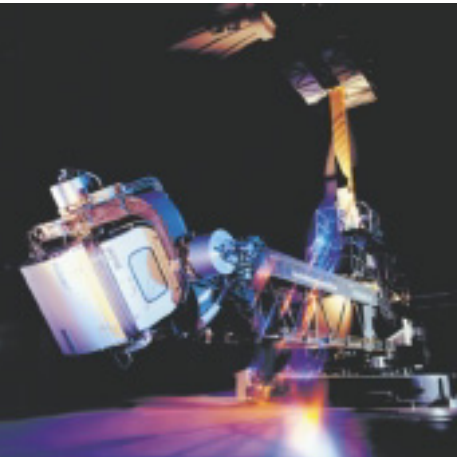


Own the Best Measurement Data ...

MGC_{plus} ...

... the Ultimate Modular, Scalable
and Configurable System





AMST



INA



HBM

Research and Development

- 24-bit A/D converter on every channel
- Sample rates up to 19.2 kHz per channel
- Parallel and simultaneous sampling on all channels
- Three independent sampling rates
- High-speed data transfer via Ethernet and USB.

Test Rigs

- All transducers supported
- Simultaneous DAQ via Ethernet, USB, CANBus, ProfibusDP...
- Several PC's can be simultaneously connected to an MGCplus
- Scalable system
- Comprehensive trigger facilities.

Calibration

- Highest precision (0.0025% accuracy class – ML38)
- Worldwide references in national calibration laboratories
- Dynamic calibration through simultaneous sampling
- Digital filter with high damping – 16th order (ML38).



One Platform for Many

With more than 100,000 MGCplus channels in different applications worldwide, the MGCplus system has achieved acceptance as a measurement standard. The wide spectrum of supported transducers, fieldbus connections and standard PC interfaces are some of the features which indicate that it is a truly integrated measurement device.



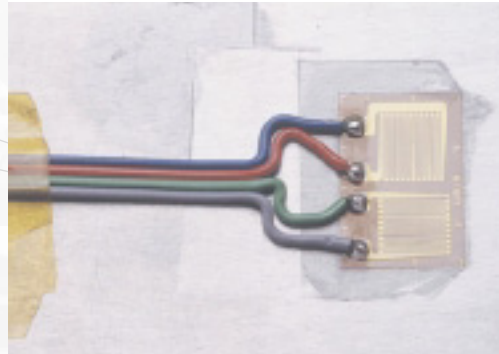
Braun



Schering



HBM



HBM

Manufacturing

- Press fit monitoring
- Fieldbus support (ProfibusDP, CANBus)
- Digital I/O, PLC compatible
- Embedded soft PLC (ML70).

Weighing

- Up to 10 parallel switched load cells
- Coarse and fine batch-weighing
- ProfibusDP support
- Simultaneous weighing
- Carrier frequency technology for high stability.

Experimental Stress Analysis

- Full cable influence compensation
- Built-in completion resistors
- Patented transducer identification technology (T-ID™, TEDS)
- Online rosette calculation.

Mobile Data Acquisition

- Intelligent data reduction
- CANBus support
- Simultaneous acquisition of GPS data
- Simultaneous DAQ to hard disk and PC
- Power supply from 8V to 58V.



Applications

"The measuring system should embrace new technology and display a high level of "future proofing". The process of test setup and execution is simple and flexible because of the MGCplus system's modularity. The system displays a cost effective solution for the demands of the Vehicle Safety Component Test."

MILES DADSON, JAGUAR/LAND ROVER

Cut your Measurement Start-up Times to a Minimum

- All transducers supported
- Includes setup and maintenance software
- Fast setup using transducer identification
- Fast system start-up with customized parameters
- Easy mounting with centralized (MGCplus) or distributed (MGCsplit) measurement systems
- MGCplus uses standard interfaces:
 - USB
 - Ethernet
 - RS232C
 - CANBus
 - ProfibusDP.

Protect your Investment

- Modular DAQ system based on off-the-shelf components
- User configurable hardware
- Standardize your measurement equipment
 - MGCplus for test benches
 - MGCsplit for mobile data acquisition based on the same components
- Full compatibility across three generations of MGCplus
- Stand-alone or fully PC-based measurements
- Multiple device expansion and synchronization up to 10,000 channels.



