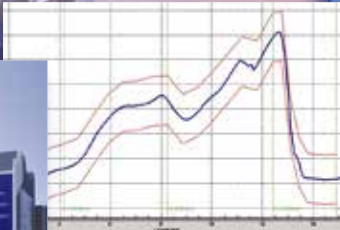
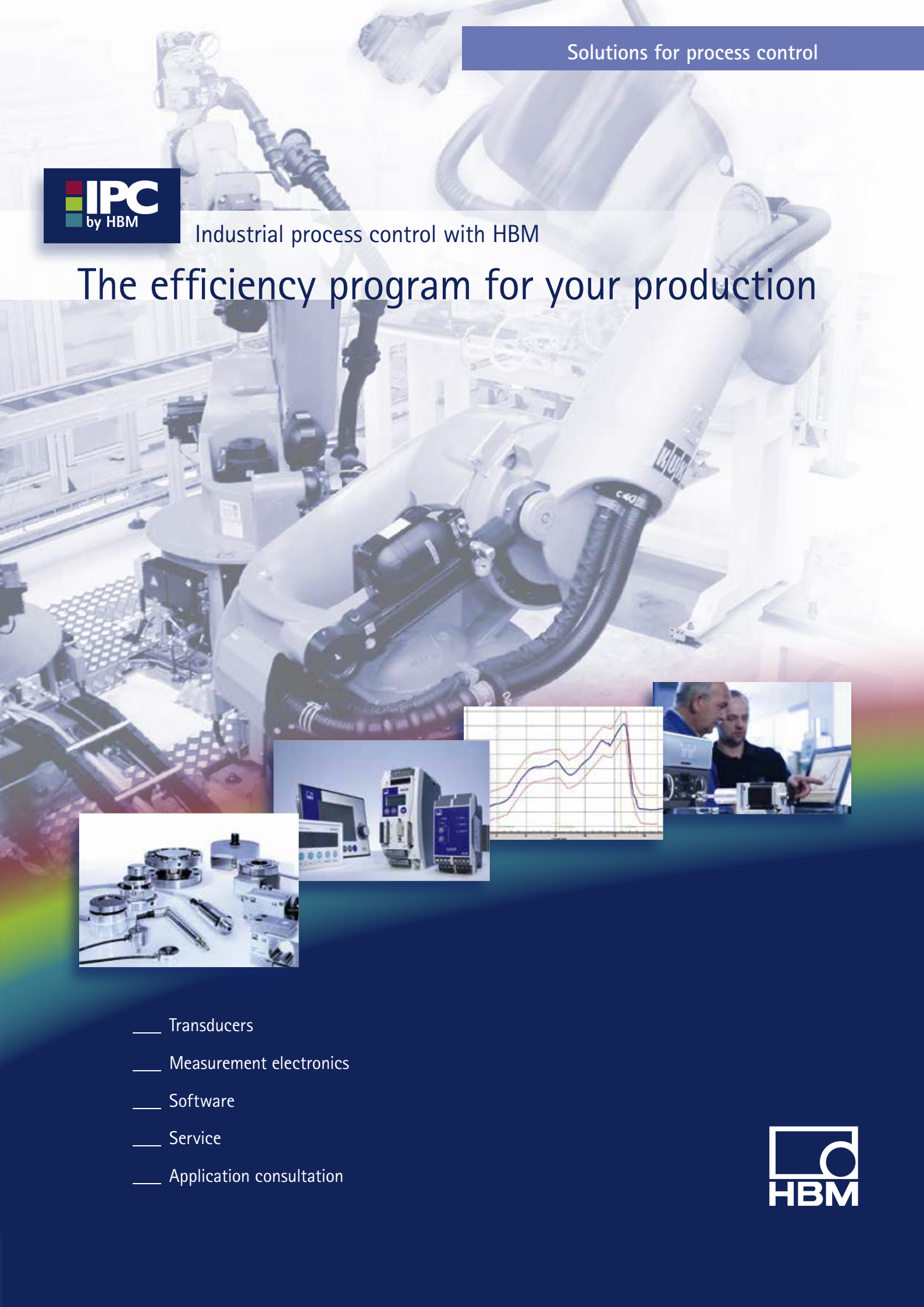




Industrial process control with HBM

The efficiency program for your production



- ___ Transducers
- ___ Measurement electronics
- ___ Software
- ___ Service
- ___ Application consultation



Quality, time and costs in an optimal relationship... The efficiency program for your

Three success factors always count in production: quality, time and costs. Balance these three key factors within an optimal relationship – with intelligent process control from HBM, the efficiency program for your production.

- Top quality for your products thanks to seamless monitoring of the production process
- Absolute cost control thanks to integrated systems



Assembly

- ___ Riveting and clinching of components and sheets
- ___ Punch riveting, blind riveting
- ___ Press fitting of bearings in gear units
- ___ Assembly of valve seats and guides in cylinder heads
- ___ Multi-component force monitoring during assembly of aircraft components

Forming of metal

- ___ Measuring press forces when stamping coins, sheets, washers
- ___ Rolling of steel or cellulose
- ___ Monitoring large presses in the automotive industry

Primary shaping of base materials

- ___ Process control in tablet pressing
- ___ Production monitoring in CD production
- ___ Process control in the production of vehicle inner cladding

"With HBM measurement technology, we have another important component in our overall system for machine monitoring and can help our customers increase their productivity and reduce quality costs."

*Hans-Georg Conrady,
Managing Director of Artis GmbH*

production



Control of machines

- ___ Displacement and yarn tension measurements in textile machinery
- ___ Web tension measurements in printing presses
- ___ Measurement of very high pressures in waterjet cutting
- ___ Control/monitoring of filling systems
- ___ Load monitoring in cranes and lifting equipment

Functionality testing

- ___ Testing of switches and operating elements in vehicle cockpits
- ___ Switch testing of door systems, locking systems and high-quality domestic appliances
- ___ Force/displacement measurements in steering column assembly
- ___ Testing of springs and shock absorbers for the automotive industry
- ___ Use of pressure transducers for testing injection nozzles

Energy production

- ___ Pressure monitoring of power lines
- ___ Force monitoring in wind power systems
- ___ Torque monitoring in generators
- ___ Overload control in heavy diesel motors

"We meticulously compared proposals from different companies with one another, and ultimately decided on HBM, because this gave us the best price/performance ratio. "HBM had no problem at all programming the individual application, and overall, we are very satisfied."

