

# AXLE ASSEMBLY TECHNOLOGY

Highly flexible assembly lines and stations for axles.

NMH delivers the complete pre-assembly processes for completion of wheel bearings (corner modules) and axes worldwide.

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



# ASSEMBLY LINES

## Your advantages with tried and tested NMH technology

- >> **Universal and compact**  
Only 1 assembly station for left and right pivot bearing / wheel bearing / corner module
- >> **Ergonomic and worker-friendly**  
Autarkic and safe positioning of the desired assembly positioning at an arbitrary angle / height for optimal accessibility
- >> **Maintenance-friendly**  
Open design for ideal accessibility
- >> **Rapid-fitting**  
Type change with innovative quick-change system

- >> **Flexibility and process safety**
  - > Easily expandable with new types
  - > Also available as a 1-way assembly fixture
  - > Use of a handheld scanner, optional camera station for prevention of incorrect assembly
  - > Poka-yoke measures against component mix-ups
  - > Monitored and controlled screwdriver technology
  - > Bar code printer for adhesive labels
  - > Interface for customer control system for component traceability
  - > Workpiece release for manual removal after process sequence OK
  - > Worldwide NMH support



>> Electric vehicle front axle assembly line



>> Handling station for front and rear axles

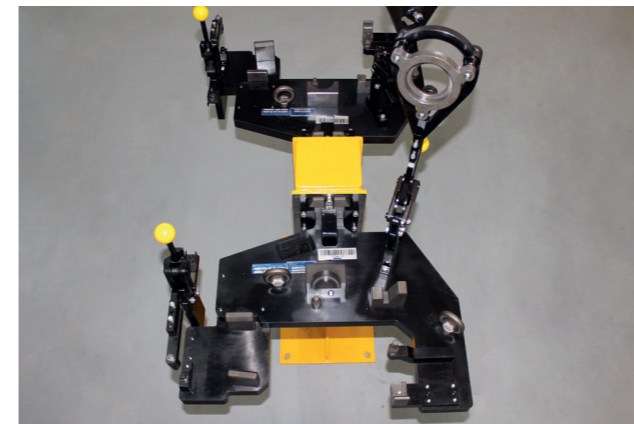
# AXLES & CHASSIS

## Your advantages with tried and tested NMH technology

- >> Universal and compact
- >> Ergonomic and worker-friendly
- >> Maintenance-friendly
- >> Rapid-fitting
- >> Flexibility and process safety



>> Tool magazine



>> Corner module workpiece carrier



>> Wheel bearing workpiece carrier



>> Wheel bearing workpiece carrier



>> Press-in system for ball joint and rubber bearing

# CLAMPING TECHNOLOGY

Quick-change assembly tools and holders aid the planner / worker in sample and prototype construction, small and start-up series or even low-cost locations.

## Your advantages with tried and tested NMH technology

### >> Universal and compact

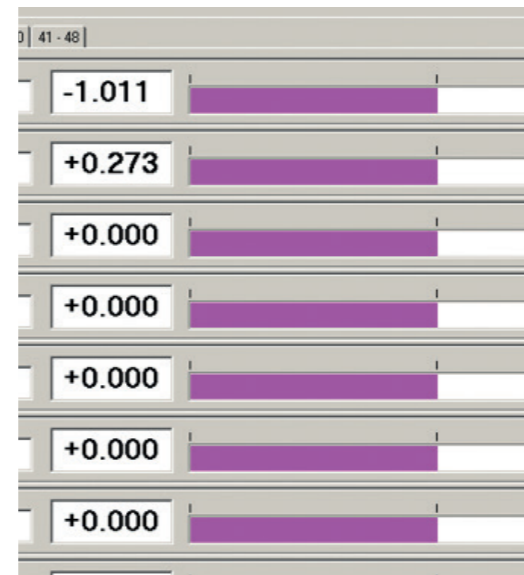
Only 1 assembly station for left and right pivot bearing / wheel bearing / corner module

