

N322T Temperature Controller with Timer

N322T Controller with Timer



The Novus N322T Temperature Controller with Timer combines precise temperature regulation with a programmable timed control in a compact industrial controller. Versatile, microprocessor-based, digital, designed for both *Heating and Refrigeration* solutions where accurate temperature control and timed switching are required. Combining precise ON/OFF temperature control with a fully programmable timer output, flexible sensor compatibility, integrated timer functionality, precise temperature regulation, programmable timed control, supports multiple sensor types, compressor protection functions and optional RS-485 Modbus communication, making it an excellent solution for equipment requiring dependable temperature control with automated cyclic operation.

Project: Dairy

Designed for dairy processing, refrigeration and process control applications.

Applications: related to processing of milk, cheese, butter, ice-cream and other commercial dairy products. Refrigeration systems such as Milk Coolers, Cold Rooms, Beverage Coolers, Incubators. Heating Equipment, Industrial Ovens, Laboratory Equipment, Defrost Control, Agitation Systems, Process Temperature Control.

Product Overview

Description	: Digital Temperature Controller with Integrated Programmable Timer
Control Type	: ON/OFF Heating or Cooling
Outputs :	: 2 Relay Outputs (Temperature Control + Timer/Defrost)
Display	: 3½-digit LED
Protection	: IP65 Front Panel

Typical Applications

- Dairy milk cooling systems
- Ice cream machines
- Refrigeration systems
- Cold rooms
- Beverage coolers
- Incubators
- Industrial ovens
- Laboratory equipment
- Defrost control
- Agitation and mixer control
- Fan control
- Process temperature control



Key Application Features

- Heating or cooling temperature control
- Integrated programmable timer for cyclic operation
- Ideal for automatic defrost cycles
- Suitable for agitator and mixer control
- Fan and periodic load switching
- Compressor protection with minimum ON/OFF time
- Power-on delay prevents simultaneous equipment startup
- Manual timer activation
- Adjustable hysteresis
- Sensor calibration offset
- Password protected parameters
- Memory retention after power failure
- Optional RS-485 Modbus RTU communication
- Control relay suitable for compressors up to 1 HP
- IP65 sealed front panel for industrial environments



Sensor Compatibility

Sensor Type Measurement Range

NTC Thermistor	: -50 to +120°C*
Pt100 RTD	: -50 to +300°C
Pt1000 RTD	: -200 to +530°C
Thermocouple J	: 0 to +600°C
Thermocouple K	: -50 to +1000°C
Thermocouple T	: -50 to +400°C

*Supplied NTC probe operating range: -30 to +105°C

NTC Sensor cable, rubber protection capsule:



NTC Sensor cable, stainless steel protection capsule:



Temperature Performance

Parameter	Specification
Resolution	: 0.1°C (-19.9 to 199.9°C), 1°C outside range
Sampling Rate	: 1.5 Samples/sec
Accuracy (NTC)	: ±0.6°C
Accuracy (Pt100/Pt1000)	: ±0.7°C
Accuracy (Thermocouples)	: ±3°C



Relay Outputs

Output	Specification
Output 1	: SPDT Relay
Rating	: 16A Resistive
Motor Rating	: 1 HP @250Vac, 1/3 HP @125Vac
Output 2	: SPST Normally Open Relay
Timer Relay Rating	: 3A @250Vac (5A Resistive)

Timer Functions

- Programmable cyclic timer
- Manual timer activation
- Adjustable timer duration
- Adjustable timer interval
- Power-on delay
- Time base selectable in:
 - Seconds
 - Minutes
 - Hours

Typical Timer Applications

- Defrost control
- Agitator control
- Mixer control
- Fan control
- Periodic equipment switching



Control Functions

- Heating or cooling selection
- Adjustable hysteresis
- Compressor minimum ON time
- Compressor minimum OFF time
- Sensor offset correction
- Configurable setpoint limits
- Power-on delay
- Manual timer start/reset
- Password protection
- Temperature selection in °C or °F

