

# ProfiMessage

## NEW

**Modular. Secure. Adaptable.**



# ProfiMessage – Modular data acquisition

## Modular and secure

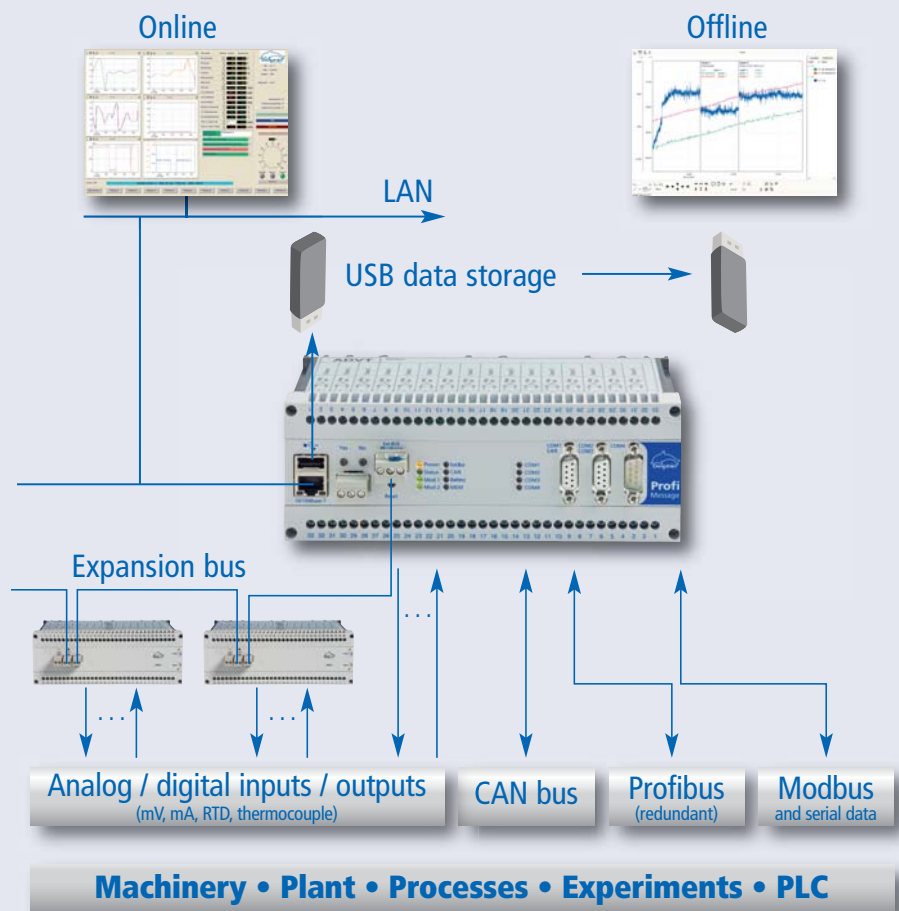
ProfiMessage is the new modular system for data acquisition, monitoring and automation of machinery, plant and test stands. ProfiMessage uses master and slave devices and a range of I/O modules to enable it to be adapted to any application.

ProfiMessage is for applications requiring high-speed, precision data acquisition with galvanic isolation, intelligent data preprocessing and monitoring functions. Areas of application range from the monitoring of industrial processes, plant and clean rooms through to data acquisition and test stand automation.

ProfiMessage devices have universal connectivity. The devices are equipped with flexible I/O modules and a range of field bus interfaces. Connecting to PLC control systems for data exchange is easy and problem-free. Measurement data is stored with extremely high time resolution making it particularly suited to systems for fault data acquisition and diagnostics.

The devices measure and store data as stand-alone, independent systems. An internal 16 GB memory is able to record up to several billion measurement records. At the press of a but-

ton, the data can be transmitted to a USB memory stick and evaluated offline. The data can also be accessed online via an Ethernet interface, either manually or automatically according to predefined time plans.