### >> Rapid-fitting and flexible

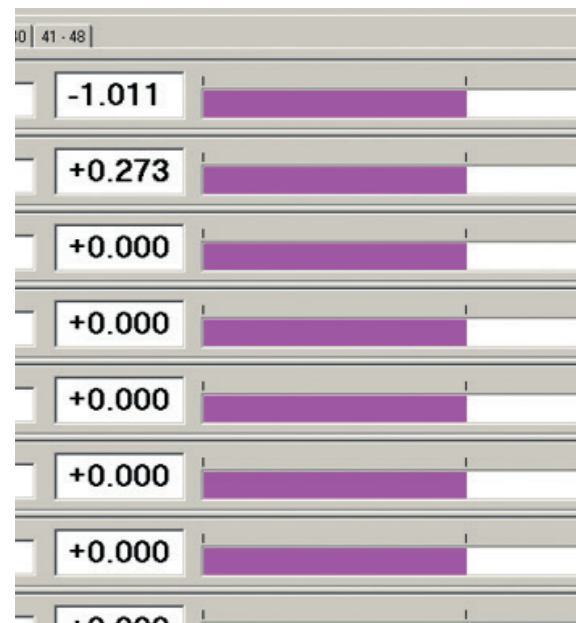
Type change with innovative quick-change system, including modularisation on workpiece carrier basis

### >> Process safety

Poka-yoke measures against component mix-ups and automatic locking with toggle clamp



>> Ball sleeve joint assembly fixture



>> Rubber bearing assembly fixture



>> Wheel bearing and driver flange assembly fixture

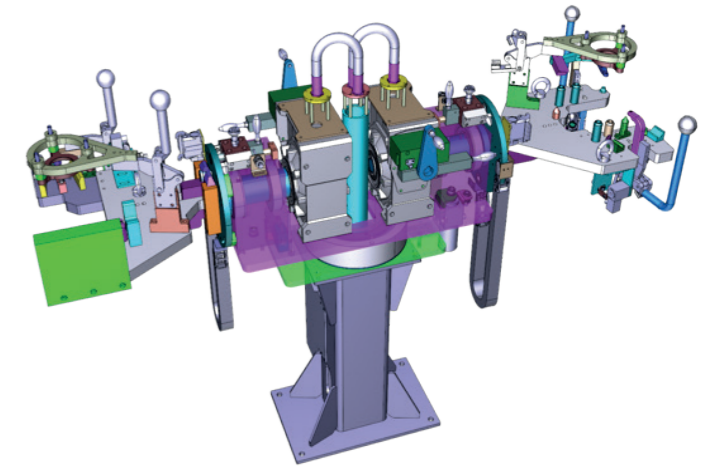
# SCREW TECHNOLOGY

## Horizontal, vertical and rotatory screw technology positioning

>> Universal assembly columns with insertable tools and holders enable construction of left and right wheel bearings (corner modules) in axle assembly

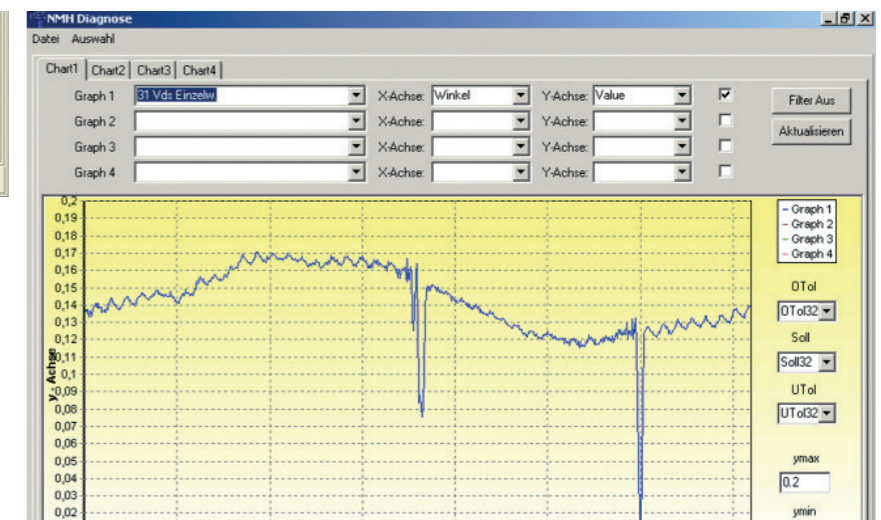
>> The monitored screwdriver technology is the ideal tool for fast and reliable assembly of all axles and chassis screwed to the securely guided suspension that can be easily positioned by the worker (NMH screwdriver suspension)

