

# Inertial Measurement Unit MM7.10



- ▶ Application 1:  $\pm 163^\circ/\text{s}$  (roll rate / pitch rate / yaw rate)
- ▶ Application 2:  $\pm 4.2 \text{ g}$  (X, Y and Z acceleration)
- ▶ Weight w/o wire: 35 g
- ▶ Size: 80 x 56 x 23.3 mm
- ▶ Power supply: 8 to 16 V

The MM7.10 was designed to measure the physical effects of rotational and linear acceleration. In order to achieve this, the sensor includes MEMS measuring elements connected to an appropriate integrated circuit.

A rotational acceleration around the integrated sensing elements generates a Coriolis force, which changes the internal capacity of the micro machined sensing parts. Furthermore, a pure surface micro machined element is used to measure the vehicle linear acceleration in all 3 axis. This combination of rotational and linear acceleration sensors enables a precise measurement of the vehicle dynamics.

The main feature and benefit of this sensor is the combination of 3 linear and 3 rotational accelerometers and its high speed 1 Mbaud CAN-signal output.

## Application

Application I	$\pm 163^\circ/\text{s}$ (roll / pitch / yaw rate)
Application II	$\pm 4.2 \text{ g}$ (X, Y and Z acceleration)
Operating temperature range	-20 to 85°C

## Technical Specifications

### Mechanical Data

Weight w/o wire	35 g
Size	80 x 56 x 23.3 mm

### Electrical Data

Power supply	8 to 16 V
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Max input current	100 mA at 7 V 50 mA at 14 V
CAN speed	1 Mbaud or 500 kbaud

## CAN Message

### CAN ID 01 0x174

Byte	Value
0	Yaw rate
1	
2	Reserved
3	
4	Acc Y-axis
5	
6	Reserved
7	Unused

### CAN ID 02 0x178

Byte	Value
0	Roll rate
1	
2	Reserved
3	
4	Acc X-axis
5	
6	Reserved
7	Unused

### CAN ID 03 0x17C

Byte	Value
0	Pitch rate
1	

2	Reserved
3	
4	Acc Z-axis
5	
6	Reserved
7	Unused

### Characteristic

#### Characteristic Application I

Measuring range	$\pm 163^\circ/\text{s}$
Over range limit	$\pm 1,000^\circ/\text{s}$
Absolute physical resolution	$0.1^\circ/\text{s}$
Cut-off frequency (-3 dB)	15 Hz; 30 Hz; 70 Hz

#### Characteristic Application II

Measuring range	$\pm 4.2 \text{ g}$
Over range limit	$\pm 20 \text{ g}$
Absolute physical resolution	$0.01 \text{ g}$
Cut-off frequency (-3 dB)	15 Hz; 30 Hz; 70 Hz

### Connectors and Wires

<b>Connector (1)</b>	<b>AMP 114-18063-076</b>
Mating connector (1)	F02U.B00.435-01
Pin 1	Gnd
Pin 2	CANL
Pin 3	CANH
Pin 4	UBat
<b>Connector (2)</b>	<b>ASL606-05PC-HE</b>
Mating connector (2)	ASL006-05SC-HE
Pin 1	UBat
Pin 2	Gnd
Pin 3	CANH
Pin 4	CANL
Pin 5	Not connected
Sleeve	DR-25
<b>Wire with open end (3)</b>	
Red wire	UBat
Black wire	Gnd
White wire	CANH
Blue wire	CANL
Wire size with open end (3)	4 x AWG24
Wire length L	15 to 100 cm

### CAN Parameters

Byte order	LSB (Intel)
CAN speed	1 Mbaud or 500 kbaud
Bit mask	unsigned
Offset (all signals)	0x8000 hex
Quantization Roll Rate	$0.005 [^\circ/\text{s}/\text{digit}]$

Quantization Pitch Rate	$0.005 [^\circ/\text{s}/\text{digit}]$
Quantization Yaw Rate	$0.005 [^\circ/\text{s}/\text{digit}]$
Quantization Acc X-axis	$0.0001274 [\text{g}/\text{digit}]$
Quantization Acc Y-axis	$0.0001274 [\text{g}/\text{digit}]$
Quantization Acc Z-axis	$0.0001274 [\text{g}/\text{digit}]$

### Installation Notes

Mounting position: The MM7.10 must not be mounted with connector pointing upwards. Other than this, Bosch has no restrictions for the mounting orientation. We recommend aligning the unit coordinate system to the vehicle coordinate system as this is the orientation that most systems will require and thus no mathematical transformation is needed.

The MM7.10 can be connected directly to most control units and data logging systems.

Avoid abrupt temperature changes.

For mounting, use only the integrated fixing holes.

