

Sales presentation, as of 03.2025

# Bosch Manufacturing Solutions | BMG



The top of the slide features a decorative header with a series of overlapping, colorful geometric shapes in shades of red, purple, blue, and green.

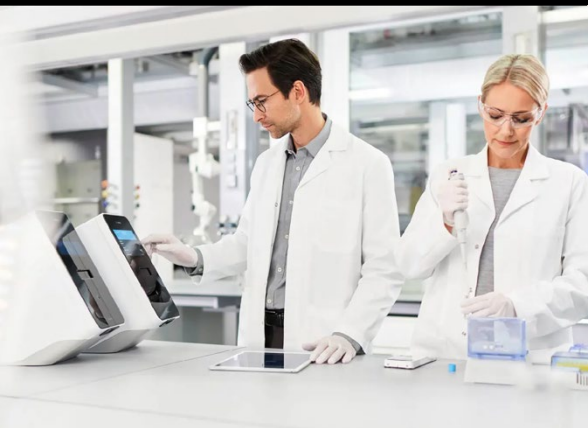
# The Bosch Group

Corporate presentation as of 01.2025





# Invented for life





# Who we are

## Our company in figures

In 2024\*



90.5

billion euros  
sales revenue



3.2

billion euros EBIT  
from operations



417 900

Bosch associates  
worldwide at year-end  
(approx.)



470

subsidiaries and regional  
companies (approx.) in  
more than **60** countries

\*preliminary figures



# Who we are

## Our business sectors



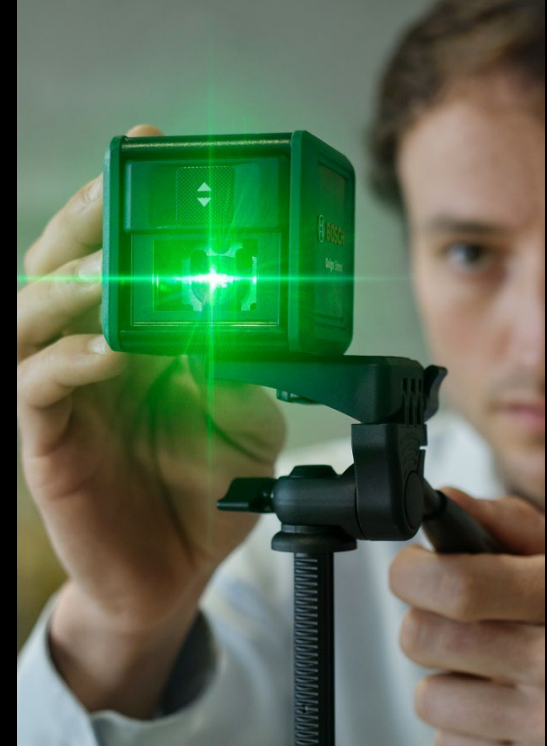
**Mobility**



**Industrial Technology**



**Energy and Building  
Technology**



**Consumer Goods**



# Who we are

## Industrial Technology



As a pioneer in the domain of connected industry, Bosch is a leading supplier of software, systems, and components for a wide variety of manufacturing and logistics applications.



# Who we are

## Industrial Technology

In 2024\*



7%

share of Bosch  
Group sales



6.5

billion euros  
sales revenue



34,800

associates  
(approx.)

\*preliminary figures



# Who we are

## Industrial Technology



### Drive and Control Technology

- Mobile Hydraulics
- Machinery Applications
- Factory Automation

### Bosch Manufacturing Solutions

- Production equipment & automation: special purpose machinery
- Individual assembly and testing systems
- advanced manufacturing processes and technologies
- digital & intelligent solutions and services along entire product lifecycle

### Bosch Connected Industry

- Production & logistics software from a single source



# Who we are

## Industrial Technology



## Drive and Control Technology

- Mobile Hydraulics
- Machinery Applications
- Factory Automation

## Bosch Manufacturing Solutions

- Production equipment & automation: special purpose machinery
- Individual assembly and testing systems
- advanced manufacturing processes and technologies
- digital & intelligent solutions and services along entire product lifecycle

## Bosch Connected Industry

- Production & logistics software from a single source



# BMG | who we are

Bosch Manufacturing Solutions | BMG –

**Global industrialization partner & turnkey special machinery provider for production equipment & automation**



> 30 years of experience as special machinery supplier



> 4.000 assembly & testing systems  
> 10.000 small & services projects



Automation level adjustable,  
semi- to fully automated solutions



Digital planning & process to digital  
engineering & i4.0 applications

**>17**

Locations



Full-liner  
**portfolio**



Several  
industries &  
product areas



**1.900**

Employees



**~680**

TNS m€





# BMG | our purpose statement

## The difference in manufacturing



For us, **‘Invented for life’** means to build a **more sustainable future** through production equipment by Bosch Manufacturing Solutions.

