

# TECHNOLOGY for tube processing

Designed and developed for your needs



Solutions



More than 35 years of experience  
in producing high quality automatic manufacto-  
ring cells and machinery  
for tube processing

We offer standard machines,  
automation solutions,  
as well as  
complex process solutions

We have already shipped over 1400 machines  
and more than 140 automatic manufacturing  
cells

Your partner for innovative processing solutions  
for tube processing

We stand for premium quality  
and know-how

## Preface

Dear customer business partner,

WAFIOS Tube Automation GmbH has taken over the assets  
and the know-how of Rosenberger AG.

This allows us to utilise the experience of more than 35 years  
in producing high-quality equipment for tube processing, as  
well as the know-how in the conceptual design and implemen-  
tation of automation solutions and individual custom-made  
production cells.

We would like to invite you to know our latest product  
overview.

Convince yourself of the variety of innovative solutions. Learn  
about „competency for premium quality“ and „future-proof  
technology“.

**Boris Kühn**  
Managing directors

## Overview

### Area

About us

Bending

Endforming

Cutting

Automation

Service

### Content

- Solutions
- References and Industry sectors
- A world of innovation

- TWISTER® Robotic bending system for tubes up to Ø 30 mm
- Bending machines for tubes up to Ø 30 mm
- Roll bending technology for tubes up to Ø 42 mm

- Endforming machines up to 300 kN
- Rollingforming machine up to a tube Ø of 20 mm

- Laser cell
- Deburring and tube-end processing for tubes up to Ø 20 mm

- Automation in 4 steps
- Automatic manufacturing cells examples
- Accessories and special equipment

- General information and accessibility
- Service components

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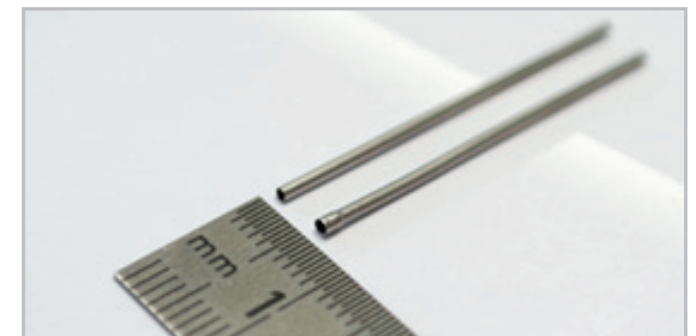
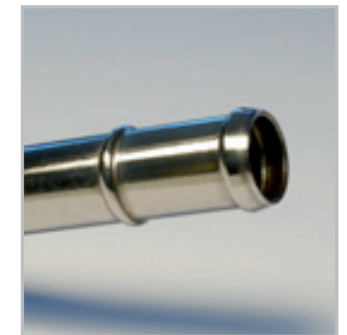
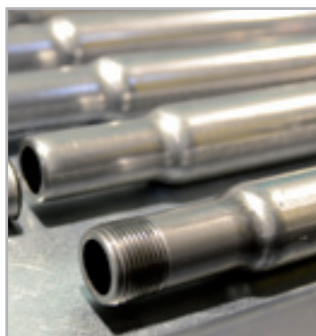
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About us  
Solutions



## About us Since 1980



Location Apolda



Location Simonswald



Tube forming

### Locations

Wafios Tube Automation GmbH has two locations, where approx. 50 employees work. Innovations arise at the sites of Simonswald and Apolda. Our know-how is constantly expanded for the development and design and implemented in customer projects. It is important for us to provide proper support to our customers with

„Quality made in Germany“.



### Since 1980

Everyday work and service at Wafios Tube Automation is characterised by competence and experience. The entire range of tube processing machines is available.

We generally do not use hydraulic systems. Our servo-electric drives are characterised by significantly low power consumption. Their operation requires low maintenance and more efficient and accurate than hydraulic drives. This ensures consistent quality right from the first workpiece.

Rosenberger - a brand that has been developing special machines as well as automatic manufacturing cells and machinery for tube processing since 1980. Due to our extensive experience and expertise, we know how to build machines and also know the entire field. This is how our engineers develop comprehensive solutions for customers, from single machines to complete production lines. With this basic knowledge, Rosenberger was able to successfully place purely servo-electric tube bending machines in the market as the first company to do so.

## References and Industry sectors Your challenges are our motivation



### Some references

- Eaton
- Veritas
- Nexttherm
- Constellium
- Autotube
- Stiebel Eltron
- Lisi Automotive
- Airbus
- ContiTech
- Vaillant
- Viessmann
- BMW
- VW
- Bosch
- FTE
- Parker
- Argus

### Industry sectors

- Automotive industry and their suppliers
- Mechanical engineering industry
- Furniture and lighting industry
- Air conditioning, plumbing and heating
- Naval industry
- Solar technology
- Cable production
- Aerospace Engineering
- Chemical industry
- General engine building
- Medical technology
- Military technology

# About us Technology



TWISTER® robot bending system



Touch Control



Efficient

### Always the current technology

With the TWISTER®, we offer a highly flexible and pioneering bending system, which is even used in tube-hose combinations. Our bending solution, combined with a KUKA robot forms an unbeatable team. Program and technology can be modified according to customers' requirements. This technique allows achievement of a substantial increase in productivity.

In the production process, the TWISTER® can be linked and combined with all of the necessary machines. The entire process can be programmed at a familiar Windows-based interface.

### User-friendly and efficient

All machinery and automatic manufacturing cells can be operated by a Windows-based user interface and are equipped with Internet access for remote diagnosis as well as a USB port for data backup and transfer. The servo-electric drive provides accurate results at any time without the known disadvantages of hydraulics. The small footprint, low power consumption and low noise and emission contribute to the quality and conservation of resources.

Our capital goods are build for high availability: 365 days a year, in three-shift operation. This requires consistent quality assurance, continuous technical development and utilisation of high quality components.

