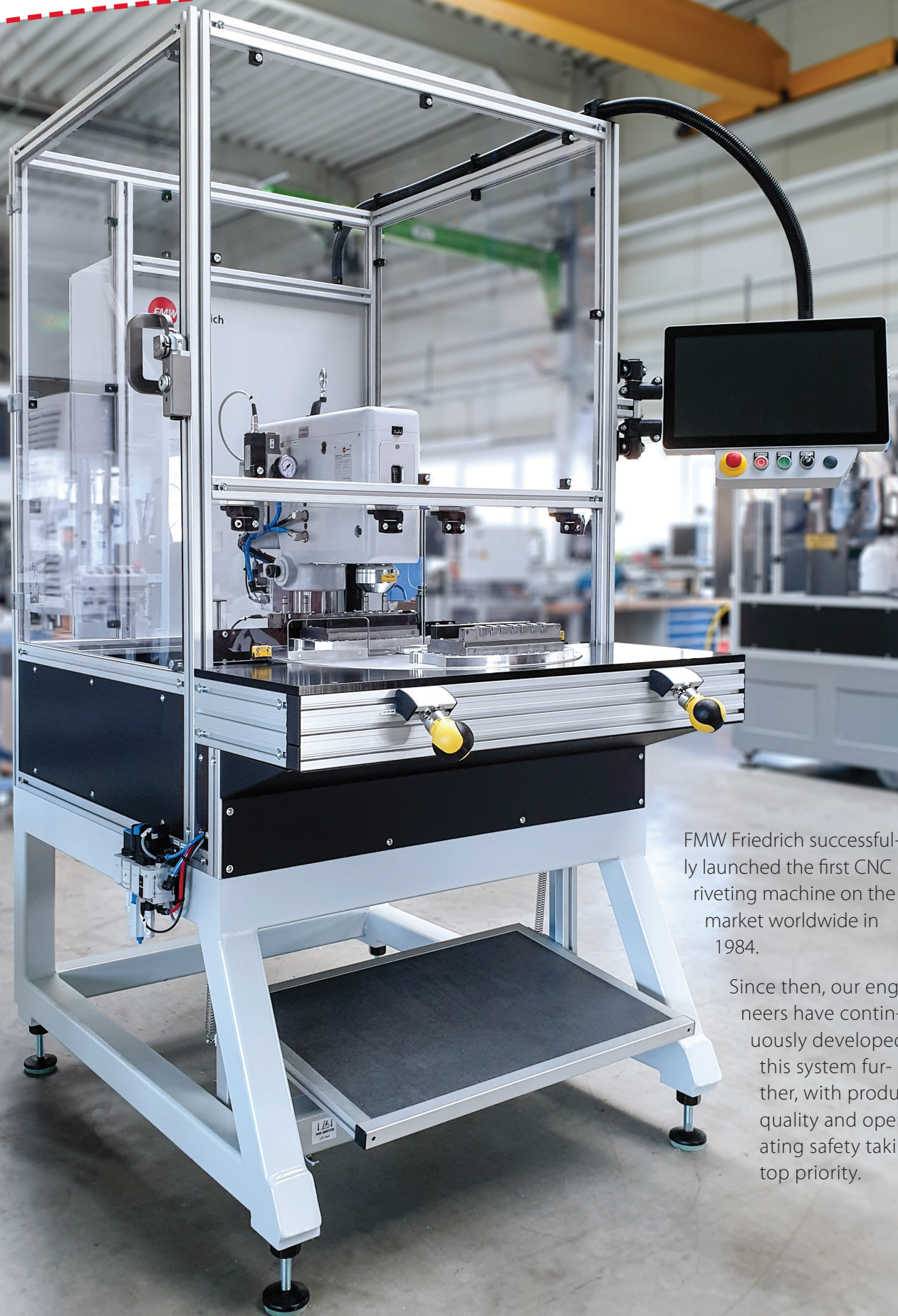


Riveting Machines Assembly Systems



Riveting Technology Pioneers

CNC riveting machines modular system



FMW Friedrich successfully launched the first CNC riveting machine on the market worldwide in 1984.

Since then, our engineers have continuously developed this system further, with product quality and operating safety taking top priority.