We create a difference in our customers’ products by offering **“the difference in manufacturing”**



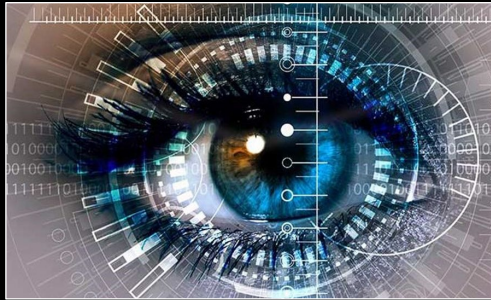
# BMG | our portfolio

## Customized assembly & testing systems

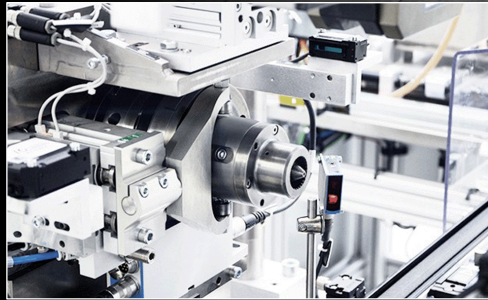
Global industrialization partner & turnkey special machinery provider for production equipment & automation, offering

# Customized assembly & testing systems

empowered by ...



**Engineering Consulting  
& Digital Engineering**



**Advanced Manufacturing  
Processes & Technologies**



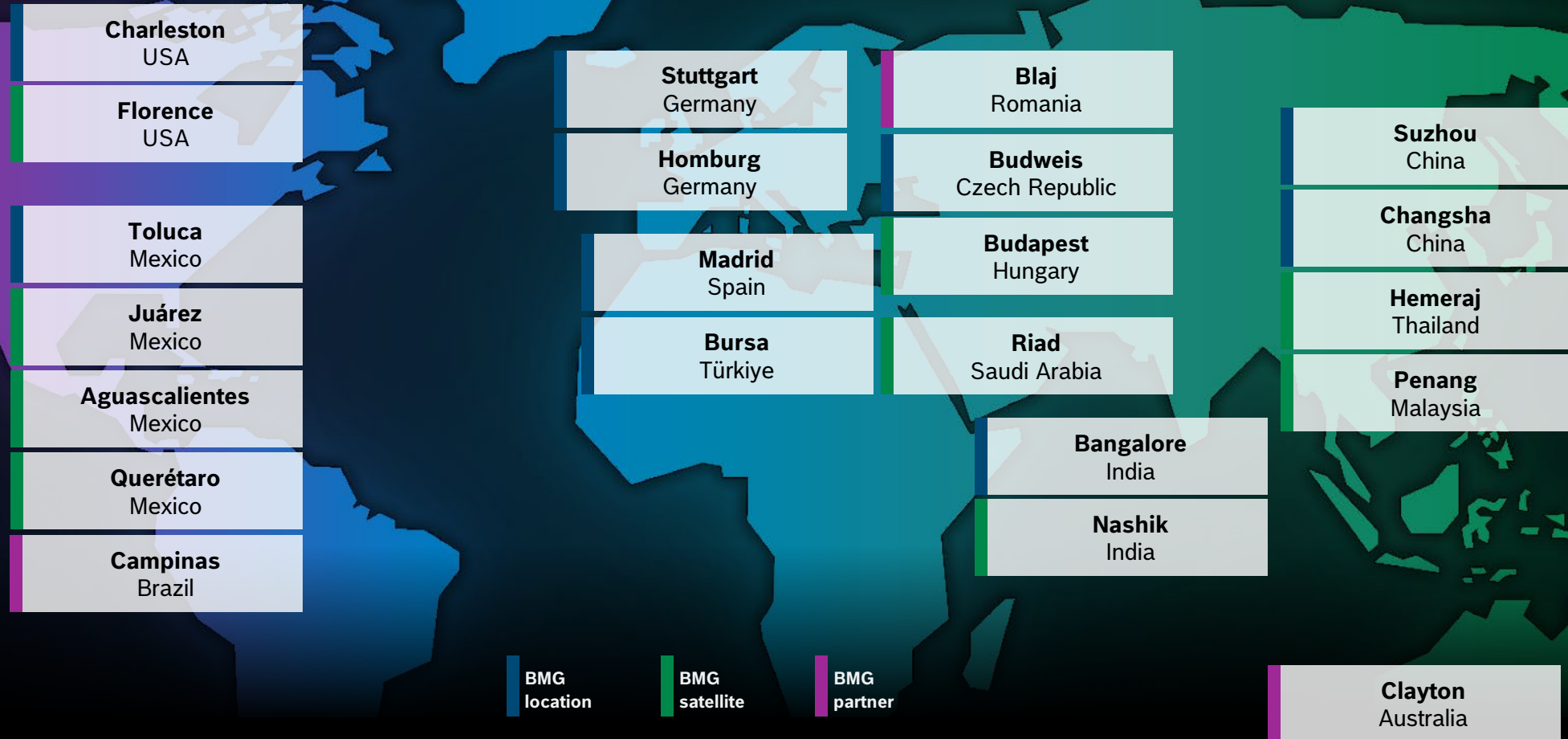
**Digital & Intelligent  
Solutions**



**Services along the entire  
product lifecycle**



# BMG | global strength in network & partners





# BMG | focus industries & product areas

## Focus industries



eMobility



Automotive (ICE)