**Convince yourself of our unique technology.**

## A world of innovation Pioneering and reliable



Our machines are used in production worldwide

### Comprehensive support

- Technical support of sales and technology
- Training programmes at our place or yours
- Use of standard components that are available worldwide
- Remote diagnosis via Internet
- Comprehensive service network, if necessary within 48 hours
- Through maintenance contracts, the availability of your operating equipment can be improved further

### Comprehensive range of offerings

- Bending up to Ø 30 mm
- Endforming up to 300 kN
- Profile rollforming up to Ø 20 mm
- Tube-end processing / deburring
- Conception and realisation of automation solutions according to current standards
- Integration of WAFIOS machines or customer machinery in existing or new plants
- Diverse and proprietary parts feed and handling systems for combination with a machine or for use in automated systems such as bunker systems, suspension magazines, indexing belts or inclined loading systems
- Measuring systems
- Special solutions
- Process development
- Service
- Training programmes

# Bending TWISTER



Bending and endforming cell



„Free“ bending sequence



Precise robot handling

## TWISTER® Robot Bending System

Because in many cases it is not possible to process tube-hose-tube combinations with conventional tube bending machines, we looked for a more flexible bending system that offers high precision and processing safety combined with operating comfort. This is how the worldwide unique robotic tube bending system with servo-electric drives – the TWISTER® – was created.

The highly productive CNC controlled tube bending system is capable of carrying out several bending functions. Modern engineering systems are characterised by high levels of comfort for the operator. They also make it possible to execute complex bending operations.

The current generation of controls are based on state-of-the-art machines software specifically designed for CNC controlled tube bending machines. The operator works with a high resolution display and user-friendly touchscreen mode. With their servo-motor bending drive, the machines are very cost- and energy-efficient with low emissions.

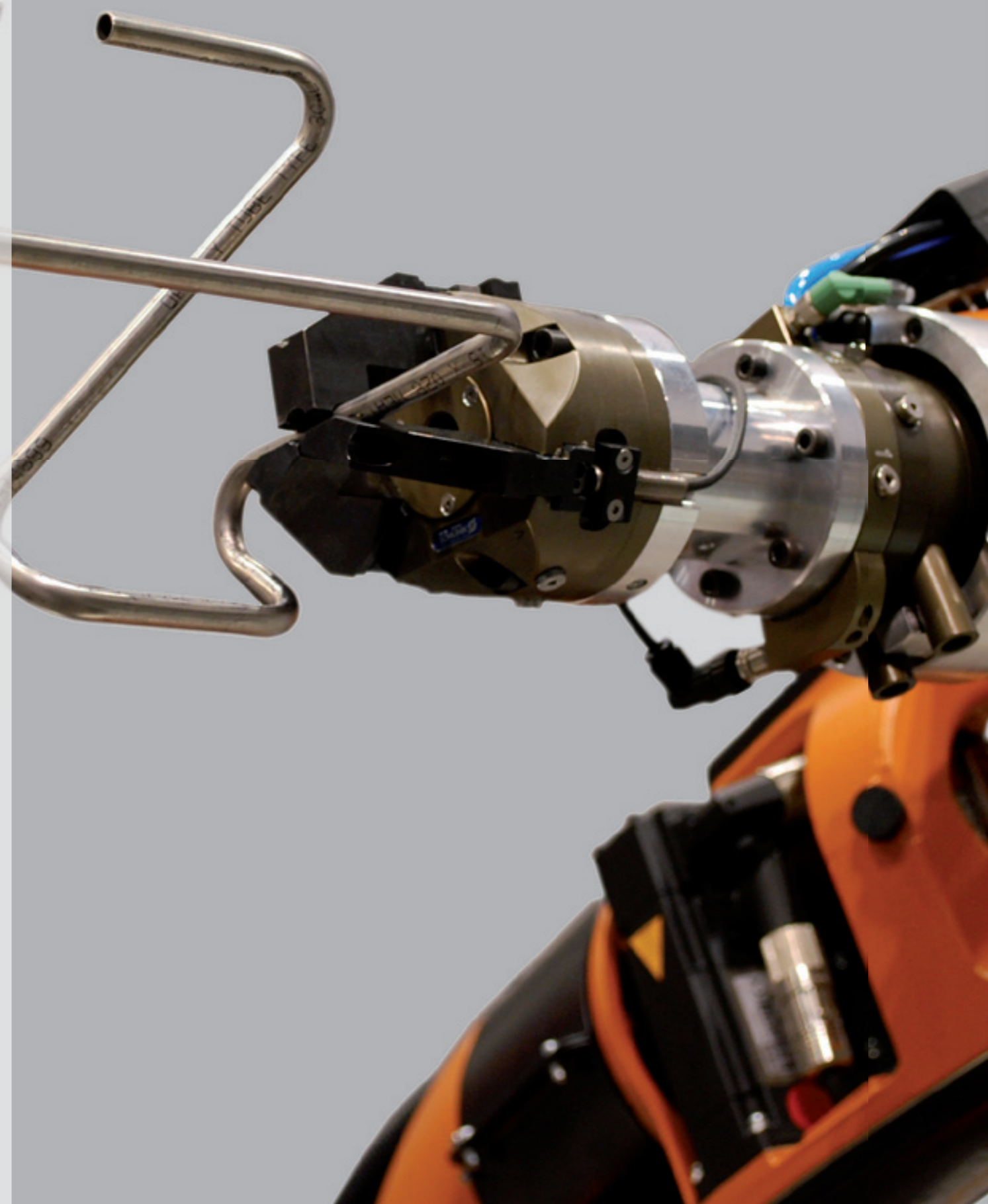
## Compact all-rounder

With the TWISTER® you will meet highest quality demands at extremely fast and flexible processing, making your manufacturing processes efficient. Furthermore, it can be flexibly developed with additional components and equipment to full automation.

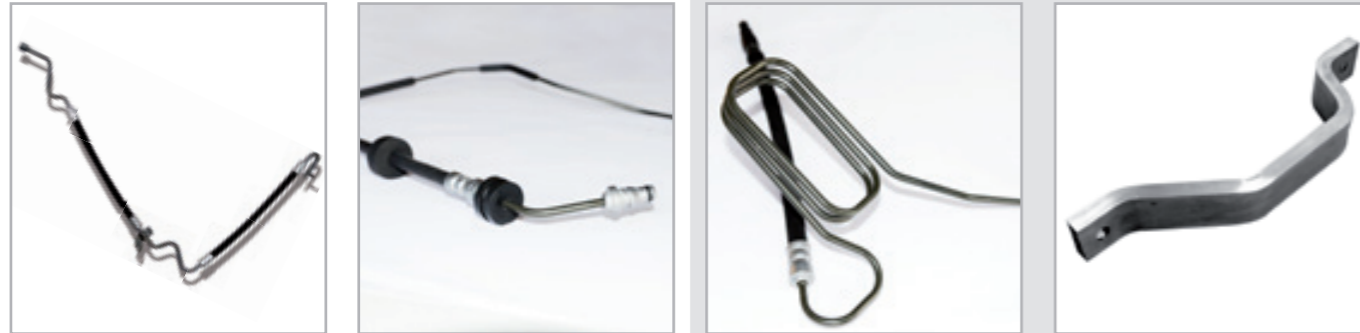
The Twister® robot bending system is not a conventional bending machine, but a compact all-rounder, which satisfies either the varied demands of bending processes, as well as the handling of complicated bending parts.



