



Measurement data acquisition systems.

For applications for test stands.

Utilising synergies

With the merger of companies, we have greatly expanded our competence and can thus also offer optimal assistance and consultation in all matters relating to measuring, control, and closed-loop control technologies.

We are capable of offering a comprehensive product portfolio for requirements in the broadest range of segments:



Process measurement technology

Laboratory measurement technology

Industrial electronics / closed-loop control technology

Industrial measurement technology

Test stand measurement technology

Customer-specific developments

Quality from Germany

All products from GHM Messtechnik are developed and produced in Germany. Through the consolidation of companies, the product range has been expanded significantly. Renowned companies value the "Quality from Germany".

Our claim - Your benefit

As a specialist and complete measurement technology provider, we develop solutions tailored to our customers and markets which meet the highest demands in the industry.

Our locations











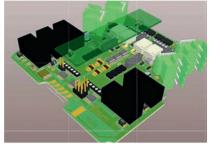


Delta ohm

Flexibility and Innovation

These two terms are an inseparable part of the success of GHM Messtechnik. In addition to the extensive standard programme tailored solutions are developed according to customer needs.

Pressure testing up to 1000 bar



Altium 3D circuit board layout





FMC cabins

GHM stands for ✓ Competence

Quality

✓ Service

Expertise in Measurement Data Acquisition

The acquisition of precise measurements is prerequisite for the development of numerous product, machines, and systems. GHM Messtechnik offers the right measurement technology for your application.

Our comprehensive measurement technology assortment has the right solution for your measuring task, whether it involves high-precision, fast, high-end systems with ten-thousand measurements per second for development and quality assurance tasks, or affordable solutions, such as those for climate monitoring.

With our extensive experience in the development of measurement technology, we can also provide customer-specific solutions in addition to our standard products.



Measurement data acquisition

Systems for measurement data acquisition are designed for the collection, storage, and processing of physical measurements.

They are used in a variety of areas in day-to-day life, including the monitoring of temperatures in living rooms, the monitoring of climate data in greenhouses, and wide-ranging industrial applications, in machine and plant construction, the automotive industry, and for logistics.

Sensors detect physical measurements such as temperature, pressure, force, changes in length, or accelerations, and convert them into an electrical signal.

The sensor data is recorded by transducers or measuring amplifiers and converted into processable electrical signals. In this connection, analogue signals can be prepared such that interference signals are filtered out, zero-point deviations are compensated for, or measurement signals are linearised and the input and output signals are galvanically isolated. Depending on application requirements, the precision of the recordings varies between values of less than 0.05 % and higher than 5 %, and the speed of the data acquisition also varies from application to application. Slowly varying values, such as room temperature or air humidity in a library require much lower recording frequencies due to the very slowly changing values; rapidly changing values, such as measurements of vibrations on a gear unit, require much higher scanning rates of more than 10,000 values per second.

Signal processing can be either analogue or digital. The analogue signals can be directly transmitted to a controller or control unit and processed there.

Digital measurement data acquisition takes the analogue electrical sensors signals and converts them into digital signals can be processed by computer. The advantage is higher flexibility in comparison with analogue signal processing. The signals can be conditioned, processed, evaluated, and visualised.

Bus-compatible measuring systems enable networking and central data acquisition and monitoring of sensor systems.

The design of a measurement data system depends directly on the application. Many individual remote measurement points require individual sensors in separate housings and a complex test stand setup requiring multichannel devices, such as a rack with amplifier modules. Software packages for the acquisition and evaluation of measurement data enable the acquisition, linking, visualisation, evaluation, and export of data in a wide range of data formats for further processing.

Dedicated software for measurement data acquisition and interfaces for standard software such as LabVIEW, and DASYLab offer comprehensive possibilities for data acquisition, function libraries for integration into dedicated software to round out the range of software support.







