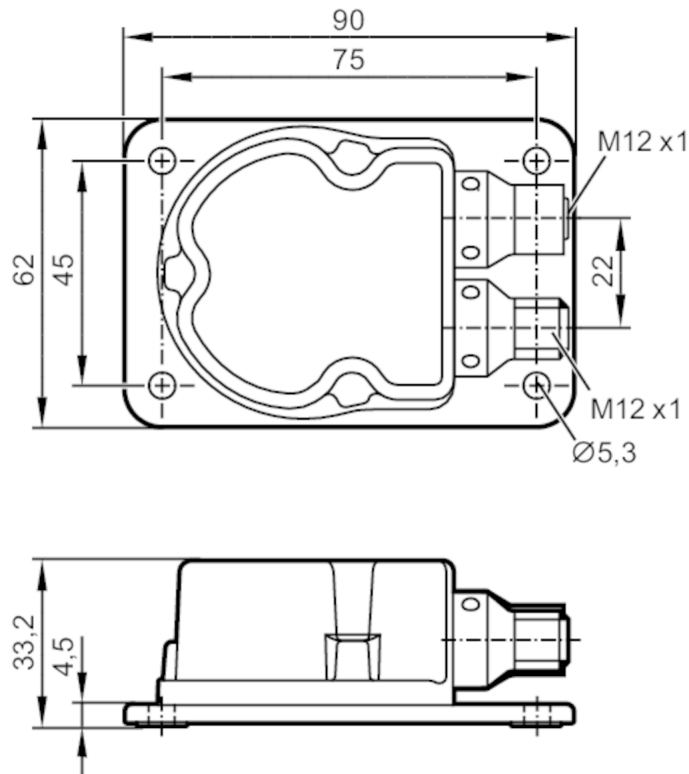


# JN2101



## Inclination sensor

INC-M2M090C -KG/US



| Product characteristics     |      |                                                                          |
|-----------------------------|------|--------------------------------------------------------------------------|
| Measuring principle         |      | MEMS capacitive                                                          |
| Communication interface     |      | CAN                                                                      |
| Inclination measurement     |      |                                                                          |
| Number of measurement axes  |      | 2                                                                        |
| Angular range               | [°]  | -45...45                                                                 |
| Application                 |      |                                                                          |
| Function principle          |      | static                                                                   |
| Application                 |      | High-precision inclination measurement in 2 axes for mobile applications |
| Electrical data             |      |                                                                          |
| Operating voltage           | [V]  | 9.2...30 DC                                                              |
| Current consumption         | [mA] | 70; (24 V DC, 25 °C)                                                     |
| Max. current consumption    | [mA] | 405; (9.2 V DC; -40 °C)                                                  |
| Min. insulation resistance  | [MΩ] | 100; (500 V DC)                                                          |
| Protection class            |      | III                                                                      |
| Reverse polarity protection |      | yes                                                                      |
| Reverse polarity protection |      | yes                                                                      |
| Power-on delay time         | [s]  | 300; (warm-up time; Max. initialisation time: 1000 ms)                   |
| Measuring/setting range     |      |                                                                          |
| Measuring principle         |      | MEMS capacitive                                                          |



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| Inclination measurement    |                                     |                                                                                              |
|----------------------------|-------------------------------------|----------------------------------------------------------------------------------------------|
| Number of measurement axes |                                     | 2                                                                                            |
| Angular range              | [°]                                 | -45...45                                                                                     |
| Limit frequency            | [Hz]                                | 0.5...10; (parameterisable)                                                                  |
| Accuracy / deviations      |                                     |                                                                                              |
| Accuracy                   | [°]                                 | $\leq \pm 0,01$ ; (absolute)                                                                 |
| Hysteresis                 | [°]                                 | $\leq \pm 0,05$                                                                              |
| Repeatability              | [°]                                 | $\leq \pm 0,01$                                                                              |
| Resolution                 | [°]                                 | 0.01; (parameterisable)                                                                      |
| Temperature coefficient    | [1/K]                               | $\leq \pm 0,0008$ °                                                                          |
| Interfaces                 |                                     |                                                                                              |
| Communication interface    |                                     | CAN                                                                                          |
| Number of CAN interfaces   |                                     | 1                                                                                            |
| Terminating resistor       |                                     | yes; (internal ; parameterisable)                                                            |
| CAN                        |                                     |                                                                                              |
| Protocol                   |                                     | CANopen                                                                                      |
| Factory settings           |                                     | Baud rate: 125 kBit/s<br>node ID: 10                                                         |
| Version                    |                                     | CiA DS301 V4.2.0; DSP-410 V2.0.0; CiA 306 V1.3.0                                             |
| Operating conditions       |                                     |                                                                                              |
| Ambient temperature        | [°C]                                | -40...85                                                                                     |
| Storage temperature        | [°C]                                | -40...85                                                                                     |
| Protection                 |                                     | IP 65; IP 67; IP 68; IP 69K                                                                  |
| Tests / approvals          |                                     |                                                                                              |
| EMC                        | DIN EN 61000-4-2 ESD                | 4 kV CD / 8 kV AD                                                                            |
|                            | DIN EN 61000-4-3 HF radiated        | 10 V/m                                                                                       |
|                            | DIN EN 61000-4-4 Burst              | 2 kV                                                                                         |
|                            | DIN EN 61000-4-6 HF conducted       | 10 V                                                                                         |
|                            | DIN EN 55022 class B / CISPR 16-2-3 | 30 - 1000 MHz                                                                                |
|                            | CISPR 25 ECE R 10                   | 30 - 1000 MHz narrowband and broadband                                                       |
|                            | ISO 11452-2 ECE R 10                | 20 - 2000 MHz / 30 V/m                                                                       |
|                            | ISO 7637-2 ECE R 10                 | pulse 1, 2a, 2b, 3a, 3b, 4, and pulse emission during operation, switching-on, switching-off |
| Shock resistance           | ISO 7637-3                          | - 80 V pulse a / + 80 V pulse b                                                              |
|                            | DIN EN 60068-2-27                   | 100 g 1 ms / 10000 impacts per axis (X/Y)                                                    |
|                            | DIN EN 60068-2-29                   | 30 g 6 ms / 24000 shock (bump)                                                               |
| Vibration resistance       | DIN EN 60068-2-64                   | 10...2000 Hz Test VII / random, mounting place car body                                      |
|                            | DIN EN 60068-2-6                    | 10...500 Hz / 10 g 10 cycles/axis, sine                                                      |
| Salt spray test            | DIN EN 60068-2-52                   | severity level 5 (motor vehicle)                                                             |
| Damp heat                  | DIN EN 60068-2-30                   | 55 °C cyclic upper temperature / 95 % rh 2 cycles of 24 h                                    |
| MTTF                       | [years]                             | 372                                                                                          |
| Standard                   |                                     | Compliant with ECE R 10, rev. 5; ISO 7637-3: 2007-07                                         |