Thanks to the modular structure of our CNC riveting machines, we offer effective production processes with a range of features in our standard program. These can be put together according to customers' requests and individually expanded.

Working concepts

- ① Rotary table (450 - 1200 mm)
- ② Conveyor transfer system
- ③ Lifter

Occupational safety

- ① Safety enclosure
- ② Safety door
- ③ Light curtain
- ④ Two-hand start

Riveting processes

- ① Pneumatic riveting machine
- ② Hydraulic riveting unit on C-shaped frame
- ③ Electrical riveting unit on C-shaped frame
- ④ Electrical joining unit on C-shaped frame

Workstation structure

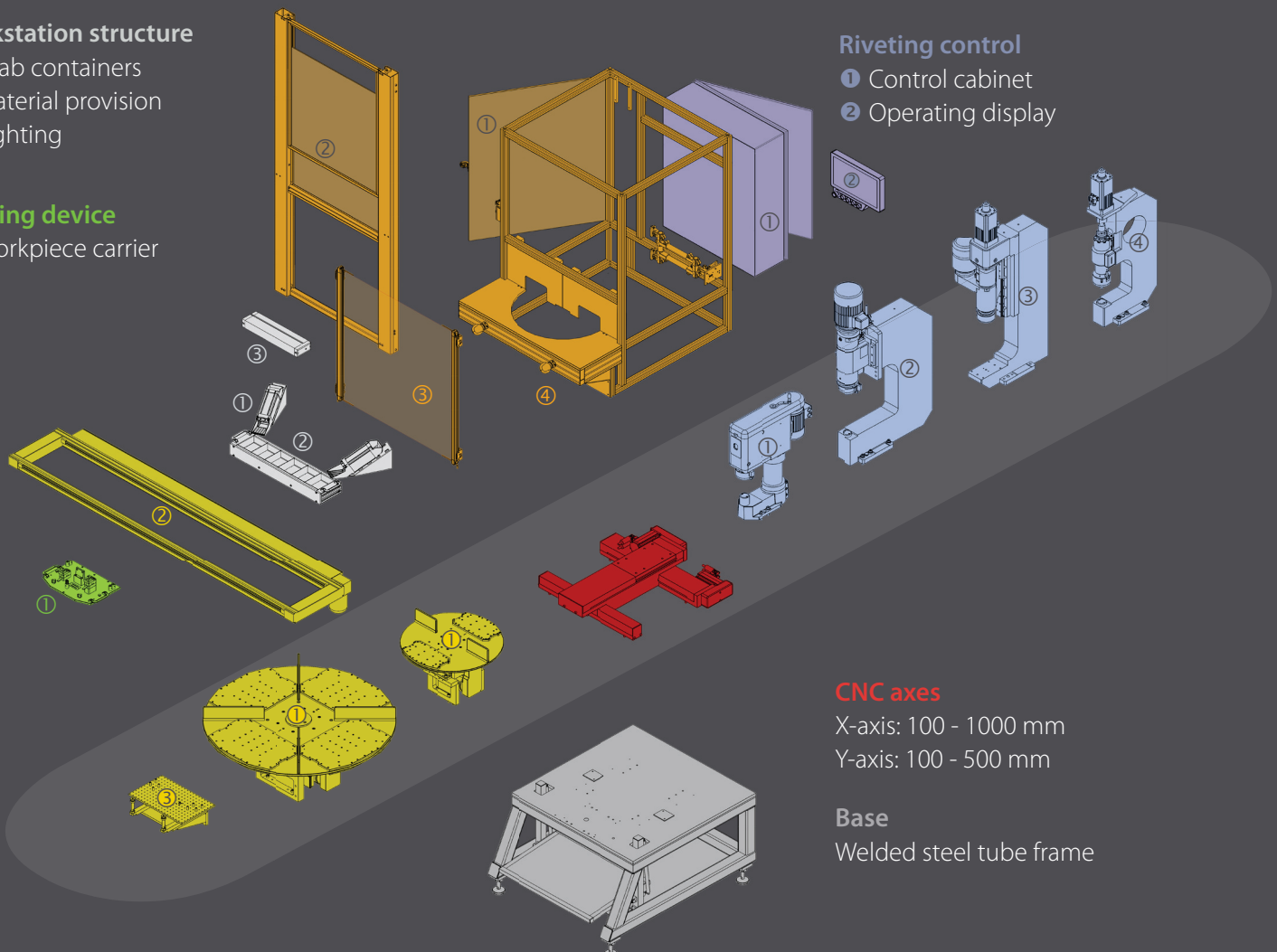
- ① Grab containers
- ② Material provision
- ③ Lighting