Work with the Measurement Professionals



Get Total Confidence in your Measured Results

- 24-bit A/D converter for each channel
- $\pm 7,680,000$ steps resolution
- Synchronous and simultaneous measurement of all channels
- Defined sample times, defined time behavior
- Auto-checking and auto-calibration functions
- Enhanced Confidence in Data method (ECID) provides complete traceability of measurement setups
- 3 independent sampling rates
- Comprehensive trigger functions
- Different precision ranges for all applications
 - down to 0.0025% for calibration
 - up to 0.1% for industrial applications.

Speed up your Development Cycles

- You can run several tests in parallel on one MGCplus
- Several users can log in to one MGCplus
 - using catman® Enterprise software
 - via CP42 multi-client communication processor
- You can evaluate data online
 - using the catman® software
 - with programmable hardware (ML70)
- You can use MGCplus to automate test rigs, machines and systems.



- 50 years of DAQ experience based on globally-patented, cutting-edge technology
- HBM is recognized worldwide by calibration institutes
- Network of skilled international sales and support services
- Know-how based on more than 10,000 MGCplus systems running in different applications
- Significant technical advantages through matched transducers, instrumentation and software, from a single source
- Infinite possibilities for turnkey solutions for special measurement tasks.

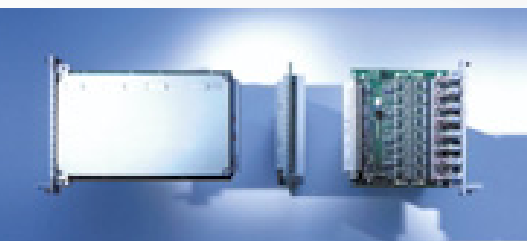
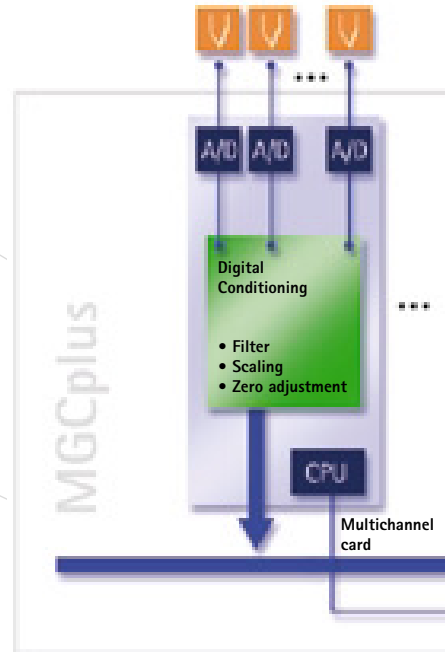


Get Flexible

Put together your own system: choose your housing, connection boards and measuring cards.
 Need a display and communication processor?
 No problem – system expansion is always possible.
 And, best of all... you can do it all yourself!