Measurement data acquisition system evaluation criteria:

Criterion	SIQUAD	DASIM				
Number of channels / measurement points	Max. 64/128 per housing (16 modules); approx. 8 housings networkable via TCP/IP	Max. 32 per housing (16 modules); approx. 8 housings networkable via TCP/IP				
Sensors	More than 12 different sensors	More than 12 different sensors				
Measurement precision	Max. 0.05 %	Max. 0.03 %				
Measuring speed	Max. 20 kHz per channel approx. 500 kS/s per housing	Max. 20 kHz / 40 kHz per channel approx. 500 kS/s per housing				
Area of application	Test stand measurement technology Industrial measurement technology	Test stand measurement technology				
Data output	Acquisition via Ethernet or CAN	Acquisition via Ethernet or CAN, analogue outputs ± 10 V				
Available software	 Parameterisation software: D Measurement data acquisition Drivers for LabVIEW, DASYLa DLL for integration into dedi 	isistion software: DAQSoft SYLab				



DASIM

The high-end system for measurement data acquisition

The DASIM measurement data acquisition system offers the highest possible flexibility and precision with very high data acquisition speed for applications in the automotive industry, in machine construction, and numerous other industrial research and development applications. The universal measuring amplifier equipped with two channels is designed for a wide variety of sensors. As a result, the measuring amplifier with the proven DASIM measuring system, combined with a powerful DSP (digital signal processor) per channel, provides especially high functionality with low spatial requirement. The resolution is 16 bits with a scanning rate from 20 to

With the DaSoft parameterisation software, each of the two channels of the amplifier can be parameterised individually for any sensor via the Ethernet interface. Sensor data can also be adopted directly from a sensor data base for parameterisation.

Each measurement channel is potentially isolated on one side and has the suitable feeds for the widest range of sensor types. Two precise analogue signals are available per channel at the amplifier output and the digital signal is available via the internal interface for further processing via Ethernet and CAN.

- Extremely universal with maximum accuracy of 0.03 %
- Isolated inputs with 16 bit A/D conversion
- 2 channels/card

40 kHz per channel.

- 1 DSP/channel
- 20 / 40 kHz scanning rate per channel
- Carrier frequency measuring amplifier for measurements in high-interference environments and for the acquisition of inductive transducers
- Synchronised acquisition of GPS and video data
- Integration of CAN Bus data into measurement data acquisition
- Analogue outputs
- Digital signal output via Ethernet and CAN
- DaSoft parameterisation software
- DAQSoft acquisition software
- Drivers for DASYLab and LabVIEW

The amplifiers are designed as modules for 19" module racks or tabletop housings. A maximum of 16 modules = 32 channels per rack or housing is possible. All channels are synchronous. The system can be expanded with additional modules for CAN signals, DIO, GPS, and video recording. A 2-channel carrier frequency amplifier is available for the acquisition of signals in environments with heavy electrical interference or inductive sensors.

APPLICATION EXAMPLE

Test stand technology

- Stationary and mobile test stand technology for the measurement of physical measurements in automotive and mechanical applications, 16-192 channels
- Users include Audi, BMW, Boysen, Daimler, Fakt, MAHA, ZF
- Motor test stand (internal combustion engines and electric motors)
- · Emissions testing
- Gear unit testing
- Vibration resistance
- Oscillation measurement (including acoustic)
- Laboratory and testing measurement technology (quality assurance)



DASIM – product overview

DASIM



	DASIM Uni2 universal measuring amplifier
Channels / module	2
Resolution	16 bit
Scanning rate	20 kHz / 40 kHz
Carrier frequency	
Band width	5 kHz / max. 15 kHz (analogue sensors)
Accuracy	± 0.03 %
Analogue output	± 10 V / 12 mA
	2 outputs / channel
Digital output	Ethernet / CAN
Sensors	DMS bridges
	DC voltage/current
	Potentiometer
	Thermocouples
	Pt100
	Analogue / digital frequency
	Incremental encoder
	PWM
	Speed sensor
	ICP®

DASIM



	DASIM TF2 Carrier frequency amplifier
Channels / module	2
Resolution	16 bit
Scanning rate	40 kHz
Carrier frequency	5 kHz
Band width	1 kHz
Accuracy	± 0.1 %
Analogue output	± 10 V / 12 mA
	2 outputs / channel
Digital output	Ethernet / CAN
Sensors	DMS bridges
	Inductive speed sensor
	Inductive transducer (LVDT)

SIQUAD family

Cost-optimised measuring amplifiers

The SIQUAD family is comprised of high-quality measuring amplifiers which offer an outstanding price-performance ratio. They are designed in 1, 2, 4, or 8-channel versions with 24 bit AD converters. The adjustable scanning rate is up to 20 kS/s per channel.