Holding device

- ① Workpiece carrier

Riveting control

- ① Control cabinet
- ② Operating display



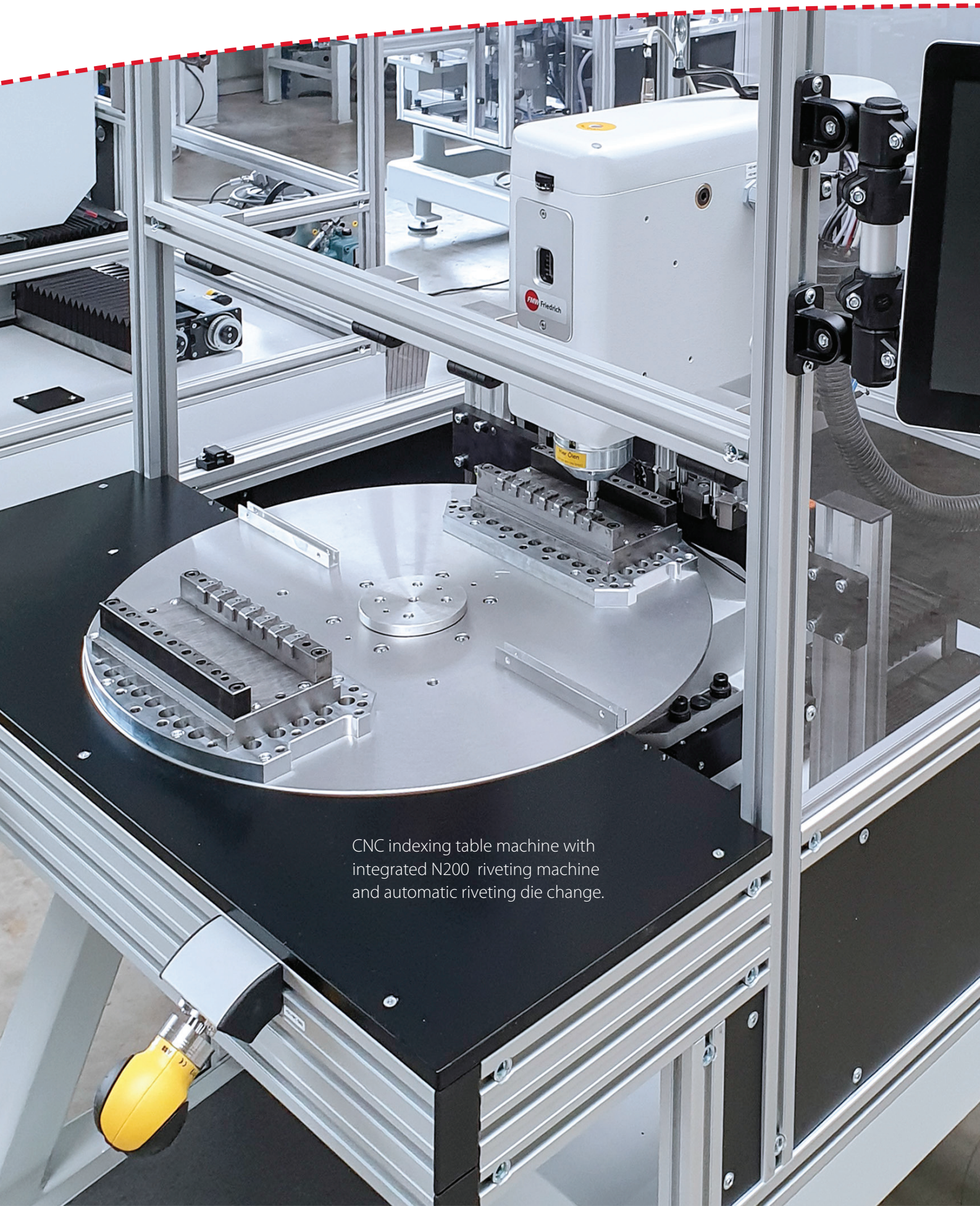
CNC axes

X-axis: 100 - 1000 mm
Y-axis: 100 - 500 mm

Base

Welded steel tube frame

CNC riveting machines modular system



CNC indexing table machine with
integrated N200 riveting machine
and automatic riveting die change.