Electrical Specifications

Parameter	Specification
Standard Supply	: 100–240 Vac/Vdc $\pm 10\%$
Optional Supply	: 12–30 Vac/Vdc
Frequency	: 50/60Hz
Power Consumption	: 5VA



Communications

Parameter	Specification
Interface	: Optional RS-485
Protocol	: Modbus RTU
Address Range	: 1–247
Isolation	: Isolated on 24V RS485 models

Environmental Specifications

Parameter	Specification
Operating Temperature	: 0 to +40°C
Storage Temperature	: -20 to +60°C
Humidity	: 20–85% RH (Non-condensing)

Mechanical Specifications

Parameter	Specification
Front Protection	: IP65
Enclosure	: IP42
Housing	: UL94 V-2 Polycarbonate
Dimensions	: 75 × 33 × 75 mm
Panel Cut-out	: 70 × 29 mm
Weight	: Approx. 120 g



NTC Temperature Sensor compatible with N322T

*Supplied NTC probe operating range: -30 to +105°C

The NTC Sensor for the N322T is a reliable, waterproof temperature sensor designed for heating and cooling applications. Featuring a high-accuracy 10 kΩ NTC thermistor and durable TPE-insulated cable, it delivers fast, dependable temperature measurement in demanding environments. Available with either a stainless steel or TPE rubber waterproof probe, both models offer IP68 protection, excellent electrical insulation, and quick response times to suit a wide range of industrial and HVAC applications.

Cable with two tinned copper wires and NTC temperature sensor at one end. The sensor is protected by a stainless steel or rubber capsule; both protected against water ingress. Suitable for heating and cooling applications.

Available in two models:

Model 1 (8830000003)

- Stainless steel capsule, 5x30mm (-30°C to +105°C)
- Capsule: Stainless steel, dimensions 5 x 30 mm, water proof
- Sensor used: NTC thermistor, $R_{25} = 10 \text{ k}\Omega$, 1%, $\beta_{25 / 85} = 3435 \text{ K}$ 1%
- Cable: tinned copper wires, 2x 0.22 mm², TPE rubber cover, 3 meters length, pickled and tinned terminals
- Working temperature range: -30 to +105 °C
- Degree of protection: IP68
- Electrical insulation: > 20 MΩ @ 500 Vdc
- Response time: approximately 9 seconds



Model 2 (8830000002)

- TPE rubber capsule, 5x20mm (- 50 to +110 °C)
 - Capsule: injected in TPE rubber, dimensions 5 x 20 mm, black colour. Waterproof
 - Sensor used: NTC thermistor, $R_{25} = 10 \text{ k}\Omega$, 1%, $\beta_{25 / 85} = 3435 \text{ K}$ 1%
 - Cable: tinned copper wires, 2x 0.22 mm², TPE rubber cover, pickled and tinned terminals, black colour
 - Cable lengths available: 30 cm, 1 meter and 3 meters
- Working temperature range: - 50 to +110 °C
- Degree of protection: IP68
 - Electrical insulation: > 20 MΩ @ 500 Vdc
 - Response time: approximately 8 seconds



We reserve the right to change specifications without prior notice. Printing and typographical errors reserved.
Product improvement and upgrade is a constant procedure. Contact us for more updated operating information & support.

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N322T

TEMPERATURE CONTROLLER

USER GUIDE – V1.8x J

1. SAFETY ALERTS

The symbols below are used in the device and throughout this manual to draw the user's attention to valuable information related to device safety and use.

CAUTION: Read the manual fully before installing and operating the device.	CAUTION OR HAZARD: Risk of electric shock.

All safety recommendations appearing in this manual must be followed to ensure personal safety and prevent damage to the instrument or system. If the instrument is used in a manner other than that specified in this manual, the device safety protections may not be effective.

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3. PRESENTATION

N322T is a 2-output digital electronic controller for heating and cooling applications. It has an input for temperature sensors such as NTC thermistors, Pt100 or J, K, or T thermocouples. It allows sensor errors (Offset) to be corrected.

Each type of sensor has a specific temperature measurement range. The controller has 2 outputs, which can act as a control output or timer output.

