

MEASURING TECHNOLOGY

We develop complete solutions for measuring, testing and assembly systems from the design to the final production, assembly and commissioning.

**See the difference for yourself. NMH –
Innovation is our world**



THE POWERFUL INDUSTRIAL PC

Our systems work successfully for the following companies, among others

BMW AG Dingolfing

- >> Gearbox housing measurement
- >> Differential measurement
- >> Rotation flank clearance adjustment
- >> Block measurement adjustment
- >> Tooth impact testing
- >> Expansion control
- >> Remaining spring travel measurement
- >> Bearing friction coefficient measurement
- >> Spring characteristic recording
- >> Track camber adjustment

Audi AG Ingolstadt

- >> Brake disc test stand
- >> Wheel hub test stand

Daimler AG Esslingen-Mettingen and Untertürkheim

- >> Differential measurement
- >> Rotation flank clearance measurement
- >> Single-flank rolling test
- >> Housing measurement
- >> Disc regulation
- >> Expansion control

Albert Weber AG Marktdorf

- >> Crankshaft measurement
- >> Force path monitoring

BMW AG Munich

- >> Backlash adjusting station

Robert BOSCH GmbH Bühl

- >> Insulating mask test
- >> Axial runout testing of DC motor anchor shafts
- >> DC motor anchor package impact measurement

ZF Friedrichshafen

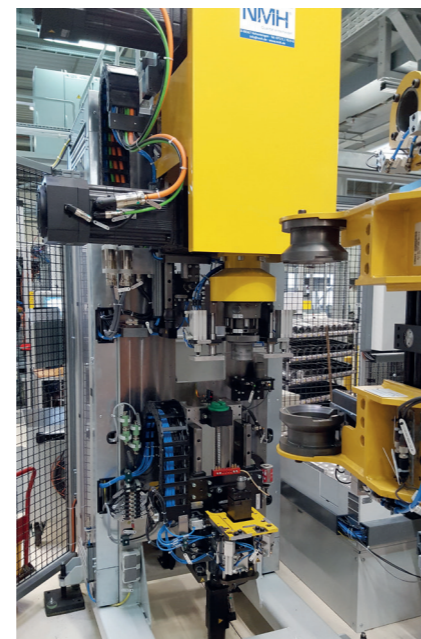
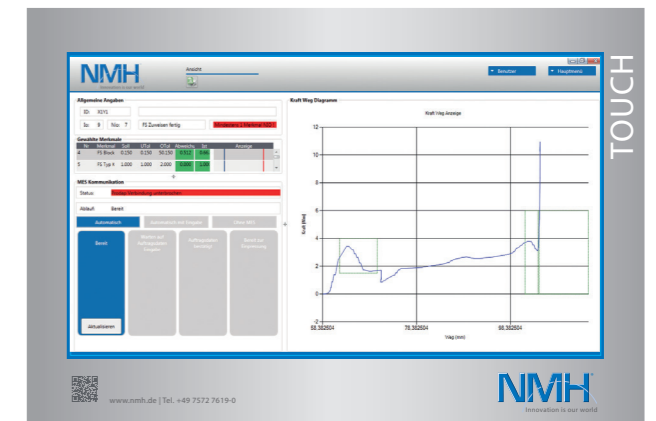
- >> Tapered roller bearing measuring device
- >> Drive and counter shaft bearing play

ZF Bouthéon S.A.

- >> Switch head test stand with sleeve curve evaluation

Measuring program, Win XP / Win 7 Ultimate 64bit®

- >> Freely editable computing formulae, characteristics, tolerances, stations, etc.
- >> PID regulating algorithms (prop. hydraulics), two-point regulators, filter functions, frequency analysis (FFT), etc.
- >> Measurement logging, statistical function, diagnostic tools, XY charts, etc.
- >> QsStat®, UniPas®, Microsoft Excel®, CSV, etc. interfaces
- >> Reporting stages for parameter management, calibration, etc. can be selected with passwords or PLC
- >> Measurement view freely parameterisable with FormFlex Tool, e.g. as an overview for workers



Bus systems

>> CAN bus, Profibus, Interbus, DeviceNet, Sercos, Ethernet LAN, Profinet

Connectable measuring devices and signals

>> Length scanners, rotary encoders, load cells, torque meters, laser scanners, analogue and digital signals, etc.
 >> Data entry via remote bus, manual or handheld scanner (e.g. bar code)

Measurement / measuring process

The measuring process is divided into "stations". These include contain all characteristics that are developed at this time. The stations are started and stopped by the superordinate control unit. Each station sends signals back to the control unit (active, end, OK / NOK).