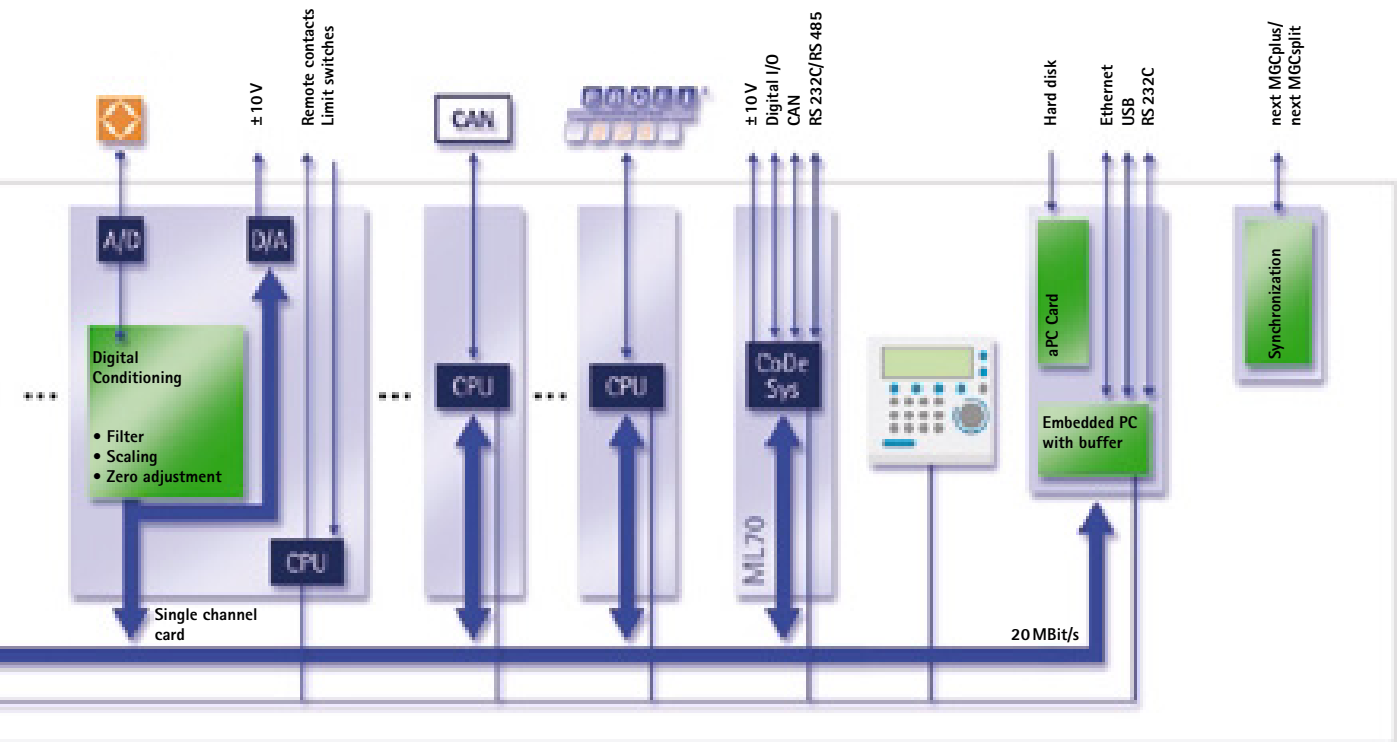
"Out of the box, the MGCplus data acquisition system was complete and easy to set up."

Jesse M. Stanley,
 U.S. Army Engineering
 Research and Development Center



The system can be easily configured by the user simply by plugging in new modules and connection boards.





The information flow within the MGCplus system allows parallel and independent use of several interfaces. Many different modules for analog signal sources and fieldbuses guarantee an optimal configuration for your applications.

Embedded Intelligence

- Real-time calculations directly in MGCplus
- Soft PLC with digital I/O, analog output, CANBus, RS232C/RS485
- Programmable with standardized languages IEC 61131-3
- Full access and control of all MGCplus resources.

Monitor, change and load programs during measurement via a separate debug interface in the ML70.

ML70





FROM ONE CHANNEL ...

Own the Strain Gage Expertise

Cut your Strain Measurement Start-up Times

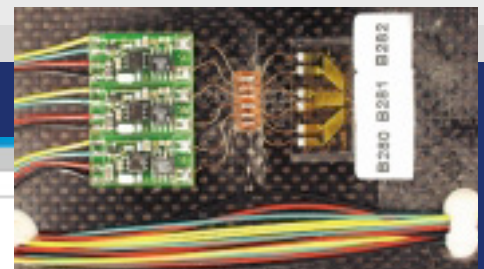
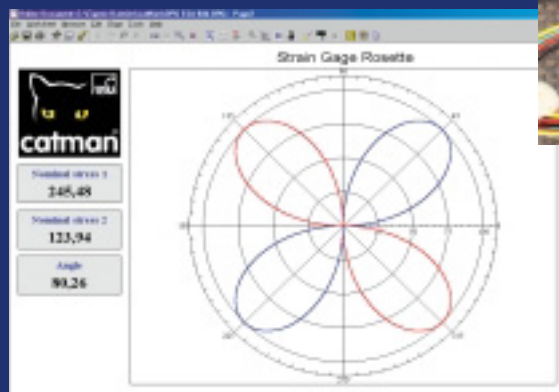
- Type in the gage factor and the system already thinks in microstrain
- Identification of the strain gages through patented transducer identification
- Three high-precision, built-in completion resistors.