CNC indexing table machine

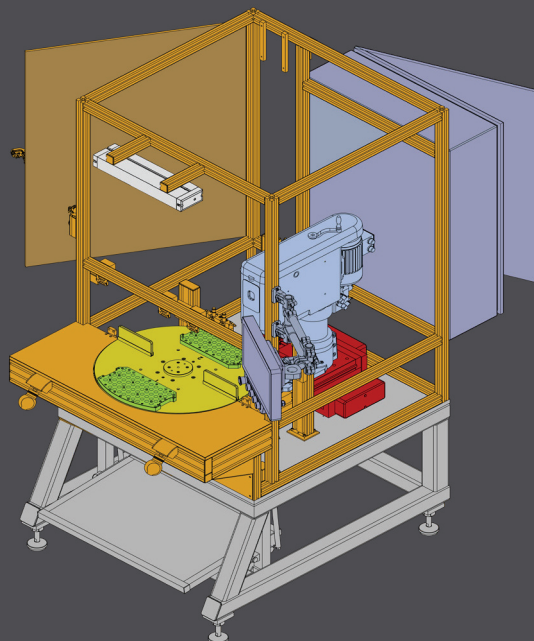
- Effective production process due to simultaneous loading and riveting
- This feature is available with every FMW riveting unit
- The movement range can be enlarged with wide-range axes
- Expandable, for example with thread forming, joining, ejection or control station

Technical specifications

Rotary/indexing table diameter (mm)	650	900	1200
X-axis travel distance (mm)	280	400	500
Y-axis travel distance (mm)	180	300	350
Division	2 or 4	2 or 4	2 or 4
Riveting area (mm)	280 x 160	400 x 280	500 x 350
Travel speed (mm/s)	up to 500	up to 350	up to 200
Depth (mm)	1640	2000	2320
Width (mm)	1070	1200	1500
Height (mm)	2200	2200	2200

Accessories

- Lifting function
- Riveting head lubrication
- Workstation structure
- Wide-range axes
- Automatic riveting die change
(see fig. below)



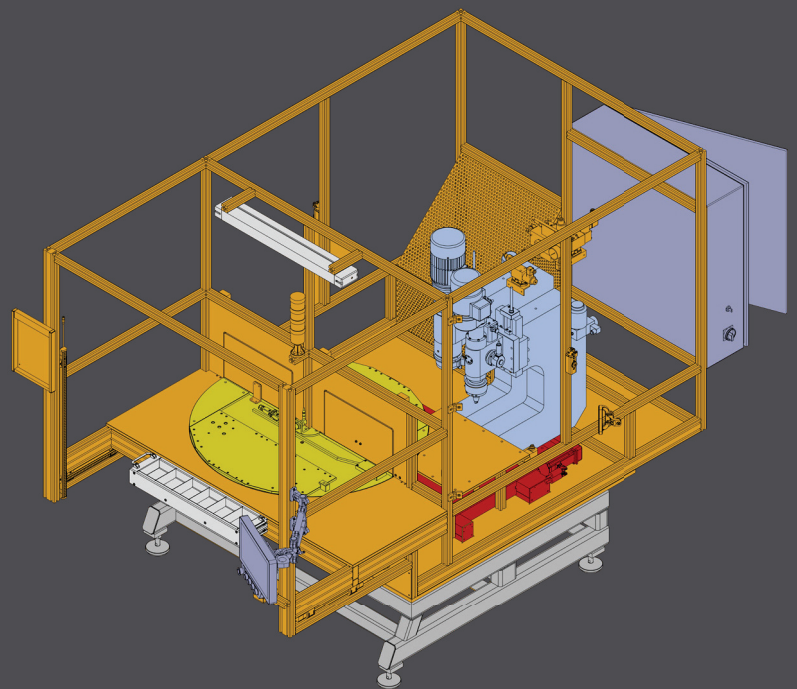
CNC-riveting machines modular system



Project examples:

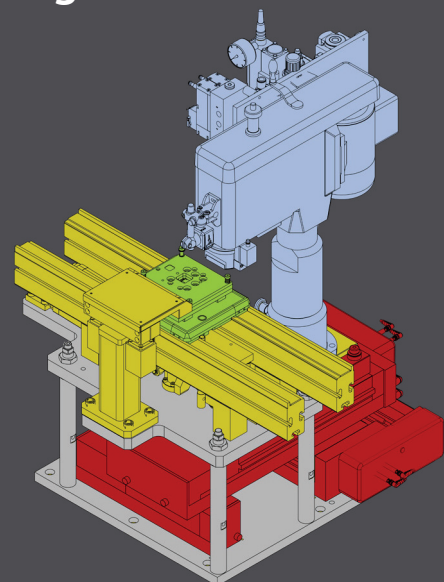
Coordinate riveting system with two hydraulic riveting units

- Two measuring systems each
NE510 40 kN max. force
NE210 12 kN max. force
- Rotary table dia. 1,2 m, 2 stations
- Wide-range axis
- Movement range 800 x 350 mm
- Light curtain for operator area
- Workpiece carrier coding
- Measurement sensors
- Assembly administration
- Wireless coupler for sensors at workpiece carrier (iO-link)
- Integration of label printer



CNC riveting module with pneumatic riveting machine

- With projection measuring system in ESD design
- N000 1.8 kN max. force
- Integrated belt conveyor with lifting and positioning unit
- Setup mode while safety door is open with reduced travel speed of axes
- Tool coding



FMW CNC machine controller

Our CNC machine control system stands out due to its versatile application options both in FMW Friedrich CNC riveting machines as well as in assembly systems. A state-of-the-art operating concept, highly flexible programming and continuous further development make it a core element of production systems.

Features

- High-resolution, robust 18.5" multitouch display for industrial applications (NC 5")
- Intuitive menu guidance and program functions
- Programming based on CODESYS V3, Linux- or Windows-based
- USB interface for loading riveting programs or connection to external input devices and storage media to back up process data
- Operating elements directly on the display
- Internal EtherCat communication

Functions

- Setup and management of riveting points
- Control of additional processing stations
- Positioning and control of CNC axes
- Communication with higher-level PLC as well as TCP socket connection possible
- Graphical real-time display of the machining cycle
- Help function directly in the user menu
- English/German language options. Other languages available on request

Industry 4.0 Functions and solutions

e.g. remote service - BDE interfaces - machine and system networking - data logging - support of open source platforms etc.