Stn	Station	Name	Meas. value	Taster	Kontrollmesswert	Ein	Start	Ende
1	Grundüberprüfung	STA	1.2.14.5.6.7.8.9	GS		4	4	4
2	Input	STA	25.30.31.32.33.34.35.36.37.100.110			5	5	5
3	Scannen	GAT	[3]			27		
4	Scandegresse	STA	39					27
5								
6	Ergebnis Schalterprüfung	STA	8			20		
7	R-Gang Motorstart auf Fenster initiieren	STA	111.112.279.280.281+288.295+300			20		
8	R-Gang Endofast Fenster initiieren	STA	113.114.284.286.302+308.302+303			20		
9	Gangstart Motorstart auf Fenster init	STA	115.116.289.314.311+316.311+311			20		6
10	Vorwärtserre	OVN	330.338.340			19		4
11	Aufzeichnung Rollprüfung li	OVN	330.338.340			46	47	46
12	Auswertung Rollprüfung links	STA	2					47
13	Aufzeichnung Rollprüfung re	OVN	330.338.340			47	48	47
14	Auswertung Rollprüfung re	STA	2					48
15								
16	1. Gang Aufzeichnung li [5s]	DMK	21*111*121*	3.4.9		6	7	7
17	2. Gang Aufzeichnung li [5s]	DMK	22*111*122*	3.4.9		6	8	8
18	3. Gang Aufzeichnung li [5s]	DMK	23*111*123*	3.4.9		6	9	9
19	4. Gang Aufzeichnung li [5s]	DMK	24*120*124*	3.4.9		6	10	10
20	1. Gang Aufzeichnung [5s]	DMK	21*111*121*	7.8.9		11	12	11
21	2. Gang Aufzeichnung [5s]	DMK	22*111*122*	7.8.9		11	13	12
22	3. Gang Aufzeichnung [5s]	DMK	23*111*123*	7.8.9		11	14	13
23	4. Gang Aufzeichnung [5s]	DMK	24*120*124*	7.8.9		11	15	14

>> Station table

All characteristics are freely configurable

Name, job, computing formula, setpoint, tolerances and master values can be entered directly in the characteristics table. Like all other parameters, no programming skills are required.

All settings can also be executed online with the running system. Elaborate compiling or transfer of the measuring program is not necessary.

No.	Name	Formel	Ein	Start	Ende
1	Hüllkurvenauswertung gesamt	Abs(E6-Abs(E5+Abs(E4-Abs(E3))))	0	0	0
2	Rollprüfung Auswertung	Abs(M20+LDM30(E)-TRU(LDM31/10)-TRQ)	0	0	60
3	Flaschenroll Prüfzeitpunkt gesamt	Abs(E7-Abs(E6-E5))	0	0	0
4	Messwerte vom Graph 1 innerhalb [%]	(TRUNC(M12*10000)/10)	100	-10	0.5.2
5	Messwerte vom Graph 2 innerhalb [%]	(TRUNC(M13*10000)/10)	100	-10	0.5.2
6	Messwerte vom Graph 3 innerhalb [%]	(TRUNC(M14*10000)/10)	100	-10	0.5.2
7	Messwerte vom Graph 4 innerhalb [%]	(TRUNC(M15*10000)/10)	100	-10	0.5.2
8	Schleppprüfung	M8	1	0	0
9	Federpacker R-Gang Mess [Hz]	M8R+LDM16+TRU(LDM15)-TRQ/5	0	0	0
10	Federpacker R-Gang Endwert [Hz]	M20+LDM16+TRU(LDM17)-TRQ/5	0	0	0
11	Federpacker Gangstart Mess [Hz]	M20+LDM16+TRU(LDM17)-TRQ/5	0	0	0
12					
13					
14					
15					
16					
17					
18					
19					
20	Kraftmesser	TRV50	0	-500	500
21	Vibrat Gang 1	V73	0	-1000	1000

