

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 MA

## Biomedical Chip Thermistors



### Applications

A complete line of standard sub-assemblies is available. Continuous research and development efforts within Thermometrics have resulted not only in these field proven designs, but in the development of our Unitherm ThermoChip Thermistor, designed exclusively for biomedical applications in the range of 32°F to 122°F (0°C to 50°C).

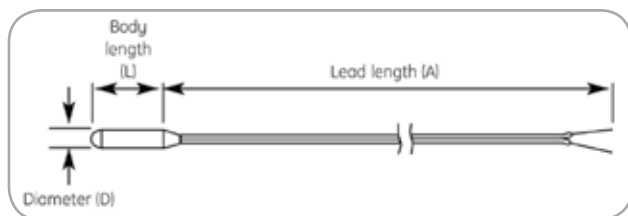
Although low in cost, these highly stable, precision thermochips provide the reliability, tight interchangeable tolerances, geometries, and fast response times that are often required. Thermometrics employs experienced applications engineers who welcome inquiries, whether for assistance, or to help with your design requirements concerning new and existing applications.

Our Biomedical Chip Thermistor assemblies are designed for use in applications involving both intermittent and continuous patient temperature monitoring. Repeatability and fast response are essential not only for the intermittent temperature requirements associated with oral and rectal fever measurements, but also with the continuous monitoring often necessary during induced-hypothermia and general anesthesia, or when employed in the care of infants and premature babies. Intensive care units along with recovery rooms have also adopted patient temperature as part of their vital sign monitoring procedures. Temperature monitoring for skin surface, tympanic, esophageal, foley catheters and biofeedback applications has also improved due to the high stability and tight interchangeable tolerances designed into each Thermometrics' Biomedical assembly.

**Amphenol**  
**Advanced Sensors**

# NTC Type MA Specifications

## MA100

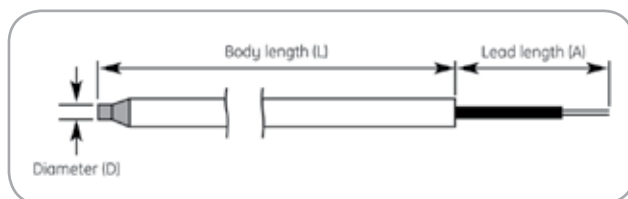


Designed for use in catheter assemblies, these sensors are available with nominal resistance values of 2252, 3000, 5000, and 10,000  $\Omega$  at 77°F (25°C). Close monitoring of manufacturing processes allow Thermometrics to maintain tight interchangeability tolerances with volume production. Typical design parameters are represented in Assembly Type table.

0.030 in (0.76 mm) (10 K $\Omega$  only) and 0.050 in (1.27 mm) diameters available with kapton sleeve only.

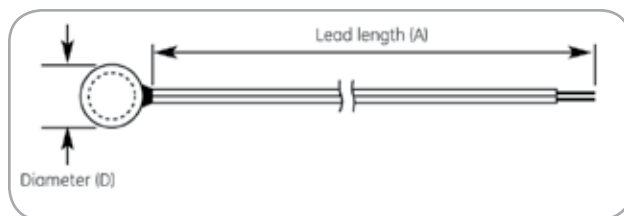
0.070 in (1.78 mm) diameter normally supplied with molded plastic tip.

## MA200



Intermittent body temperature measurements are common practice in all phases of patient care. This assembly is ideally suited for the disposable cover oral and rectal fever thermometers in use today. It features rugged construction with tip sensitive shaft assemblies exhibiting resistance values of 2252, 3000, 5000, and 10,000  $\Omega$  at 77°F (25°C). Refer to Assembly Type table for typical design parameters.

## MA300



Routine continuous patient temperature monitoring is now feasible by using the convenience of the patient's skin site as an indicator of body temperature. The stainless steel housing used is suitable for both reusable and disposable applications, while maintaining maximum patient comfort. Nominal resistance values of 2252, 3000, 5000, and 10,000  $\Omega$  at 77°F (25°C) are available. Refer to Assembly Type table for typical design parameters.

