

# TopMessage – Modular measurement

## Network compatible and modular

TopMessage are modular devices for data acquisition and automation. A master/slave design makes TopMessage suitable for both small and large applications that require the processing of thousands of channels. Master and slave devices can each accommodate two I/O modules. There is a range of I/O modules for users to select an appropriate module(s) for their application. I/O modules are available for any number of channels and sensor types. A network interface enables TopMessage devices to be integrated into a

TCP network or to be directly connected to a PC workstation or laptop/netbook computer. Online measurement data can be transmitted, saved and processed. The data can be stored simultaneously within the TopMessage device itself.

TopLab is identical in construction and functionality to TopMessage – only their housings differ. TopMessage devices are designed for rail-mounted installations, and TopLab, with its 4 mm plugs, for laboratory applications.



**TopMessage and TopLab with identical functions.**

### TopMessage – for industry

- Industrial-grade, compact design for cabinet-mounting
- Screw terminals



### TopLab – for the laboratory

- Laboratory-grade, robust tabletop design
- 4 mm laboratory or BNC connectors



## Product features

- Data acquisition and automation
- Data transmission via LAN (internet / intranet)
- Data storage capability for independent operation
- Modular and scalable
- Full potential isolation
- Universal inputs and outputs
- Control and automation functions
- Signal conditioning within the device
- Connection to external equipment and PLC control
- Configuration via PC