Energy

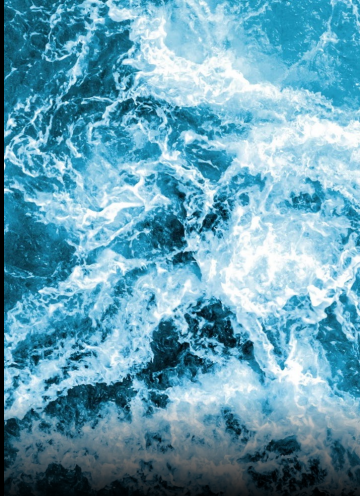


Consumer Goods

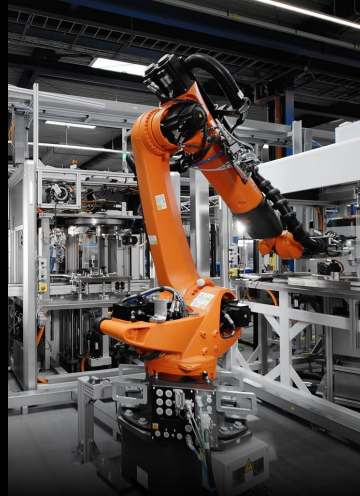
## Focus product areas



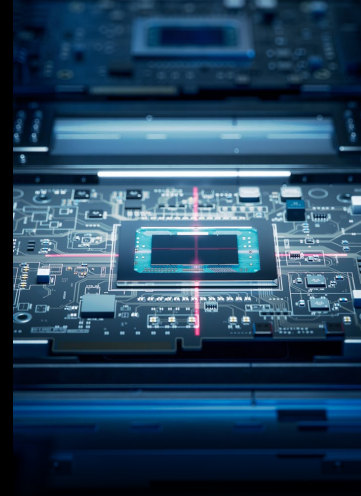
Battery



H2 Solutions / Fuel Cell



eDrive



Sensors & Electronics



Chassis & Steering

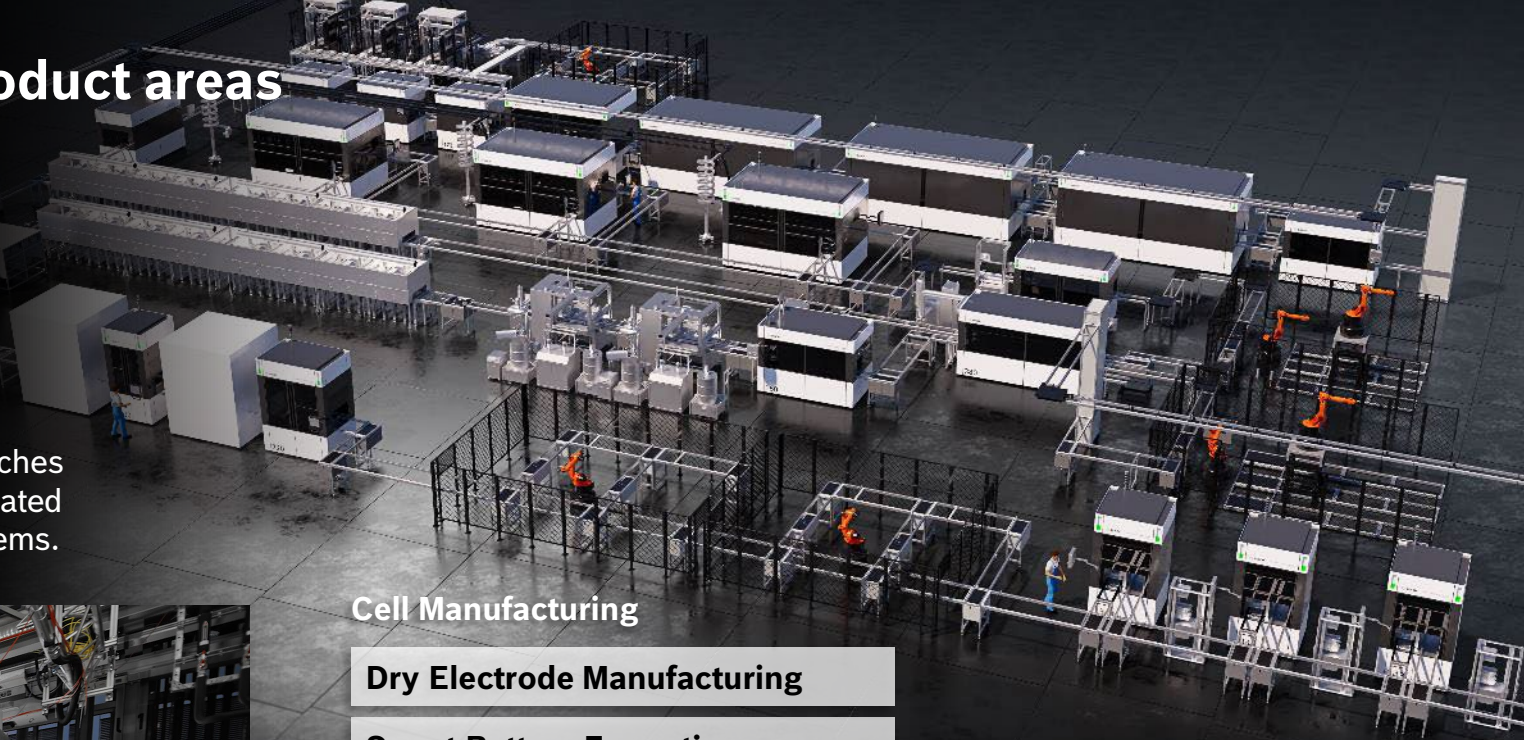


Combustion Engine



# Stay charged

with battery production equipment from Bosch Manufacturing Solutions | BMG. Our expertise reaches from cell production technologies up to fully automated and intelligent Cell to X assembly and testing systems.