## Assembly Type

| Assembly Type                  | MA100                                                                                 | MA200                                    | MA300                                    |
|--------------------------------|---------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------|
| Standard Diameters (D)         | 0.030 in (0.762 mm)<br>0.050 in (1.27 mm)<br>0.070 in (1.78 mm)<br>0.080 in (2.03 mm) | 0.156 in (3.96 mm)                       | 0.375 in (9.52 mm)                       |
| Body Length (L)                | 3/8 in (9.52 mm)                                                                      | 3.75 in (95.25 mm)                       | N/A                                      |
| Lead Length (A)                | 3/8 in (9.52 mm)                                                                      | 3.75 in (95.25 mm)                       | N/A                                      |
| Tolerance                      | See Tolerance Code and Temperature Table                                              | See Tolerance Code and Temperature Table | See Tolerance Code and Temperature Table |
| Wire Gauge                     | 20, 30, 32, 38, AWG                                                                   | 30 AWG                                   | 30 AWG                                   |
| Standard Wire Insulation       | *Heavy Isomid<br>*Medical Grade PVC<br>*Polyurethane with Nylon Overcoat              | PTFE                                     | Medical Grade PVC<br>PTFE                |
| Body Material                  | Molded Plastic or Kapton Sleeve                                                       | Lexan Shaft<br>Aluminum Tip              | Stainless Steel                          |
| Nominal R Values @ 77°F (25°C) | 2252 $\Omega$ , 3000 $\Omega$ , 5000 $\Omega$ , 10,000 $\Omega$ (for all three types) |                                          |                                          |

## Thermal Response Time (63% Response)

| Series                      | Still Air  | Still Water* |
|-----------------------------|------------|--------------|
| MA100 Catheter Assembly     | 15 seconds | 2.0 seconds  |
| MA200 Oral-Rectal Assembly  | 35 seconds | 0.6 seconds  |
| MA300 Skin Surface Assembly | 45 seconds | 2.0 seconds  |

\*Response time provided is for assembly plunged from 77°F (25°C) air to 41°F (5°C) water.

# NTC Type MA Specifications

## Tolerance Code and Temperature Range

| Temperature Range °F (°C) | Tolerance Code |                |                |
|---------------------------|----------------|----------------|----------------|
|                           | A<br>±°F (±°C) | B<br>±°F (±°C) | C<br>±°F (±°C) |
| 32 to 68 (0 to 20)        | 0.27 (0.15)    | 0.36 (0.2)     | 0.45 (0.25)    |
| 68 to 95 (20 to 35)       | 0.18 (0.1)     | 0.27 (0.15)    | 0.36 (0.2)     |
| 95 to 102 (35 to 39)      | 0.09 (0.05)    | 0.18 (0.1)     | 0.27 (0.15)    |
| 102 to 107.60 (39 to 42)  | 0.14 (0.075)   | 0.27 (0.15)    | 0.36 (0.2)     |
| 107.60 to 113 (42 to 45)  | 0.18 (0.1)     | 0.27 (0.15)    | 0.36 (0.2)     |
| 113 to 122 (45 to 50)     | 0.27 (0.15)    | 0.36 (0.2)     | 0.45 (0.25)    |

## Data

Our biomedical series thermistor chips and sub-assemblies are designed to be interchangeable over a 32°F to 122°F (0°C to 50°C) range. Best overall stability is maintained when exposure and storage temperatures remain below 158°F (70°C).