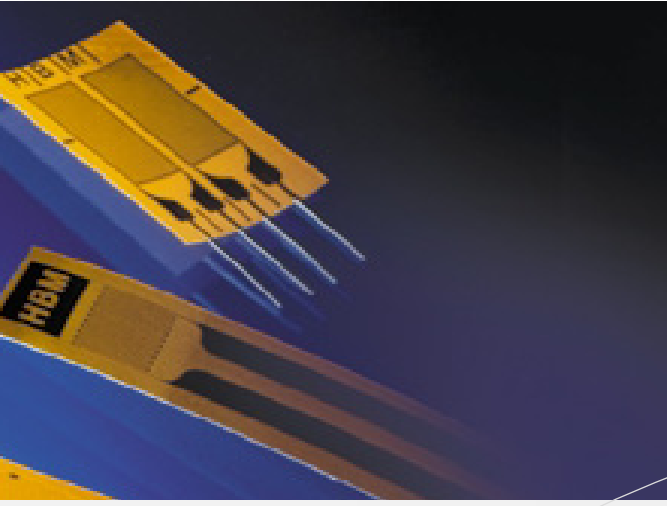
Get the Best Strain Gage Data

- 100% cable influence compensation using patented "Extended Kreuzer Circuit"
- Auto calibration to eliminate temperature influence on the amplifier
- Online calculations in MGCplus
 - Principle stresses
 - Rainflow matrix
- Synchronized and parallel DAQ of strain with force, displacement, temperature, etc.
- Automatic calibration with strain gage simulators and dedicated software.

Protect Your Investment

- MGCplus measures static and dynamic strain signals
- High channel density allows attractive pricing
 - 128 channels per 19" housing
 - Expandable up to 10,000 channels
- Flexible integration with a control system through analog outputs, Ethernet, CANBus, ProfibusDP and ActiveX support with catman®.





... UP TO 10,000 CHANNELS

Get Rich Strain Gage Know-how

- HBM is a leading manufacturer of strain gages, accessories, electronics and software for experimental stress analysis
- More than 40,000 MGCplus strain gage channels in operation worldwide
- More than 5 million HBM strain gages installed in the last 10 years
- HBM's catman® software comprises dedicated modules for strain gages.

Up to 10,000 Channels in One MGCplus Network

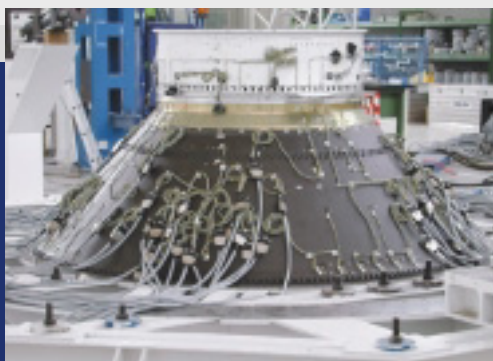
- Simultaneous measurement of all channels
- Pre-trigger and post-trigger capabilities
- Fast data transfer through 100 MBit Ethernet
- Static and dynamic measurement with the same system
- Full software support with catman® Enterprise.

$\mu m/m$

ε

"HBM's hardware and software combination gives us the flexibility we need to perform tests ranging from a few channels at high speed to large channel counts. We felt that HBM's hardware is some of the best we've seen. And we appreciate their experience and level of expertise in strain gage measurement."

STEVE VOTH, CESSNA AIRCRAFT COMPANY





MGCsplit

Distributed, robust and easy scalable measurement modules

MGCsplit is a network-like measurement system based on standard MGCplus components. Even complex measurement systems can be easily configured by simply connecting the MGCsplit modules in a daisy-chain. You can mount the MGCsplit modules anywhere space is available – directly on the test object, in an engine compartment or under a seat. Due to its ruggedized housing, reliable measurement data will be generated even in the harshest of environments. In test rig applications, you can use the MGCplus housing as the base unit, and expand it as required with MGCsplit modules in minutes.

Extreme Environmental Conditions

- ___ MGCsplit works in sunny, icy, windy, high and low temperature conditions, in dirt and mud, and in high humidity
- ___ Shockproof metal enclosure
- ___ IP65 protection permits installation directly on the test object
- ___ Temperature range between -30°C and 70°C (-22°F up to 158°F)
- ___ Reliable gas-proof plugs
- ___ Galvanically isolated inputs.