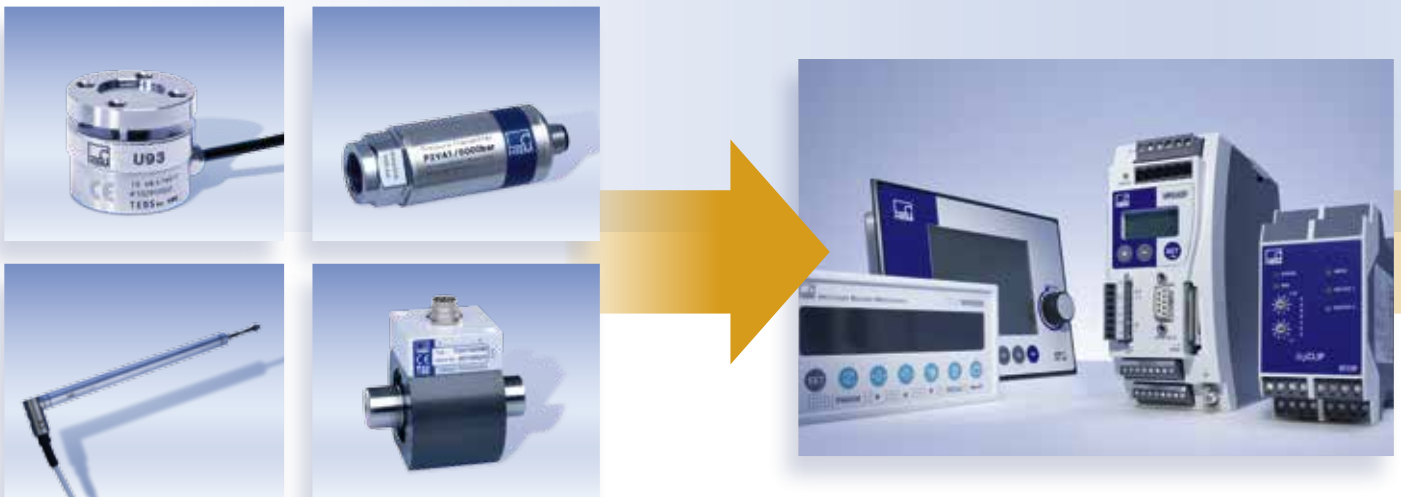
*Reimar Bürkmayer,
Applications Engineer, Ketten Wälder GmbH*



Process control with HBM ... Complete security with our comprehensive

Only HBM offers you the unique complete solution for your process control – comprising transducers, measurement electronics, software and services.

Your production will profit from the all-round competence of the global technology leader in the area of measurement technology. Know-how that you can trust in with perfectly matched components, set up rapidly and easily.



1

Transducers

Reliable and robust:

The quality transducers from HBM are perfectly suited to the harsh requirements in the industrial environment...

...and for the following measured quantities:

- Force
- Torque
- Displacement
- Pressure

Also available in customized versions, developed and produced according to your individual requirements.