## Cell Manufacturing

**Dry Electrode Manufacturing**

**Smart Battery Formation**

## Cell to X Manufacturing

**Cell Supply**

**Cell Cleaning**

**Begin & End of Line Testing**

**Dispensing**

**Resistance Welding**

**Laser Welding**

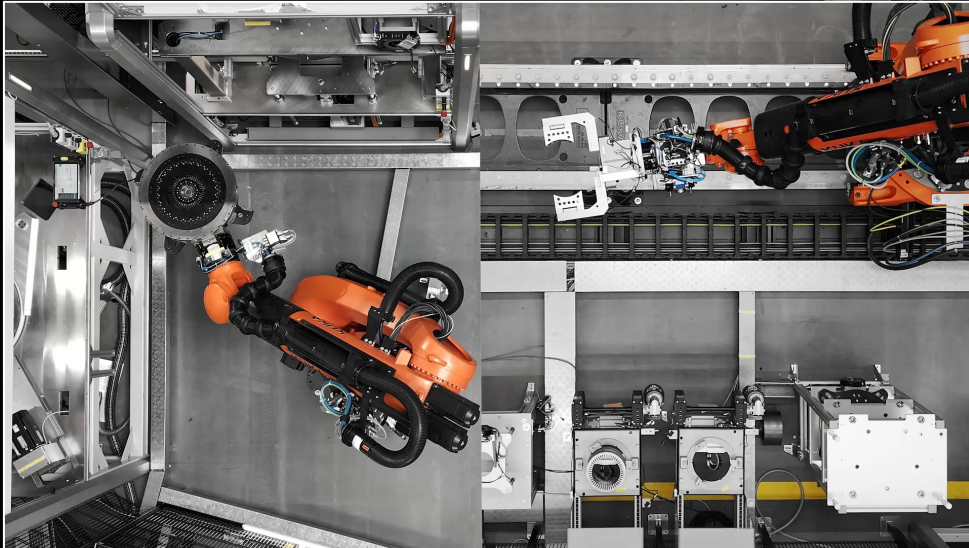
**Machine Vision**

**Leakage Testing**



# Driving mobility

with innovative eDrive production equipment from Bosch Manufacturing Solutions | BMG. Our expertise ranges from various winding technologies such as Hair-Pin, I-Pin, X-Pin, for all vehicle classes, to individual line concepts from semi to fully automated, including AI based solutions for increased efficiency.