The amplifiers have isolated inputs and are designed specifically for each sensor with appropriate feeds for DMS bridges, DC signals, potentiometers, temperatures sensors, ICP® sensors, and frequency generators.

A universal 4-channel measuring amplifier is available a variety of different sensors for high flexibility with changing measuring tasks.

For the measurement of the electrical output of machinery and systems, there is an output measuring amplifier available, which provides a high-precision output of the real and apparent power, as well as the frequency and output factor.

The digital signal for further processing via CAN and Ethernet, is available at the amplifier output. Analogue outputs are also optionally available.

Affordable digital high-end SIQUAD measuring amplifier system

- Isolated inputs
- 4 to 8 channels/card (2 with FC)
- Universal amplifier modules (≥ 12 sensors) and modular versions for DMS, DC, temperature, ICP®, frequency, Analogue Out (AO), Digital I/O (DIO)
- Scanning rates of up to 20 kS/s

- Accuracy < 0.05 %, 24 bit AD converter
- Optional analogue signal outputs
- · data acquisition via Ethernet, CAN
- DaSoft parameterisation software
- DAQSoft acquisition software
- Drivers for DASYLab, LabVIEW

SIQUAD 19" systems modularly and versatile expandability



The amplifier modules are designed for 19" module racks or tabletop housings. A maximum of 16 modules = 64 channels per rack or housing is possible. They are networkable via Ethernet interface. All channels are synchronous. The system can be expanded with additional modules for CAN signals, DIO, GPS, and video recording. The systems are available for stationary or mobile use.

SIQUAD mini-systems – local and autarkic



The SIQUAD mini systems are flexible, compact units for up to 3 amplifier modules for central measurement data acquisition. They gain the greatest possibility with the use of universal or sensor-specific measuring amplifiers with low spatial requirement. The systems are available for stationary or mobile use.

SIQUAD system application example

User Rheinmetall MAN Military Vehicles GmbH, Kassel Application: Test driving and rig testing

Rheinmetall MAN Military Vehicles GmbH performs dynamic testing and rig testing with various vehicles and vehicle components under sometimes very harsh conditions. SIQUAD measurement data acquisition systems are used for this purpose. Mobile 19" housings with different equipment are currently used. They comprise DC and universal amplifiers, CAN-IF, and GPS-IF. With the modular design of universal amplifiers, the optimal configuration can be flexibly arranged without elaborate work.

Expansions with strain gauges in 1/4, 1/2, and full bridge circuits, as well as temperatures, accelerations, pressures, speeds, torques, paths, forces, voltages, and currents are measured. The vehicle CAN data and the CAN data of external measuring systems (e.g. rotary measurement systems) can be recorded with the CAN cards. The measuring amplifiers are adjusted for each channel with the DaSoft configuration software with regard to the sensor type, measuring range, feed voltage, filter, limit values, scanning rate, offset, and units and saved in a file. If necessary, each measurement can thus be repeated with the same setting. The measurement data acquisition takes place by means of a driver directly in DASYLab.

SIQUAD – product overview of modular measuring amplifiers

19" amplifier modules



	SIQUAD universal	SIQUAD sensor-specific
Channels / module	4	2/4/8
Resolution	24 bit	24 bit
Scanning rate	20 kHz	20 kHz
Band width	5 kHz	5 kHz
Accuracy	up to 0.03 %	up to 0.03 %
Digital signal output	Ethernet CAN	Ethernet CAN
Analogue signal output	Optional ± 10 V	Optional ± 10 V
Sensors	Universal*	Sensor-specific**

SIQUAD 19" amplifier modules



	SIQUAD DIO8	SIQUAD AO4	CAN Interface
Channels / module	8	4	2 CAN nodes
Resolution	24 bit	4 x 16 bit DA	
Scanning rate	20 kHz		
Band width			
Accuracy			
Digital signal	Ethernet		Ethernet
output	CAN		CAN
Analogue signal	8 relay outputs	± 10 V	
output		± 20 mA opt.	
Sensors	Digital inputs,	Analogue	CAN messages
	frequencies, incremental counters	outputs	