Ensure that the environmental conditions do not exceed the sensor specifications.

You will find further application hints in the offer drawing at our homepage and calibration sheet.

Deliver the calibration sheet with your order placement.

Note:

CAN ID 04 0x7DC, RX1 0x7DF and RX2 0x7D4 are used for configuration of the sensor (SYNC). Make sure that the CAN ID 04 0x7DC, RX1 0x7DF and RX2 0x7D4 are not used in your CAN network by any other device.

CAN DBC file on request

Standards considered on request

### Safety Note

The sensor is not intended to be used for safety related applications without appropriate measures for signal validation in the application system.

### Legal Restrictions

Due to embargo restrictions, sale of this product in Russia, Belarus, Iran, Syria, and North Korea is prohibited.

### Ordering Information

#### Inertial Measurement Unit MM7.10

Without wire (1)

Order number **F02U.V03.092-01**

#### Inertial Measurement Unit MM7.10

Wire with motorsport connector (2)

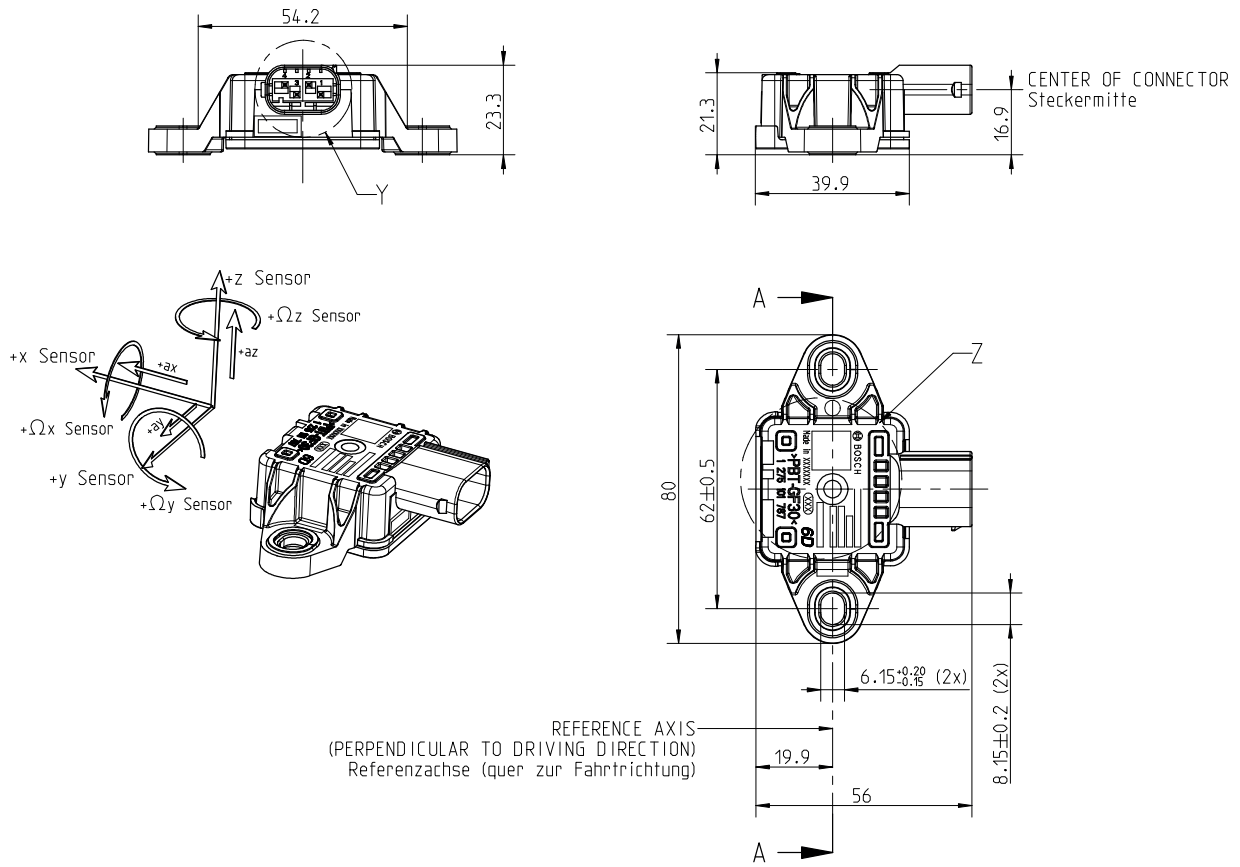
Order number **F02U.V03.092-02**

#### Inertial Measurement Unit MM7.10

Wire with open end (3)

Order number **F02U.V03.092-90**

Dimensions



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