Displays the **Compressor Protection Function by Supply Voltage Monitoring**, important to protect compressors in refrigeration systems.

4. SPECIFICATIONS

INPUT SENSOR: The sensor is chosen at the time of purchase and is presented on the upper side of the box. The options are:

- Thermistor **NTC**: 10 k Ω @ 25 °C | Range: -50 to 120 °C (-58 to 248 °F) | Accuracy: 0.6 °C (1.1 °F).

Maximum error in the interchangeability of original NTC sensors: 0.75 °C (1.35 °F). This error can be eliminated through the **Offset** parameter.

Note: For the NTC thermistor option, the sensor comes with the equipment. Its operating range is limited to **-30 to 105 °C** (-22 to 221 °F).

It has cable of 3 m in length, 2 x 0.5 mm², and can be extended up to 200 m.

- Pt100: Range: -50 to 300 °C (-58 to 572 °F) | α = 0.00385 | 3 wires | Accuracy: 0.7 °C (1.3 °F); according to IEC-751 standards.
- Thermocouple type **J**: Range: 0 to 600 °C (32 to 1112 °F) | Accuracy: 3 °C (5.4 °F).
- Thermocouple type **K**: Range: -50 to 1000 °C (-58 to 1832 °F) | Accuracy: 3 °C (5.4 °F).
- Thermocouple type **T**: Range: -50 to 400 °C (-58 to 752 °F) | Accuracy: 3 °C (5.4 °F).

Thermocouples according to IEC-584 standards.

Measurement resolution:.....0.1° from -19.9 to 199.9°
..... 1° elsewhere

Note: The equipment keeps its precision all over the range, despite the lack of display resolution in a part of the range does not allow its visualization.

OUTPUT1:.....Relay SPDT; 1 HP 250 Vac / 1/3 HP 125 Vac
..... (16 A Resistive)
..... Optionally: Pulse, 5 Vdc, 25 mA max.

OUTPUT2:.....Relay: 3 A / 250 Vac, SPST-NO

POWER SUPPLY:

Voltage:..... 100~240 Vac/dc ($\pm$ 10 %)
Optionally: 24 V (12~30 Vdc) (*)
Mains frequency: 50~60 Hz
Consumption:.....5 VA

Note: Models with a 24 V power supply do not have electrical isolation between the power supply, input, and RS485 communication circuits.

In direct current (Vdc) supply networks, you must observe the polarity of the connection.

DIMENSION:

Width x Height x Depth:75 x 33 x 75 mm

Panel:70 x 29 mm

Weight: 100 g

OPERATION CONDITIONS:

Operation temperature:0 to 40 °C (32 to 104 °F)

Storage temperature: -20 a 60 °C (-4 to 140 °F)

Relative humidity: .20 to 85 % RH (non-condensing)

Housing in polycarbonate UL94-2.

Protection: Housing: IP42 | Front panel: IP65.

Suitable wiring: Up to 4.0 mm².

RS485 interface with MODBUS protocol (optional).

Serial interface not isolated from the input circuit.

Interface isolated from the power supply circuit, except for the model with 24 V power supply.

Certifications: CE.

5. ELECTRICAL CONNECTIONS

The following figure indicates the connection, power supply, and output terminals of the controller:

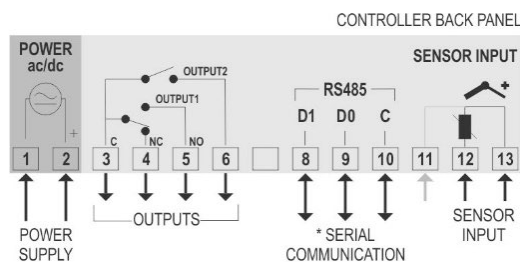


Figure 1 – Electrical connections

* The serial communication feature is not always present in the controller.

Pt100 with 3-wire connection. For a 2-wire connection, connect terminals 11 and 13. For proper cable resistance compensation, the conductors must have the same electrical resistance values (same cross-section).