## eDrive – some process highlights

Handling & Robotics

Twisting

Laser Welding

Separating & Cutting

Clamping

Optical Inspection: Post Vision

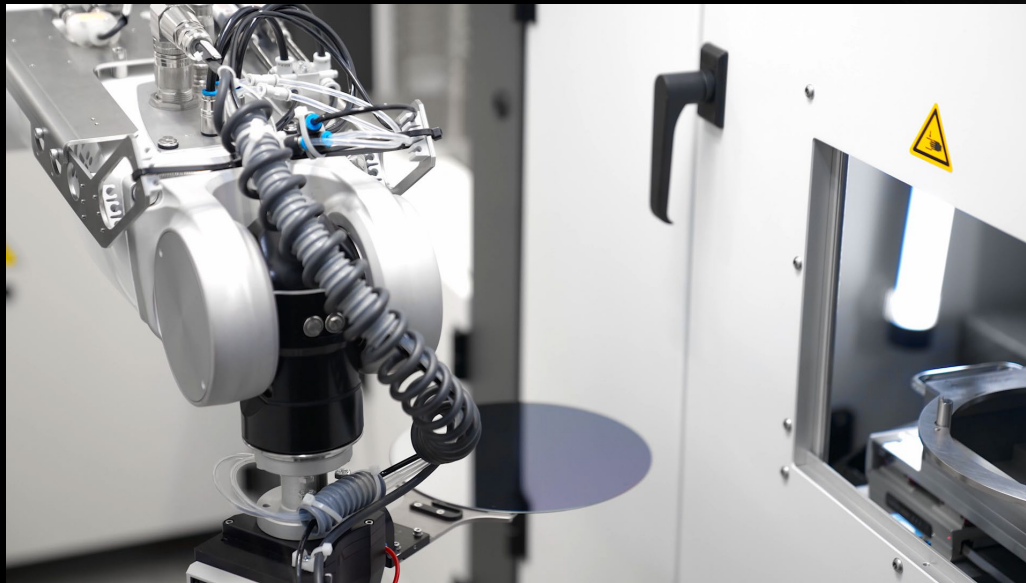
Parameter Identification (PI) Testing

Further ...



# Unleash power

with sensors & electronics production equipment from Bosch Manufacturing Solutions | BMG. We provide flexible assembly technology for ECUs, power electronics, and sensors, mainly in eMobility. Our scalable solutions optimize investments and adapt to variable production volumes.



## Sensors & Electronics – some insights

**Flexfoil Handling**

**Laser Welding of Electrical Connections**

**Laser Micro Structuring**

**Laser Cleaning**

**Dispensing**

**Screwing**

**Pressfit & Single Pin Insertion**

**Optical Inspection**

**Magnetic Conveyor System**



» Reference Project NorthH2 & Fraunhofer IWES

# From Water to Energy –

empower your sustainable future with H<sub>2</sub> solutions by Bosch Manufacturing Solutions | BMG, in the area of water purification & electrolysis, fuel cell assembly & testing as well as power generation.



» H2 circle –  
BMG as system industrialization partner

## Water Purification

» BMG Pure Water System

## Electrolysis – from water to hydrogen

» PEM Ely Stack Testing

» PEM Electrolyzer System

» AEM Ely Stack Testing

» SOEC Stack Testing

## Fuel Cell – from hydrogen to energy

» PEMFC Testing

» PEMFC – FCPM Assembly & Testing

» PEMFC – FCPM Power Generator

» PEMFC – FCPM – Bipolar Plates Processes

» PEMFC – Coatings

» Hydrogen Gas Injection



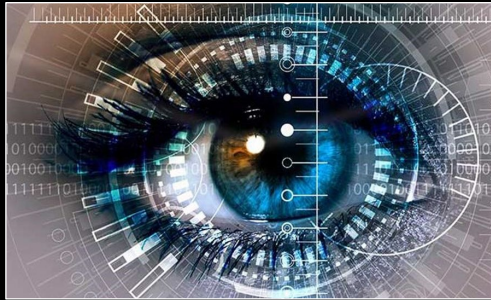
# BMG | our portfolio

## Customized assembly & testing systems

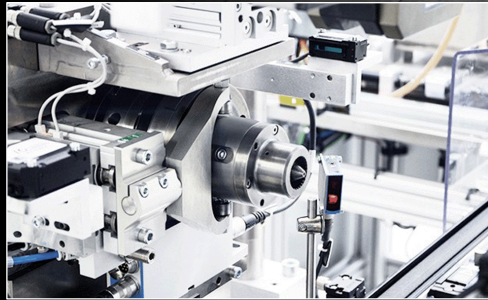
Global industrialization partner & turnkey special machinery provider for production equipment & automation, offering

# Customized assembly & testing systems

empowered by ...