# and automation technology

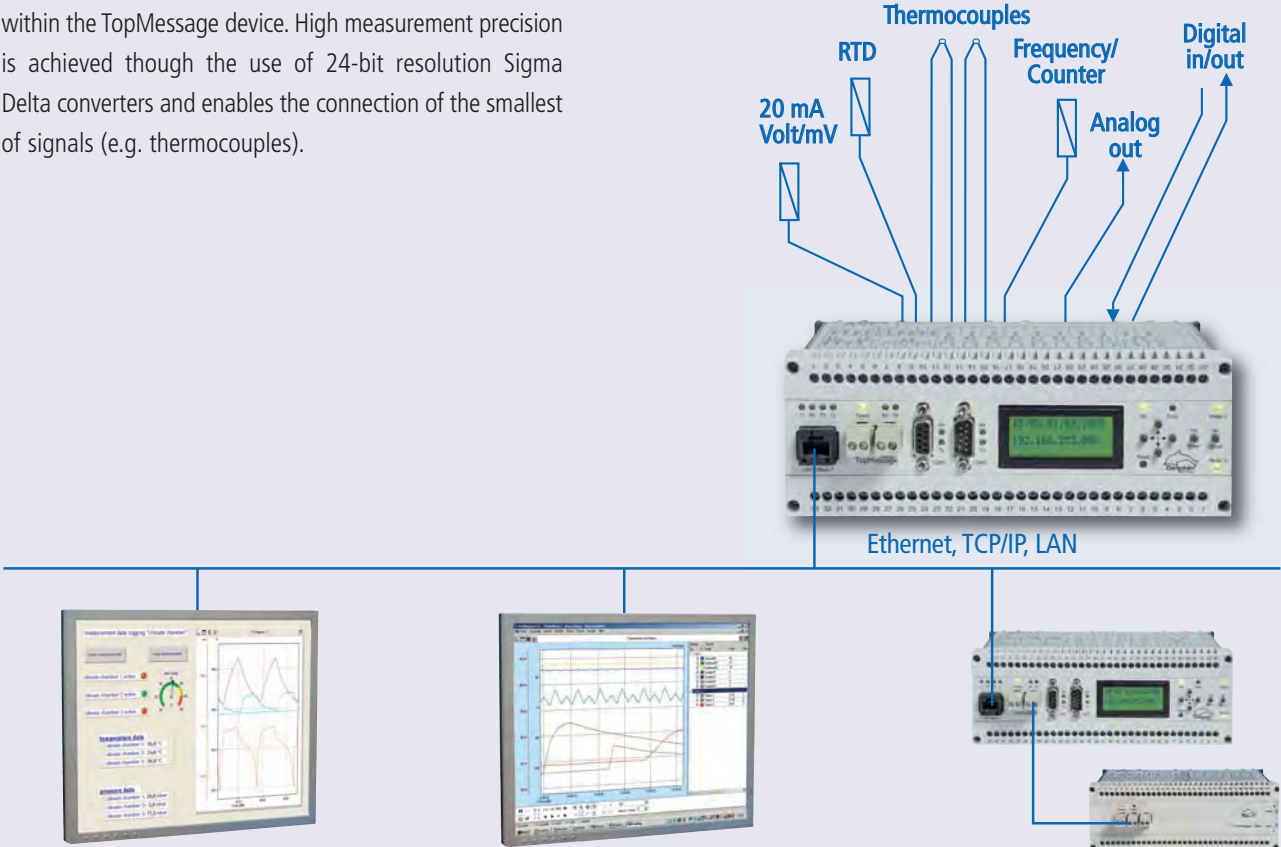
## Universal connectivity

TopMessage's universal inputs enable the connection of signals of any type including non-isolated signals. This means costly measurement transducers are usually not necessary. Potential isolation between channels as well as differential inputs saves both time and money.

Universal inputs enable any unit of measurement to be acquired (e.g. temperature, pressure flow, vibration etc.). Data then undergoes direct scaling and linearization. Conversions from mA to bar or ml/min take place directly within the TopMessage device. High measurement precision is achieved through the use of 24-bit resolution Sigma Delta converters and enables the connection of the smallest of signals (e.g. thermocouples).

## Various Applications

- Multi-channel data acquisition
- Monitoring and alarm management
- Test stand automation
- Product testing
- Quality assurance
- Monitoring of buildings



## Easy to configure

An optional integrated data memory can permanently store up to 128 million measurement values without PC-support and with edge or level triggering. The ProfiSignal-Software enables online / offline analysis, visualization and operation from any PC workstation as well as PC-controlled process automation and database communications via ODBC/SQL.

Configuration of the Message devices takes place with the PC user-friendly DataService / Configurator software. Configuration data is processed online and permanently within the devices. Configuration data may be amended and adjusted during measurement runs.

# TopMessage – Models and interfaces

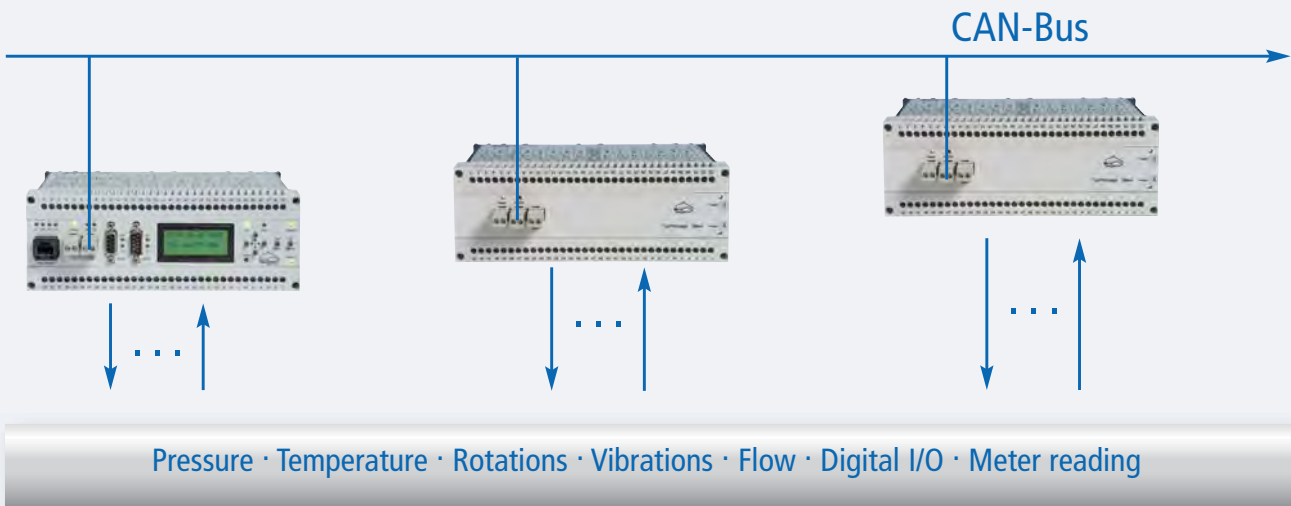
## Extendible using modules

Master / slave devices can be equipped with either two similar or two different I/O modules. Up to ten slaves, with identical housings, can be connected to a master device. Data transfer between master and slave takes place via a CAN bus.



Technical specifications are available on page 46.

CAN bus lines can be up to 100 m in length depending on data transfer rates.