5.1 INSTALLATION RECOMMENDATIONS

- The temperature sensor wires should run through the system plant **separately** from the control output and power supply wires. If possible, in grounded conduits.
- The controller power supply should preferably come from a network suitable for instrumentation or from a different phase from that used by the control output.
- It is recommended to use RC FILTERS (noise suppressors) in contactor coils, solenoids, etc.

6. OPERATION

Before use, the controller must be configured. That is, you must set values for the parameters that determine how the equipment operates.

The configuration parameters are organized in groups or Levels, called Parameter Levels.

LEVEL	FUNCTION
0	Temperature Measurement
1	Setpoint Adjustment / Voltage Indication
2	Configuration
3	Calibration

Table 1 – Parameter level

When you turn on the controller, the display shows its firmware version for 1 second. This information is useful when consulting the manufacturer. The controller then starts displaying the temperature value measured by the sensor. This is level 0 or the Measurement level.

To access level 1, press **P** for **1 second** until the **SP** parameter appears. To go back to level 0, press **P** once more.

To access level 2, press **P** for **2 seconds** until the **UnE** parameter appears. Release **P** to remain on this level. Press **P** again to access the other parameters of this level. After reaching the last parameter, the controller will return to the first level (0).

Use the **←** and **→** keys to alter a parameter value.

Notes:

- The configuration will be saved by the controller upon advancing to the next parameter in a level. Even in the event of a power outage, the configuration will be saved in permanent memory.
- If the keys are not used for more than 20 seconds, the controller returns to the measuring level, ending and saving the configuration made so far.

6.1 LEVEL 1 – SETPOINT ADJUSTMENT LEVEL

This level displays the Setpoint parameter. It sets the desired temperature value for the system. The current SP value is shown alternately with the parameter.

Use the **←** and **→** keys for setting the suitable values.

U Voltage	The screen voltage measurement. For values lower than 150 Vac and higher than 254 Vac, it presents the message U . Function available for N322T-NTC-LVD.
SP Setpoint	Temperature adjustment for control. SP value is limited to the values programmed in SPL and SPH .

6.2 LEVEL 2 – PROGRAMMING LEVEL

This level displays the remaining parameters. The parameters and their values are shown alternately.

Use the  and  keys for setting the suitable values.

Unit <i>Unit</i>	Temperature unit. Allows you to select the display unit for the measured temperature. 0 Temperature in Celsius degrees. 1 Temperature in Fahrenheit degrees.
Typ <i>Type</i>	Type of temperature sensor to be used. This parameter is only available on models with THERMOCOUPLE sensors. 0 Thermocouple J. 1 Thermocouple K. 2 Thermocouple T.
Off <i>Offset</i>	Value to correct the temperature indication. Allows you to make small adjustments to the temperature display to correct measurement errors that appear, for example, when replacing NTC-type temperature sensors.
SPL <i>SP Low Limit</i>	Setpoint lower limit. Allows you to set the minimum value for the Setpoint adjustment. It must be defined to a value lower than SPH .
SPH <i>SP High Limit</i>	Setpoint upper limit. Allows you to set the maximum value for the Setpoint adjustment. It must be defined to a value higher than SPL .
HYS <i>Hysteresis</i>	Control hysteresis. Differential between the on and off point of the control output relay. In degrees.
ALE <i>Alarm Enable</i>	Allows you to enable the alarm. 0 Disabled alarm. 1 Audible alarm and flashing output 2 (1 second). 2 Audible alarm and constant output 2. 3 Flashing output 2 (1 second). 4 Constant output 2. Function available for N322T-NTC and N322TB-NTC. For N322T-NTC, parameters 1 and 2 work as parameters 3 and 4 , respectively. The alarm function works only for FoE = 2 parameter.
ALT <i>Alarm Time</i>	Allows you to set the time for which the alarm will be activated. From 1 to 255 seconds. To turn off the alarm before the set time, simply press the key  for 1 second. For N322T-NTC, parameters 1 and 2 work as parameters 3 and 4 , respectively. The alarm function works only for FoE = 2 parameter.

