

T H E R M O M E T R I C S  
A C O M M I T M E N T T O E X C E L L E N C E

# NTC Type CR1

## Harsh Environment Chip Thermistor



### Description

NTC type CR1 are NK format chip thermistors on Sn coated Alloy 52 leads with a high performance acid and moisture resistant coating. Our NTC chip thermistors are ideal for harsh environment applications and high volume assembly.

### Features

- AEC Q200 Rev D Qualified
- Suitable for EGR, SCR, TMAP, OAT, HVAC & white goods applications
- Performance up to 190°C with excellent stability
- Small body diameter
- Fast response
- High thermal shock resistance
- Harsh environment fluids resistance
- Water immersion
- Flexible – coated leads can be formed
- Insulation resistance to 1kV d.c.
- Designed for accurate temperature measurement, control & compensation
- Tight tolerances on resistance and B value
- Available on bandolier to IEC 286-2 RoHS 2011/65/EC / REACH compliant

### Applications

- Automotive
- HVAC
- White goods
- Marine
- Aerospace
- Military
- Industrial
- Healthcare

**Amphenol**  
**Advanced Sensors**

# Type CR1 Specifications

## Specification Data

|                         |                                        |
|-------------------------|----------------------------------------|
| Minimum operating temp. | -40°C                                  |
| Performance up to:      | 190°C                                  |
| Thermal time constant   | 15s (cooling)<br>2.4s (ambient change) |
| Dissipation factor      | 2.2mW/K                                |
| Mass                    | 0.18g                                  |
| Packing                 | 1000/box<br>2000/reel                  |

## Options

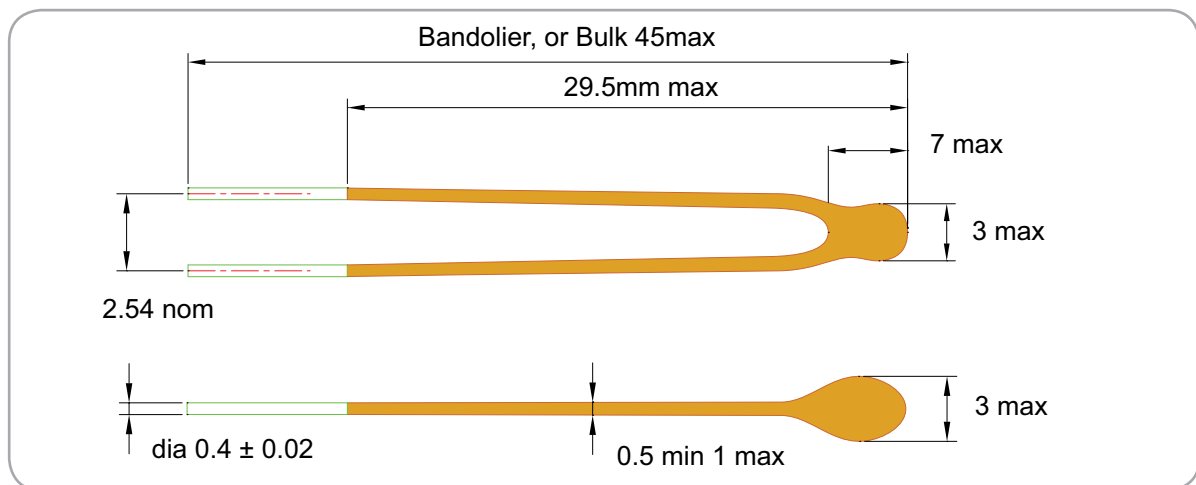
- Other resistance values and B values within the ranges shown
- Alternative reference temperatures 0°C to 100°C
- Bulk packed or bandolier up to  $H_1 = 48\text{mm}$
- Lead materials : Steel/Alloy 52
- Contact Amphenol for specific application requirements

Coding:

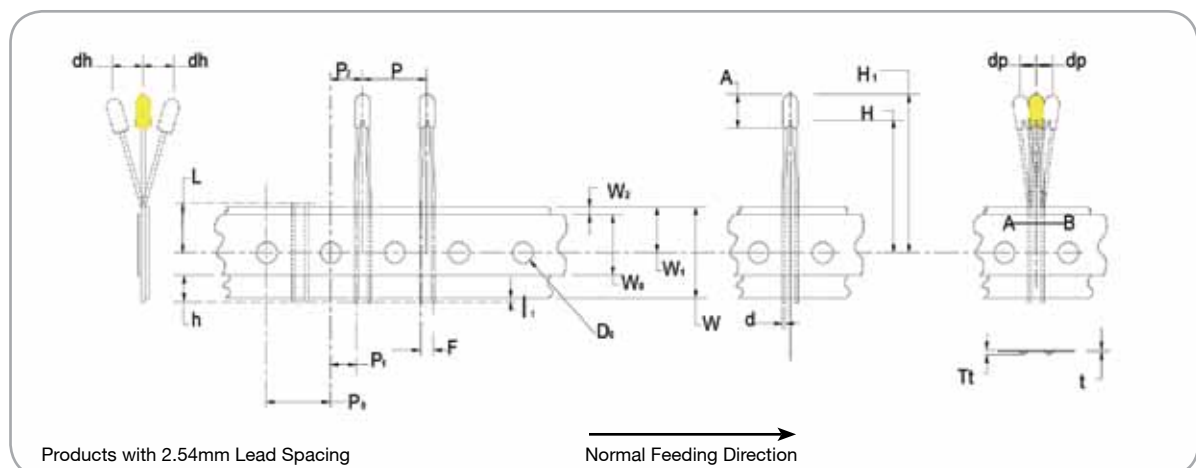
- Standard EGR Sensor - NKA202C2B2
- For CR1 Coating add Suffix C to Code

See Table on page 4 for standard resistance values

## Typical Dimensions (mm)



## Bandolier Schematic



# Bandolier Specifications

| Item                                                                                                                                                                                                                                                                                                                                                                                               | Symbol | Value (mm)              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|
| TOTAL BAND THICKNESS                                                                                                                                                                                                                                                                                                                                                                               | t      | 0.7 ± 0.2               |
| MAXIMUM BAND THICKNESS<br>Including component lead/splices                                                                                                                                                                                                                                                                                                                                         | Tt     | 1.5 MAXIMUM             |
| CARRIER TAPE WIDTH                                                                                                                                                                                                                                                                                                                                                                                 | W      | 18 + 1.0 / - 0.5        |
| ADHESION TAPE WIDTH<br>The hold down tape shall not protrude beyond either edge of the carrier tape                                                                                                                                                                                                                                                                                                | W0     | 6.0 MINIMUM             |
| POSITION OF ADHESION TAPE<br>Gap between upper edges of carrier tape and hold-down tape                                                                                                                                                                                                                                                                                                            | W2     | 3.0 MAXIMUM             |
| SPROCKET HOLE POSITION                                                                                                                                                                                                                                                                                                                                                                             | W1     | 9.0 ± 0.5               |
| SPROCKET HOLE DIAMETER                                                                                                                                                                                                                                                                                                                                                                             | D0     | 4.0 ± 0.2               |
| PITCH OF COMPONENT                                                                                                                                                                                                                                                                                                                                                                                 | P      | 12.7 ± 1.0              |
| SPROCKET HOLE PITCH                                                                                                                                                                                                                                                                                                                                                                                | P0     | 12.7 ± 0.3              |
| PITCH TOLERANCE OVER ANY 20 PITCHES                                                                                                                                                                                                                                                                                                                                                                |        | ± 1.0                   |
| WIRE POSITION<br>Distance between the ordinate and the first lead of the following component in the direction of unreeling or feeding. (Valid from upper edge of the tape to the seating plane)                                                                                                                                                                                                    | P1     | 5.08 ± 0.7              |
| HOLE CENTRE TO COMPONENT CENTRE                                                                                                                                                                                                                                                                                                                                                                    | P2     | 6.35 ± 1.3              |
| IN-PLANE COMPONENT DEVIATION<br>Maximum deviation of the component body in the tape plane (from the nominal position)                                                                                                                                                                                                                                                                              | dp     | ± 3                     |
| FRONT TO REAR DEVIATION<br>The maximum lateral deviation of the component from the nominal position measured at the bottom centre of the component body. Maximum alignment deviation of the leads (valid from the upper edge of the tape to the seating plane) when dh is taken as zero, shall be 0.2mm. This dimension must remain in limits after the device has been cropped from the bandolier | dh     | ± 3                     |
| WIRE SPACING<br>At upper edge of tape                                                                                                                                                                                                                                                                                                                                                              | F      | 2.5 ± 0.5               |
| WIRE DIAMETER                                                                                                                                                                                                                                                                                                                                                                                      | d      | 0.4 ± 0.02              |
| SEATING HEIGHT<br>Distance between the abscissa and the seating plane of the component body with straight leads.                                                                                                                                                                                                                                                                                   | H      | 45 ± 1                  |
| HEAD HEIGHT<br>Distance between the abscissa and the top of the component body                                                                                                                                                                                                                                                                                                                     | H1     | 48 max                  |
| WIRE PROTRUSION<br>(Adhesive tape)<br>Protrusion of wires beyond the lower side of the adhesive tape                                                                                                                                                                                                                                                                                               | h      | 5 MAXIMUM               |
| WIRE PROTRUSION<br>(Carrier)<br>Protrusion of wires beyond the lower side of the carrier tape                                                                                                                                                                                                                                                                                                      | l1     | NO PROTRUSION PERMITTED |
| CUT WIRE LENGTH<br>For cut out components the length of the residual leads beyond the upper edge of the carrier tape measured from the abscissa                                                                                                                                                                                                                                                    | L      | 12 Nom                  |
| COMPONENT HEAD LENGTH                                                                                                                                                                                                                                                                                                                                                                              | A      | 5 max                   |