FMW Pick-by-Vision

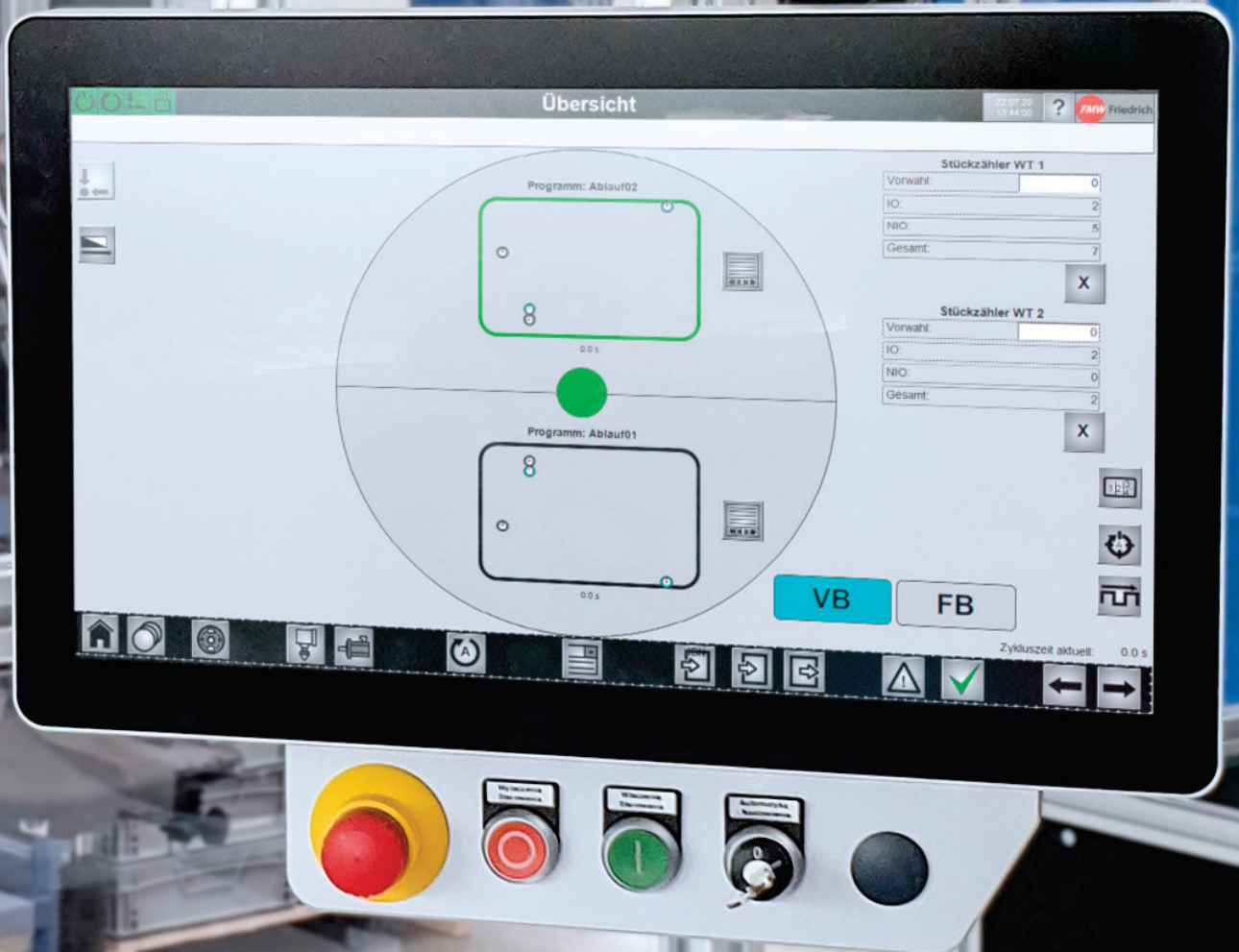
The optional FMW Pick-by-Vision system adds another modern and useful element to the functions of the FMW-CNC machine control.

In the event of a placement or riveting error, the operator is shown the exact areas on the machine display, visually highlighted, where action needs to be taken.

This allows loading and rework times to be reduced to a minimum and costs to be saved.

Example (see photo): A base size error of a component to be riveted is shown in red.