## TWISTER® Robot Bending System FLEXIBLE and EFFICIENT



# Bending TWISTER



Bending for tubes up to Ø 30 mm

### Product features

- Highest flexibility
- No additional programming work as only one controller is operated
- Performs additional handling tasks
- Free choice of bending sequence
- Suitable for full automation without additional handling
- Work cycles in automatic, single step, programming and manual mode as well as diagnosis
- High accuracy due to servomotor drives
- Control panel with touchscreen and Windows
- Functionality of the robot is retained
- Long lines can be bent from both sides from the outside to the centre
- Bending of tube-hose-tube combinations
- Tool and program change in less than 5 minutes

### Optional

- Toolkits
- Additional bending heads
- Insertion aid
- Mandrel / wiper die
- Servo driven collet chuck, clamp and pressure die
- Hydraulic gripper for more clamping power
- Feeding systems
- Quick tool-change systems
- Programming station, Interface to measuring station
- Remote service

Hydraulic gripper



## TWISTER® Robot Bending System Technical data

Machine type	TWISTER® RB20	TWISTER® RB30
Bending planes	Position of bending planes free programmable within max. 78 mm	Position of bending planes free programmable within max. 138 mm
Number of bending heads	min. 1   max. 5	
Robot gripper	min. 1   max. 16	
Bending direction	right <u>and</u> left	
Bending torque	360 Nm without mandrel: Ø 20 x 2 mm mit mandrel: max. Ø 15 x 1 mm (steel)	900 Nm without mandrel: Ø 30 x 2 mm with mandrel: max. Ø 25 x 1 mm (steel)
Mandrel device	optional	
Bending stroke	max. 210°	
Max. axis velocity	Bending: 560°/sec	
Bending radius	57 mm (center line)	125 mm (center line)
Repeatability	Bending, rotation: ± 0.05°   feed: ± 0,01mm	
Robot	Kuka KR-16	Kuka KR-32
Electr. connection	3 x 400V / 50Hz   with fuse of at least 32A   depending on the cell	
Power consumption	7-12 KVA	
Pneumatic connection	6 bar, 1/2"-connector	6 bar, 1/2"-connector
Dimensions (L x W x H)	from 4000 x 4000 x 2300 mm	from 4000 x 4000 x 2300 mm
Weight	Robot approx. 400 - 600 kg Bending head approx. 850 kg Mandrel unit approx. 450 kg	Robot approx. 700 - 900 kg Bending head approx. 1200 kg Mandrel unit approx. 500 kg

## Bending RB Series



CNC Bending Head RB20-1 / RB30-1



CNC Bending Machines RB LR



Insertion aid



Mandrel / wiper die

### CNC controlled tube bending machines - RB Series

The CNC controlled tube bending machines RB20 and RB30 are ideally suited for bending of tubes or profiles with various bends, lengths and twists on different bending levels with several bending radii. Therefore, they can be used in a variety of industrial applications for the purpose of shaping tubes.

Due to the fully automated operation of the computer-controlled tube bending machines, it is possible to freely program all settings and save them in the program. Specific parameters, such as the feeding motion, the desired bending angle and the mechanical twisting can be set and adjusted.

All models have been optimized for automatic mass production purpose as well as for low volume or prototype manufacturing.

### Modern and user-friendly control

The highly productive CNC controlled tube bending machine is capable of carrying out several bending functions. State-of-the-art controls are characterised by high levels of comfort for the operator. They also make it possible to execute complex bending operations.

The current generation of controls are specifically designed for CNC controlled tube bending machines. The operator works with a high resolution display and user-friendly touchscreen. With their servo-motor drives, the machines are very cost- and energy-efficient with low emissions.

## Tube Bending Machines - RB Series COMPACT & MODULAR





# Bending RB Series



Bending for tubes up to Ø 30 mm

### Product features

- Left- or right-bending possible
- High accuracy due to servomotor drives
- Servomotoric or pneumatic clamp and follower
- Prepared for automation
- Work cycles in automatic, single step, programming and manual mode
- Various diagnostic options
- Free programmable XYZ-Axis
- Finger-gripper or collet
- PLC-based CNC control
- Mobile control panel with touchscreen and Windows OS
- Compact design
- Roll bending option
- Tool and program change in less than 5 minutes

### Optional

- Toolkits
- Integrated feeder magazine
- Insertion aid
- Split bending die optional (e.g. for bends >180°)
- Mandrel / wiper die
- Collet chuck servo motor-driven
- Clamping piece servo motor-driven
- Slide rail servo motor-driven (x-axis)
- Slide rail servo motor-driven (z-axis)
- Weld seam detection
- Bending head support
- Machine extension (length)
- Radius enlargement
- Robot interface
- Mandrel lubrication
- Programming station
- Remote service