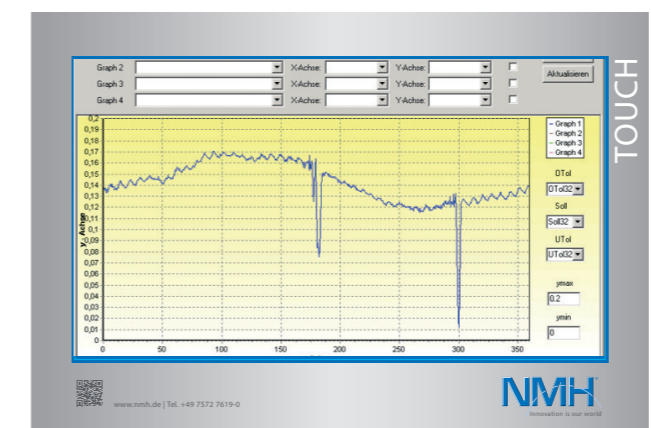
>> Characteristics table

Local data recording

>> Local data recording via Ethernet with the compact mec-box

Graphic diagnostics

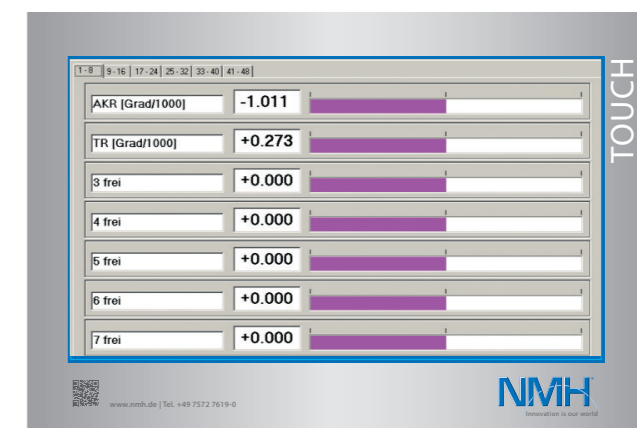
Graphic evaluation of each characteristic is also possible. Characteristics can be displayed via time $y = f(t)$ or depending on each other $y = f(x)$. Frequent applications are impact measurement and force / path monitoring. The illustration shows the backlash of a gear unit with tooth impact.



>> Radial clearance measurement graphic

Sensor values

The current value can be displayed for each sensor. A corresponding bar graph shows the sensor setting over the entire measuring range and thus supports all setting and adjusting work. All sensors can be standardised and monitored. Linearity, home position, free lift and idle monitoring, among other things, are possible.



>> Current value display of rotary encoders and measuring scanners



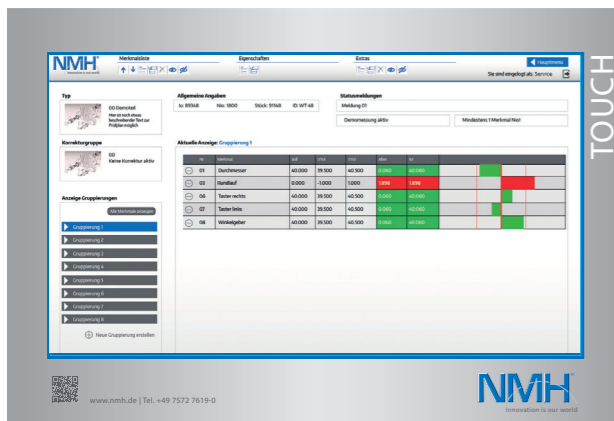
>> Example installation of a measuring system



>> Measuring system for testing of shift turrets for commercial vehicle applications

Measurement results

The worker is given an overview of all quality-related data for the current workpiece. Feature, setpoint, tolerance, dimension and current value are displayed. Classification is also clear with the red / green colour change. A bar diagram displays the measurement result for the tolerance limits and rapidly delivers information about the direction and extent of the measurement deviation. Test plans, workpiece data, unit counter, status and error messages are also output; all measurement processes are recorded in detail and clearly arranged.

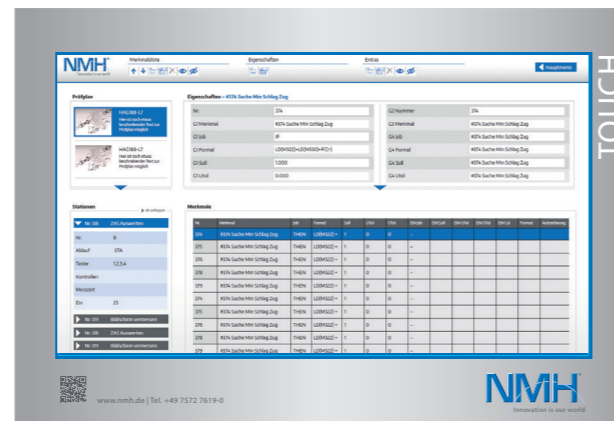


>> Measurement results

FormFlex

The user can create user-defined images via the "Form Flex" tool.