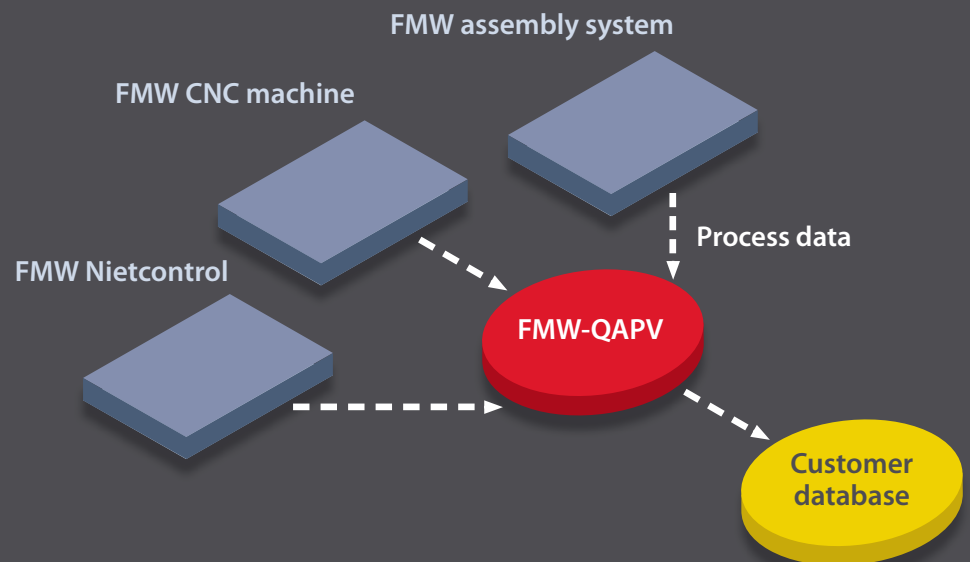




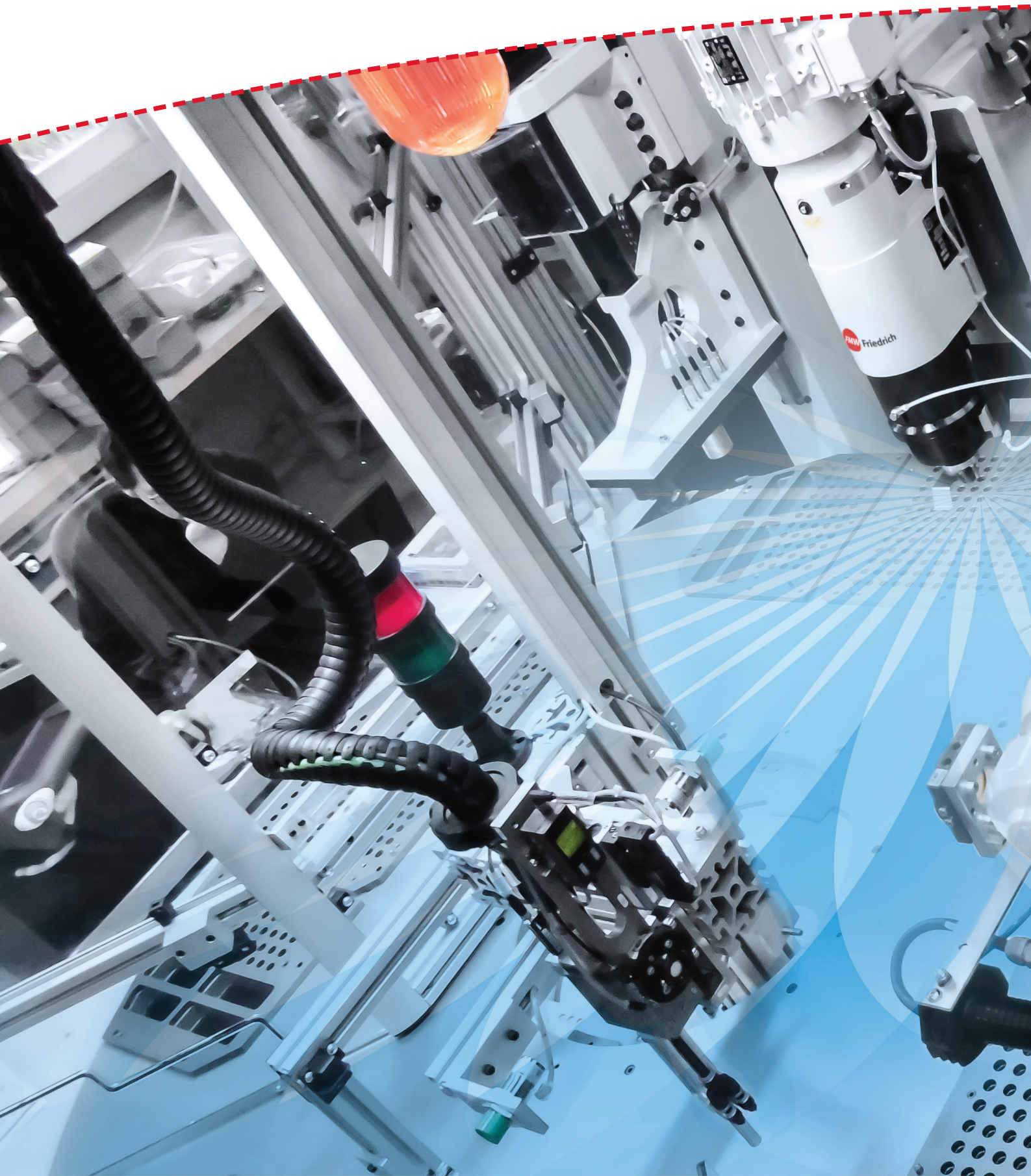
FMW Friedrich QAPV

The FMW Friedrich QAPV software (**Quality Assurance and Process Visualization**) for the transfer, archiving, and visualization of process data was developed in collaboration with our customers.