**Engineering Consulting  
& Digital Engineering**



**Advanced Manufacturing  
Processes & Technologies**



**Digital & Intelligent  
Solutions**



**Services along the entire  
product lifecycle**

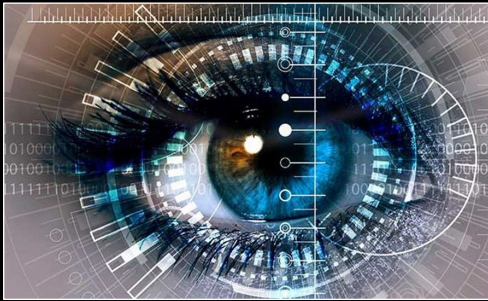


# BMG | our portfolio

## Customized assembly & testing systems

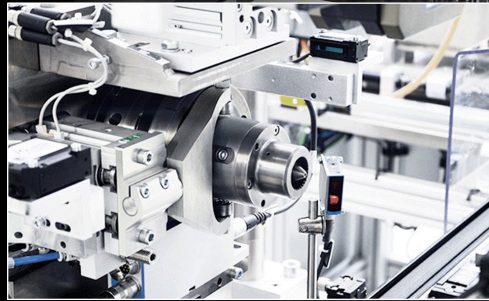
## Customized assembly & testing systems

empowered by ...



### Engineering Consulting & Digital Engineering

- Engineering Consulting
- Seamless Digital Toolchain
- Model-Based Engineering
- Functional Machine Structure
- Field Data Leverage
- Mechatronic Modular Standards
- Material Flow Simulation
- Virtual Commissioning



### Advanced Manufacturing Processes & Technologies

- Handling, Robotic & Automation
- Measurement & Testing
- Optical Inspection
- Forming
- Laser Technology
- Joining
- Surface Technology
- Separating



### Digital & Intelligent Solutions

- System Connectivity
- Condition Monitoring & Alerting
- Data Analysis
- Prediction
- Intelligent Process Optimization
- Line & Shopfloor Solutions
- Hardware & Services



### Services along the entire product lifecycle

- Technical Support
- Modernization & Condition-based Services
- Engineering Services
- Spare Parts & Repairs
- Services Contracts



# Engineering Consulting & Digital Engineering



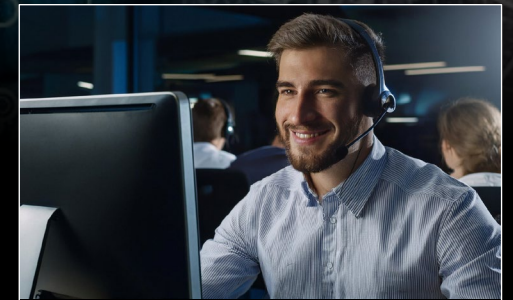
Engineering Consulting  
& Digital Engineering



Advanced Manufacturing  
Processes & Technologies



Digital & Intelligent  
Solutions



Services along the entire  
product lifecycle



# BMG | our portfolio

## Engineering Consulting & Digital Engineering

We support you with our experience already in **your SE work** - for **sustainable product design** that leads to **simpler and more cost-effective manufacturing equipment concepts**. Thanks to our **digital engineering**, we are able to simulate even before realization and thus check everything for feasibility and technical requirements.