## Tube Bending Machines - RB Series

### Technical data

Machine type	RB20-1*	RB20-M (-E)	RB30-1*	RB30-M (-E)
Stroke	mm	mm	mm	mm
X-axis	-	310 (120+190)	-	410 (205+205)
Y-axis	-	150**	-	260**
Z-axis	-	1170	-	1170
		**Valid only for RB20-M / RB20-E has no Y-axis		**Valid only for RB30-M / RB30-E has no Y-axis
Max. tube lengths (with mandrel)	-	2400 mm	-	2400 mm
Bending direction	right <u>or</u> left	right <u>or</u> left	right <u>or</u> left	right <u>or</u> left
Bending planes	Position of bending planes free programmable within max. 78 mm		Position of bending planes free programmable within max. 138 mm	
Bending torque	360 Nm Ø 20 x 2 mm (steel)   with mandrel: max. Ø 15 x 2 mm		900 Nm Ø 30 x 2 mm (steel)   with mandrel: max. Ø 25 x 1 mm	
Follower force	Pneumatic 3.7 kN: Yes   Servomotor 2.6 kN: Optional		Pneumatic 3.7 kN: Yes   Servomotor 2.6 kN: Optional	
Bending mandrel	Optional (stroke 210 mm)		Optional (stroke 210 mm)	
Bending angle	max. 195° (Optional 210°)		max. 195° (Optional 200°)	
Speeds	feeding: 1870 mm/s   bending: 560°/s		feeding: 1870 mm/s   bending: 560°/s	
Collet inner-Ø	25 mm		35 mm	
Bending radius	57 mm (center line)   (Optional 137 mm)		125 mm (center line)   (Optional 205 mm)	
Repeatability	Bending, rotation: ± 0.05°   feed: ± 0.05 mm		Bending, rotation: ± 0.05°   feed: ± 0.05 mm	
Electr. connection	3 x 400V / 50Hz   with fuse of 32A		3 x 400V / 50Hz   with fuse of 32A	
Pneumatic connection	6-8 bar, 1/2"-connector		6-8 bar, 1/2"-connector	
Dimensions	L x W x H mm	L x W x H mm	L x W x H mm	L x W x H mm
Basic machine	-	2400x1070x1690	-	2480x1070x1900
+mandrel (670 mm)	-	3070x1070x1690	-	3150x1070x1900
Extended (1000 mm)	-	3400x1070x1690	-	3480x1070x1900
Mandrel+Extended	-	4070x1070x1690	-	4200x1070x1900
Weight	kg	kg	kg	kg
Basic machine	850	1400	1200	1500
+mandrel (600 kg)	1450	2000	1800	2100
Extended (300 kg)	-	1700	-	1800
Mandrel+Extended	-	2300	-	2400

\* Only in combination with additional safety devices or the robotic bending system TWISTER®

# Bending BMZ Series



Biegekopf mit Muster

WAFIOS Programmier-System  
(WPS 3.2)

Werkzeugwechselsystem

## New Bending Dimensions

The BMZ series is based on a successful and reliable concept. Designed for the production of complicated bent parts from cut-to-length, end-treated and ready-to-install tubes, the WAFIOS BMZ series sets standard on the market since many years.

The extremely flexible and universal WAFIOS tool systems increase the service life of the machines significantly. Tools for roll-bending, rotary-bending and free-form bending operations can be employed. As the bending head enables left- and right-bending operations in one clamping, the production of complicated two- and three-dimensional work pieces is possible in one pass.

**Due to the WAFIOS tool systems, bending times, unproductive times and retooling times have been reduced to a minimum.**

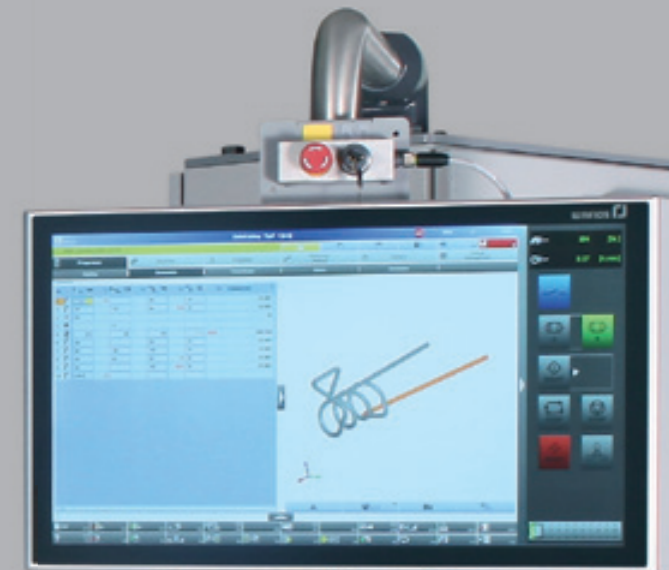
## Product benefits

- High level of flexibility and high degree of automation
- Highest output and quality
- Value added superior and precise technology
- Perfect handling of machine due to functional design
- Configuration of machine according to product requirement

Swivel axis



## Tube Bending Machines - BMZ Series\* VERSATILE & PROFITABLE



# Bending BMZ Series



Bending for tubes up to Ø 25 mm

## Product features and Options

- Extremely high bending speeds
- Integrated loading and unloading automation (option)
- Right/left bending in one clamping
- Combined rotary-draw, roll and free-form bending
- Fully electronic machine concept, all relevant bending parameters are CNC-controlled
- Increased output, especially when producing complicated parts
- User-friendly machine control WAFIOS WPS 3.2 EasyWay with plain-language programming of lengths / angles or coordinates, connection of all machine components, graphic operator interface
- User-friendly and secure machine control due to new handheld operating device with touch screen
- Ergonomic machine concept, designed for multipleshift, reliable operation
- Reduced retooling times due to simple and repeatable tool changes
- Open collet system for holding tubes whose ends have been processed and that are fitted with/without cap nuts
- Tube lengths of up to appr. 2,000 mm are possible
- Up to 10/14 CNC axes

## Tube Bending Machines - BMZ Series Technical data

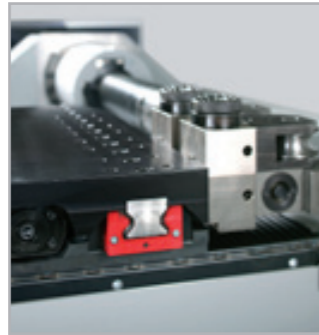
Technical Data		BMZ 8	BMZ 12
Operating range	Tube diameter, max.* Standard lengths* (recommended) From BMZ magazine	8,0 x 1 mm up to 2.000 mm 100 - 2.000 mm	12,0 x 1 mm up to 2.000 mm 100 - 2.000 mm
CNC axes	Standard/Maximum Bending head Spindle unit (without swiveling) Lateral displacement of bending head Internal mandrel unit Auxiliary gripper Loading arm Swiveling the collet	6 / 10 3 axes 2 axes 1 axes -- Pneumatic 1 axes (optional) 1 axes (optional)	7 / 10 3 axes 2 axes 1 axes 1 axes (optional) Pneumatic 1 axes (optional) 1 axes
Collet	Operating principle Structure Single stroke Multiple stroke	Pneumatic Open 750 mm At will	Pneumatic Open 750 mm At will
Programming	Length/angle Coordinates Order lists Graphical display	Yes Yes Yes Yes	Yes Yes Yes Yes
Automatisierung	Loading from a magazine Position-oriented depositing Combination with robots	Optional Optional Optional	Optional Optional Optional
Weight		1.150 kg	1.300 kg
Space requirements (l x w x h mm)		2100 x 1250 x 2050	2150 x 1250 x 2050

\* All specifications depend on material and bending radius, different lengths on request

## Bending RBV Series



RBV42RR Bending head



RBV60R Follow bar  
with additional guide rail



Tube positioning with boost pressure  
function of advance feed unit



New quick die change equipment  
for combined rotary-draw and free-  
form bending

## Tube Bending Machines - RBV Series\* RELIABILITY & EFFICIENCY

### Perfect Union of Design and Functionality

An ingenious machine concept with integrated automation. AI-ready the standard version of the WAFIOS RBV 60 R unites different bending procedures with high flexibility in one unique machine concept - also in small-batch production.