I/O-Modules	Analog inputs	Analog outputs	Frequency Status inputs	Status inputs	Switch outputs	Sum Samplingrate
<b>ADGT</b>	8 channels, V/mV, 20 mA, RTD, thermocouples					60 Hz
<b>ADIT</b>	10 channels, V/mV, 20 mA, RTD, thermocouples	1 channel 20 mA			1 channel	600 Hz
<b>ADVT</b>	15 channels, V/mV, 20 mA, thermocouples					600 Hz
<b>ADFT</b>	8 channels V/mV, 20 mA	2 channels 0 ... 10 V DC	2 channels	2 channels	4 channels	10 kHz
<b>AMD T</b>	8 channels V/mV, 20 mA	2 channels 0 ... 10 V DC	2 channels	2 channels	4 channels	10 ... 160 kHz
<b>AAST</b>	4 channels, V/mV, 20 mA, RTD, thermocouples	4 channels 20 mA		2 channels	2 channels	600 Hz
<b>IOIT</b>				24 channels	1 channel	
<b>OTPT</b>				1 channel	24 channels	
<b>DIOT</b>			11 channels	1 channel	16 channels	

## Software channels

A range of software channels are available as standard in all TopMessage or TopLab devices. They run within the device itself and require no PC support. The DataService / Configurator software is available as a configuration tool.

### Limit values

Limit values for alarm output and event control. User friendly functions for determining steady-state conditions. Integrated wire-break monitoring.

### Calculation channels

Mathematical operations of channels. Differential measurements, quotients, efficiency rates, performance etc. The saving and evaluating of calculation channels takes place as for hardware channels.

### Averaging channels, statistical functions

Calculation of averages and statistical functions.

### PID controller

Several controllers simultaneously. AAST module, with 4 analog inputs / outputs, enables the simultaneous operation of 4 controllers. Automatic and real-time settings as default parameter.

### Integrators and differentiators

Integration and differentiation over time periods in additional channels. Includes operating time counters, edge counters and totalers.

### Timer

Targeted generation of edges and impulses in digital outputs. Simple tool for controlling external set-ups.

### Alarm notification by email or text messaging

Independent sending of fault notification messages as email or text message. Requirement: Network operation or GSM modem.

### Set points

Generation of setpoint graphs for internal/external use. Operating external equipment (e.g. controller). Monitoring processes on a PC.

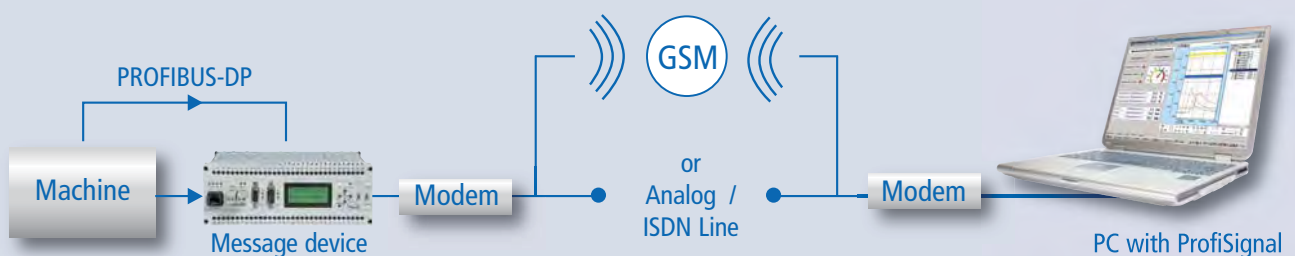
### Linearization channels

Permanently built-in sensor linearization and user-defined sensor characteristic curves (up to 7,500 points).

## PLC and modem connection

As well as an Ethernet interface, TopMessage devices also have optional ModBus (RTU/TCP) and PROFIBUS-DP interfaces. TopMessages can also be used as PLC data-loggers by being linked to fieldbus systems. External equipment and devices (e.g. weighing machines, modems, large displays)