>> NMH screwdriver suspension: easy horizontal, vertical and rotatory position positioning by the worker at all times



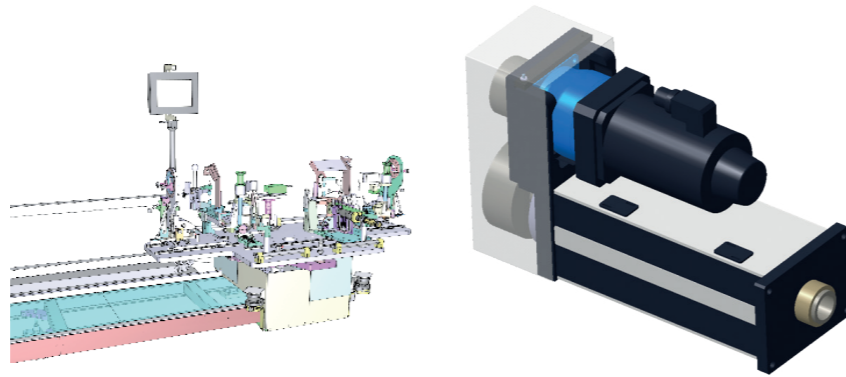
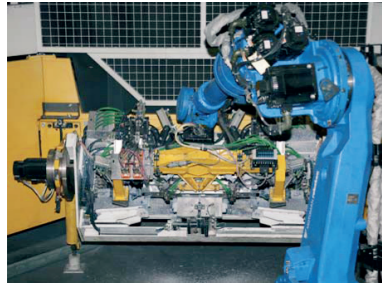
>> 2-way quick-change rotating and pivoting assembly column

6	50	Werkzeuge von Graph 3 auswählen [F1]	TRUNGQ427-100001018	100	-18	0,12
7	50	Werkzeuge von Graph 3 auswählen [F1]	TRUNGQ427-100001018	100	-18	0,12
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20	20	Werkzeuge	TR-100	0	-1000	1000
21	20	Werkzeuge	TR-100	0	-1000	1000
22	20	Werkzeuge	TR-100	0	-1000	1000



>> Screwdriver suspension

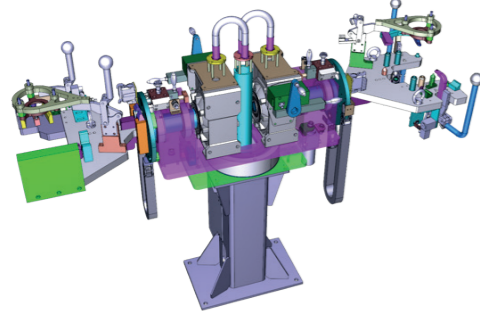
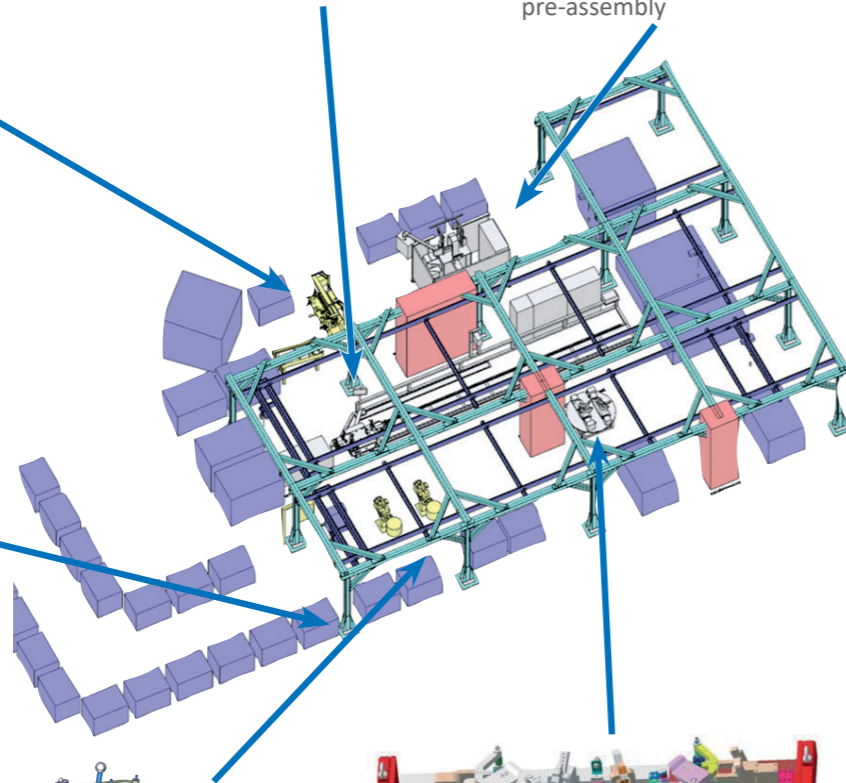
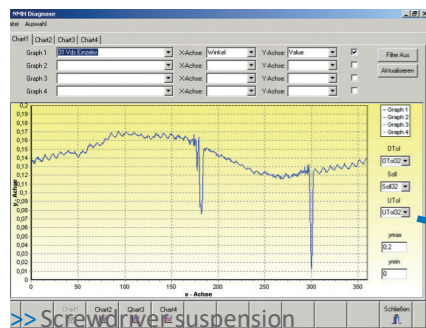
# FRONT AXLE ASSEMBLY