The new ergonomic design of the machine body, in combination with the dynamic positioning unit of the bending head meets the most stringent demands with regard to ...

- ...Accessibility, thanks to the new and patented quick die change equipment and the advance feed and mandrel carriage that were adapted to the machine design
- ...Maintenance, service and user friendliness
- ...Greater range of parts thanks to extremely high degrees of freedom.

The further development of the bending head for improving the rigidity of the housing and the follow bar guide enables

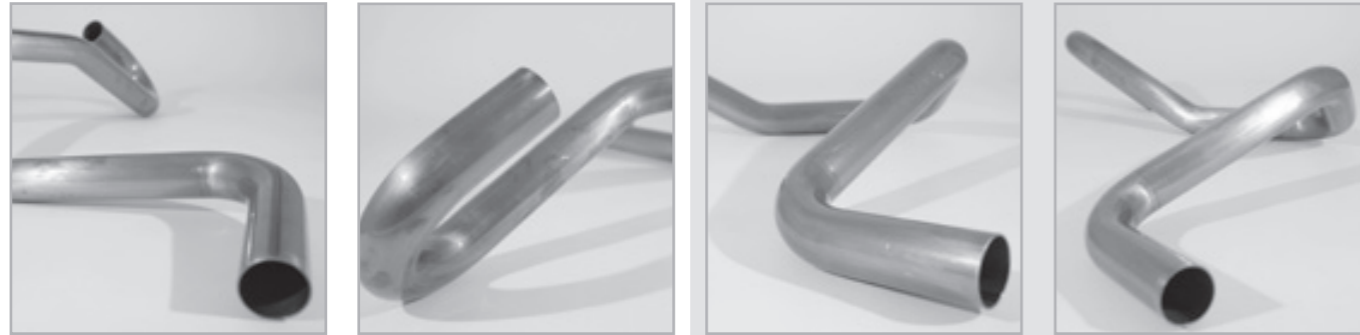
- ...Increased repeat accuracy
- ...Higher process safety
- ...More dynamical acceleration processes

### Product benefits

- Highest precision at maximum rigidity of machine body and bending head
- Higher process safety by optimized positioning and clamping drives
- Shorter down times due to innovative quick die change equipment
- High work speed thanks to bending head with optimized drive for more dynamical acceleration processes
- Higher energy efficiency due to new, optimized drive trains



# Bending RBV Series



Bending for tubes up to Ø 60 mm

### Product features

- Extremely robust body and bending head design, verified by finite element method
- Free positioning of hood increases degrees of freedom for extreme bending geometries
- Right and left bending for rotary-draw and free-form bending in one clamping
- Fully electric drive concept
- Mandrel bending device is freely programmable over the entire feed length (patented)
- Tube positioning with boost pressure function (booster) of advance feed unit
- New, more rigid follow bar design with a second linear guide
- Up to 3 tool levels for each bending direction
- Higher holding torques due to the use of a gear drive for the linear movements of clamping axes
- Basic equipment includes 8 CNC axes (upgradeable to up to 16)

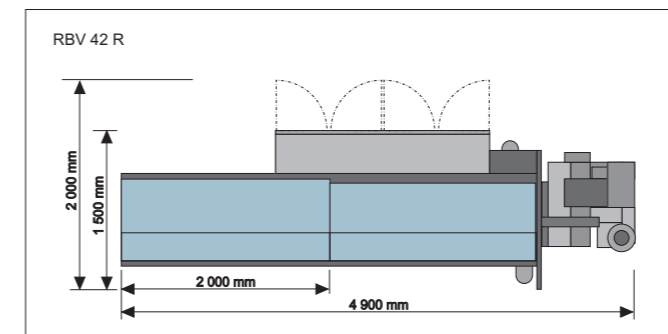
### Steuerung

- Bewährtes Steuerungsprogramm WAFIOS WPS 3.2 EasyWay
- Intuitives Steuerungskonzept führt in kurzen und übersichtlichen Schritten zum Biegeprogramm
- Interaktive grafische 3D-Rohrprogrammierung
- Fünf unterschiedliche Benutzerlevel mit Berechtigungen
- Zahlreiche Funktionen zur Überwachung des Maschinenzustands
- iQtube zur graphischen Simulation des Biegeablaufs mit integrierter Kollisionsüberwachung und theoretischer Stückleistung (Option)

## Tube Bending Machines - RBV Series

### Technical data

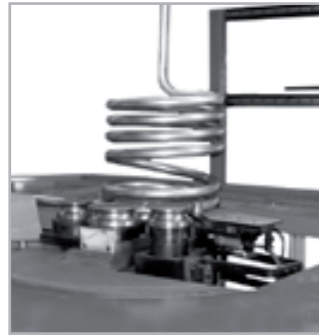
Technical Data	RBV 42 R/RS	RBV 60 R/RS
<b>Bending capacity</b> Bending torque Clamping force Boost pressure: advance feed unit	4.5 kNm 30 kN / 58 kN 10 kN/20 kN	8 kNm 60 kN / 140 kN 25 kN/50 kN
<b>Bending geometry parameters</b> Max. tube diameter Feed length Max. bending radius, rotary-draw bending Max. bending radius, free-form bending Max. bending angle	42 mm 2,700 / 4,700 mm 130 mm infinite 190°	60.3 mm 3,000 / 4,500 mm 180 mm infinite 193°
<b>Bending procedures (rotary-draw bending)</b> Bending directions Bending levels per bending direction Tool installation height per bending direction	Left and right bending up to 3 160 mm	Left and right bending up to 3 160 mm
<b>Max. speeds</b> Advance feed Rotation Bending	2,000 mm/s 450°/s 180°/s	1,700 mm/s 450°/s 180°/s
<b>Axes accuracy</b> Advance feed Rotation Bending	+/-0.05 mm +/-0.05° +/-0.05°	+/-0.05 mm +/-0.05° +/-0.05°
<b>Dimensions/weight</b> l x w x h mm Weight	4,900 x 1,500 x 1,500 4,800	5,600 x 1,900 x 1,600 5,500
<b>Connection and consumption data</b> Voltage Frequency Compressed air connection Max. compressed air consumption	400 V 50/60 Hz 6 bar 1-3 l/min	400 V 50/60 Hz 6 bar 2-5 l/min



## Bending RRB42



RRB42 - Feeding rolls



RRB42 - Bending rolls



RRB42 - Pitch- and Ø-adjustment



Chain loader for tubes > 10 m length

## Roll Bending Technology - RRB42 PROVEN & ROBUST

### Roll bending machine RRB42

The basic machine for manual production of heat exchangers comprises a tube-feeding device and a rollbending device.