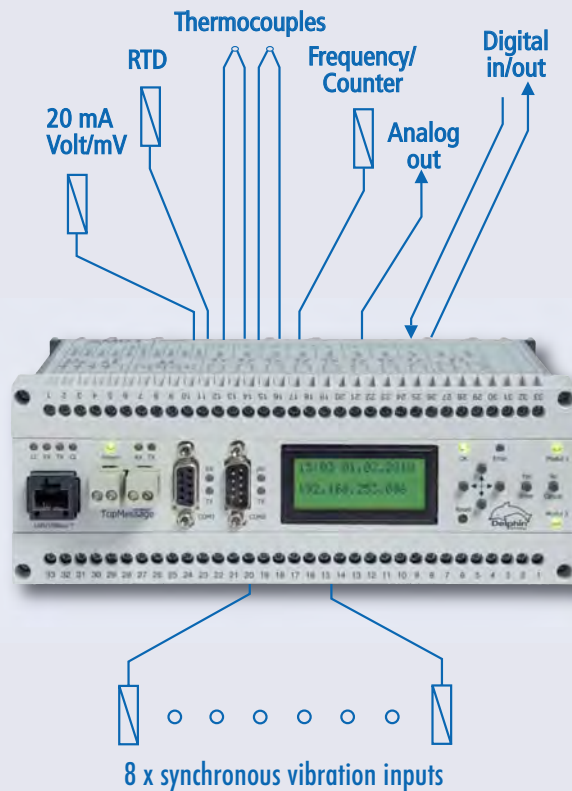
can be connected using a range of interfaces. TopMessage's integrated network interface acts as a gateway from Ethernet to fieldbus. It is possible to monitor PLC measurement values and variables from any desktop PC. The stored data can be effectively analyzed and permanently archived using ProfiSignal software.



# TopMessage – Vibration measurement

## Universal vibration measurement device

TopMessage devices are also suitable for vibration monitoring and damage diagnostics applications. Vibration and process data can be acquired, stored and monitored. Typical measurements are acceleration, velocity and wave length. The ProfiSignal software enables measurement data to be portrayed, analyzed and managed for alarms. The Vibro ProfiSignal option, specially developed for vibration measurement enables the data portrayal in FFT or Orbit diagrams.



## Flexible applications

Vibration measurement technology can be universally deployed. TopMessage devices are monitoring hydro turbines and generator air gaps for vibrations in installations around the world. The devices are also being used in damage diagnostic systems for drives, shafts and bearings on ships. An especially innovative application is the acquisition and monitoring of combustion chamber and gas turbine vibrations (humming). Message devices in mobile vibration measurement cases are being used around the world as well as are being used in permanent test stand installations.

## Various Applications for vibration measurement technology

- Shaft vibration
- Bearing vibration
- Combustion chamber vibration / humming
- Vibrations in housings
- Generator air gap
- Mobile vibration measurement
- Gear box vibrations

## Product features

- Synchronous, parallel data acquisition from up to 16 vibration signals
- DSP supported signal processing
- Computation and monitoring of FFT spectrum directly in Message device
- Characteristic value calculation (Peak-Peak, Gap ...), order analysis
- Characteristic value monitoring / alarm management (text messaging, email)
- Notification to main control system via PROFIBUS-DP or Modbus RTU / TCP
- Trend and analysis of measurement data using ProfiSignal software via network
- Evaluation using orbit, FFT, cascade and x(y) diagrams
- Calculation of envelope frequency spectrum and vibration velocity

## Hardware AMDT

The I/O module AMDT is the base module for vibration measurement. A TopMessage master device can accommodate up to two AMDT modules. AMDT is equipped with eight synchronous analog inputs, rotation inputs and digital outputs. AMDT modules can be operated in conjunction with other I/O modules from the TopMessage series.

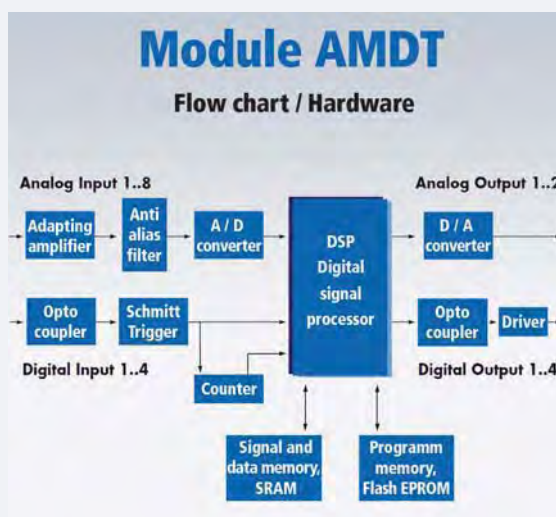
## Practical technology

Delphin's standard version vibration measurement technology already has many practical functions. Its modular design enables adaptation to any size of application. Message devices can acquire vibration signals such as speed, acceleration and displacement as well as typical units of measurement such as pressure, temperature, flow and rotation. The Message device's compact, industrial-grade design, with detachable clamps and rail mountings, make them easy to install into cabinets and housings.