2

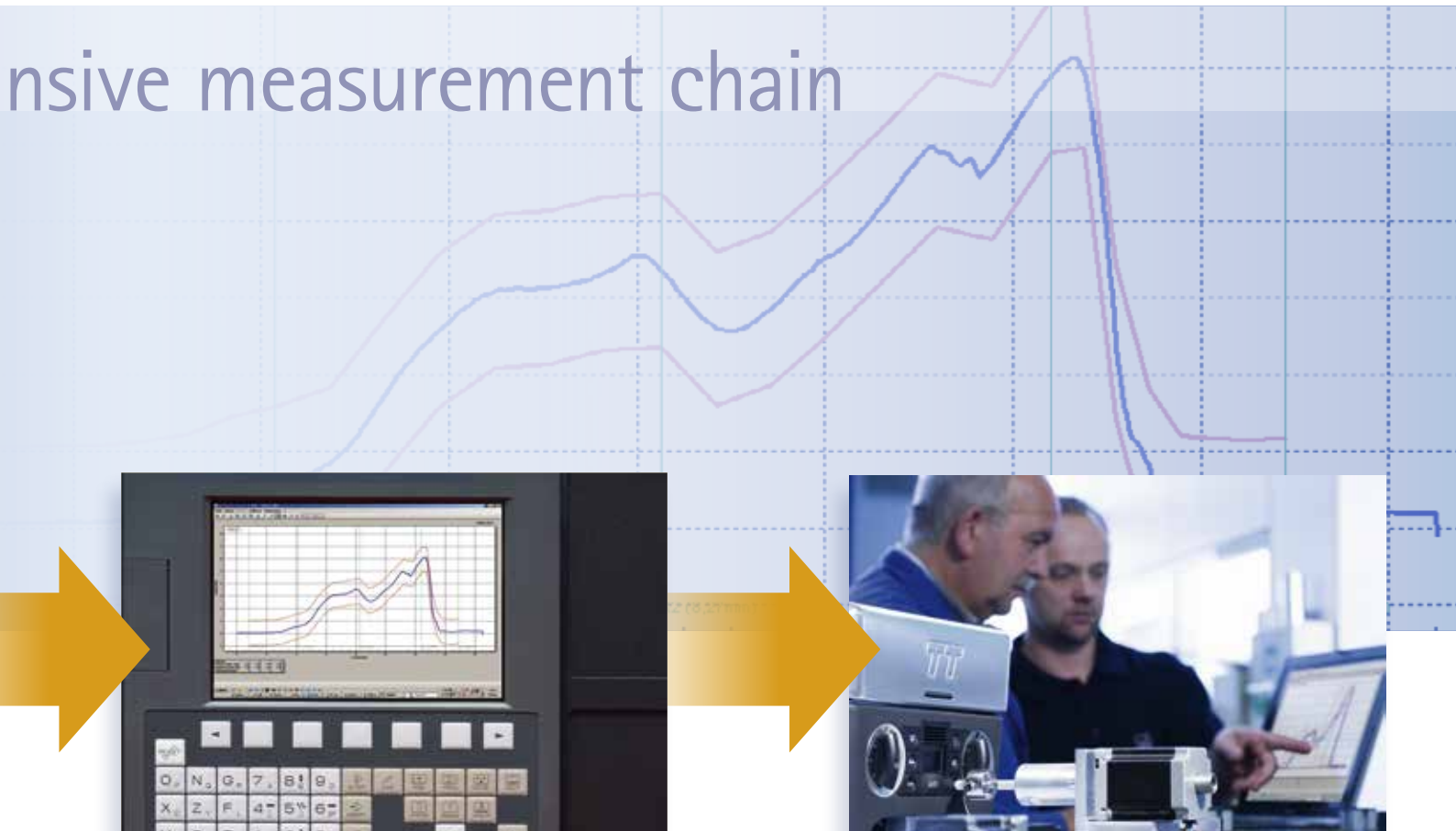
Measurement electronics

HBM measurement electronics ensure measured values in your production are acquired rapidly, professionally and securely.

- Industrial [measuring] amplifiers
- Operator terminals
- Process controllers

Use our ePlan macros for efficient electrical construction.

Comprehensive measurement chain



3.

Software

Specially developed for the requirements in production:

HBM Industrial Software – with professional tools for intelligent process control.

- ___ Individually upgradable FASTpress Suite
- ___ Intuitive assistant software
- ___ INDUSTRYmonitor for numerous applications

Use HBM to create your software solution.

4.

Service

Before, during and after purchase:

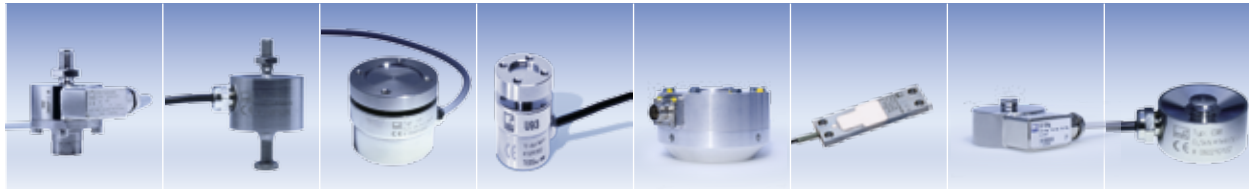
Our measurement technology experts are at your side – whenever you set up and operate your process controls.



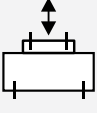
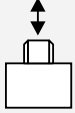


- ___ Application consultation at the start of your project
- ___ On-site services and training
- ___ Comprehensive support services
- ___ Calibration
- ___ Re-calibration

Contact the HBM application consultant:
application-engineering@hbm.com

Force transducer

HBM force transducers measure static and dynamic tensile and compressive loadings – and almost displacement-free at that.



Force transducers	U2B	U9B	U3	U93	U10M	SLB700A	C2	C9B
Measurement principle	 Strain gauges							
Direction of force	Tensile and compressive					Pressure		
Design								
Non-linearity	0.2	0.5	0.2	0.5	0.06	0.2		0.5
Nominal (rated) force		50 N						50 N
N	500 N		500 N				500 N	
kN	200 kN	50 kN	100 kN	1 kN 50 kN	1.25 kN 500 kN	500 μm/m	200 kN	50 kN
Special characteristics	<ul style="list-style-type: none"> Versatile usage, main use: Test benches 	<ul style="list-style-type: none"> Miniature force transducers 	<ul style="list-style-type: none"> Lateral force-insensitive 	<ul style="list-style-type: none"> Highly compact Robust TEDS 	<ul style="list-style-type: none"> High dynamic oscillation width Precise Double bridge design TEDS 	<ul style="list-style-type: none"> Hermetically sealed Analog output 0V ... 10V or 4mA ... 20mA 	<ul style="list-style-type: none"> Hermetically sealed Low overall height 	<ul style="list-style-type: none"> Miniature force transducers

... for your applications

Safely and reliably determining forces... a must in numerous applications:



Cracking components






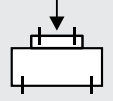
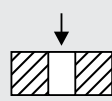
Safe loading of large masses



Error-free pressing of tablets

Torque transducers





Reliable and always technologically unbeaten: HBM's analog and digital torque transducers.

	
CFT	CFW
 Piezoelectric	
Pressure	
	
1	1
5 kN 120 kN	20 kN 700 kN
<ul style="list-style-type: none"> · Extremely stiff · No nominal (rated) displacement · Calibrated 	<ul style="list-style-type: none"> · Extremely compact · No nominal (rated) displacement · Mounting aids available



Ensuring product quality with piezoelectric sensors



Torque transducer	T20	T22	T40
Measurement principle	 Strain gauges		
Signal transmission	Contactless		
Design	 Shaft stub Friction locking	 Shaft stub Friction locking	 Flange
Nominal (rated) speed	10000rpm	9000rpm	15000rpm
Output signal: Torque	± 10V	± 5V; 10 ± 8mA	5/30/120 kHz or 10V
Output signal: Speed/angle of rotation	360 increments/ revolution	-	1,024 increments/ revolution
Option, Coupling	yes	yes	yes
Non-linearity	0.1	0.3	0.03
Nominal (rated) torque	0.1 N·m 200 N·m	5 N·m 1 kN·m	200 N·m 10 kN·m
Special characteristics	· Torque and speed measurement system	· Voltage output · Current output	· Digital measured value transmission · High measuring bandwidth · Measurement flange



Traceable and reliable: Function testing of components



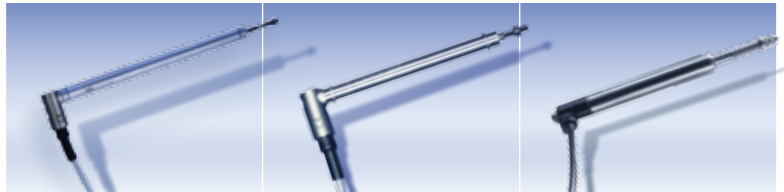
... for your applications

Smooth production:
Torque recording in process control.