The tube is inserted into the machine from behind and transported to the bending unit with the 14 rolls. There, the tube is shaped as programmed by 5 bending rolls.

For more complex geometries, the bending unit is expanded by two additional axes. The pitch and diameter rolls can be adjusted automatically during the process.

**This online measuring and adjustment is unique on the market!**

### Prepared for automation

The roll bending machine can, of course, also be used partially/fully automated in different versions. The bending machine can be additionally supplied with a magazine to feed in tubes at a fixed length.

To reduce cut-offs, a welding station can be integrated between the magazine and the roll bending machine to connect the tube ends and produce an „endless tube“.

An additional cutting station can be installed at the roll bending machine front to separate the heat exchanger from the „endless tube“. This is where the transverse welding seams are automatically removed if they are located in the spiral bends.

# Bending RRB42



Roll bending up to tube Ø of 42 mm

### Product features

- Production of tube spirals from tubes of max 42 x 2.0 mm
- Arbitrary shapes and pitches can be produced
- Programming of all tool positions with  $\pm 0.1$  mm
- Tube bending without mandrel
- CNC control is PLC-based
- The machine can roll- or draw-bend the tubes around a fixed roll or apply various radii in the roll-bending procedure
- „Endless processing“ by fully automated welding and cutting
- Control panel with touchscreen and Windows
- Safety (fully enclosed machine)

### Optional

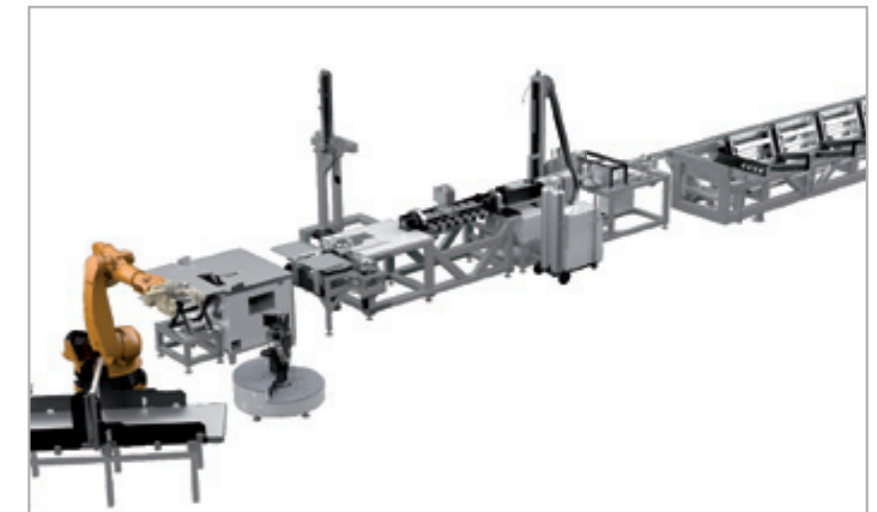
- Toolkits
- Remote service
- In case specific outlets or connection geometries are needed, additional stations, e.g. bending with TWISTER® or other manufacturing processes such as thread rolling or tube end forming can be added. The finished heat exchanger is discharged on a conveyor belt.

## Roll Bending Technology Technical data

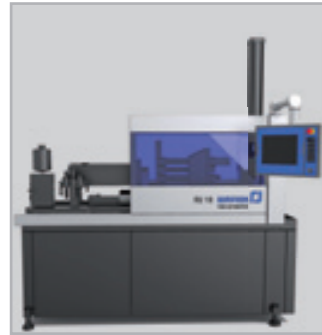
Machine type	Roll bending machine RRB42
Diameter	Ø of 100 - 1200 mm (depending on the tube diameter and material)
Bending angle	90° ... + 90° bending and roll bending
Speeds	feeding: 200 mm/sec   bending: 40°/sec
Bending radius	60 mm, 270 mm inside ... 955 mm outside
Repeatability	feeding: $\pm 0,1$ mm   bending: $\pm 0,1^\circ$
Electr. connection	3 x 400 V AC ca. 3,7 kVA
Pneumatic connection	6 bar, 10 l/min
Control voltage	24 VDC
Dimensions (L x W x H)	approx. 3500 x 2000 x 3000 mm*
Weight	approx. 2500 kg*

### Example: Roll bending plant

- Chain bunker for 13 m tubes
- Tube feeding on belt with metal links
- Weld seam detection of the longitudinal seam
- Orbital welding device
- Roll bending machine RRB42
- Cutting unit for separating the tube
- TWISTER® for the last bends
- Discharge conveyor belt for finished parts
- Safety fence
- Operator panel



## Forming RU Series



Endforming Machine RU Series



Rolling head and cutting head



Thread-rolling head



Additional clamps

### CNC controlled endforming machines - RU Series

**Flexibility by innovation** | The market is demanding more efficient and versatile machines for processing tube ends. There already are several machines based on different concepts that try to meet the requirements of the industry. However, there are PRO's and CON's for each of them.

Creation of value by precise technology. These days, new technical possibilities are provided by servoelectric drives, which, unlike the hydraulic solutions, are able to follow complex and variable sets of parameters for each step.

The endforming machine is not just an evolution of our previous RU8-12-18 machines but rather a completely new development including the advantages of earlier models and considering solutions for customer requirements from the past.

### Compact design and prepared for automation

A worldwide unique is the compact design of the machine with vertically aligned tools (maximum 16, also multiple rotating tools) combined without any hydraulics, which significantly reduces the machine's dimensions and makes it easy to transport.