Hardware and software from Delphin provide complete systems for all vibration measurement requirements.



## Vibration module functions



### Inputs / outputs per module

- 8 parallel analog inputs
- Synchronous sampling, flexible triggering
- 160 KHz sampling rate, adapted anti-alias-filter
- 4 digital inputs, potential isolation, 2 inputs with frequency counters, 3.5 V high-level
- 4 digital outputs, potential isolated, switching voltage max. 50 V@2.5 A

### FFT / frequency spectrum

- Flexible parametering of frequency range, line numbers and frequency resolution
- FFT algorithms for 1024, 2048, or 4096 points or with 400, 800, or 1600 lines
- Standard 'Hanning', and 'Flat Top' window functions
- Averaging of frequency spectrums

### Characteristic values

- Arithmetical average, TRMS
- Peak-Peak, min / max values
- Amplitude / frequency of the main vibration
- Amplitude / phasing of synchronous shaft vibrations and dual-shaft synchronous vibrations
- Selective frequency band evaluation

# TopMessage – Technical specifications

## TopMessage / TopLab

<b>Analog inputs</b>	
Voltage range	$\pm 156 \text{ mV} \dots \pm 10 \text{ V}$
Current range	0/4 ... 20 mA
Thermocouples	any, all types, integrated temperature compensation; resistance thermometer Pt100(0), NTC and linear resistance to 10 k $\Omega$ (not ADVT)
Potential isolation	750 VDC for system and supply; 400 VDC between channels at ADGT module, 110 VDC between channels in other modules
Resolution	24 Bit ( $\approx 7$ decimal places) precision: V, mA 0,01 % from accumulated value Pt100 0,1 K; Pt1000 0,1 K thermocouple 0,1% from accumulated value
<b>Analog outputs</b>	
Resolution	16 Bit
Potential isolation	750 V
Output signal	0/4 ... 20 mA at maximum burden 650 $\Omega$
<b>Digital inputs</b>	
Potential isolation	2,5 kV
Output signal	low: 0 ... 1,5 VDC@0 ... 1,5 mA high: 3,5 ... 90 VDC@2 mA
<b>Frequency / counter inputs</b>	
Potential isolation	2,5 kV
Measurement range	low: 0 ... 1,5 VDC@0 ... 1,5 mA high: 3,5 ... 90 VDC@2 mA
Measurement frequency	up to 30 kHz to TTL-level
<b>Digital outputs</b>	
Potential isolation	2,5 kV
Switching voltage	max. 50 VDC@2,5 A
<b>Data storage</b>	
Standard size / measurement data	Storage partitionable, data compression standard: 500 kB; max. 96.000 measurement values
Maximum / measurement data	1 GB; up to 128 millions measurement values
<b>Interfaces</b>	
Serial	RS232/485/422, switchable, PROFIBUS DP Slave optional
Physical equipment COM 1	9-pole sub-D connector, DIN EN ISO 19245-1
Protocols	customer specific, modem connector, Modbus RTU Master / Slave
Physical equipment COM 2	9-pole sub-D connector, DIN 41652, chapter 1 (ISO 4902)
Ethernet	RJ45 (8-pole STP-socket), 10 BaseT (Twisted Pair, 10 Mbps, half-duplex), Protocols: TCP/IP, HTTP, SMTP, SNMP, Modbus TCP Client / Server
<b>Modulbus</b>	
Physical equipment	2-pole Phoenix plugs; internal bus for connecting additional modules
Baud rate	1 MBaud (adjustable)
Length	up to 10 m (1 MBaud)
<b>General technical information</b>	
Weight	1 kg
TopMessage dimensions	200 x 73 x 118 mm
TopMessage mounting	Rail mounting DIN EN 50023 or screw fixing
TopMessage signal connections	Deattachable screw terminals, 33 terminals (2-rows), lead protection, connector cable, max. 2,5 mm <sup>2</sup>
TopLab dimensions	226 x 145 x 180 mm
TopLab signal connections	up to 64 4 mm lab plugs, gold plated
Temperature range	-20 ... 60 $^{\circ}\text{C}$
Power supply	12-36 VDC / 12-28 VAC eff. / $\pm 10\%$ , for AMDT 18 VAC/DC power input for master device: < 10 Watt
LC-Display	For servicing purposes: 4 lines à 15 characters 4 cursor keys, Enter, Esc, Reset keys Displays configuration data, channel name, scaled and lineared measurement data



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