Displacement transducers

Robust, precise, reliable:

Inductive displacement transducers, ideal for use in industry.



Displacement transducers	WA-T	WA-L	WI
Measurement principle	 Inductive		
Design	Probe	Plunger	Probe
Non-linearity	0.2% or 0.1%	0.2% or 0.1%	0.2%
Cable electronics, 0.5V...10V output	optional	optional	no
Nominal (rated) measuring range (displacement)	2 mm 100 mm	2 mm 500 mm	2 mm 10 mm
mm			
Special characteristics	<ul style="list-style-type: none"> · Good temperature stability · Large measuring range 	<ul style="list-style-type: none"> · Good temperature stability 	<ul style="list-style-type: none"> · Very compact design

... for your application

Important in numerous applications of process control: measuring displacement.



Production of specialist components for automotive suppliers: HBM monitors assembly

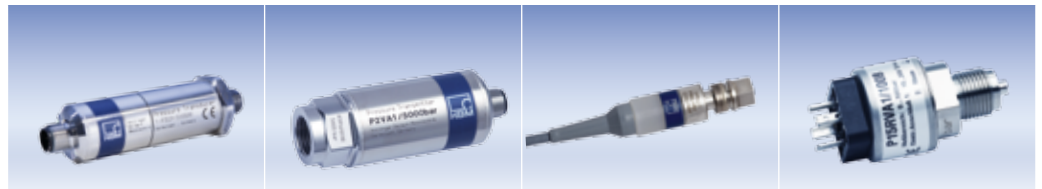



Quality assurance in electro-mechanical press systems

Pressure transducers

For safe measurement of pressure:

HBM pressure transducers, available in special versions for industrial applications.



Pressure transducers	P3 Industrial Class	P2V	P8AP	P15
Measurement principle	 Strain gauges			
Non-linearity	0.1% or 0.2%	0.2% ... 0.3%	0.3%	1%
Integrated electronics	-	0.5V ... 10V or 4mA ... 20mA	-	0.5V ... 10V or 4mA ... 20mA
Nominal (rated) measuring range	10 bar 3000 bar	100 bar 7000 bar	10 bar 500 bar	10 bar 500 bar
Special characteristics	· Pt100 for temperature compensation	· Analog output	· Compact design · Low mass	· Analog output · Compact design



Testing of injection nozzles



© Bystronic

Precise control of extreme pressures in waterjet cutting

... for your application

Pressure measurement during process monitoring.

Safe measurement results... with added value

HBM measurement electronics for industrial process control

Only the use of powerful measurement electronics converts the signals of your transducers into accurate production data. Use the measurement electronics developed especially for industrial use by HBM with unique technology advantages that ensure even more safety and reliability in your process control.

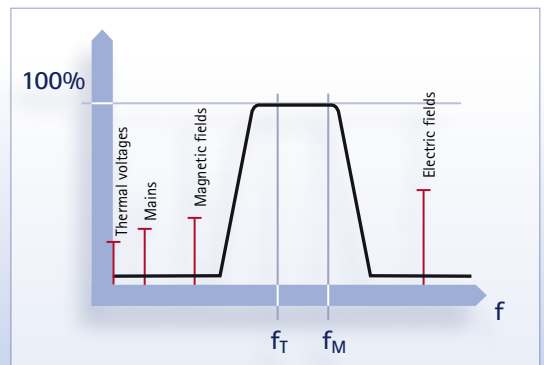


Producing... and measuring without errors!

HBM uses carrier frequency technology in its measurement electronics – with clear advantages for you because this technology enables the systematic masking out of interference.

HBM's measurement electronics deliver first class results in industry's demanding environment where there is frequent electromagnetic interference from the surroundings.

EMC safety also applies in the opposite direction: with our Greenline concept, we ensure that no electromagnetic interference is emitted by HBM products.



The carrier frequency amplifier signal systematically masks interferences.



TEDS
by HBM™

Plug & Measure thanks to TEDS sensor detection

Plug in... and measure immediately!

Don't lose any time when setting up your process control – with TEDS, the electronic data sheet in the transducer. TEDS ensures the transducer and measurement electronics communicate fully automatically. Your process control can be set up within minutes without extensive synchronization and parameterization.

TEDS: This is "Plug & Measure" in your production!

for you!



Rapid forwarding

You want to rapidly process the data from your process control?

HBM measurement electronics support all common standard interfaces such as Profibus DP, CANopen or Fast Ethernet – and can therefore be seamlessly integrated in your processes.

*Connected with a click:
I/O modules and PLC mini-controller*



Wireless flexibility in your production

Wireless solutions are ensuring more flexibility and lower costs in increasing numbers of production systems.

HBM measurement electronics support common wireless technologies – for wireless and reliable transmission of data from production monitoring devices.