### Seamless Digital Toolchain

- Automation of engineering tasks
- Bi-directional change management
- Highly efficient global collaboration



### Model-Based Engineering

- Line concept & material flow
- Kinematic sequences
- PLC software & MES connection



### Functional Machine Structure

- Structured requirement engineering
- One perspective for all domains
- Parallelized work



### Mechatronic Modular Standards

- Effective reuse in engineering
- Creators are provided right content at right time
- Exchange of standards across organizations



### Field Data Leverage

- Digital machine twins
- Product understanding and improvements
- Custom-tailored services

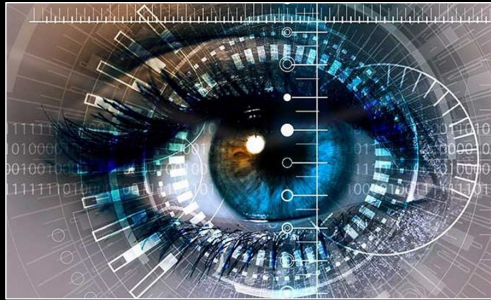


### Digital Solutions & Application on the Edge

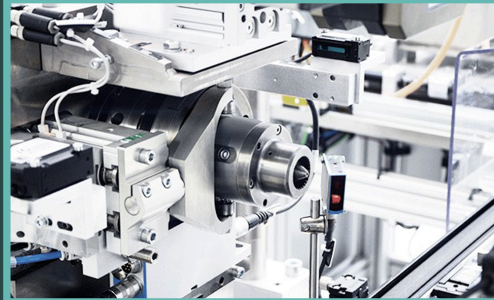
- Real-time data processing
- Data aggregation & enrichment
- Powerful (AI) algorithms on the edge



# Manufacturing Processes & Technologies



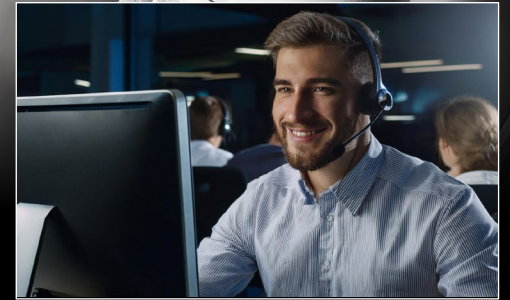
Engineering Consulting  
& Digital Engineering



Advanced Manufacturing  
Processes & Technologies



Digital & Intelligent  
Solutions



Services along the entire  
product lifecycle



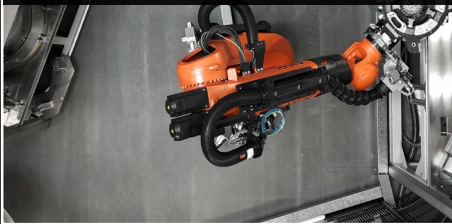
# BMG | our portfolio

## Manufacturing Processes & Technologies

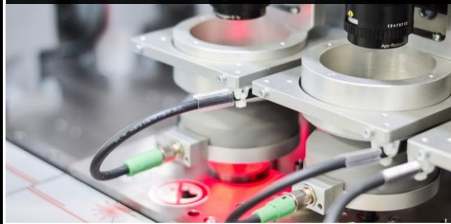
### Manufacturing Processes – innovative & intelligent.

Efficient solutions for demanding & customized applications

Handling, Robotic & Automation



Optical Inspection



Separating



Joining



Measurement & Testing



Laser Technology



Forming



Surface Technology





# BMG | our portfolio

## Manufacturing Processes & Technologies

### Manufacturing Processes – innovative & intelligent.

Efficient solutions for demanding & customized applications

#### Handling, Robotic & Automation

- Handling & Positioning
- Transfer, Transport & AGVs
- Robotics & Gripping
- Feeding, Clamping, Palletizing

#### Optical Inspection

- Assembly Guiding
- Process Control
- Quality Check End of Line / Inline

#### Separating

- Stripping / Skinning
- Cutting with undefined Edge (Internal Grinding & External Grinding)
- Balancing

#### Joining

- Resistance & keep welding
- Friction welding
- Ultrasonic welding
- Dispensing & gluing
- Tightening & screwing

#### Measurement & Testing

- Electrical Testing & Characterization
- Leakage, Gas & Pneumatic Testing

#### Laser Technology

- Laser Welding (on-the-fly)
- Laser Cutting
- Laser Drilling
- Laser Micro Structuring

#### Forming

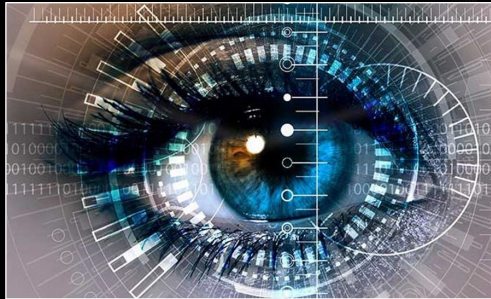
- Twisting
- Bending
- Winding
- 3D Forming