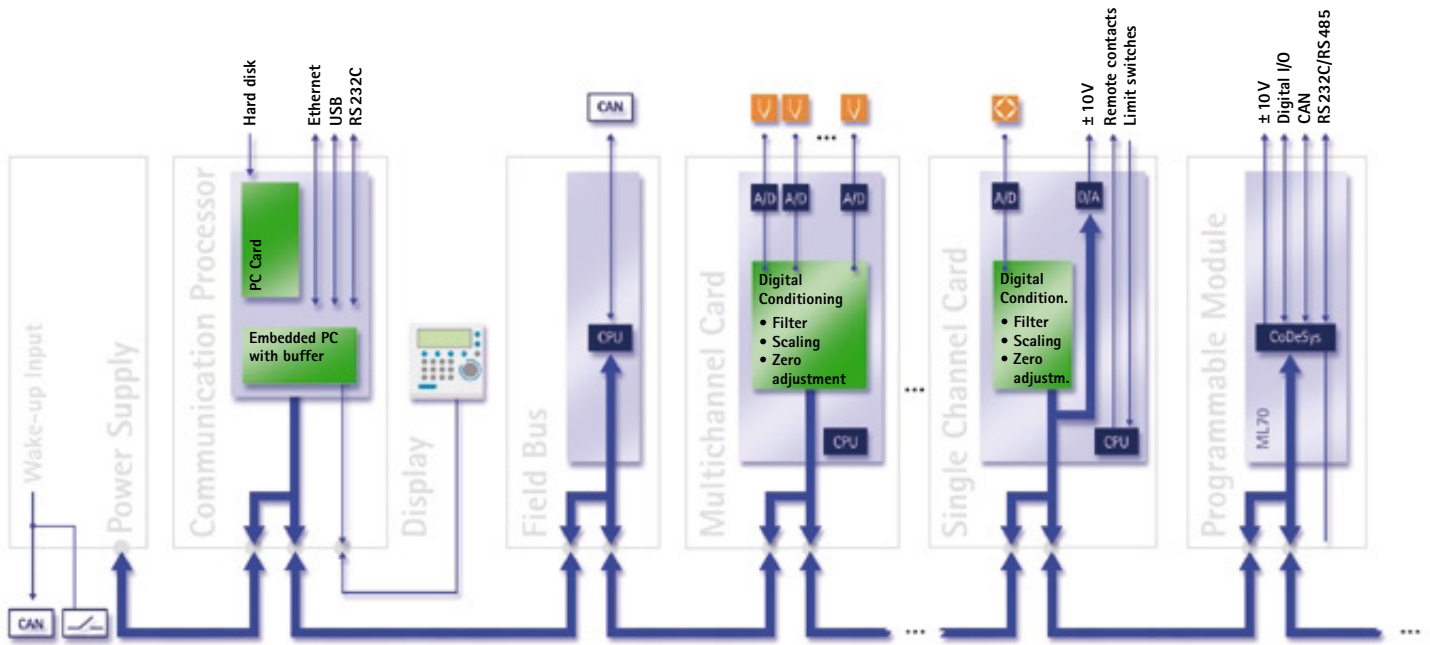
MGCsplit for Mobile Data Acquisition

- ___ Stand-alone data storage with a PC Card hard disk or flash card
- ___ Can be operated by non-skilled personnel
- ___ High data security by simultaneous measurement on a PC and hard disk
- ___ Connection to base station via wireless Ethernet or GSM
- ___ GPS measurement for position and true velocity
- ___ Saves evaluation time through intelligent data compression
- ___ Offers Enhanced Confidence In Data (ECID) by storing all measurement parameters together with the data – full traceability of tests, even years later.



"Our products are tested in the most demanding of environments, such as extremes of temperature, dirt, humidity, and vibration. That is why the IP65 protection provided by MGCsplit was a critical factor in determining the choice of the measurement system. In addition, almost all important measurement quantities can be acquired with one system and evaluated with catman® – Software and hardware from one supplier."