## Applications

- Modular data acquisition and monitoring
- Process data acquisition and data preprocessing
- Fault data acquisition and damage diagnostics
- Acquisition, processing and recording of PLC and field bus signals
- Monitoring device for process and vibration signals
- Automation device for experiments and test stands
- Intelligent data logger with high capacity memory
- Remote monitoring device for plant and machinery
- Laboratory data acquisition and automation

# and automation

## Intelligent monitoring and analysis

In conjunction with vibration measurement I/O modules, the ProfiMessage becomes a shaft and bearing vibration measurement device. Devices are then typically deployed in monitoring and analysis systems for condition monitoring. By attaching modems, users can use ProfiMessages as fully independent remote monitoring systems for plant, marine vessels or similar decentralized machinery and vehicles.

ProfiMessage devices are equipped with further functions in the form of software channels. Software channels enable functions such as threshold value monitoring, mathematical integration or online computations. They are extremely easy to configure. Users are then able to program their own monitoring or record-keeping systems into the device without requiring any IT expertise. This system of software channels has been taken from the popular TopMessage series. Users are then able to quickly and effectively deploy their ProfiMessage devices for their day to day requirements.

## Functions

- Acquisition, recording, analysis of measurement data
- Monitoring and automation functions
- Combined process and vibration data
- Universal analog inputs with high precision capability
- Galvanic isolation across channels
- Simple, intuitive configuration and operation
- Ethernet interface for online operation
- USB interface for data memory read out
- Two Profibus interfaces (single or redundant, according to PNO 2.212 V1.2)
- Four serial interfaces
- Freely configurable CAN bus interface
- Compact, modular design
- XML format configuration



### ProfiMessage and ProfiLab with identical functions.

#### ProfiLab – for the laboratory

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



#### ProfiMessage – for industry

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



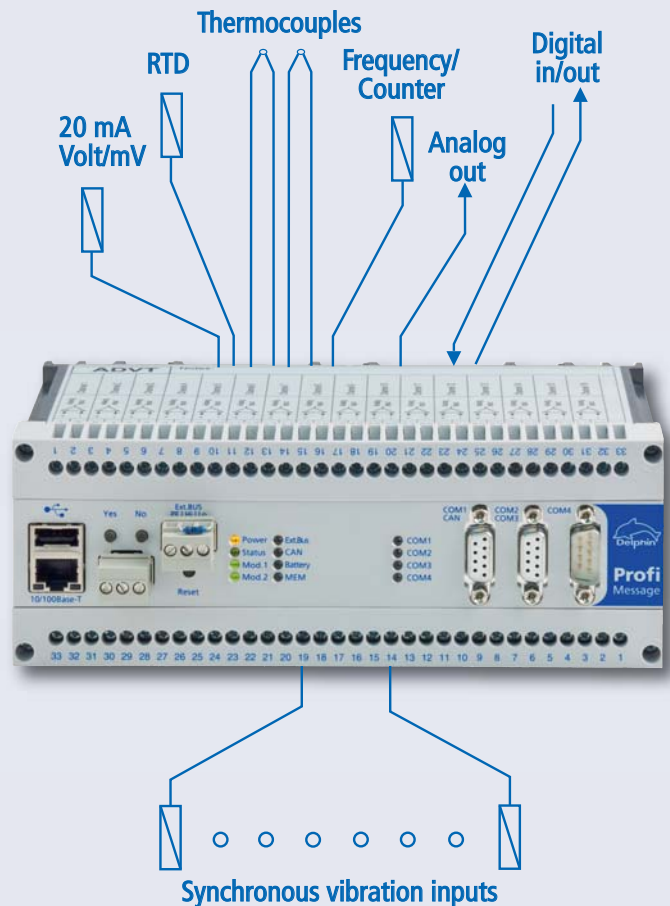
# Functions

## Universal and galvanically isolated

A major benefit of the ProfiMessage device is the differential, high-precision and galvanic isolation of its inputs and outputs – isolation from channel to channel and from the power supply.