#### Surface Technology

- Electro plating
- PVD coating
- Functional printing



# Digital & Intelligent Solutions



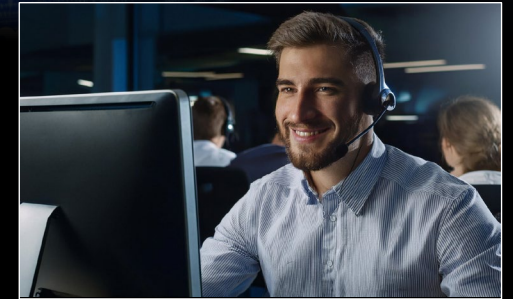
**Engineering Consulting  
& Digital Engineering**



**Advanced Manufacturing  
Processes & Technologies**



**Digital & Intelligent  
Solutions**



**Services along the entire  
product lifecycle**



# BMG | our portfolio

## Digital & Intelligent Solutions | IP Suite environment

Factory Network OS

Plant OS: e.g. Bosch Nexeed MES / IAS

### BMG intelligent production suite (IP Suite)



Condition Monitoring  
& Alerting



Data Analysis



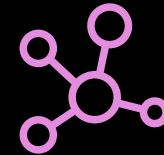
Prediction



Intelligent Process  
Optimization



Line & Shopfloor  
Solutions



System  
Connectivity

Hardware, Security, Documentation

Line, Machine, Process

Nexeed

Beckhoff

Mitsubishi

Siemens

Fanuc

CtrlX

...

BMG Consulting & Services

Bosch Edge Layer



# BMG | our portfolio

## Digital & Intelligent Solutions | IP Suite modules overview

### BMG intelligent production suite (IP Suite)



#### Condition Monitoring & Alerting

Process Monitoring
Health Report
Cycle Time Assist
Cycle Time Analysis
uHMI (universal HMI)
Dolphin



#### Data Analysis

AI-based Anomaly Detection
AI-based Root Cause Analysis
MathEngine



#### Prediction

MathEngine
------------



#### Intelligent Process Optimization

PPO (Process Parameter Optimization)
MathEngine



#### Line & Shopfloor Solutions

DashCam (Event-based Video Monitoring)
KPI-Views / Digital Twin
MTS (Maintenance Ticket System)



#### System Connectivity

UMC (Universal Machine Connector)
-----------------------------------

### Hardware, Security, Services & Documentation

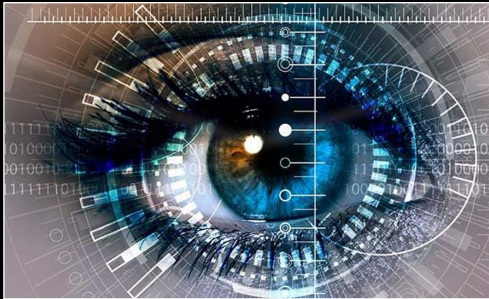
Experience Share System (ESS)

EFA (Embedded Field Application)

Digital Manuals



# Services along entire product lifecycle



**Engineering Consulting  
& Digital Engineering**



**Advanced Manufacturing  
Processes & Technologies**



**Digital & Intelligent  
Solutions**



**Services along the entire  
product lifecycle**



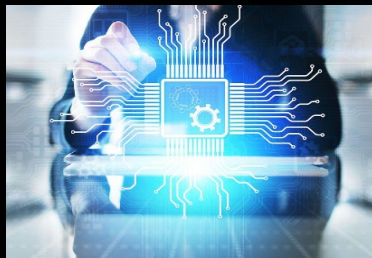
# BMG | our portfolio

## Services along entire product lifecycle

With our comprehensive range of services, we ensure worldwide availability, fast response times, and flexible organization. We maintain consistent standards across all locations, providing you with local contacts for seamless support and efficient solutions wherever you are.



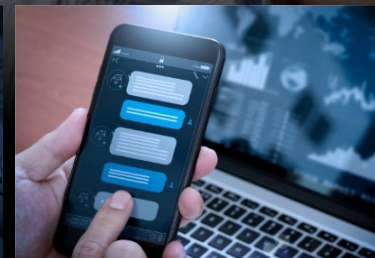
**Consulting Services & Services Contracts**



**Engineering Services**



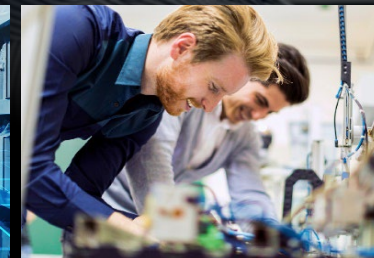
**Modernization & Condition-based Services**



**Technical Support**



**Spare parts & Repair Services**



**Training**