HBM measurement electronics, wireless... for on the go

Modular and good: Measurement electronics



Electronics	Clip			
	AE101	AE301	AE501	MC3
Connection, transducer	SG full bridge	SG full bridge	Inductive half bridge	SG full bridge
Supply	DC power supply	CF supply (600 Hz)	CF supply (4.8 kHz)	CF supply (1 kHz)
Channels per device	1	1	1	1
Integrated signal processing				
· Accuracy class	0.1	0.1	0.1	0.1
· Filter frequency, Hz (1 dB)	6000	10	10	30
· Limit value switch	2 with module GR201			1
· Peak value memory, current value memory	2 with module TS101			
Parameter sets (measurement programs)	1	1	1	1
Interfaces				
· Analog output: Voltage, current	with output stage module EM201/EM201-K2			with output stage module MC3/Z01
· Digital inputs				
· Digital outputs				
Operation			DIP switch Adjustment potentiometer	
Special characteristics		· AE301S6 with MB=2Hz · AE301S7 with MB=60Hz		
Assembly /Degree of protection		Rail, IP20		Wall-mounted housing, IP65

... for your application

HBM amplifiers function reliably and securely in the tough industrial environment.



for use in process control

MGA II					
MC2A	ME10	ME30	ME50	ME50S6	ME250S6
Inductive half bridge	SG full bridge	SG full bridge	Inductive half bridge	SG full bridge	SG full bridge
CF supply (5 kHz)	DC power supply	CF supply (600 Hz)	CF supply (4.8 kHz)	CF supply (4.8 kHz)	CF supply (4.8 kHz)
1	1	1	1	1	2
0.1	0.1	0.1	0.1	0.1	0.1
100	10000	60	500	250	250
1					
1	1	1	1	1	1
with output stage module MC3/Z01	with output stage module EM001/EM002				
DIP switch Adjustment potentiometer					
Optional: Desktop housing, digital display and connection boards					
Wall-mounted housing, IP65	19" plug-in card, IP20				

*Well automated:
Amplifiers in a
fieldbus group*















*Practical on site:
Amplifiers with display
and control panel*



Start production in the digital age

Electronics	MVD		Scout
	MVD2510	MVD2555	Scout55
Connection, transducer	 SG full bridge	 SG full bridge  SG half bridge  Inductive full bridge  Inductive half bridge  LVDT  Piezoresistive full bridge  Potentiometric transducer	 SG full bridge  SG half bridge  Inductive full bridge  Inductive half bridge  LVDT  Piezoresistive full bridge  Potentiometric transducer
Supply	DC power supply	CF supply	CF supply
Channels per device	1	1	1
Integrated signal processing			
· Accuracy class	0.1	0.1	0.1
· Filter frequency, Hz (1 dB)	5	0.05 ... 500	0.05 ... 500
· Limit value switch	2	4	4
· Peak value memory, current value memory		2	2
Parameter sets (measurement programs)	1 + Factory setting	8 + Factory setting	8 + Factory setting
Interfaces		RS232 / RS485	RS232 / RS485
· Analog output: Voltage, current	 Voltage  Current	 Voltage  Current	 Voltage  Current
· Digital inputs	 2x	 6x	 6x
· Digital outputs	 3x	 5x	 5x
Operation	Keyboard or control inputs	Setup software, keyboard or control inputs	Setup software, keyboard or control inputs
Special characteristics	· 4 1/2 digit LED display, red	· 10 digit LCD display with background illumination, red	· 10 digit LCD display with background illumination, red
Assembly /Degree of protection	Panel mounting, IP51		

PACeline		digiCLIP	
CMA	CMD600	DF30	DF31
 Piezoelectric transducer	 Piezoelectric transducer	 SG full bridge	 SG full bridge
Charge input	Charge input	CF supply (600 Hz)	CF supply (4.8 kHz)
1	1	1	1
0.5	0.5	0.05	0.05
5000	30000	0.05 ... 100	0.05 ... 100
	2	4	4
	3	3	3
1	2+ Factory setting	1+ Factory setting	1+ Factory setting
	ETHERNET <-->	CAN,  or DeviceNet	
 Voltage	 Voltage		
 2x	 3x		 1x
	 2x		 2x
Control inputs	CMD Assistant or control inputs	digiCLIP Assistant or control inputs	
<ul style="list-style-type: none"> · TEDS · Two measuring ranges (100%, 20%) · Galvanic isolation of all electrical signals 	<ul style="list-style-type: none"> · TEDS · SensorTeach for rapid training processes · Measurement data streaming via Ethernet · Galvanic isolation of all electrical signals · Strip chart, LabView driver 	<ul style="list-style-type: none"> · TEDS · Hot swapping · Modular plug-in housing 	<ul style="list-style-type: none"> · TEDS · Hot swapping · Modular plug-in housing
Field housing,  IP65	Field housing,  IP60	Rail, IP20	

Electronics	PME			
	MP01	MP30	MP55	MP60
Connection, transducer	<ul style="list-style-type: none"> Voltage Current Resistance thermometer Thermocouples (Types: J, K, R, S) 	<ul style="list-style-type: none"> SG full bridge 	<ul style="list-style-type: none"> SG full bridge SG half bridge Inductive full bridge Inductive half bridge LVDT Piezoresistive full bridge Potentiometric transducer 	<ul style="list-style-type: none"> Frequency signals Torque transducer Pulses, incremental encoder
Supply	DC power supply	CF supply (600 Hz)	CF supply (4.8 kHz)	Counter, pulse input
Channels per device	4	1	1	1
Integrated signal processing				
· Accuracy class	0.1	0.03	0.1	0.05
· Filter frequency, Hz (1 dB)	0.05 ... 250	0.05 ... 20	0.05 ... 500	0.05 ... 500
· Limit value switch	2 (per channel)	4	4	4
· Peak value memory, current value memory	2 (per channel)	2	2	2
Parameter sets (measurement programs)	4+ Factory setting	4+ Factory setting	4+ Factory setting	4+ Factory setting
Interfaces				
· Analog output: Voltage, current	<ul style="list-style-type: none"> Voltage Current 	<ul style="list-style-type: none"> Voltage Current 	<ul style="list-style-type: none"> Voltage Current 	<ul style="list-style-type: none"> Voltage Current
· Digital inputs			4x	
· Digital outputs			4x	
Mathematical functions				
Intelligent functions				
Operation	PME Assistant or front-side keyboard or control inputs			
Special characteristics				· Direction of rotation detection
Assembly / Degree of protection	Rail, IP20			