>> Front axle stabiliser pre-assembly

>> Front axle assembly

>> Front axle / rear axle spring strut pre-assembly



>> Pivot bearing / wheel bearing pre-assembly



>> Electrical machine / gearbox pre-assembly

# HYBRID VEHICLES

Overall responsibility for construction of an assembly line for the complete pre-assembly of the front axles for hybrid vehicles.

## Your advantages with tried and tested NMH technology

### >> Project handling

You have a central contact person and representative for the duration of the project

### >> Adherence to schedules

Open communication with regular project progress reports

### >> Service, maintenance and warranty

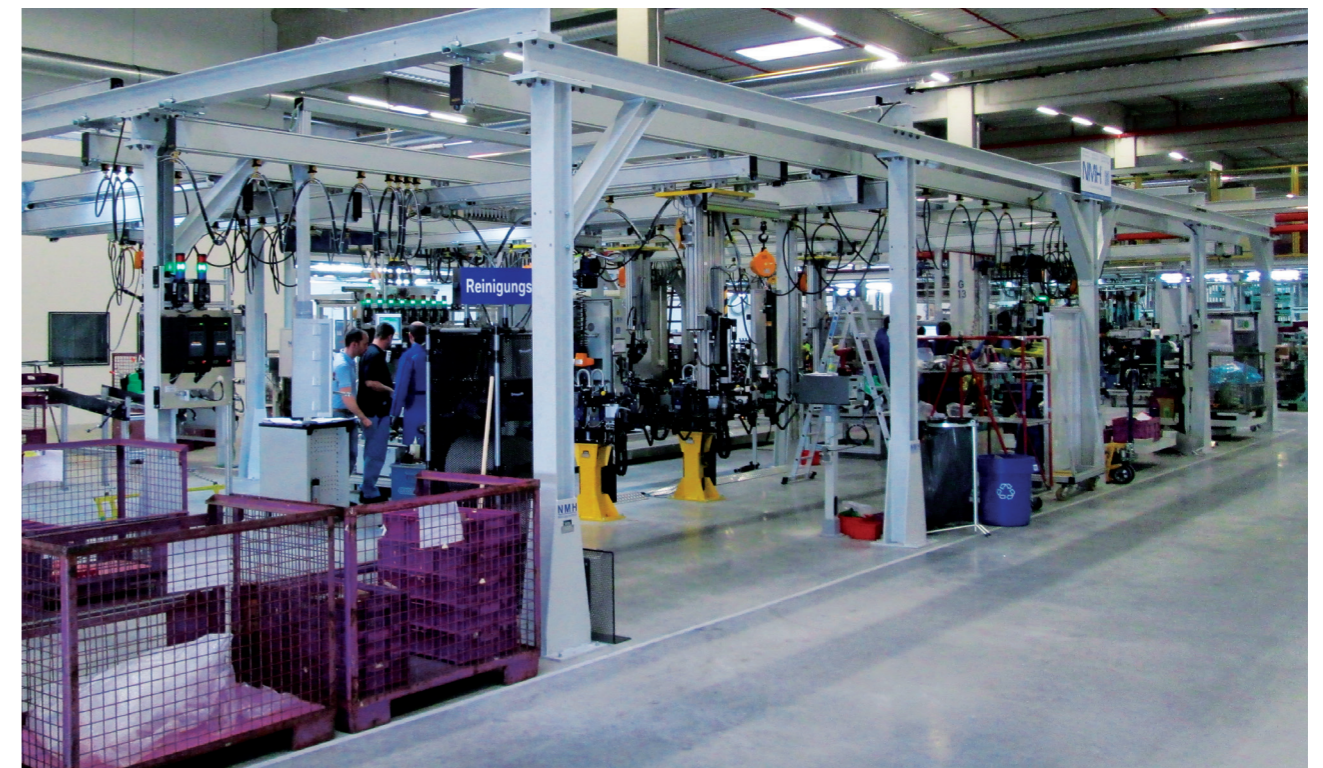
On-site service, after-sales support, 12 or optional 24 month warranty, guaranteed spare part supply