FRANK HELBLING, LIEBHERR FRANCE SAS



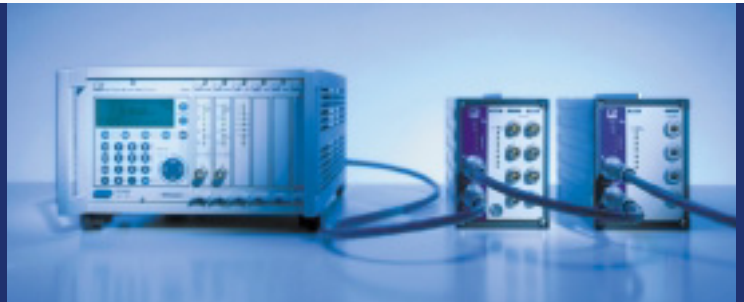
A typical MGCsplit system controlled by an external display unit. Perfect for mobile data acquisition.

"We were particularly sensitive to the ability to have the read-out in the cab of the test vehicle with the measurement module fitted directly onto the test object. The vibration when agricultural implements are in operation can be quite severe and must not affect the measurement result adversely. MGCsplit is the most cost effective solution to our needs."

CHRISTOPHE ESPANEL, JOHN DEERE



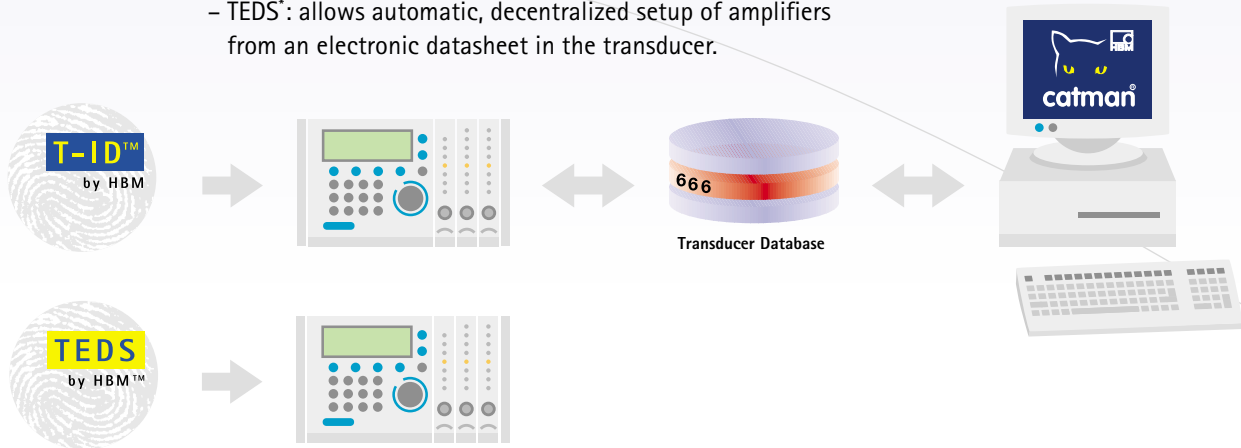
Liebherr



Expand a basic MGCplus unit with MGCsplit modules. Simple expansion within a minute!

Transducer Identification

- Connect up your transducers and start measuring immediately!
- You do not need to think about amplifier settings and channel assignment.
- HBM offers you two new transducer identification methods:
 - T-ID™: uses a centralized PC database to set up amplifiers.
 - TEDS*: allows automatic, decentralized setup of amplifiers from an electronic datasheet in the transducer.



T-ID™ Transducer Identification

- The MGCplus automatically recognizes the transducer by its unique ID number
- The ID number can be used as a reference in a PC database to set up the MGCplus
- Use the T-ID™ to check and validate your wiring
- You can freely edit and expand the database to include additional sensor, device and process setups.

TEDS* Transducer Electronic Datasheet

- Complete datasheet information about a transducer is contained in its local memory
- Automatic amplifier setup without a PC
- Fully compliant with IEEE 1451.4 standard.

*) in development



"We use the compact MGCplus measuring amplifier system as an on-board laboratory instrumentation tool with a variety of transducers for universal tasks. The option of assigning parameters in advance saves us a lot of configuration work. We especially appreciate the easy and reliable operation during road tests."

HORST ROTH, ADAM OPEL AG

Software for your MGCplus



catman® Enterprise

catman® Professional

catman® Express

ActiveX®

catman® Enterprise

- Easily manages up to 10,000 channels
- Several client PCs are connectable with a measurement server
- Distributes data in local and global networks.