| EGR SENSOR | Resistance        | B value 25/85°C | Coating | Packing                               |
|------------|-------------------|-----------------|---------|---------------------------------------|
| NKA202C2B2 | R100= 186.6Ω ± 2% | 3540K ± 0.75%   | CR1     | Bandoliered H <sub>1</sub> = 45 ± 1mm |

# NKA Standard Range Resistance Values

(other values available upon request)

| R25<br>$\Omega$ | Material<br>System | B Value<br>25/85°C<br>K | Maximum#<br>Operating<br>Temp.<br>°C (°F) | Code<br>R25°C $\pm$ 1% | Code<br>R25°C $\pm$ 2% | Code<br>R25°C $\pm$ 3% | Code<br>R25°C $\pm$ 5% | Code<br>R25°C $\pm$ 10% |
|-----------------|--------------------|-------------------------|-------------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
| 500             | 2                  | 3540 $\pm$ 1%           | 170 (338)                                 | NKA501C2*1             | NKA501C2*2             | NKA501C2*3             | NKA501C2*5             | NKA501C2*10             |
| 500             | 2A                 | 3627 $\pm$ 1%           | 170 (338)                                 | NKA501C2A*1            | NKA501C2A*2            | NKA501C2A*3            | NKA501C2A*5            | NKA501C2A*10            |
| 500             | 7                  | 3977 $\pm$ 1%           | 170 (338)                                 | NKA501C7*1             | NKA501C7*2             | NKA501C7*3             | NKA501C7*5             | NKA501C7*10             |
| 1000            | 2                  | 3540 $\pm$ 1%           | 170 (338)                                 | NKA102C2*1             | NKA102C2*2             | NKA102C2*3             | NKA102C2*5             | NKA102C2*10             |
| 1000            | 2A                 | 3627 $\pm$ 1%           | 170 (338)                                 | NKA102C2A*1            | NKA102C2A*2            | NKA102C2A*3            | NKA102C2A*5            | NKA102C2A*10            |
| 1000            | 7                  | 3977 $\pm$ 1%           | 170 (338)                                 | NKA102C7*1             | NKA102C7*2             | NKA102C7*3             | NKA102C7*5             | NKA102C7*10             |
| 2000            | 2                  | 3540 $\pm$ 1%           | 170 (338)                                 | NKA202C2*1             | NKA202C2*2             | NKA202C2*3             | NKA202C2*5             | NKA202C2*10             |
| 2050            | 2                  | 3540 $\pm$ 0.75%        | 170 (338)                                 |                        | NKA202C2B2             |                        |                        |                         |
| 2000            | 2A                 | 3627 $\pm$ 1%           | 170 (338)                                 | NKA202C2A*1            | NKA202C2A*2            | NKA202C2A*3            | NKA202C2A*5            | NKA202C2A*10            |
| 2000            | 7                  | 3977 $\pm$ 1%           | 170 (338)                                 | NKA202C7*1             | NKA202C7*2             | NKA202C7*3             | NKA202C7*5             | NKA202C7*10             |
| 2700            | 1                  | 3977 $\pm$ 0.75%        | 190 (374)                                 | NKA272C1*1             | NKA272C1*2             | NKA272C1*3             | NKA272C1*5             | NKA272C1*10             |
| 5000            | 4A                 | 3435 $\pm$ 1%           | 170 (338)                                 | NKA502C4A*1            | NKA502C4A*2            | NKA502C4A*3            | NKA502C4A*5            | NKA502C4A*10            |
| 5000            | 1                  | 3977 $\pm$ 0.75%        | 190 (374)                                 | NKA502C1*1             | NKA502C1*2             | NKA502C1*3             | NKA502C1*5             | NKA502C1*10             |
| 10000           | 4A                 | 3435 $\pm$ 1%           | 170 (338)                                 | NKA103C4A*1            | NKA103C4A*2            | NKA103C4A*3            | NKA103C4A*5            | NKA103C4A*10            |
| 10000           | 5                  | 3740 $\pm$ 1%           | 170 (338)                                 | NKA103C5*1             | NKA103C5*2             | NKA103C5*3             | NKA103C5*5             | NKA103C5*10             |
| 10000           | 1                  | 3977 $\pm$ 0.75%        | 190 (374)                                 | NKA103C1*1             | NKA103C1*2             | NKA103C1*3             | NKA103C1*5             | NKA103C1*10             |
| 12000           | 5                  | 3740 $\pm$ 1%           | 170 (338)                                 | NKA123C5*1             | NKA123C5*2             | NKA123C5*3             | NKA123C5*5             | NKA123C5*10             |
| 30000           | 8                  | 3977 $\pm$ 1%           | 170 (338)                                 | NKA303C8*1             | NKA303C8*2             | NKA303C8*3             | NKA303C8*5             | NKA303C8*10             |
| 50000           | 8                  | 3977 $\pm$ 1%           | 170 (338)                                 | NKA503C8*1             | NKA503C8*2             | NKA503C8*3             | NKA503C8*5             | NKA503C8*10             |

