

DTI DiMod

Digitization Module

The DiMod (digitization module) Type DTI307... of the DTI technology is designed for decentralized and sensor close signal processing and digitization of the recorded measuring data. The data transfer to the central data recorder which stores the measuring data is done via RS-485 bus lines. A DiMod contains the following subassemblies:

- Signal processing with instrumentation amplifier
- 4-pole anti-aliasing filter, 4 kHz cut-off frequency
- 5 V sensor supply regulator
- 0 V/5 V shunt stimulation
- Sampling ADC with 16 bits resolution
- Single chip micro controller
- EEPROM with 8 kByte
- RS-485 bus connection

Description

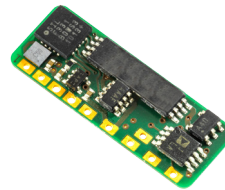
The functionality of the DiMod signal processing is deliberately kept simple. The AD converter used has a 16 bit signal resolution with a noise ratio of max. 1,5 LSB. The gain factor is permanently set via a resistor at the instrumentation amplifier. The DiMods are produced with gain factors adapted to the application measuring range. By setting the appropriate gain, a DiMod is configured for dedicated applications.

The sensors are calibrated together with the DiMod as measuring chain. For quick checking of the measuring chain a shunt stimulation is present.

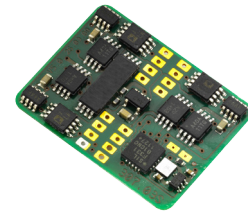
DiMods are available in a solid as well as a flexible circuit board. Both versions exist as uniaxial version for a single sensor (Type DTI307.1) and triaxial version for a sensor with up to three axes (Type DTI307.3). The latter provides all parts for signal processing and digitization in 3 parallel layouts. Microcontroller, EEPROM, RS-485 bus connection, and sensor supply regulator are installed only once. Apart from that, the functionality remains the same.

Since the triaxial DiMod behaves like three parallel connected uniaxial DiMods to the bus lines, the 8 kBytes memory of the EEPROMs is divided into three equal parts. Therefore, for compatibility reasons, the uniaxial DiMod only uses this memory range.

Type DTI307...



Type DTI307.1S



Type DTI307.3S

Technical Data

Type DTI307...		.1	.3
Supply voltage	V	5,2 ... 6	5,2 ... 6
Sensor supply	V	5 + 0,075/ -0,125	5 + 0,075/ -0,125
Power consumption without sensor	mW	60	120
Sensor input		instrumentation amplifier	
Amplification factor		factory preset	
AD converter	Bits	16	16
Effective number of bits (ENOB)	Bits	15	15
Sampling rate	kHz	20	20
Shunt stimulation		with analog switches to ground and +5 V shunt as hole resistance	
Memory			
EEPROM (usable)	kByte	2,666	8
Communication RS-485			
Transmission of measuring data	Mbit/s	6	6
Commands/messages	kBd	115	115
Weight	grams	0,7	1,4
Dimensions (LxWxH)	mm	11x9x6	10x10x10
Type DTI307.1S	mm	22x8	
Type DTI307.3S	mm	24,8x18,8	

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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... can be installed close to the sensor (e.g. in the connector) or directly into the sensor replacing sensor ID modules. Wiring complexity is drastically reduced by using bus lines for digital signal transmission.

The DiMod technology concept of the sensor in combinations with the bus connection to a central data recorder (Type DTI304...) in the dummy or a rack in the vehicle is designed for minimal space requirements at minimal power loss. Up to 12 sensor signals are 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.

In addition to the single sensor (uniaxial DiMod Type DTI307.1) and the triaxial sensor (three channel DiMod Type DTI307.3) versions in rigid or flexible design, there are some special versions available such as DiMods with memory and controller for free flying impactors as well as DiMods for communication with tilt sensors for dummy positioning.

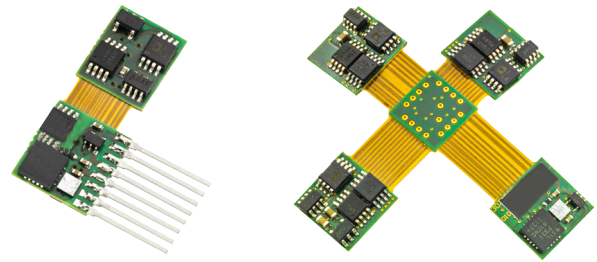


Fig. 1: Types DTI307.1 (left) and DTI307.3 (right) opened

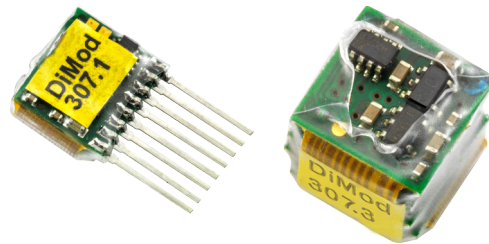


Fig. 2: Types DTI307.1 (left) and DTI307.3 (right) closed

Ordering Key

Variants		Type DTI307 <input type="checkbox"/>
1 channel DiMod	.1	↑
1 channel DiMod, s version	.1S	
3 channel DiMod	.3	
3 channel DiMod, s version	.3S	

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