 $^{*:} DMS\ bridges,\ DC\ voltage/current,\ potentiometers,\ the mocouples,\ Pt100,\ analogue/digital\ frequency,\ incremental\ encoders,\ PWM,\ torque\ encoders,\ ICP^{\otimes}$

^{**:} DMS bridges, DC voltage/current, potentiometers, themocouples, Pt100, analogue/digital frequency, incremental encoders, ICP® electrical power

SIQUAD compact systems



Universal, autarkic and compact

The compact devices from the SIQUAD family offer the high performance of the modular SIQUAD systems with cost optimisation and low spatial requirement for measuring tasks with few channels. They are very well suited for both stationary use and mobile applications.

Devices with CAN interface assist you with measurement data acquisition in the automotive field; our models with Ethernet interface offer a proven basis for both stationary and mobile applications.

Devices with up to 16 channels are available, designed for use with sensor-specific amplifiers or the highly flexible universal measuring amplifier. In addition to box housings, devices for top hat rail mounting are also available, as well as a single-channel CAN stick for quick integration of additional measurement points into your data acquisition.

The devices of the compact series use the same software as the 'large' systems and can be networked with the modular systems from the DASIM and SIQUAD series.



APPLICATION EXAMPLE

Vibration monitoring of wind power plants

 Detection of vibrations on parts of wind power plants, such as rotor blades, for early damage recognition
 acquisition of data via TCP/IP for monitoring and evaluation



SIQUAD – product overview of compact devices

SIQUAD CAN Compact devices



	SCC universal	SCC sensor-specific
Channels /	4	4/8/16
module	universal	sensor-specific
Resolution	24 bit	24 bit
Scanning rate	20 kHz	20 kHz
Band width	5 kHz	5 kHz
Accuracy	up to 0.03 %	up to 0.03 %
Signal output	CAN	CAN
Sensors	Universal*	Sensor-specific**
Form factor	Compact housing,	Compact housing,
	optionally with flange or	optionally with flange or
	carrier rail mount	carrier rail mount

SIQUAD CAN compact devices



	TSC universal	SCC universal
Channels /	1/2	1
module	universal	universal
Resolution	24 bit	24 bit
Scanning rate	approx. 20 kHz	approx. 20 kHz
Band width	approx. 5 kHz	approx. 5 kHz
Accuracy	up to 0.03 %	up to 0.03 %
Signal output	CAN	CAN
	Optional 1x analogue	
Sensors	Universal *	Universal *
Form factor	Carrier rail	CAN stick

SIQUAD CAN Ethernet Compact devices



	SEC universal	SEC sensor-specific
Channels /	4	4/8/16
module	universal	sensor-specific
Resolution	24 bit	24 bit
Scanning rate	20 kHz	Max. 20 kHz
Band width	5 kHz	Max. 5 kHz
Accuracy	up to 0.03 %	up to 0.03 %
Signal output	CAN	CAN
	Optional analogue	Optional analogue
Sensors	Universal *	Sensor-specific**
Form factor	Compact housing,	Compact housing,
	optionally with flange or	optionally with flange or
	carrier rail mount	carrier rail mount

^{*}: DMS bridges, DC voltage/current, potentiometers, themocouples, Pt100, analogue/digital frequency, incremental encoders, PWM, torque encoders, ICP $^{\circ}$

^{**:} DMS bridges, DC voltage/current, potentiometers, themocouples, Pt100, analogue/digital frequency, incremental encoders, ICP® electrical power