Replace \* in the table codes shown above as follows:

Loose-packed ..... R

Bandoliered ..... B

*Note: Add Suffix C to Code for CR1*

*See separate tables for resistance - temperature data*

**Amphenol**  
**Advanced Sensors**

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AAS-920-645G - 06/2015

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[NKA502C4AR10C](#) [NKA202C2AR2C](#) [NKA202C7R10C](#) [NKA103C4AR1C](#) [NKA103C1R10C](#) [NKA102C2AR1C](#)  
[NKA102C7R1C](#) [NKA123C5R1C](#) [NKA503C8R1C](#) [NKA102C2R10C](#) [NKA202C2R10C](#) [NKA272C1R10C](#)  
[NKA303C8R10C](#) [NKA202C2AR1C](#) [NKA502C4AR2C](#) [NKA503C8R2C](#) [NKA103C4AR10C](#) [NKA501C2R1C](#)  
[NKA501C7R10C](#) [NKA103C1R1C](#) [NKA502C1R10C](#) [NKA503C8R10C](#) [NKA103C1R2C](#) [NKA202C2AR10C](#)  
[NKA103C5R10C](#) [NKA123C5R10C](#) [NKA501C7R1C](#) [NKA501C2AR2C](#) [NKA502C1R2C](#) [NKA501C2AR10C](#)  
[NKA501C2AR1C](#) [NKA202C2R1C](#) [NKA202C7R2C](#) [NKA272C1R2C](#) [NKA123C5R2C](#) [NKA501C2R10C](#)  
[NKA502C4AR1C](#) [NKA501C7R2C](#) [NKA103C5R2C](#) [NKA102C7R10C](#) [NKA103C4AR2C](#) [NKA303C8R1C](#)  
[NKA303C8R2C](#) [NKA102C2AR10C](#) [NKA502C1R1C](#) [NKA103C5R1C](#) [NKA102C2AR2C](#) [NKA102C2R5](#)  
[NKA103C1R10](#) [NKA502C1R10](#) [NKA102C2R3](#) [NKA103C1B1](#) [NKA103C1B10](#) [NKA202C2R5](#) [NKA272C1B1](#)  
[NKA302C1R3](#) [NKA502C1R1](#) [NKA502C1R5](#) [NKA103C1R1](#) [NKA103C1R3](#) [NKA103C1R5](#) [NKA123C5R2](#)  
[NKA182C2R2](#) [NKA202C2R2](#)

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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)

[www.lifeelectronics.ru](http://www.lifeelectronics.ru)