NOVUS
PRODUTOS ELETRÔNICOS LTDA

Thermometer N320

ELECTRONIC THERMOMETER – OPERATION MANUAL – V1.6x

1. APPLICATION

The N320 is an electronic indicator that provides you in the frontal display the measured temperature of the sensor connected to its terminals. The temperature sensors available are NTC Thermistor, Pt100, Pt1000 and J type thermocouple, with offset correction capability.

The features of a particular model (input sensor type, sensor range, mains supply, etc) are identified by the label placed on the thermometer body.

2. SPECIFICATIONS

INPUT SENSOR: The input sensor type can be chosen form the 3 options below (specified when placing the order):

- **NTC** Thermistor, 10kΩ@25°C;
  Measuring range: –50 to 120°C;
  Accuracy: 0,6°C (with original sensor);
  Sensor interchangeability: 0.75°C (this error can be compensated by the **offset** parameter in the thermometer).
- **Pt100, α**= 0,00385; according to IEC 60751(ITS-90);
  Measuring Range: –50 to 300°C
  Accuracy: 0,7°C;
- **Pt1000, α**= 0,00385; according to IEC 60751(ITS-90);
  Measuring Range: –200 to 530°C;
  Accuracy: 0,7°C;
- Type **J** Thermocouple;
  Measuring Range: 0 to 600°C (according to IEC60584 (ITS-90));
  Accuracy: 3°C; Cold junction compensation
  Note: The above figures are achieved after 15 minutes warm-up.
  In the thermometer with NTC input, a 3m-sensor cable is bundled with the instrument. The cable can be extended up to 200m.

MEASUREMENT RESOLUTION:
0,1°C from –19.9 to 99.9°C With NTC; 1°C elsewhere.

POWER SUPPLY:
85 to 250Vac; Mains frequency: 50/60 Hz; or 12 to 24Vdc
Power consumption: 0,6VA
Caution: check the power supply specification before energizing the thermometer.

DIMENSIONS:
Width x Height x Depth: 75x33x75mm; Panel cut-out: 70x29mm
Weight: 100g

OPERATING ENVIRONMENT:
Operating temperature: 0 to 50°C
Storage temperature: -20 to 60°C
Relative humidity: 20 to 85% non condensing

CASE:
Self-extinguishing Polycarbonate;
Protection: Front panel: IP65, Box:IP42
Suitable wiring: Up to 4,0mm²

Self-extinguishing policabonate case,

RS-485 communication; RTU MODBUS protocol (optional)

3. ELECTRICAL WIRING

Figure 1 below shows the thermometer connections to sensor, mains and outputs.

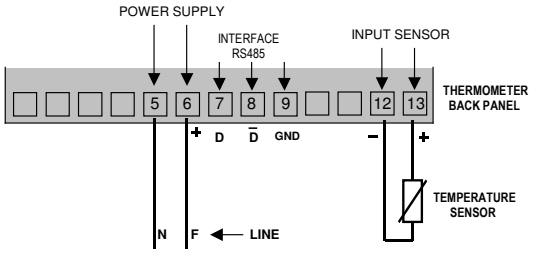

Figure 1 – N320 terminals

It is important to follow the recommendations below:

- Signal wires should be installed in grounded conduits and away from power or contactor wires.
- The instrument should have its own power supply wires that should not be shared with electrical motors, coils, contactors, etc.
- Installing RC filters (47R and 100nF, series combination) is strongly recommended at contactor coils or any other inductors.
- System failure should always be taken into account when designing a control panel to avoid irreversible damage to equipment or people.

4. OPERATION

Upon power-up, the N320 display shows for 1 second its firmware version. This information is useful when consulting the factory.

After that the termometer starts to show the temperature measured by sensor. This is the temperature measurement level.

Besides this level the equipament has **oFS (offset)** parameter through which you can compensate indication erros caused by sensor exchange.

To access level **1**, press P for 2 seconds until the "oFS" message shows up alternating the name with their respective values. You can adjust the desired Offset clicking on the ▲ and ▼ keys.

Press P again to return to the initial screen (temperature display).

Notes: 1 A parameter configuration is saved when the P key is pressed to advance to the next parameter in the cycle. The configuration is stored in a non-volatile memory, retaining its value when the thermometer is de-energized.

2 If no keyboard activity is detected for over 20 seconds, the thermometer saves the current parameter value and returns to the measurement level.

5. CALIBRATION

The thermometer is factory calibrated. The following parameters should be accessed only by experienced personnel. To enter this cycle, the P key must be kept pressed for 18 seconds.

Don't press the ▲ and ▼ keys if you are not sure of the calibration procedures. Just press the P key a few times until the temperature measurement level is reached again.

CAL ***Calibration low***	*Offset* value of the input. It adjusts the lower measurement range of the sensor.
CAH ***Calibration High***	Gain calibration. It adjusts the upper measurement range of the sensor.
CJL ***Cold Junction Calibration***	Cold Junction *Offset* calibration.This parameter is available only for thermocouple.
Sn2 ***Serial number***	First part of the thermometer electronic serial number.
Sn1 ***Serial number***	Second part of the thermometer electronic serial number.
Sn0 ***Serial number***	Third part of the thermometer electronic serial number.

6. ERROR MESSAGES

The display signs related to measurement errors are shown below:

--- (---)	Indicates: • Measured temperature exceeded maximum allowed range for the sensor. • Broken **Pt1000** or **T/C J**. • Short circuited **NTC** sensor.
--- (---)	Indicates: • Measured temperature is below minimum measurement range of the sensor. • Short circuited **Pt1000** or **T/C J** • Broken **NTC**.