Earth loops and non-isolated sensors therefore present no problems. This unique system architecture therefore prevents the occurrence of damaging earth loops and enables problem free non-isolated measurement.

Depending on the type of I/O module being used, each input can be configured separately to measure mV, mA, RTDs and thermocouples. Universal inputs enable the measurement of voltages, currents or temperatures making ProfiMessage extremely flexible to deploy. ProfiMessage is also equipped with digital inputs, for functioning as status or frequency inputs, as well as digital / analog outputs.

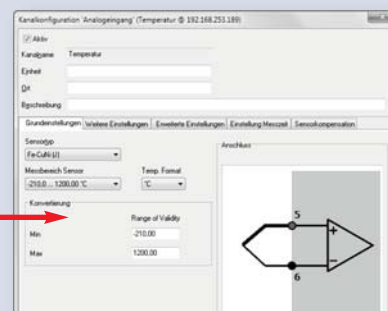


## Simple and intuitive configuration

Configuration of ProfiMessage devices takes place using Configurator software that is included in delivery. The software gives a clear overview of channels, with operation being intuitive and similar to the Windows Explorer functioning. Double-clicking a channel opens a configuration dialog portraying all the channel's properties.

The individual configuration files are stored in XML format within the ProfiMessage devices and can therefore be accessed and updated offline using an XML editor.

|                          |           |
|--------------------------|-----------|
| Druck                    | 15,09 bar |
| Temperatur               | 25,81     |
| Analog Input #03 / AAST  |           |
| Analog Input #04 / AAST  |           |
| Ref. Temperatur          | 37,78 °C  |
| Analog Output #06 / AAST |           |
| Analog Output #07 / AAST |           |
| Analog Output #08 / AAST |           |
| Analog Output #09 / AAST |           |