Important key figures such as CPK, CMK, etc. are graphically prepared and made available externally via an interface, if required. Archived data can be reimported at a later date.



Assembly systems





Tailored solutions through consultation

Each FMW assembly system is designed and produced in close collaboration with the customer for their respective operating conditions. Customers benefit from our full-service principle, starting with consultation through design and production to commissioning.

FMW's full-service principle

We support our customers well before the realization of a solution by providing comprehensive specific expertise on the riveting and assembly process.

We develop production concepts for customers, taking into account all the relevant parameters and linking the riveting process with other production processes.

The consistent digitization of FMW riveting machines allows for the integration of processes and production across technologies in an **"intelligent factory"**. Clearly defined interfaces to customer-specific systems enable efficient personnel and resource planning.



Partnership-based project planning and process consulting with expertise



Versatile machinery for in-house production



FMW riveting machine assembly in a CNC indexing table machine



Video acceptance in the factory at FMW before delivery to the customer

Working in partnership simplifies the entire project process and results in efficient operations with the best possible outcome: Customers receive a turnkey system with high-quality components, flexible and revisable with a long service life.

Processes that can be integrated

Cryogenics **Labeling** **Blind riveting**
Automatic parts removal **Lubrication**
Orbital riveting (GBA) **Embossing**
Handling systems **Compressed rivets**
Flaring **Radial point riveting**
Ionization **Torque testing**
Robotic systems **Screwing** **Thread cutting**
Force evaluation
Joining **Automatic parts feeding**
Ultrasonic welding **Camera checks**
Greasing **Bushings** **Roll-forming**
etc.



e.g.: Feed systems for correctly positioned component provisioning

... Tensioning, gripping and clamping units support the assembly processes



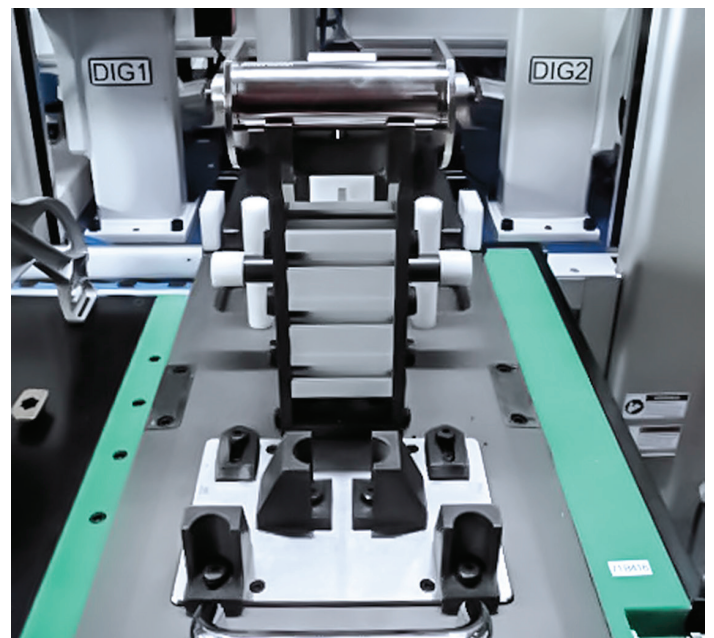
... Bolting station with depth limitation and network interface



Project examples:

Assembly system with 2 horizontally working riveting units with measuring system, manual transfer system and testing station

- 2 x NE513 40kN max. force
- Riveting and test station, each with safety guard and 1-hand start
- Checking of all components for presence and correct position
- Manual cross transport section between test and riveting station
- Testing and joining station with force measuring device
- Alternating horizontal riveting of 2 riveting points. **With tolerance class categorization**





Portal riveting machine with pneumatic riveting unit and measuring system

- NE400 25 kN max. force
- Riveting area 800 x 500 mm
- W-axis for overall lift of riveting unit of 270 mm
- Servo conveyor belt section with indexation and locking of workpiece carrier in position
- Workpiece carrier coding
- Belt drive with protective function
- Riveting volume area > 1 m³
- Active workpiece acceptance system
- Pick-by-Light and Place-to-Light
via Bluetooth data transfer