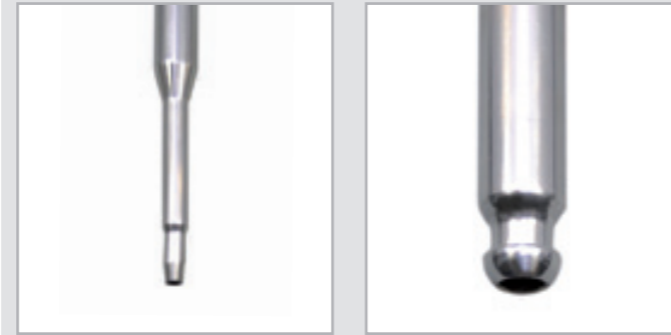
The machine can be selected as a manually operated variant, as a master machine for simple automation and as a fully automatic forming press. Via the robot interface, the machine can be perfect integrated into a automated manufacturing cell.

## Endforming Machines - RU Series MODULAR & PRECISE





# Forming RU Series



Endforming force up to 300 kN

### Product features

- Programming assistant (forming force and speed)
- High accuracy due to servomotor drives
- Prepared for automation
- Work cycles in automatic, single step, programming and manual mode as well as diagnosis
- Cycle time optimisation by free programming (override potentiometer for test run)
- Optimal control of material flow properties by servo drives
- Hydropneumatic clamping system
- Low Noise, low-maintenance and energy-saving servo-drives
- CNC control is PLC-based
- Double-tool dies offer the possibility **to cut the cycle time to half!**
- Touchscreen with Windows
- Small, compact design
- Tool and program change in less than 5 minutes

### Optional

- Toolkits
- Tool adapter
- Double-tool
- Additional clamps
- Automatic component feed (e.g. flanges or nuts)
- Loading magazine
- Tool drive for rotating tools
- Rolling and cutting (trimming)
- Thread rolling
- Machine extension (length)
- Additional programming inputs
- Tool break control
- Programming station
- Remote service

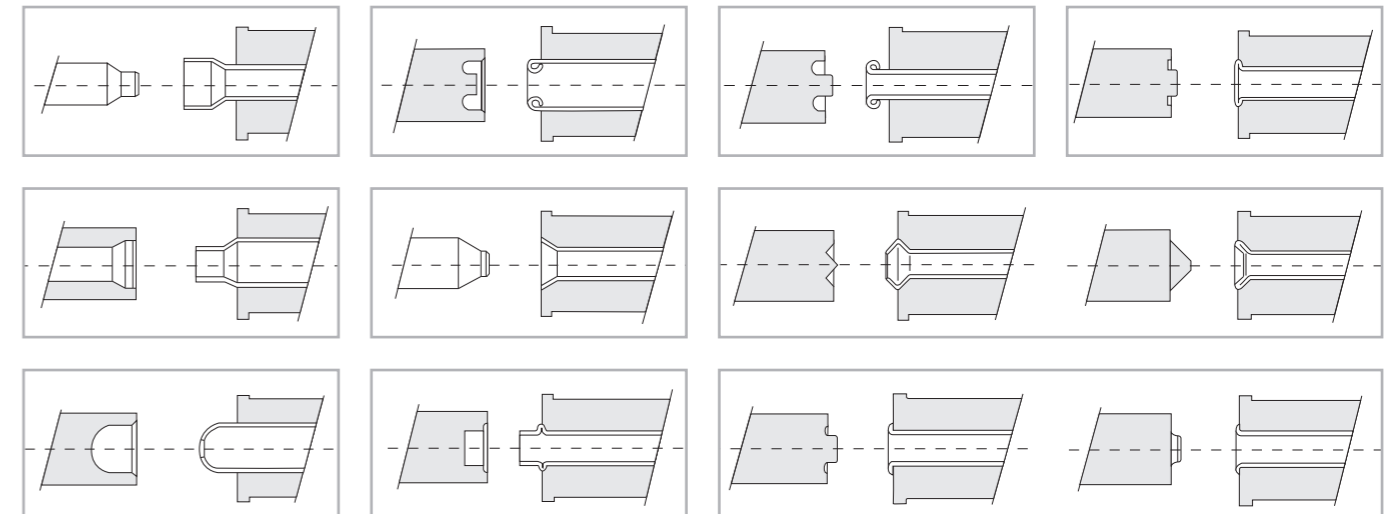
## Endforming Machines - RU Series

### Technical data

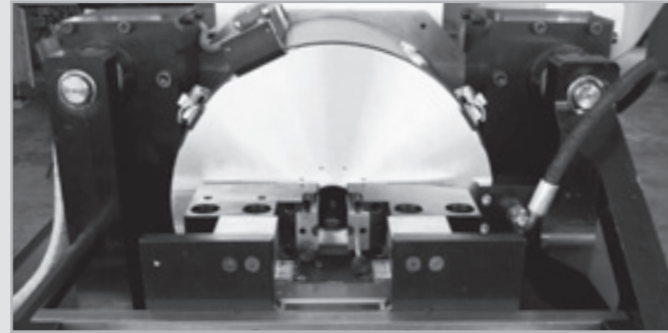
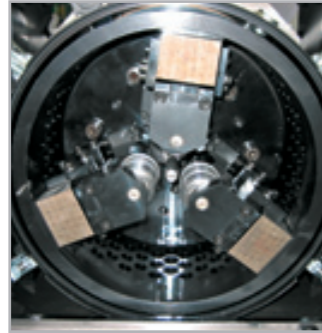
Machine type	RU8	RU12	RU18	RU30
Tool stroke	220 mm			200 mm
Endforming force	80 kN	120 kN	180 kN	300 kN
Clamping force (workpiece)	180 kN	180 kN	270 kN	450 kN
Position accuracy	± 0,05 mm			± 0,05 mm
Electrical connection	3 x 400V / 50Hz   with fuse 32A			3 x 400V / 50Hz   32A
Control voltage	24 VDC			24 VDC
Pneumatic connection	6-7 bar, 1/2"-connector			6-7 bar, 1"-connector
Clamps	Horizontal or vertical (69.9 mm, 95 mm or 155 mm)			vertical (120 mm)
Forming punches	2, 6 or 8			2 or 4*
Dimensions (LxBxH)	Default: 2800 x 1300 x 2700 mm (with filter unit: 3500 x 1300 x 2700 mm)			2800 x 1400 x 2700
Weight	approx. 2400 kg			approx. 4000 kg

\* More forming punches on request

### Examples of forming operation - illustration representation



# Forming RW20



CNC Rollingforming Machine RW20

Roll from head

Tube clamp fixture

## CNC controlled rollforming machine RW20

The CNC controlled rollingforming machine RW20 applies complex to tubes up to 20 x 1.5 mm, because of the servo-electrical drive and compact construction, it works energy-efficient on small footprint.

Tools and programs can be adjusted and set up for other manufacturing processes within a short time.