				
MP70DP	FASTpress MP85A	EASYswitch MP85A-S	DT85	PMX PMX
<p>CAN CAN signals max. 8 channels (MP01, MP30, MP55, MP60)</p>	<ul style="list-style-type: none"> Voltage SG full bridge SG half bridge Inductive full bridge Inductive half bridge LVDT Piezoresistive full bridge Potentiometric transducer Frequency signals, pulses Torque transducer SSI 	<ul style="list-style-type: none"> Voltage SG full bridge SG half bridge Inductive full bridge Inductive half bridge LVDT Piezoresistive full bridge Potentiometric transducer Frequency signals, pulses Torque transducer SSI 	<p>CAN</p> <ul style="list-style-type: none"> · External display and control unit for MP85A, PME and digiCLIP · CAN signals max. 10 devices of type MP85A, PME or digiCLIP 	<ul style="list-style-type: none"> Voltage Current SG full bridge SG half bridge Inductive full bridge Inductive half bridge LVDT Piezoresistive full bridge Potentiometric transducer
CAN interface	Universal	Universal	CAN interface	DC / CF supply (4.8 kHz)
8 channels	2	2	10 modules	16 measurement channels, 32 math computing channels
	0.1	0.1		0.1
	0.05 ... 1000	0.05 ... 1000		0.1 ... 2000
4	4 (per channel)	4 (per channel)		32
2				32
4+ Factory setting	31 in Flash memory, 1000 on MMC card in device	31 in Flash memory, 1000 on MMC card in device		100 + Factory setting
<p>CAN </p>	<p>CAN ETHERNET <--></p>	<p>CAN ETHERNET <--></p>	<p>CAN RS232</p>	<p>ETHERNET <--> EtherCAT </p>
<p>U Voltage</p> <p>I Current</p>				5x U Voltage
	1/5 x	1/5 x		8x
	4/8 x	4/8 x		8x
<p>+ - Addition, multiplication, mean value</p>				<p>+ - x = Sum, difference, addition, subtraction</p>
	<ul style="list-style-type: none"> Tolerance window Envelope curves 	<ul style="list-style-type: none"> Tolerance window Envelope curves 		<ul style="list-style-type: none"> Tolerance band Signal characteristics Signal generators 2-point scaling 2-point controller PID controller
	PME Assistant, INDUSTRY-monitor or control inputs	PME Assistant, INDUSTRY-monitor or control inputs	Buttons and encoder wheel	Integrated web server or control inputs
<ul style="list-style-type: none"> · Gateway from CANopen to Profibus DP 	<ul style="list-style-type: none"> · TEDS · Module for fitting monitoring 	<ul style="list-style-type: none"> · TEDS · Module for haptic and switch testing 	<ul style="list-style-type: none"> · LCD display 5.7" · No fan needed 	<ul style="list-style-type: none"> · TEDS · EtherCat up to 9.6 kHz transmission rate · USB for backup and data storage · CAN for external field modules
	Rail, IP20		Panel mounting, IP52	Rail or wall mounting, IP20

Professional tools for even more security

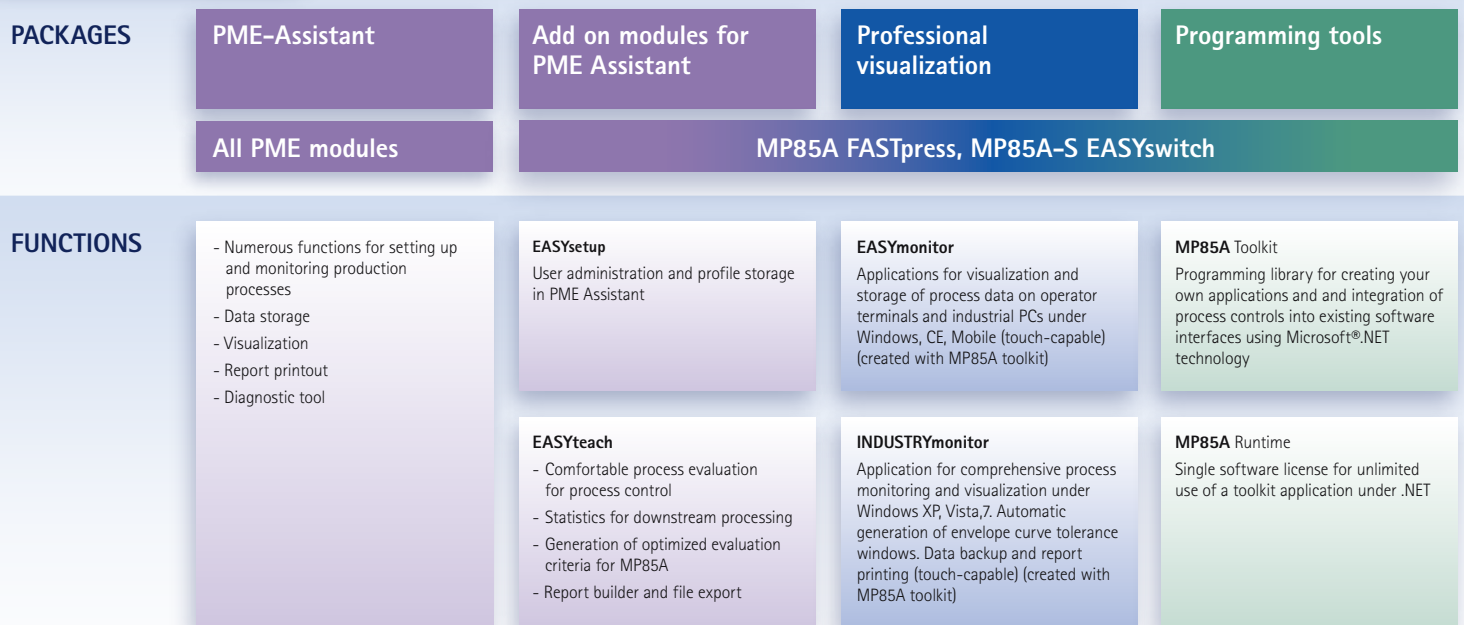
User-friendly, powerful: HBM software for industrial applications

Specially developed for use in process control: The powerful "HBM Industrial Software" supplies you with valuable professional tools for your production tasks.