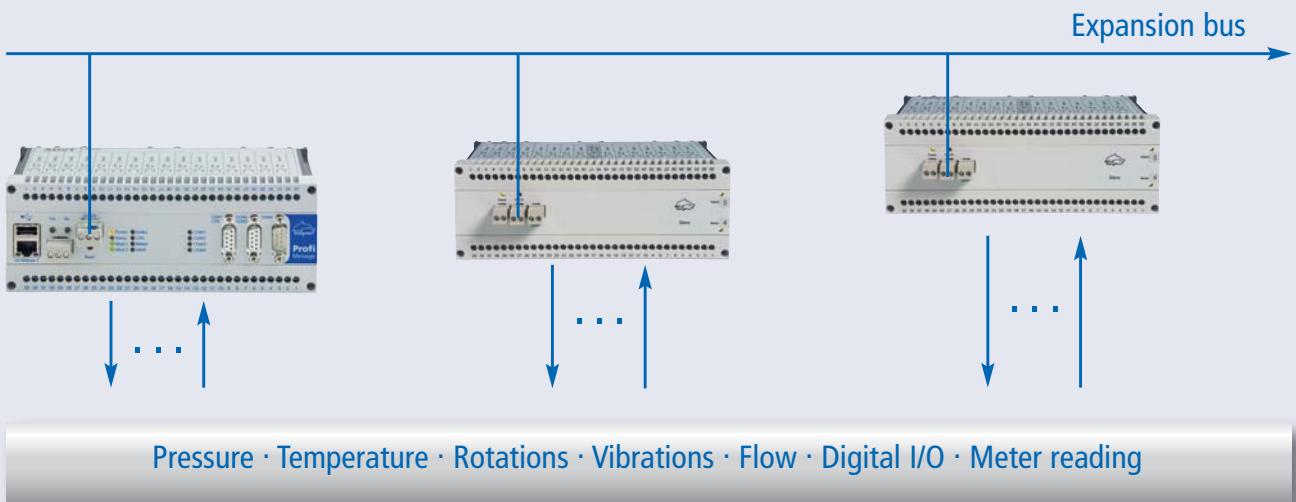


# I/O modules

## Flexible and extendible

ProfiMessage master/slave devices can be equipped with two either identical or different I/O modules. Up to 20 slaves, with identical housings, can be connected to a master device. Data exchange between devices takes place via a real-time expansion bus using robust two-wire technology. Slave devices can be decentrally installed and administered from a master device. Nine different I/O modules are available for ProfiMessage. A master or slave may contain either two identical or two different I/O modules. Master devices are also available without internal I/O modules for the exclusive processing of field bus signals – such devices can then function as PLC data loggers or deployed for process fault detection and diagnostic systems.

Slave devices can then function as PLC data loggers or deployed for process fault detection and diagnostic systems.



| 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>ADV T</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 Kanäle 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    |                  |



# Interfaces

## A range of interfaces

ProfiSignal offers a range of field bus interfaces. A master device has two Profibus DP slave interfaces (redundant according to PNO 2.212 V1.2), one Modbus TCP, one Modbus RTU, and one freely configurable CAN interface. The interfaces can also be used to connect any serial measure-

ment devices via RS232/485. An Ethernet high-speed connection is available for connecting ProfiMessage to a PC workstation or server. X-Message functions enable ProfiMessage devices to communicate online with each other, and to exchange data, without PC support.

### Profibus

ProfiMessage is optionally equipped with two separate Profibus DP slave interfaces. ProfiMessage integrates into Profibus using GSD files. Virtually any analog or digital signal can be read or written from Profibus. An option is available to switch the type of operation to redundant PNO 2.212 V1.2 Profibus.

### Modbus TCP / RTU

The LAN and RS485 interfaces can also transmit data via the Modbus TCP protocol. ProfiMessage supports both Modbus master or slave operation.

### RS232 / RS485

The serial interfaces are able to function under different protocols. The protocols can be generated either by the user or by Delphin. ProfiMessage serial interfaces are being used in climate chamber operation, for laboratory equipment, for power measuring hardware and GPS receivers.

### CAN bus

The CAN bus interface can be programmed as required. Any identifier from a CAN bus can be read, scaled, processed and stored.

### LAN / TCP

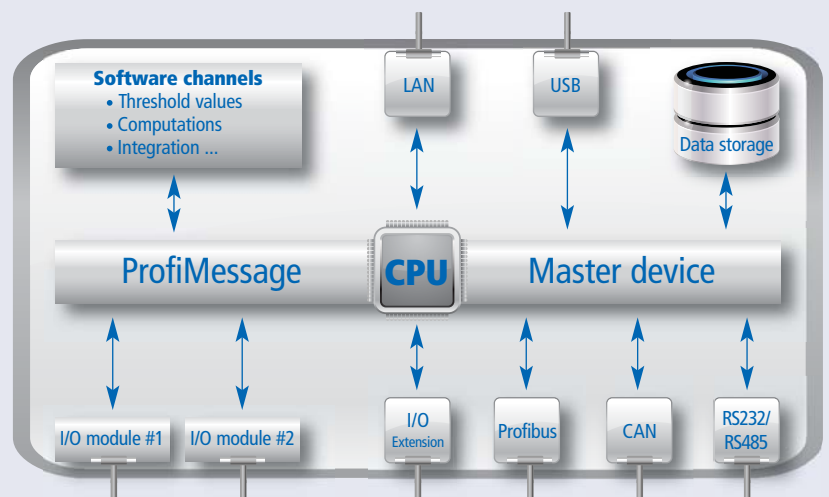
The LAN interface can be used to transmit all measurement data online, including software channels, at high speed via intranet or internet. Any networked PC can then access the ProfiMessage devices via this interface. There are also additional TCP services such as NTP, FTP, HTTP and SFPMP etc. available. The device's internal data memory can also be read out via LAN.

### USB interface (Master)

The USB interface can be used to transmit data from the internal memory to USB memory stick.