Act <i>Action</i>	Control action assigned to OUTPUT1: 0 Reverse action for heating. 1 Direct action for cooling.
Cnt <i>Control</i>	Output inversion. Inverts Setpoints and outputs. 0 Setpoint commands OUTPUT1. Timer output on OUTPUT2. Factory setting. 1 Promotes inversion. Setpoint controls OUTPUT2. Timer output on OUTPUT1. When the FoE parameter is set to 2 , cnt is automatically changed to 0 .
Off <i>Off time</i>	Allows you to set the minimum off time for the control output. Once the control output is switched off, it will remain in this status for at least the time programmed in this parameter. Typically used to extend compressor life in refrigeration systems. For heating applications, set to 0 . Value in seconds (from 0 to 999 s).
Ont <i>on time</i>	Allows you to set the minimum on time for the control output. Once the control output is switched on, it will remain in this status for at least the time programmed in this parameter. Typically used to extend compressor life in refrigeration systems. For heating applications, set to 0 . Value in seconds (from 0 to 999 s).
dl <i>Delay</i>	Delay time to start control. After the controller is switched on, the control output will only be switched on when the time programmed in this parameter has elapsed. Used in large refrigeration systems to prevent simultaneous compressor start-ups in the event of a power outage. Value in seconds (from 0 to 250 s).
E1b <i>T1 Base</i>	Time base for E 1 : 0 Seconds. 1 Minutes. 2 Hours.
E2b <i>T2 Base</i>	Time base for E 2 : 0 Seconds. 1 Minutes. 2 Hours.
E1 <i>Timer 1</i>	Interval between timer output activations. Adjustable between 0 and 999 units of E 1b . It will automatically be blocked, and its value will be set to zero when the FoE parameter is 2 .
E2 <i>Timer 2</i>	Timer output activation duration. Adjustable between 1 and 999 units of E2b .

Fot Force Timer	0 The timer respects the interval and duration programmed in E1 and E2. 1 The timer output is switched on with the control output. When the control output is switched off, the timer output returns to the programming of E1 and E2, starting with E2. 2 The process will only start when the key  is pressed for more than 1 second, thus flashing the P3 flag. If the key is pressed again for more than 1 second, the process will be switched off. This will be indicated by a beep and the P1 and P2 flags. When the temperature reaches the programmed Setpoint for the first time, the P3 flag will flash, indicating that the timer has been activated. When the programmed time is reached, output 1 will be disabled, turning off P3 flag and triggering the alarm, according to parameter ALE. When this function is enabled, E1 and cnt are automatically set to zero and must remain at zero. In applications with defrosting, set to 0. The function 2 is available for N322T-NTC and N322TB-NTC.
dFH defrost hold	Allows the temperature display to remain unchanged during the defrost time plus the time set in this parameter. 0 The indication can be updated. 1 to 250 The temperature display will remain unchanged from the defrost, showing the temperature measured at the start of the defrosting process. In seconds, minutes, or hours. In applications without defrosting, set to 0.
dFC defrost Compressor	Behavior of the control output (OUTPUT1), where the compressor is connected, during the defrosting process: 0 OUTPUT1 is switched off during defrost. 1 OUTPUT1 remains on during defrost. 2 OUTPUT1 operates normally. Turns on and off as required to maintain temperature. In refrigeration systems, OUTPUT1 normally controls the system's compressor. In applications without defrosting, set to 2.
CPE Compressor Protect	Enables compressor protection by monitoring electrical voltage. If the mains voltage is not set between the CPL and CPH Setpoints. 0 Disables compressor protection. 1 Enables compressor protection. Function available for N322T-NTC-LVD.

CPE Compressor Protect Time	Allows you to set a compressor shutdown delay when the compressor protection is activated while voltage monitoring is being performed. Time interval adjustable between 5 and 30 seconds. Function available for N322T-NTC-LVD.
CPL CP Low Limit	Lower electrical voltage limit used by the compressor protection. Minimum electrical voltage value that the compressor can operate at. Parameter adjustable between 150 and 254 Vac, which must be 10 Vac lower than the value set in the upper limit (CPH). Function available for N322T-NTC-LVD.
CPH CP High Limit	Higher electrical voltage limit used by the compressor protection. Maximum electrical voltage value that the compressor can operate at. Parameter adjustable between 150 and 254 Vac, which must be 10 Vac higher than the value set in the upper limit (CPL). Function available for N322T-NTC-LVD.
Rdd Address	Controllers with an RS485 serial communication interface have the Rdd parameter. In this parameter, you can set a communication address for each network element. The address defined must be between 1 and 247.

