
Operating temperature	-20 °C ... +70 °C
Shelf temperature	-45 °C ... +85 °C
Humidity	RH 96% maximum
ESD	IEC61000-4-2 $\pm 8 \text{ kV}$
Electromagnetic field	IEC61000-4-3 10 V/m f=10 kHz ... 2000 MHz, 80% AM @ 1 kHz 10 V/m f=900 +/- 5 MHz, 50% AM @ 200 Hz 10 V/m f=1800 MHz +/- 5 MHz, 50% AM @ 200 Hz
Burst	IEC61000-4-4 $\pm 2 \text{ kV}$ supply $\pm 1 \text{ kV}$ sensor
Surge	IEC61000-4-5 sym. $\pm 1 \text{ kV}$ ( $R_f=2 \Omega$ ) asym. $\pm 2 \text{ kV}$ ( $R_f=2 \Omega$ )
HF-susceptibility	IEC61000-4-6 3 V <sub>pp</sub> 80% AM @ 1 kHz f=0.01 ... 100 MHz
LF-susceptibility	IEC60553 3 V <sub>pp</sub> 0.05 ... 10 kHz
Interference field intensity	Basis CISPR 16-1, 16-2 reduced characteristic
Connection	DIN46244 fiat connector, gold-plated A6.3 x 0.8
Protection class	DIN EN60529 Body IP20, terminals IP00
Mounting	Snap-fit on top-hat channel or G-channel
Installed position	Any
Body material	Thermoplastic polyester, green, fire protection class V0
Weight	55 g
Standard supply	CE requirements complied with, DIN EN 61000-6-2, DIN EN 61000-6-4, DIN EN 50155, approved by GL, LR, DNV

## Type key / variants

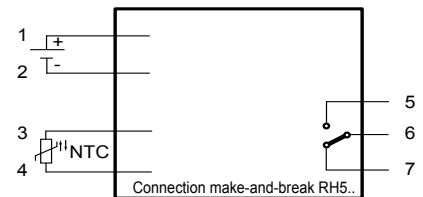
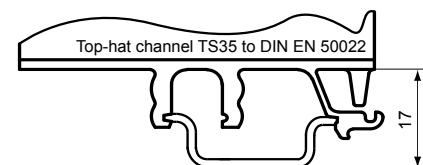
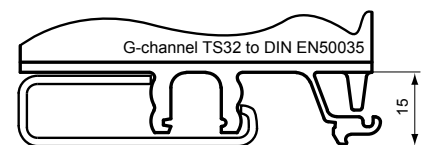
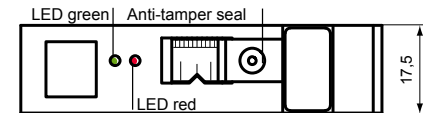
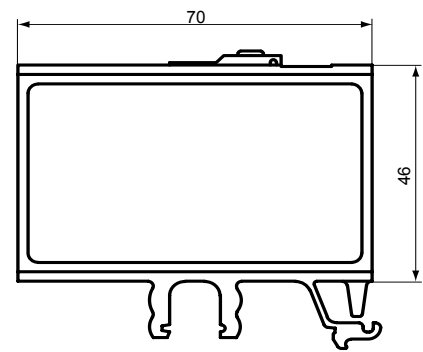
Input range:	40 ... 120 °C	5 ... 70 °C
Make-and-break contact in closed circuit	RH51	RH52
Make-and-break contact in open circuit	RH51-A	RH52-A

### Device codes

R	Limit-value switch
H	Input signal
H	NTC resistance
5	Type series
5	Type 5
1	Input range
1	40 ... 120 °C = 2663,3 ... 194,65 Ω (NORIS temperature sensors TH.1)
2	5 ... 70 °C = 2181 ... 231 Ω (NORIS temperature sensors TH.2)
A	Variants
	Output contact as make-and-break contact in closed circuit
A	Output contact as make-and-break contact in open circuit

R H 5 1 -A (RH51-A)

## Other Data



### Relais position and LED code

	6/7 RH5..-A	5/6 RH5..-A	6/7 RH5..	5/6 RH5..	LED grün	LED rot
R < switch point	x	-	-	x	x	-
R > switch point	-	x	x	-	x	x
Broken-wire in sensor circle	-	x	x	-	o	x
Short circuit in sensor circle	-	x	x	-	x	x

x = contact closed / LED lighting

- = contact open / LED out

o = LED flashing



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