### >> Responsibility for quality

Order processing and working method according to DIN ISO 9000, project management manual

### >> Competence and expertise

- > Experienced project engineers
- > In-house production, including assembly and commissioning
- > Modern, high-performance CAD work stations
- > Short decision-making paths
- > Flat hierarchies
- > High decision-making competence and employee responsibility
- > Overall functional responsibility

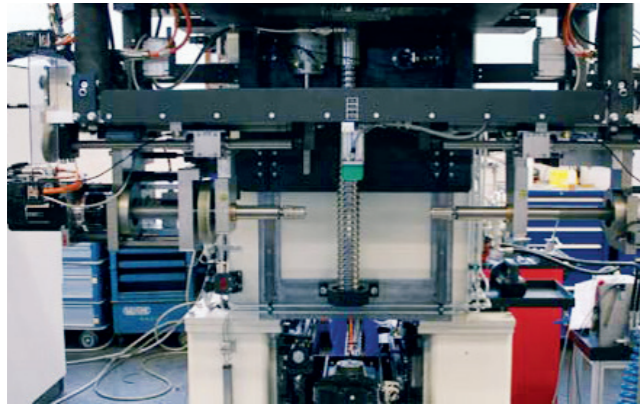


>> Hybrid vehicle overall axle assembly layout

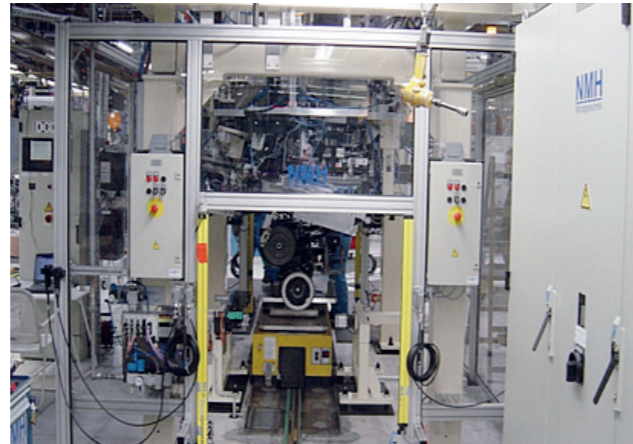
## Axle assembly

# CAMBER-TRACK ADJUSTING SYSTEM

- >> HAT moves into the system via FTS
- >> Counterboring of the floating plate
- >> Fully-automatic screw assembly of the complete HAT
- >> Welding
- >> Customer: BMW Dingolfing