6.3 LEVEL 3 – CALIBRATION LEVEL

The controller leaves the factory perfectly calibrated. When recalibration is necessary, it must be performed by a specialized professional.

Press the  key for **4 seconds** to access this level. This level also contains the parameters for configuration protection.

If you have entered this level by accident, go through all the parameters without making any changes until the controller returns to the measurement level.

PAS Password	Parameter for entering a password to change the other parameters.
CAL Calibration Low	Calibration of the measuring range offset. Adjustment of the lower value of the sensor's measuring range.
CAH Calibration High	Calibration of the measuring scale gain. Adjustment of the upper value of the sensor's measuring range.
UoL Voltage Calibration	Offset adjustment for voltage indication calibration. Parameter only available for N322T-NTC-LVD.
CJL Cold Junction Calibration	Offset calibration of the Cold Junction. Only available for thermocouples.
FAC Factory Calibration	Allows you to return to the controller's original calibration. When changed from 0 to 1, the original calibration is restored and any changes made to the calibration will be disregarded.
PrE Protection	Allows you to set the levels of parameters to be protected.
PAC Password Change	Allows you to change the current password. You can set a number between 1 and 999.
Sn2 Serial Number 2	Displays the first 2 digits of the controller's electronic serial number.

Sn1 Serial Number 1	Displays the central 3 digits of the controller's electronic serial number.
Sn0 Serial Number 0	Displays the last 3 digits of the controller's electronic serial number.

7. OPERATION

The controller triggers the control output to bring the system temperature up to the value set in the Setpoint parameter. On the controller's front panel, the **P1** flag lights up when the control output is switched on.

The timer output is typically used to defrost the system. The **E1** and **E2** parameters define the interval between defrosts and the duration of the defrost, respectively.

Manual defrost: The  key allows you to start or stop a timer or defrosting process. Pressing this key for at least 1 second inverts the status of the timer output.

Example: If it was on, it will be turned off. If it was off, it will be turned on, starting a new timer.

On the front panel, the **P2** flag lights up when the timer output is switched on. Other functions can be given to the timer output: Mixer, fan, etc.

8. CONFIGURATION PROTECTION

The purpose of the configuration protection system is to prevent undue changes to the controller parameters and, consequently, to its operating mode. This system is composed of parameters that define the degree of protection to be adopted (full or partial).

Parameters that define the protection:

- PRS** Parameter for defining the parameter levels to be protected.
- PrL** Parameter for defining the parameter levels to be protected.
- Only **Calibration** level is protected (factory configuration).
 - Calibration** and **Configuration** levels are protected.
 - All levels are protected: **Calibration**, **Configuration**, and **Setpoints**.
- PAC** Parameter for changing the current password. You can set the password to a number between 0 and 1999.

8.1 HOW CONFIGURATION PROTECTION WORKS

The **PRS** parameter appears at the beginning of the protected level. By entering the correct password, you can change the parameters of the protected levels.

If you do not enter the correct password or if you just pass this parameter, the parameters of the protected levels can only be viewed and not changed.

Important notes:

- After **five** consecutive attempts to enter a wrong password, new tentative will be blocked for the next 10 minutes. If the current valid password is unknown, the **master password** can be used **only** to define a new password for the controller.
- The factory default password is **111**.

9. MASTER PASSWORD

The master password, which allows you to set a new password for the controller, uses the serial number of the equipment. It is composed as follows:

$$[1] + [\text{higher digit of SN2}] + [\text{higher digit of SN1}] + [\text{higher digit of SN0}]$$

The master password for the device with serial number 97123465 is: **1936**

As follows: **Sn2** = 97; **Sn1** = 123; **Sn0** = 465 = 1 + 9 + 3 + 6

9.1 HOW TO USE THE MASTER PASSWORD

- In the **PRS** parameter, enter the master password.
- In the **PAC** parameter, enter the new password, which must not be zero (0).
- Use the new password.