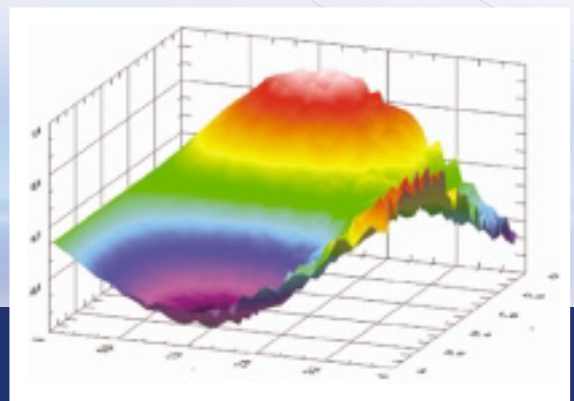
ActiveX®

catman® Professional

- Powerful tool for setup, measurement, visualization, and analysis
- Report generation, including all setup parameters for traceability
- More than 400 mathematical functions including modules for stress analysis, statistics and signal analysis.

catman® Express

- Ready-made modules for plug-and-play, measurement and visualization
- Supports export formats such as Excel, ASCII, DIAdem®, nSoft, and RPC.



Other Software for MGCplus

- DIAdem® (National Instruments)
- BEAM (AMS)
- LabView®, DasyLab® (National Instruments) via ActiveX®

MGCplus Assistant

- Easy setup of the MGCplus unit
- Several user profiles
- Diagnosis and service functions.

CONNECTION BOARDS



Number of inputs

1 1 1 1 1 1 1 1 1 1

AMPLIFIER MODULES

SINGLE CHANNEL AMPLIFIERS

Single Channel Amplifiers													Multi Channel Amplifiers	Accuracy class ⁵⁾	
Single Channel Amplifiers	Excitation	Accuracy class ⁵⁾													
ML01B		0.03												ML801	0.05 (0.1 mit AP401) (0.1 mit AP409)
ML10B	DC ³⁾	0.03												ML460	0.03
ML30B	TF ⁴⁾ 600 Hz	0.03													
aML35B	TF ⁴⁾ 75 Hz	0.03													
ML38	TF ⁴⁾ 225 Hz	0.0025													
ML50B	TF ⁴⁾ 600 Hz	0.03													
ML55B	TF ⁴⁾ 4,800 Hz	0.03													
ML55BS6	TF ⁴⁾ 9,600 Hz	0.03													
ML60B		0.01											T10		

1) max. 4 AP in one housing when supplying T10F
 2) ML70 can be used without connection board
 3) DC – Direct Current
 4) TF – Carrier frequency
 5) Accuracy class – the biggest individual error of the specification

Easy Guide to

AP 401	AP 409	AP 460	AP 801	AP 809	AP 810	AP 814i	AP 815i	AP 835	AP 836		AP 71	AP 72	AP 75	AP 77	AP 78
4 electr. isolated	4 electr. isolated	4 electr. isolated	8	8	8	8	8	8	8		2 x CAN	2 serial	8 dig. in 8 dig. out	ProfibusDP	10 analog out

MULTICHANNEL AMPLIFIERS

SPECIAL FUNCTION MODULES

Special Function Modules	Description					
ML70 ²⁾	Free Programmable Module (IEC 61131-3)					
ML71 ML71S6	CAN Receiver CAN Transmitter					
ML77	ProfibusDP Module					
ML78	Multichannel I/O Module					

EXPLANATION OF SYMBOLS

- Strain gage (resistive) full bridge
- Strain gage (resistive) half bridge
- Strain gage (resistive) quarter bridge
- Inductive full bridge
- Inductive half bridge
- Piezo-resistive transducer
- Thermo resistors
- Thermocouples
- Voltage
- Current
- Passive piezoelectric transducer
- Current fed piezoelectric transducer
- Torque/rotary speed T32, T34, T10 opt. KF1

- min^{-1} T4WA Rotary speed T4WA
- Impulse counter / frequency
- Digital output
- Digital input
- Analog output
- ProfibusDP
- CANBus
- Serial I/O RS232C, RS422, RS485 I/O
- Potentiometer 200Ω – 5000Ω
- T10 T10 torque transducer family, except option KF1

Assembling your MGCplus System



From Sensor to Software

HBM is a partner you can totally rely on.

That's why we offer you a complete product range for your test and measurement tasks - from sensor to software.

www.hbm.com

MGC_{plus}

... the Ultimate Modular, Scalable and Configurable System



measurement with confidence

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