

DTI IMU

Type DTI5002A06

Inertial measurement unit

The IMU (inertial measurement unit) Type DTI5002A06 of the DTI technology is designed to measure linear acceleration and angular rate in all three orthogonal directions. Therefore the unit consists of 3 accelerometers, 3 angular rate sensors and 2 triaxial DiMods Type DTI307.3. All components are combined in one housing and only one 4 wire cable leads to the connector. All sensor data are transferred to the data recorder via one RS-485 bus line. The sensor housing provides the possibility (mounting pattern) to screw three tilt sensors on top.

- 6-axis sensor (acceleration and angular rate in the three coordinate directions)
- 4-pole anti-aliasing filter, 4 kHz cut-off frequency
- Sampling rate 20 kHz
- Sampling ADC with 16 bits resolution
- Shunt stimulation of all axes
- DTI bus connection
- Dimensions 30x30x27 mm

Description

The functionality of the sensor Type DTI5002A06 is to measure three linear accelerations and three angular rates at one position. The sensor is designed for crash test applications and can be mounted in crash test dummies, vehicles or similar "short duration" applications.

The calculation of the stored data will be done by postprocessing after the crash test by the customer itself. The range of each axis will be fixed during manufacturing. Therefore contact our sales experts for help to define the measurement range in front of an order.

The sensors are calibrated together with the DiMods as measuring chain. For quick checking of the measuring chain a shunt stimulation is present. The DiMods behave to the bus lines like six parallel connected uniaxial DiMods.



Technical data

Acceleration

Measuring range, typ.	g	±1 500
SAE J211-1 specification	CFC	1 000
Resonance frequency, typ.	kHz	23
FS output signal, typ.	LSB	±27 000
Nonlinearity, typ.		
up to FS (Full Scale)	%	±1
Cross sensitivity, typ.	%	±3
ZMO, typ.	LSB	±1 000

Angular rate

Measuring range, typ.	°/s	±8 000
Angular rate calibration		
up to FS/max.	°/s	±3 000
FS output signal, typ.	LSB	±27 000
Sensitivity linear acceleration, typ.	(°/s)g	0,1
Nonlinearity, typ.	%	±0,5
Cross sensitivity, typ.	%	±1
ZMO, typ.	LSB	±1 000

General data

Supply voltage	V	5,2 ... 6
Sampling rate ¹⁾	kHz	20
Operation temperature range	°C	0 ... 40
Load shock, max.	g peak	4 000
Warm-up time, typ.	s	60
Housing material		Alu alloy
Weight, typ.	grams	60
Dimensions (x, y, z)	mm	30x30x27
Mounting screws	metrical	M3x30
Torque	N·m	1,2

¹⁾ Sampling rate 100 kHz on request

Application

Due to the steady increase of the measuring locations in crash testing and the associated additional wires in the conventional measurement technology where the sensor signals are transmitted in an analog way to a central data acquisition unit, the handling of the test dummies is quite cumbersome.

Using the DiMod technology, a significant simplification and improvement can be achieved both in the dummy and on-board instrumentation by shifting the signal processing and digitization to the sensors. Due to their small size, DiMods of the Type series DTI307... are installed in this case directly into the sensor. Wiring complexity is drastically reduced by using bus lines for digital signal transmission.

The DiMod technology concept at the sensor in combination with the bus connection to a central data recorder (Type DTI304.xy) in the dummy or a rack in the vehicle is designed for minimal space requirements at minimal power loss. Up to 12 sensor channels can be connected to one bus line thus leading to a simple and well-arranged wiring in the vehicle or in the dummy. As mentioned before, the measuring data are centrally stored in a data recorder and read out after the crash.

Ordering code

- DTI IMU

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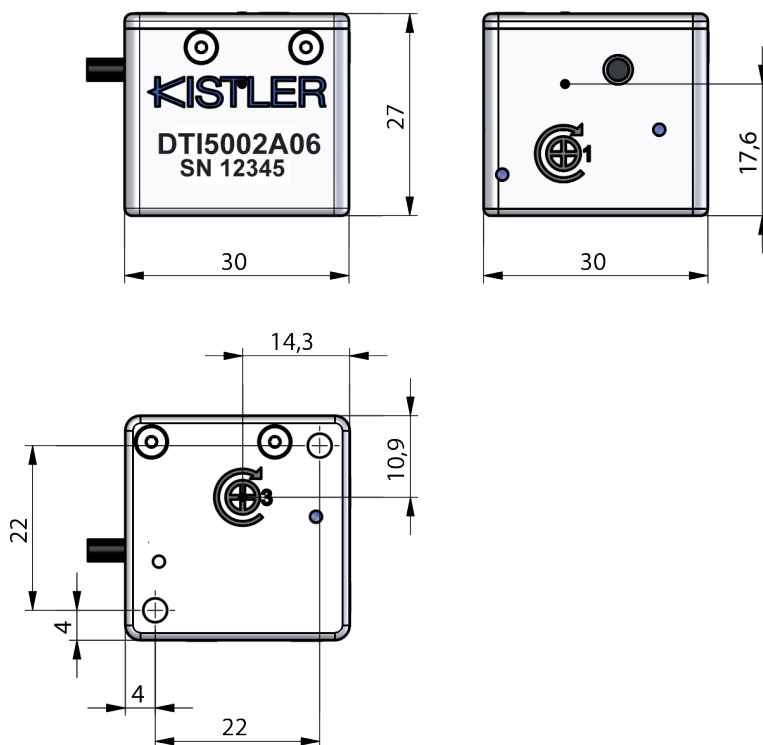


Fig. 1: Dimensions in mm

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