10. ERROR MESSAGES

On the display, the controller shows messages that correspond to problems related to the temperature measurement. Whenever they are displayed, the control output relay will be turned off.

If it is configured to show the differential temperature, the value shown will be zero.

	Measured temperature exceeded maximum allowed range for the sensor. Broken Pt100 . Short circuited NTC .
	Measured temperature is below minimum measurement range of the sensor. Short circuited Pt100 . Broken NTC .

Table 2 – Error messages

11. COMPRESSOR PROTECTION (N322T-NTC-LVD)

The controller constantly monitors the voltage of power network and shuts the compressor if this tension is not within limits.

These limits are defined in parameters **CPL** and **CPH**, adjustable between 150 and 254 Vac.

In addition to turning the compressor off, the controller starts to signal on this occurrence on its display. It switches the indication of voltage value measured with the temperature value.

When the voltage exceeds limits (lower than 150 Vac and higher than 254 Vac), the signaling start to indicate temperature alternating with the message .

12. WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.



NTC Sensor

INTRODUCTION

Two tinned copper wires cable and type-NTC temperature sensor at one end. Sensor is protected by a rubber or a stainless steel capsule, both waterproof. It is a proper solution for either heating or cooling applications.

SPECIFICATION

Sensor: NTC thermistor, R25= 10 kΩ, 1%, β25/85= 3435 K 1%

Cable: 2 tinned copper wires; 2 x 0.22 mm²; TPE (synthetic rubber) overmolded cap; tinned stripped terminals; black color.

Length: 3 meters

Protection capsules: option 1- overmolded TPE rubber capsule; dimensions Φ5 x 20 mm; black color; waterproof.
option 2- 304 stainless steel capsule; dimensions Φ 5 x 30 mm; waterproof.

Operating temperature: - 50 to +110 °C for rubber capsule / - 30 to +105 °C for stainless steel capsule

Response time: 8 seconds (rubber capsule) and 9 seconds (stainless steel capsule) to reach 63 % of the applied temperature step.

Protection degree: IP68

Electrical insulation: > 20 MΩ @ 500 Vdc

FEATURES

NTC-type temperature sensor; R25= 10 kΩ; 1%; β25/85= 3435 K 1%

Accuracy: < 1% @ 25 °C

Interchange error: 0.5 % @ 25 °C

Temperature x Ohmic Resistance relation:

Temperature (°C / °F)	Resistance (kΩ)	Temperature (°C / °F)	Resistance (kΩ)	Temperature (°C / °F)	Resistance (kΩ)
-50 / -58	329.500	5 / 41	22.050	60 / 140	3.020
-45 / -49	247.700	10 / 50	17.960	65 / 149	2.588
-40 / -40	188.500	15 / 59	14.690	70 / 158	2.228
-35 / -31	144.100	20 / 68	12.090	75 / 167	1.924
-30 / -22	111.300	25 / 77	10.000	80 / 176	1.668
-25 / -13	86.430	30 / 86	8.313	85 / 185	1.451
-20 / -4	67.770	35 / 95	6.940	90 / 194	1.266
-15 / 5	53.410	40 / 104	5.827	95 / 203	1.108
-10 / 14	42.470	45 / 113	4.911	100 / 212	0.973
-5 / 23	33.900	50 / 122	4.160	105 / 221	0.857
0 / 32	27.280	55 / 131	3.536	110 / 230	0.758

ORDERING

Identification Code (P/N)	Description
8.830.0.0002	NTC sensor, <u>rubber</u> capsule, 3 meter long
8.830.0.0003	NTC sensor, <u>304 stainless steel</u> capsule, 3 meter long

DIMENSIONS

NTC Sensor cable, rubber protection capsule:



NTC Sensor cable, stainless steel protection capsule:



MORE INFORMATION

Sensor cables should always be routed away from high-current power conductors, preferably through grounded conduits.

WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.