## Resistance vs Temperature

| Temperature<br>°F (°C) | 2252 Ω  | 3 kΩ    | 5 kΩ    | 10 kΩ   | 103(ⅴ) Ω |
|------------------------|---------|---------|---------|---------|----------|
| 32.00 (0)              | 7373.00 | 9821.93 | 16369.9 | 32739.8 | 29565.8  |
| 33.80 (1)              | 7005.80 | 9332.76 | 15554.6 | 31109.2 | 28224.8  |
| 35.60 (2)              | 6659.04 | 8870.84 | 14784.7 | 29569.5 | 26951.9  |
| 37.40 (3)              | 6331.49 | 8434.49 | 14057.5 | 28115.0 | 25743.3  |
| 39.20 (4)              | 6021.97 | 8022.17 | 13370.3 | 26740.6 | 24595.5  |
| 41.00 (5)              | 5729.40 | 7632.41 | 12720.7 | 25441.4 | 23505.0  |
| 42.80 (6)              | 5452.74 | 7263.87 | 12106.4 | 24212.9 | 22468.7  |
| 44.60 (7)              | 5191.06 | 6915.27 | 11525.4 | 23050.9 | 21483.8  |
| 46.40 (8)              | 4943.46 | 6585.43 | 10975.7 | 21951.4 | 20547.2  |
| 48.20 (9)              | 4709.11 | 6273.23 | 10455.4 | 20910.8 | 19656.6  |
| 50.00 (10)             | 4487.22 | 5977.64 | 9962.74 | 19925.5 | 18809.3  |
| 51.80 (11)             | 4277.07 | 5697.69 | 9496.15 | 18992.3 | 18003.1  |
| 53.60 (12)             | 4077.97 | 5432.47 | 9054.11 | 18108.2 | 17235.7  |
| 55.40 (13)             | 3889.29 | 5181.11 | 8635.19 | 17270.4 | 16505.1  |
| 57.20 (14)             | 3710.42 | 4942.83 | 8238.05 | 16476.1 | 15809.4  |
| 59.00 (15)             | 3540.80 | 4716.88 | 7861.46 | 15722.9 | 15146.7  |
| 60.80 (16)             | 3379.91 | 4502.54 | 7504.24 | 15008.5 | 14515.3  |
| 62.60 (17)             | 3227.24 | 4299.17 | 7165.28 | 14330.6 | 13913.6  |
| 64.40 (18)             | 3082.34 | 4106.14 | 6843.57 | 13687.1 | 13340.0  |
| 66.20 (19)             | 2944.77 | 3922.88 | 6538.13 | 13076.3 | 12793.0  |
| 68.00 (20)             | 2814.12 | 3748.83 | 6248.05 | 12496.1 | 12271.4  |
| 69.80 (21)             | 2690.01 | 3583.49 | 5972.48 | 11945.0 | 11773.8  |
| 71.60 (22)             | 2572.07 | 3426.38 | 5710.63 | 11421.3 | 11299.0  |
| 73.40 (23)             | 2459.96 | 3277.03 | 5461.72 | 10923.4 | 10845.8  |
| 75.20 (24)             | 2353.37 | 3135.04 | 5225.07 | 10450.1 | 10413.1  |
| 77.00 (25)             | 2252.00 | 3000.00 | 5000.00 | 10000.0 | 10000.0  |
| 78.80 (26)             | 2155.56 | 2871.53 | 4785.88 | 9571.77 | 9605.42  |
| 80.60 (27)             | 2063.79 | 2749.28 | 4582.13 | 9164.26 | 9228.45  |
| 82.40 (28)             | 1976.44 | 2632.91 | 4388.19 | 8776.38 | 8868.24  |
| 84.20 (29)             | 1893.27 | 2522.12 | 4203.54 | 8407.07 | 8523.96  |
| 86.00 (30)             | 1814.07 | 2416.61 | 4027.68 | 8055.35 | 8194.82  |
| 87.80 (31)             | 1738.61 | 2316.09 | 3860.15 | 7720.30 | 7880.09  |
| 89.60 (32)             | 1666.71 | 2220.31 | 3700.51 | 7401.03 | 7579.07  |
| 91.40 (33)             | 1598.18 | 2129.02 | 3548.36 | 7096.72 | 7291.10  |
| 93.20 (34)             | 1532.85 | 2041.98 | 3403.30 | 6806.60 | 7015.55  |
| 95.00 (35)             | 1470.54 | 1958.98 | 3264.97 | 6529.94 | 6751.83  |
| 96.80 (36)             | 1411.11 | 1879.81 | 3133.02 | 6266.03 | 6499.37  |
| 98.60 (37)             | 1354.41 | 1804.27 | 3007.12 | 6014.23 | 6257.64  |
| 100.40 (38)            | 1300.29 | 1732.18 | 2886.96 | 5773.93 | 6026.13  |
| 102.20 (39)            | 1248.63 | 1663.36 | 2772.27 | 5544.53 | 5804.36  |
| 104.00 (40)            | 1199.30 | 1597.65 | 2662.75 | 5325.50 | 5591.88  |
| 105.80 (41)            | 1152.19 | 1534.89 | 2558.15 | 5116.30 | 5388.26  |
| 107.60 (42)            | 1107.19 | 1474.94 | 2458.23 | 4916.46 | 5193.09  |
| 109.40 (43)            | 1064.18 | 1417.65 | 2362.75 | 4725.49 | 5005.96  |
| 111.20 (44)            | 1023.08 | 1362.89 | 2271.49 | 4542.98 | 4826.53  |
| 113.00 (45)            | 983.78  | 1310.55 | 2184.24 | 4368.49 | 4654.43  |
| 114.80 (46)            | 946.21  | 1260.49 | 2100.82 | 4201.64 | 4489.33  |
| 116.60 (47)            | 910.27  | 1212.62 | 2021.03 | 4042.05 | 4330.91  |
| 118.40 (48)            | 875.89  | 1166.81 | 1944.69 | 3889.38 | 4178.88  |
| 120.20 (49)            | 842.99  | 1122.99 | 1871.65 | 3743.29 | 4032.94  |
| 122.00 (50)            | 811.50  | 1081.04 | 1801.73 | 3603.46 | 3892.83  |