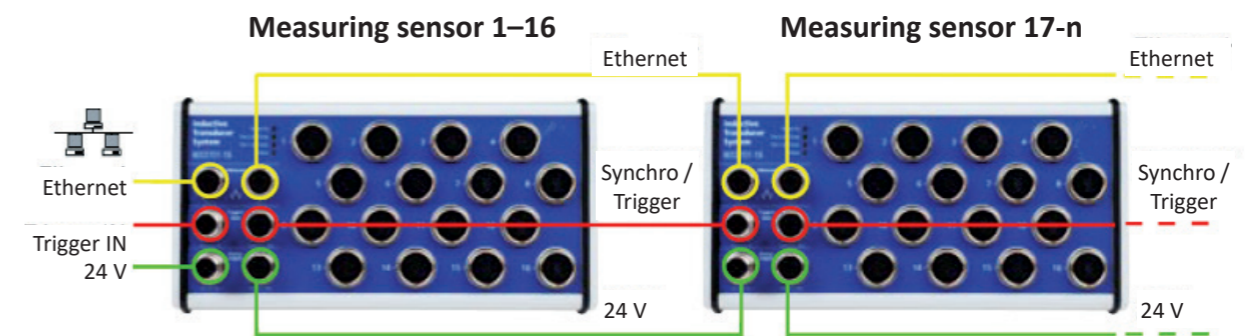
Functional and purposeful relationships of two or three features can be represented in a linear diagram.



>> Feature view

Technical data

- >> Local hardware
- >> Easy connection of all common transmitters
- >> Measurement transmission via Ethernet
- >> Durable industrial version with protection rating IP65
- >> 24 V power supply
- >> Available in 4, 8 or 16 channel mec-box versions
- >> Networking of multiple boxes (cascading), trigger signal for synchronisation of multiple boxes
- >> Power supply, Ethernet and trigger signal are connected



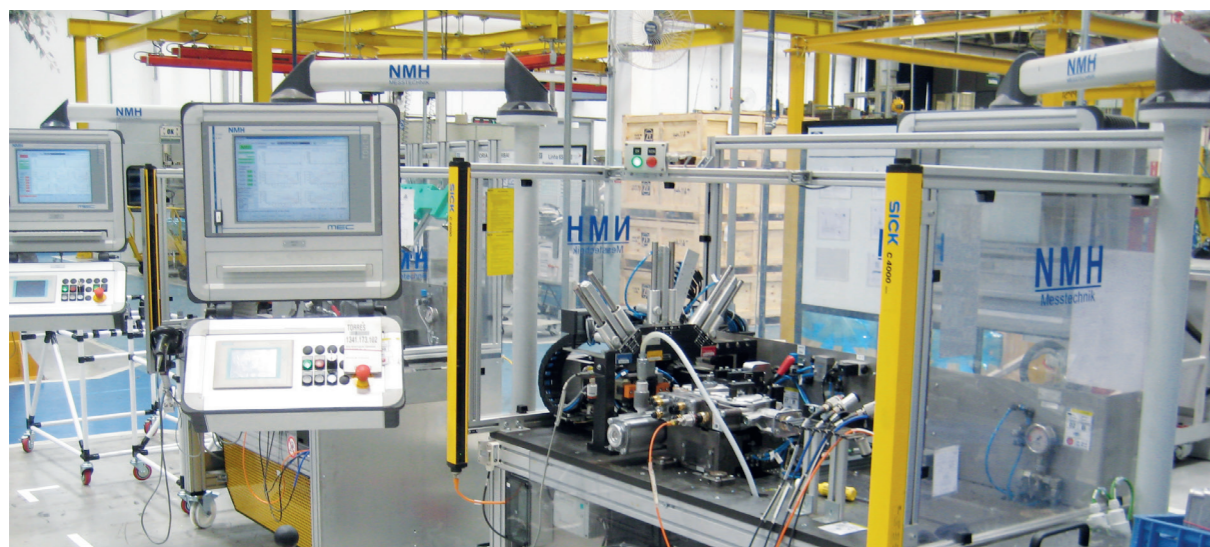
>> mec-box (local measurement)

Summary

Our systems are used in a wide variety of systems. The range covers everything from automatic test stands in the production line to the individual work station in the laboratory. Our customers count on reliable hardware and state-of-the-art technology in centralised and local measurement recording. They benefit from continuously improved software and the extremely easy operation of our measuring program, in addition to the variety of functions.

See for yourself

Create testing plans quickly without programming skills. Choose a standard to resolve special measuring tasks quickly and safely.



>> Measuring system for testing of shift turrets for commercial vehicle applications

**MORE THAN 3,400 CUSTOMERS
WORLDWIDE – INNOVATION IS
OUR WORLD**



About NMH

NMH is one of the “hidden champions” for complex measuring, testing and assembly systems. The company employs around 100 employees at the Hohentengen location. NMH offers complete solutions – from the design to the final production, assembly and commissioning. Nearly all German premium automotive manufacturers and their suppliers are NMH customers.

**Excerpt of
references**



Company film



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