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## Inclination sensor

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| Mechanical data       |                                     |                |
|-----------------------|-------------------------------------|----------------|
| Weight                | [g]                                 | 415.5          |
| Dimensions            | [mm]                                | 90 x 62 x 33.2 |
| Materials             | housing: diecast zinc nickel-plated |                |
| Installation position | horizontal                          |                |

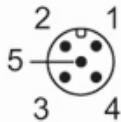
| Displays / operating elements |                     |                         |
|-------------------------------|---------------------|-------------------------|
| Display                       | preoperational mode | 1 x LED, green          |
|                               | operational mode    | 1 x LED, green flashing |
|                               | fault               | 1 x LED, red            |

| Accessories    |                     |
|----------------|---------------------|
| Items supplied | Protective cover: 1 |

| Remarks       |        |
|---------------|--------|
| Pack quantity | 1 pcs. |

### Electrical connection - CAN-In

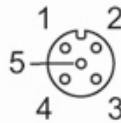
Connector: 1 x M12; coding: A



|   |            |
|---|------------|
| 1 | CAN Screen |
| 2 | + UB       |
| 3 | CAN_GND    |
| 4 | CAN_H      |
| 5 | CAN_L      |

### Electrical connection - CAN-Out

Connector: 1 x M12; coding: A



|   |            |
|---|------------|
| 1 | CAN Screen |
| 2 | + UB       |
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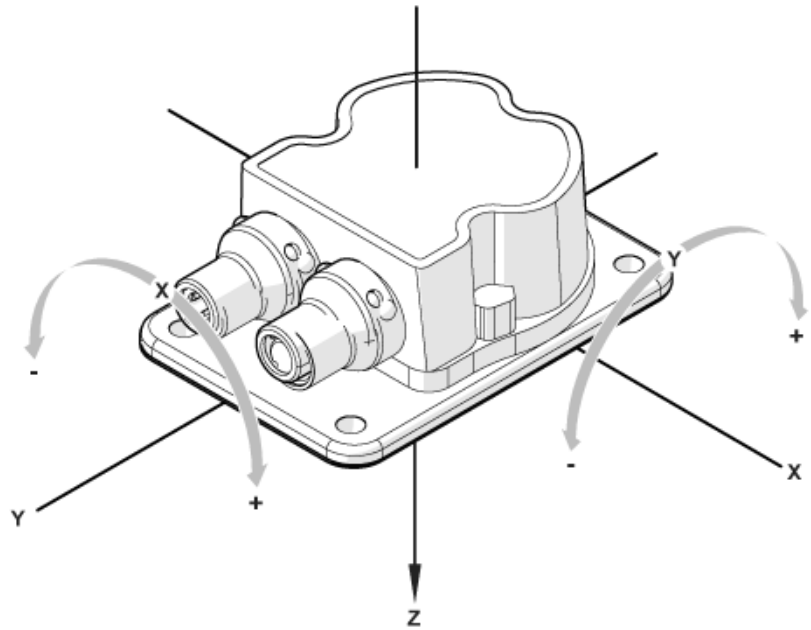


## Inclination sensor

INC-M2M090C -KG/US

### Diagrams and graphs

measuring and installation direction



horizontal installation position / rotation about x- and y-axis