System comparison

Amplifier / system	DASIM	SIQUAD
Channels per amplifier	2	1, 2, 4, (8)
Channels per 19" housing	up to 32	up to 64 (128)
Scanning rate per channel	1 Hz – 20 kHz, 1 Hz – 40 kHz	1 Hz – 20 kHz
Scanning rate per housing	approx. 500 kS/s	approx. 500 kS/s
Sensor connection	Lemo jacks, housing rear wall	Various jacks, amplifier front panel
Universal amplifier	DMS, full/half (quarter) bridge; potentiometers; DC voltage/current; thermocouples J, K, etc.; Pt100, analogue frequency; digital frequency; incremental encoders; PWM; torque encoders; ICP©	DMS, full/half (quarter) bridge; potentiometers; DC voltage/current; thermocouples J, K, etc.; Pt100, analogue frequency; digital frequency; incremental encoders; PWM; torque encoders; ICP©
TF 5 kHz amplifier	DMS, LVDT, torque encoder	
AD conversion	16 bit	24 bit
Modular amplifiers	 DIO (8 I, 8 O), AO (4x ± 10 V) (front panel)	DMS, full/half (quarter) bridge DC voltage (also HV) / current Thermocouples J, K, etc. Pt100 Digital frequency, incremental encoder ICP© electrical power DIO (8 I, 8 O), AO (4x ± 10 V)
CAN interface	2 CAN nodes (front panel)	2 CAN nodes
Interfaces	RS 232 CAN, Ethernet	RS 232 CAN, Ethernet
Measurement data output	CAN, Ethernet, ± 10 V	CAN, Ethernet, optional ± 10 V

System advantages

- Flexible and expandable
- cost-effective per universal measuring amplifiers: low stock holding of measuring technology for changing requirements
- cost-effective per sensor-specific measuring amplifiers: affordable amplifiers for constantly recurring measuring tasks
- Networkable modular and compact systems
- Amplifier with universal or sensor-specific inputs
- High stability and accuracy up to 40kS/s at 16 bit; A/D conversion / 20kS/s at 24 bit A/D conversion
- Isolated inputs
- Analogue and digital signal output
- Integrated sensor feed
- Local data acquisition
- Dedicated software for parameterisation and measurement data acquisition
- Drivers for LabVIEW, DASYLab
- Customer-specific adaptations possible (measurement ranges, connections)

Software

DaSoft - parameterisation

With the DaSoft software, measuring amplifiers of the DASIM and SIQUAD series can be conveniently parameterised.

Measurement ranges, feed voltages, filter settings, and units can be adjusted for each sensor type. There is an oscilloscope view for the preview of sensor signals. The settings made for individual or multiple connected systems can be saved for later use.

DAQSoft – measurement data acquisition

DAQSoft enables the acquisition of measurement data from measuring amplifier systems of the DASIM and SIQUAD series. The settings are automatically adopted from DaSoft.

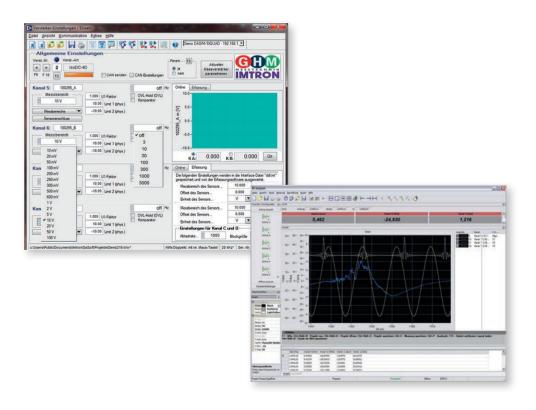
DAQSoft offers the widest range of triggering possibilities for the starting and stopping of measurements, measurement display as numerical value, bar or pie charts, and representative as various graphs.

Channels can be linked with each other during the measurement or retroactively and compared. In addition, a variety of export possibilities are available in various formats with the possibility of creating reports.

Drivers for LabVIEW and DASYLab

Drivers can be used when using LabVIEW and DASYLab with GHM IMTRON measurement data acquisition hardware

Like DAQSoft, the drivers use the settings made in DaSoft.



Application report





CAN-Compact-Modules for detection of the widest variety of sensors for output on a CAN-Bus



- reduction of investment costs by reducing the number of necessary measuring systems
- additional hardware for potential isolation and sensor supply can be omitted
- significant shortening of commissioning time by universal measuring amplifiers
- reduction of setup costs by using the same hardware for different measurement tasks

Measurement data recording The SIQUAD Family

The requirements placed on us

Developers of automotive components are constantly faced with new challenges due to the increasing numbers of tests on new products and simultaneously shorter development times with shorter production life cycles. Quicker replacement of sensors and measuring technology has become indispensable for day-to-day inspection and testing work. A measuring system should also be as versatile as possible for the largest number of different types of tests, support various sensor types, be easy to manage and reduce conversion times.