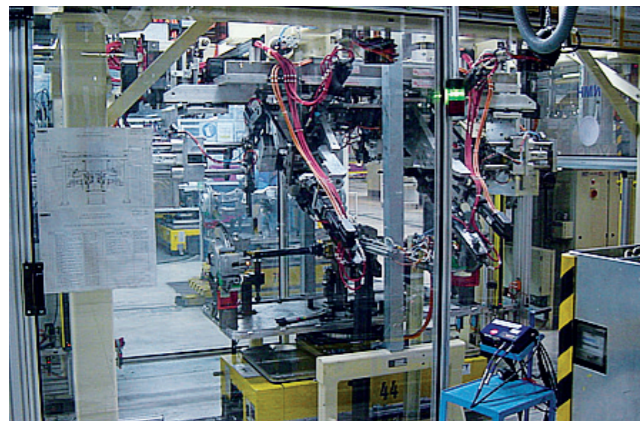
>> Front view



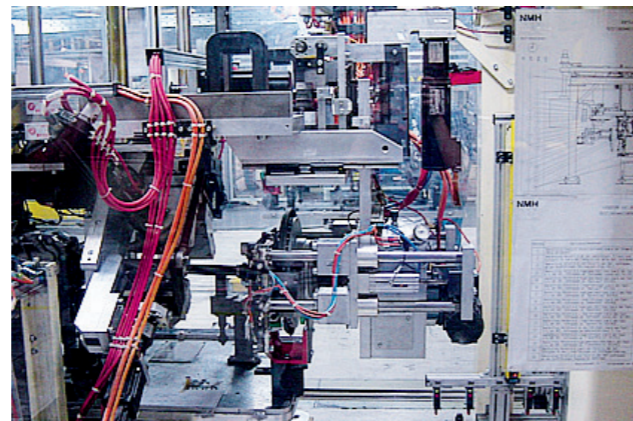
>> Inlet side

## Output shaft screw assembly

- >> HAT moves into the system via FTS
- >> Counterboring of the feed plate
- >> Location of the pivot bearing of the screw heads via light scanner and servo drive
- >> Output shaft screw assembly
- >> Customer: BMW Dingolfing



>> System side view



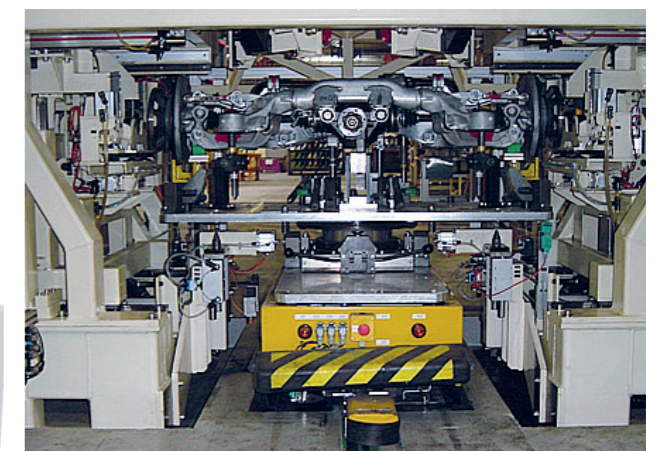
>> Screw unit detail view

## Machine and assembly concept

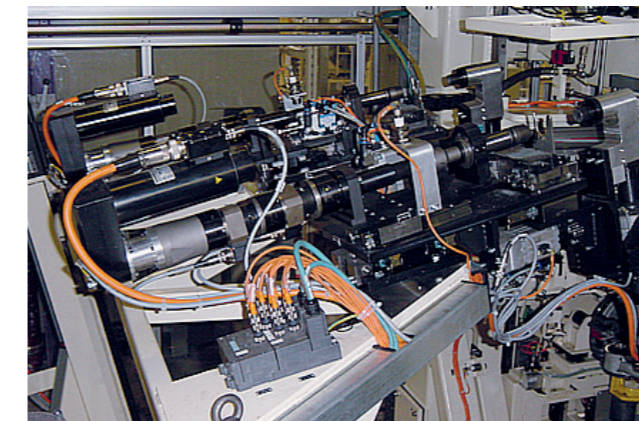
- >> Part recognition at the inlet
- >> Measurement of the track and camber values via 3 laser measuring units on both the left and right side
- >> The wobble is measured in parallel with a laser on the left and right side
- >> Parallel pre-adjustment of the track and camber setpoints
- >> NOK measurement: adjustment process is repeated up to 2 x
- >> OK measurement: system moves back to home position
- >> Customer: BMW Dingolfing



>> Track / camber adjusting machine (inlet side) with protective enclosure, operating units, workpiece carrier and position monitoring, workpiece carrier with rear axle in the station



>> BTS with workpiece carrier and rear axle in the station (outlet-side view)



>> Camber adjusting unit with adjusting and lock spindles

## Performance capability

- >> Cycle time: 70 sec (incl. workpiece inlet and outlet)
- >> Output per shift: approx. 400 axles
- >> Belt speed: 30 m/min