### Expansion bus

The expansion bus enables up to 20 slave devices to be connected to the master device.



ProfiMessage interfaces and functions

# Extended functions

## Intelligent and secure

Monitoring and automation tasks can be realised using ProfiMessage software channels. Software channels are pre-defined function modules that users can generate and configure per mouse click and then subsequently run within

the device. All functions are performed autonomously by the powerful internal processor. This guarantees full operational security for the ProfiMessage device.

| Online analysis                                                                                             |                                                                                                                                    | Description                                                                     | Examples |
|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------|
|  Calculation channel       | Performs computations between channels. Functions include: basic arithmetic operations, trigonometry, binary and Boolean functions | Calculating temperature differences between two input temperatures              |          |
|  Averaging channel         | Performs computations of moving and triggered averages                                                                             | Average and highly sensitive signals from thermocouples                         |          |
|  Edge counter              | Counter for impulses (high, low and reset-functions)                                                                               | Counting energy impulses (kWh)                                                  |          |
|  Differentiator           | Computes changes taking place over time periods                                                                                    | Gravimetric feeders in laboratories                                             |          |
|  Integrator              | Numerical integration over time periods                                                                                            | Computing volumes from flows                                                    |          |
|  Totalling channels      | Time-independent addition of measurement data                                                                                      | Totalling of analog measurement data                                            |          |
|  Linearization           | Corrective computation for non-linear sensors                                                                                      | Linearization of a specific application PTC sensor                              |          |
|  Operating hours counter | Accumulates hour times from digital signal high levels                                                                             | Determining uptime / downtime patterns for machinery                            |          |
|  Statistic channel       | Performs computations of moving and triggered statistics (min, max, variance, standard deviation)                                  | Determining the maximum value of an experiment                                  |          |
|  Stop watch              | Measures time between two events                                                                                                   | Determining switch times for valves or thermal switches                         |          |
| Monitoring                                                                                                  |                                                                                                                                    | Description                                                                     | Examples |
|  Wake-up                 | Generates impulses for absolute chronological events (once a day, week, month ...)                                                 | Determining daily statistics for production                                     |          |
|  Batch alarm             | Generates an alarm from multiple digital input channels                                                                            | Alarms from various parts of an installation are summarized in one notification |          |
|  Threshold value         | Generates an event for a threshold violation (over / under runs, consistency, hysteresis, line monitoring)                         | Alarm for overrun of a storage temperature                                      |          |
|  Status monitoring       | Evaluates status information from measurement data and generates alarms                                                            | Alerting of wire-breaks in an mA-signal                                         |          |
|  System monitor          | Displays system information (CPU load, free memory capacity ...)                                                                   | Alerting for a full data memory                                                 |          |
| Automation                                                                                                  |                                                                                                                                    | Description                                                                     | Examples |
|  Setpoint channel        | Automates setpoint curve with rest, stop and start triggers                                                                        | Automatic temperature gradient for a climate chamber                            |          |
|  FlipFlop channel        | RS, JK, D, FlipFlop                                                                                                                | Records digital states                                                          |          |
|  Impuls generator        | Generates cyclical impulses                                                                                                        | Energy counter reset, time synchronized every 15 mins.                          |          |
|  Logic channel           | AND, OR ...                                                                                                                        | Boolean conjunctions for any digital signal                                     |          |
|  Timer channel           | Timer functions (on / off delay)                                                                                                   | Time delayed start of an experiment                                             |          |
|  Variable                | Records constants and parameters                                                                                                   | Process constant                                                                |          |