HBM software not only supports you with the complete set of essential standard functions. You can also individually customize your software, thanks to the modular structure, to the requirements of your production lines.

FASTpress Suite

[...powered by HBM Industrial Software]



FASTpress Suite ... – powered by HBM Industrial Software

The star in the HBM Industrial Software range: "FASTpress Suite", ideal in combination with the industrial amplifier MP85A FASTpress and MP85A-S EASYswitch.

FASTpress Suite is a complete software package for your process control.

Visualization, evaluation, further processing:

FASTpress Suite offers you exactly the performance that you require for your process control.

PME Assistant

For simple setup and reliable monitoring of production systems

Add-on modules

With extra tools for automatic optimization of your evaluation criteria, for statistical process control and simplified user administration.

Programming tools

The solution for system integrators – with a programming tool for individual customization of the operating and control software.



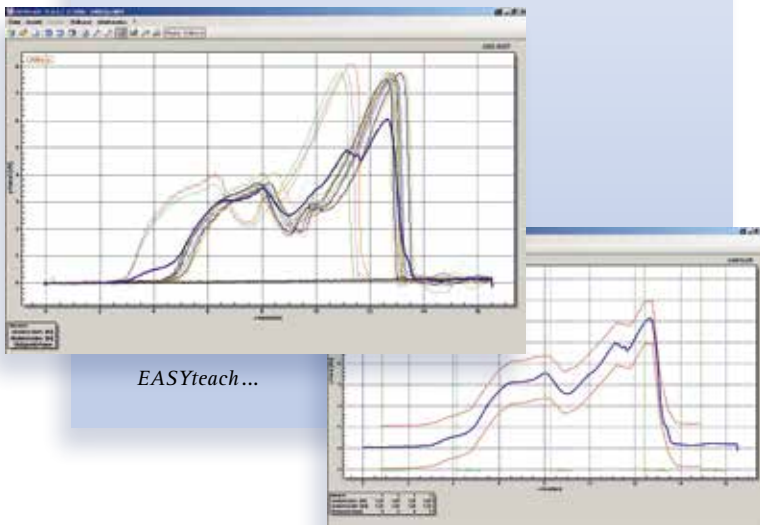
Yinyang/ www.istockphoto.com

Process optimization with EASYteach

EASYteach... Rapid process analysis

With EASYteach, you can analyze and optimize your production process in just a few seconds. The advantage: The production processes are perfectly tailored to the relevant task.

- ___ Process analysis of up to 10000 processes
- ___ Automatic generation of envelope curves and tolerance windows
- ___ Report builder and file export



EASYteach...

...with automatic envelope curve generation



Process control on mobile operating units



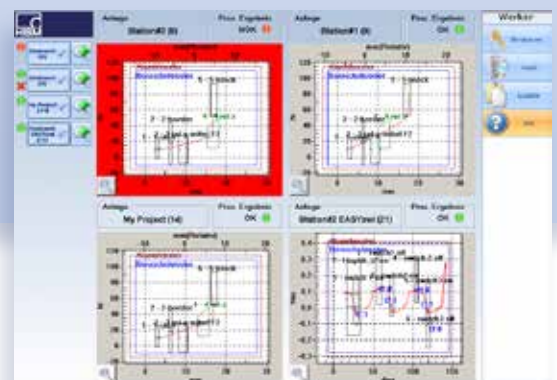
Process control and visualization directly on the machine control

INDUSTRYmonitor... the production software

From works employee to service technician to administrator – the INDUSTRYmonitor software serves to process data acquisition, visualization and data storage, supporting your production employees in diverse areas.

Benefit from:

- ___ Process monitoring and process data storage
- ___ Simple Touch operation
- ___ Transparent display
- ___ Up to 3 individually controllable user levels
- ___ I-P.M. quality data connection
- ___ Additional functions through plug-ins



INDUSTRYmonitor with 4 MP85A

Always in the picture about your production

You want to access the actual key data of your production line at any time? Regardless of where you are: HBM Industrial Software is also available for mobile end units such as handheld computers.



Quality optimally monitored ... and seamless

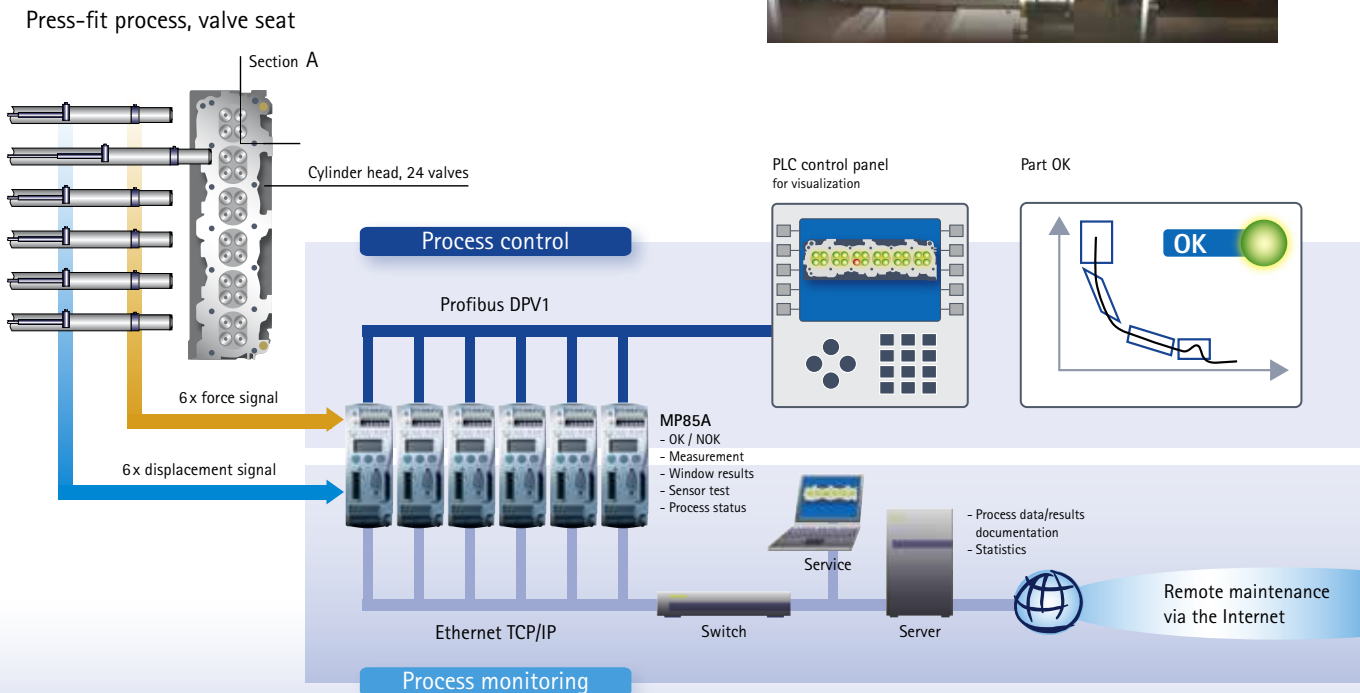
Quality is the hard currency of global production. Only those companies who can document and permanently maintain quality can continue to be successful. It makes sense to trust in HBM measurement technology: a synonym for reliability and dependability of more than 60 years.