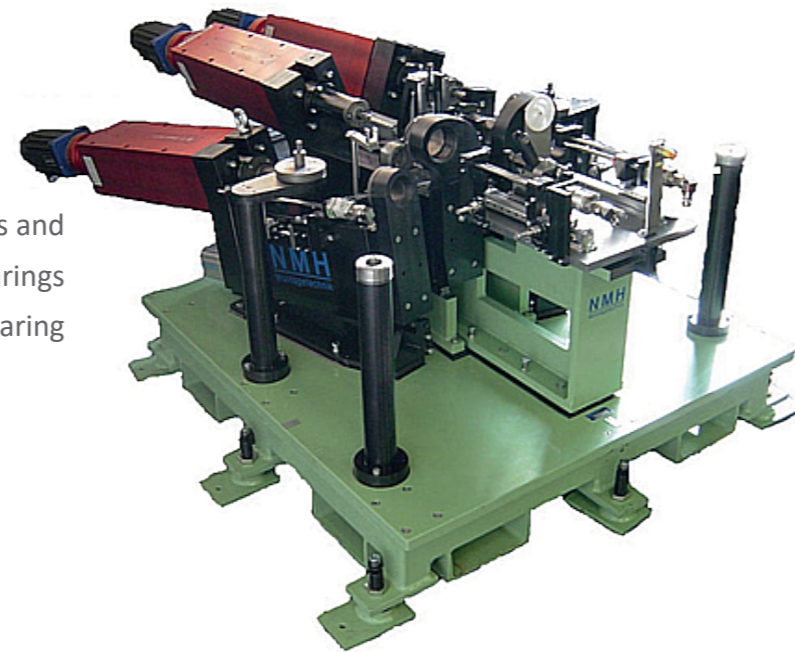
## Axle assembly

# FRONT AXLE/REAR AXLE RUBBER BEARINGS

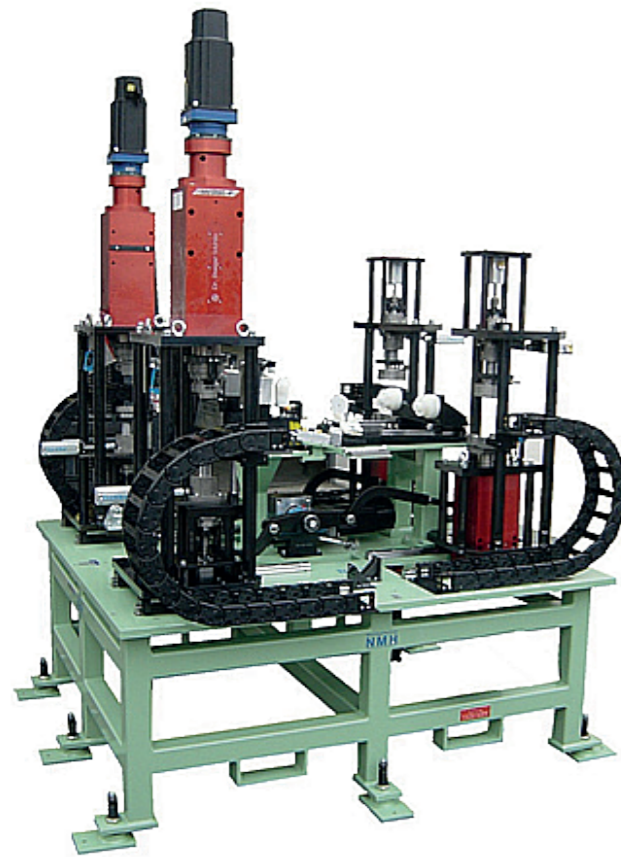
### Performance capability

- >> Cycle time: 50 s (including component handling by robot)
- >> 50 kN press-in force, monitored path
- >> Customer: Daimler Mettingen and Hamburg

Press-in of 2 x rubber bearings and  
2 x suspension arm bearings  
on the rear axle bearing