# ProfiMessage – Technical data

## ProfiMessage / ProfiLab

| Analog inputs                     |                                                                                                                                                                             |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage range                     | $\pm 156 \text{ mV} \dots \pm 10 \text{ V}$                                                                                                                                 |
| Current range                     | 0/4 ... 20 mA (max. 500 $\Omega$ shunt)                                                                                                                                     |
| Thermocouples                     | Any, all types, integrated temperature compensation; resistance thermometer Pt100(0), NTC and linear resistance to 10 k $\Omega$ (not ADVT)                                 |
| Resolution                        | 24-bit ( $\approx 7$ decimal places) precision: V, mA 0,01 % v. accumulated value Pt100 0,1 K; Pt1000 0,01 K; thermocouple 0,1% from accumulated value                      |
| Analog outputs                    |                                                                                                                                                                             |
| Resolution / potential isolation  | 16 bit / 750 V                                                                                                                                                              |
| Output signal                     | 0/4 ... 20 mA                                                                                                                                                               |
| Maximum burden                    | 650 $\Omega$                                                                                                                                                                |
| Digital inputs                    |                                                                                                                                                                             |
| Potential isolation               | 2,5 kV low: 0 ... 1,5 VDC@0-1,5 mA high: 3,5 ... 90 VDC@2 mA                                                                                                                |
| Frequency / counter inputs        |                                                                                                                                                                             |
| Potential isolation               | 2,5 kV 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                                                                                                                                                   |
| Digital outputs                   |                                                                                                                                                                             |
| Potential isolation               | 2,5 kV                                                                                                                                                                      |
| Switching voltage / inverse diode | max. 50 VDC@2,5 A / integrated                                                                                                                                              |
| Data storage                      |                                                                                                                                                                             |
| Standard size / measurement data  | Storage partitionable, data compression standard: 500 kB; max. 96,000 measurement values                                                                                    |
| Max. size / measurement data      | 16 GB; up to 1 billion measurement values                                                                                                                                   |
| Serial interfaces                 |                                                                                                                                                                             |
| COM 1 / COM 2                     | RS485 interface, switchable Profibus DP slave interface                                                                                                                     |
| Physical equipment                | 9-pol sub-D connector, galvanic isolation 1 KV                                                                                                                              |
| Baud rate                         | RS485: 500 KBaud; Profibus: 12 MBaud                                                                                                                                        |
| Protocols                         | PC terminals, large displays, Modbus RTU, Master slave, TCP                                                                                                                 |
| COM 3 / COM 4                     | RS232 interface                                                                                                                                                             |
| Physical equipment                | 9-pol sub-D connector, galvanic isolation 1 KV                                                                                                                              |
| Baud rate                         | RS232: 57,6 KBaud                                                                                                                                                           |
| Protocols                         | PC terminals, large displays, Modbus RTU, Master slaves                                                                                                                     |
| Module bus                        |                                                                                                                                                                             |
| Physical equipment                | 3-pole Phoenix plugs; internal bus for connecting additional modules                                                                                                        |
| Baud rate / length                | 10 MBaud (adjustable) / up to 10 m (1 MBaud)                                                                                                                                |
| General technical information     |                                                                                                                                                                             |
| Dimensions / weight               | ProfiMessage: 200 x 73 x 118 mm / ProfiLab 226 x 145 x 180 mm / each 1 kg                                                                                                   |
| ProfiMessage-mounting             | Rail mounting DIN EN 50023 or screw fixing                                                                                                                                  |
| Signal connections                | ProfiMessage: Deatchable screw terminals, 33 terminals (2-rows), lead protection, connector cable, max. 2,5 mm / ProfiLab: up to 64 4 mm laboratory connectors, gold plated |
| Temperature range                 | -20 ... 60 $^{\circ}\text{C}$                                                                                                                                               |
| Power supply                      | 12-36 VDC / 12-28 VACeff. / $\pm 10\%$ , bei AMDT 18 VAC/DC<br>power input for master device: < 10 Watt                                                                     |
| Ethernet interface                | RJ45 (8-pol. STP-socket), 100 Base-T (twisted pair, 10 Mbps, full-duplex), galvanic isolation: 1,5 kV Protocol: TCP/IP, UDP, ICMP, Modbus TCP, Master slaves                |
| USB interface                     | USB 1.1. configuration and download                                                                                                                                         |