Fully automatic quality control

HBM amplifiers give more safety in quality control. Integrated evaluation functions ensure reliable and continuous control of production. This gives yet another advantage - the distribution of measurement and control tasks to decentralized HBM components eases the load on central controllers and increases the productivity of your plant.

Your advantages:

- Stringent quality control with HBM measurement technology
- Automated quality monitoring thanks to field buses and digital inputs/outputs
- Simple and clear visualization of your process data – on site on in the entire plant network



Fully automatic production system for cylinder heads with HBM components

ssly documented

Documented quality

Can you prove the quality of your production? Yes – with HBM measurement technology. The MP85A series amplifiers store production and quality data in current formats ASCII(CSV), Q-DAS and I-P.M.
 An important requirement for seamless documentation of your quality – and for database-supported analysis and proof.

Benefit from numerous advantages:

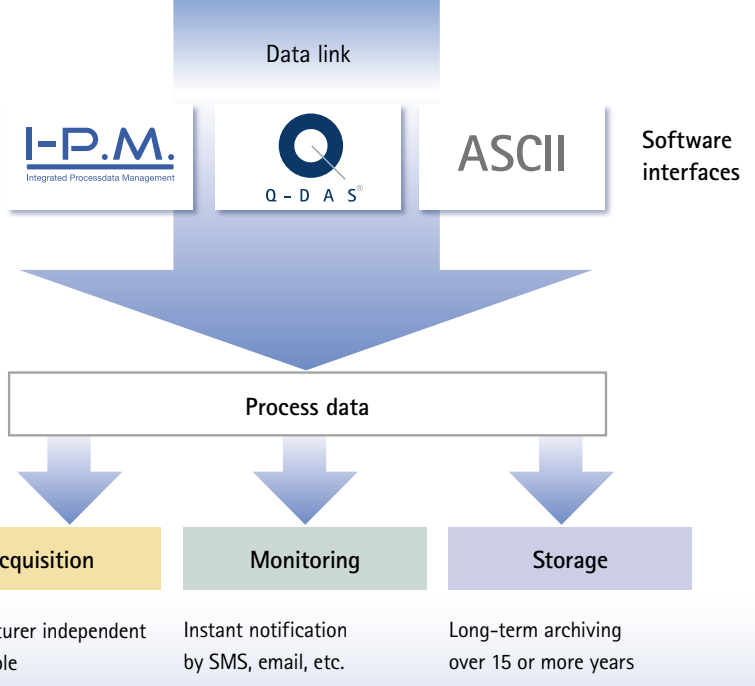
- ___ Rapid overview of your quality status
- ___ Less downtimes and lower costs
- ___ Rapid error evaluation
- ___ Automatic notification
- ___ Integrated archiving



MP85A process controller



Quality data storage with the MP85A amplifier



Acquisition	Monitoring	Storage
Manufacturer independent and reliable	Instant notification by SMS, email, etc.	Long-term archiving over 15 or more years

Expert know-how for your production Close to you throughout the world

HBM Support: Immediate. Competent. Reliable.

Process control with HBM is the efficiency program for your production. You profit before, during and after set up of your process control from the know-how of an entire team of experts in measurement technology. Available globally, with numerous service and support features.



A complete team of experts at your side

HBM supports you with expert knowledge at every phase of your project:

- During project planning and offer creation – with sound advice regarding the necessary specifications
- During the setup of your process control, for example with on-site commissioning
- With competent support from the experts in our dedicated Technical Support Centers
- On-site seminars regarding basics and working in industrial process control with software production (Microsoft .Net / Siemens Step7)

"Process control with HBM is one of the main factors of our success. This guarantees that we obtain reliable results – across Europe!"

*Richard Winder, Durability PAT Leader,
Landrover UK*

As global as your production

Do you produce globally, in various countries or on various continents?

Then work with a top global partner for your process control as well.

The HBM Support network covers over 60 countries around the world, across all continents.

In other words, regardless of where your production sites are HBM offers you world class support to ensure quality.



With know-how and competence in application for your production: The HBM Service Team



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Questions about project planning your
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Industrial process control with HBM

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Always up to date and relevant:

Comprehensive information about process control on our website.

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- ___ Regular updates about process control in our email newsletter



Practical construction tools: You can plan with HBM

Plan with HBM – right from the project planning phase of your automation system. We will supply you with appropriate ePLAN macros containing specification data, drawings and connections for HBM's measurement amplifiers.

The advantages:

- ___ Integrated project planning, documentation and administration of your automation system with ePLAN
- ___ Integration of HBM components in your plant planning thanks to appropriate ePLAN macros



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