# NTC Type MA Specifications

## Ordering Information

The code number to be ordered may be specified as follows:

### MA

#### Code

100FA

100FD

100DD

100BF

200LC

300TA

300TB

100GG

#### Standard Assemblies

Series 100, 0.070 in (1.78 mm) diameter molded plastic tip, 30 gauge PVC insulated ribbon cable.

Series 100, 0.070 in (1.78 mm) diameter molded plastic tip, 32 gauge bifilar heavy isomid insulation.

Series 100, 0.050 in (1.27 mm) diameter kapton sleeve with 32 gauge bifilar heavy isomid insulation.

Series 100, 0.030 in (0.768 mm) diameter kapton sleeve with 38 gauge bifilar heavy isomid insulation.

Series 200, 0.156 in (3.96 mm) diameter aluminum tip, 30 gauge PTFE leads.

Series 300, 0.375 in (9.52 mm) diameter stainless steel cup, 30 gauge PVC insulated ribbon cable.

Series 300, 0.375 in (9.52 mm) diameter stainless steel cup, 30 gauge PTFE insulated ribbon cable.

Series 100, 0.080 in (2.03 mm) diameter molded plastic tip, 28 gauge kynar insulated twisted pair.

#### Code

232

302

502

103

103 (Y)

#### Resistance Cable\*

2252  $\Omega$

3000  $\Omega$

5000  $\Omega$

10,000  $\Omega$

10,000  $\Omega$

#### Code

X

#### Tolerance

Refer to tolerance code and temperature range table

MA - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ Typical Model Number

\*Refer to resistance vs temperature table on previous page.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## Amphenol:

[MA100GG232C](#) [MA100GG232B](#) [MA100GG232A](#) [MA100GG103C](#) [MA100GG103A](#) [MA100GG103B](#) [MA100BF103A](#)  
[MA100BF103B](#) [MA100GG103AN](#) [MA100GG103BN](#) [MA100BF103BN](#) [MA100GG103CN](#) [MA100BF103C](#)  
[MA100BF103AN](#) [MA100BF103CN](#) [MA100BF232XN](#) [MA100GG232CN](#)

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А