>> Rubber bearing and suspension arm bearing  
press-in station



>> Subframe mount press-in station

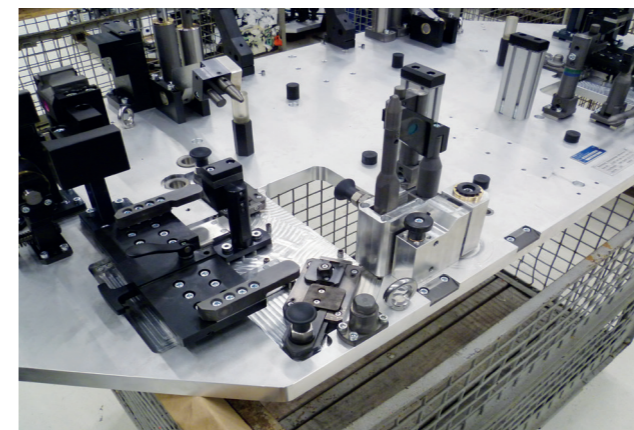
Press-in of 4 x subframe mounts  
on the rear axle bearing

## Axle assembly

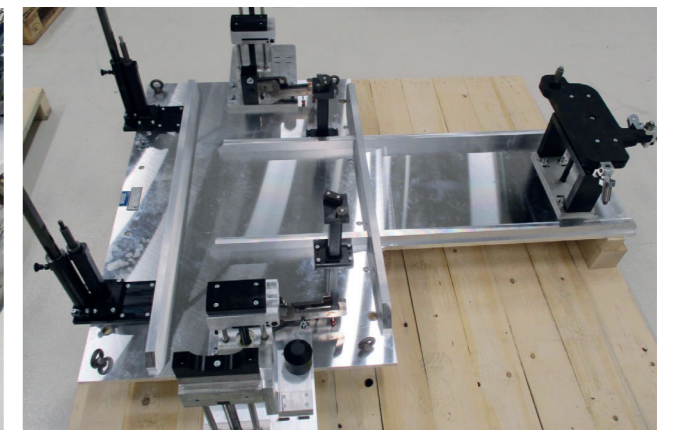
# INNOVATIVE EXAMPLES



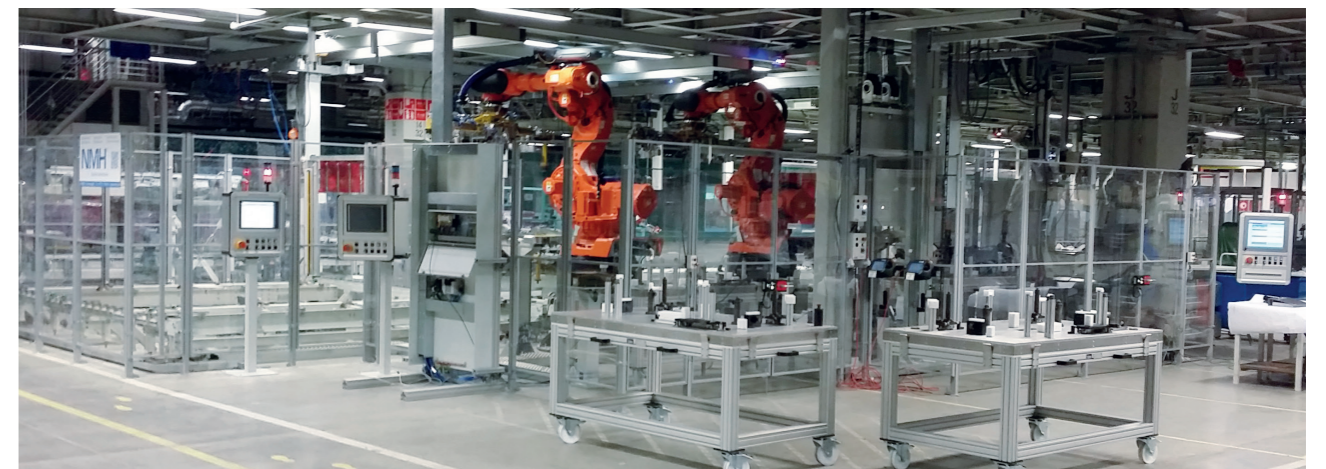
>> Front and rear axle workpiece carrier



>> Drive assembly workpiece carrier



>> Front axle workpiece carrier



>> Axle transfer from pre-assembly to MAT robot station

MORE THAN 3,400 CUSTOMERS  
WORLDWIDE – INNOVATION IS



**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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