Our solution

The compact CAN systems from the SIQUAD family offer the necessary flexibility for a wide range of measuring tasks with a universal measuring amplifier for the most common types of sensors for voltage, current, DMS, temperature, frequency, vibrations and torque. The sturdy devices are available with different numbers of channels. Affordable, sensor-specific devices are available for constantly recurring measuring tasks.





CAN-Compact-Module with sensor-specific inputs

The advantages

The measuring systems for the CAN bus from Imtron enable flexible recording of data from analogue sensors.

- The data is pre-processed, digitalised with 24-bit AD converters and output at up to 1 MBaud to the CAN bus. In the process, the signals are galvanically isolated and can be filtered with the powerful integrated signal processor.
- The power supply of the various sensors is also provided by the measuring system.
- The devices have a 9..36 V DC voltage supply and can also be operated via the on-board network.
- Various devices are offered for different purposes. The assortment of potential solutions ranges from a single-channel "CAN-Stick" that enables any arbitrary number of analogue sensors to be supplied on CAN-Bus to multi-channel, sensor-specific devices, e.g. for temperature, and up to 8-channel universal measuring amplifiers.
- A significant improvement of commissioning time by the use of configuration software DASoft. The software takes the task of parameterization for the necessary sensor types, measuring ranges and filter, a separate hardware configuration is not necessary.

Focus on the customer – the decision to purchase

- The proven SIQUAD-Family cuts down on the variety of measuring technology required for different tasks while simultaneously lowering costs associated with equipping for different measurements.
- Measuring tasks can be completed quickly without reducing the quality of the measurement results.
- In addition to CAN systems, the device family includes quick modular measuring data recording systems with an Ethernet interface that can be categorised on a software and hardware basis.



CAN mounting rail module with 1 or 2 universal inputs

Analogue signal conditioning (TSA+ASK) for measurement data acquisition via AD converter cards

The modules for analogue signal conditioning are available as carrier rail modules and 19" modules. Both variants have 3-way isolation and flexible signal filtering with 4 pluggable filter modules (optionally 8). Arrangement with Bessel or Butterworth characteristic with an accuracy of 0.1 % and better, the modules are very well-suited for both industrial use and use in measurement technology.

TSA modules for carrier rail mounting

The carrier rail modules are available in different versions for standard signals and for the connection of various sensors, such as DC signals, DMS bridges, ICP® sensors, temperature sensors, or speed and pulse encoders. Various standard voltage and/or current signals are available on the output side.

Modules for the mathematical linkage of signals, for the RMS value formation, and for pulse formation round out the programme.

ASK cards as 19" module

The 4-channel ASK cards have current and voltage inputs (±10 V, ±20 mA) and a voltage output (±10 V). The inputs and outputs are optionally mounted on the front or rear side of the 19" module rack or tabletop housing.

The power supply units are available for stationary or mobile use. Customer-specific adaptations for measurement ranges, connections, and mechanical design are possible.





odule ype		Signal input									Standard signal output voltage and/or current		
Sensor	Voltage	Current	DMS	Potentiometer	Pt100	Thermocouples	ICP	Speed pulse	RS 422	Plug-in filter	±10V/0-10V	± 20 mA / 0/4 - 20 mA	TT.

TSA modules

TSA file	•	•							•	•/0	•/0	
TSA-DMS			•						•	•/0	•/0	
TSA-poten- tiometer				•					•	•/0	•/0	
TSA-DC	•	•							•	•/0	•/0	
TSA-Pt100					•				•	•/0	•/0	
TSA-TC						•			•	•/0	•/0	
TSA-ICP							•		•	•/0	•/0	
TSA-RMS	•	•	•				•		•	•/0		
TSA-IF								•				•
TSA-MATH	•								•	•/0	•/0	

ASK modules

ASK-44A	•	•					•	•/-	
ASK-44E	•	•					•	•/-	
ASK-44D						•			•
ASK-DP 140, DP 200	•	•					•	•/-	
ASK-8	•						•	•/-	

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