The RW 20 can be used as stand-alone, manually operated machine or integrated in fully automated installations and manufacturing cells.



RW20 toolkit: Rollers, roller holder, mandrel, clamp jaws

## Rollingforming Machine RW20 FOR COMPLEX GEOMETRIES



# Forming RW20



Precision rolling for tubes up to Ø 20 mm

### Product features

- Programming assistant
- High accuracy due to servomotor drives
- Prepared for automation
- Optimal control of material flow properties by servo controller
- Low noise, low-maintenance and energy-saving servo-drives
- CNC control is PLC-based with plain text control panel
- Work cycles in automatic, single step and manual mode as well as diagnosis
- Cycle time optimisation by free programming
- Servomotor tube stop
- Chain drive for high availability
- Recirculating lubrication and cooling of the rolling process
- Control panel with touchscreen and Windows

### Optional

- Toolkits
- Loading magazine
- Flow control unit for additional control of material flow properties
- Thread rolling
- Filter system with nonwoven paper
- Programming station
- Interface to measuring station
- Remote service

## Rollingforming machine RW20

### Technical data

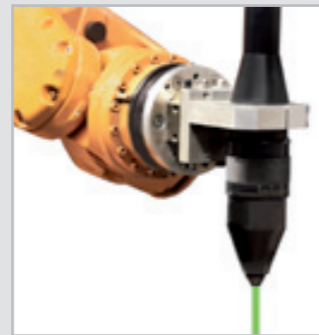
Machine type	CNC Rollingforming machine RW20
Workpiece diameter	Ø 20 (max. Ø 30 mm / depending on the tube material)
Rolling length	47 mm
Repeatability	± 0,02 mm
Recirculating cooling system	yes
Recirculating lubrication system	yes
Band-pass filter installation	yes
Electrical connection	3 x 400 V AC approx. 6 kVA
Pneumatic connection	6-7 bar, 1/2"-connector
Dimensions (L x W x H)	approx. 1900 x 1100 x 2050 mm
Weight	approx. 1500 kg

# Cutting RL150



Shuttle system for workpiece feeding

Protective safety hood covering the entire laser system



Laser unit handled by robot



Sample cut

## Product features

- High flexibility
- High speed
- Wear-free process (low maintenance cost)
- High accuracy
- Short set-up time and versatile tools
- Less emission
- Less energy consumption compared to conventional technology
- Integration in manufacturing cell and linking with other processes

## Area of application

- 2D-cuts (flat material)
- 3D-cuts (tubes, rods, profile)
- 3D-free-form cuts (complex frames)
- Continuous 24x7 operation is possible!

## RL150 - Technical data

Stroke	min. 500 x 500 x 500 mm max. 1000 x 1000 x 1000 mm (depending on the robot)
Repeatability	± 0,03 mm
Robot	e.g. KUKA
Laser processor	IPG fibre laser   150 W
Wave length	1070 nm
Cooling	Air-cooled
Cutter head	Precitec
Materials (other materials after consultation)	Steel   stainless steel   alloyed steel   unalloyed steel   Alumi- nium   precious metal
Cutting gas	Air (oxygen or nitrogen)
Electrical connection	400 V AC, 50 Hz   16 A
Pneumatic connection	6-8 bar, 1/2"-connector or 1"-connector (depending on application)
Control voltage	24 VDC
Dimensions (L x W x H)	approx. 1000 x 1000 x 1000 mm
Weight	approx. 200 kg

# Laser Cell RL150 INNOVATIVE & VERSATILE

**Precise robot handling**  
for accurate positioning of  
sections

**Cutting heads by Precitec**  
are based on more than  
40 years of experience in  
laser technology

**Reduced cycle time**  
by using shuttle feeding  
system

**The capacitive sensor**  
controls focus and avoids  
collisions

**Exhaust and filter unit**  
for particles and fumes pro-  
duced by laser

## Laser Cell - RL150

The use of laser technology offers major advantages in many areas of material processing. Our systems offer efficient and flexible solutions for processing a wide range of different and complex tasks. Our laser systems make it possible to cut a wide variety of different materials without causing any damages or chips. Thanks to their high degree of flexibility, our automatic manufacturing cells can be easily adapted to meet widely varied requirements while ensuring efficient and reliable work results.

The plant's innovative robot and fiber optics technology ensure rapid and precise processing. Low set-up times and minimum wear are guaranteed to increase the economic efficiency of the laser cutting process.

# Cutting RT20



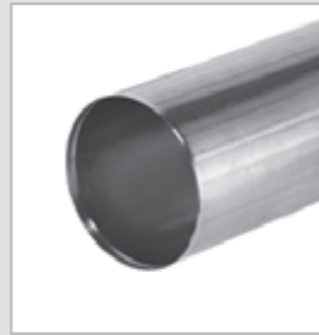
Deburring Machine RE20



RE20 - Clamping unit



RE20 - Tool



Sample part

## Deburring Machine RE20

The cnc controlled device is dedicated for machining of tube or rod ends. As all WTA machines, the RE20 concept is focused on efficient energy consumption, small footprint and low emissions.

The RE20 can be operated as hand operated single machine or is integrated as machine component in a fully automatic processing plant. The pneumatic or servo motor feed axis enables a very precise process.

## Product features and options

- CNC control is PLC-based
- Simple and quick program change
- **Optional exhaust device**
- Tool kits
- Remote service

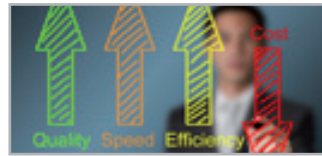
## RE20 - Technical data

Processes	Deburring, facing, taper outside / inside
Stroke	approx. 35 mm
Drilling performance	max. Ø 15 mm/steel 600 N/qm <sup>2</sup>
Motor output	0,75 KW   2900 rpm
Spindle speed	1140 rpm at 50Hz, programmable
Tools	standard or carbide tool: max. Ø28 mm collet: max. 16 mm
Feeding speed	max. 18 m/min
Accuracy	± 0,01 mm
Dimensions (L x W x H)	940 x 730 x 1360 mm
Weight	approx. 150 kg + 70 kg (exhaust device)
Control voltage	24 VDC
Electrical connection	3 x 400 V AC   approx. 6kVA
Pneumatic connection	6 - 7 bar, 1/2"

# Deburring Machine RE20 COMPACT & PRECISE



# Automation 4 steps



## 1. Analysis

Documentation of a detailed customer requirements by our experts based on data and on site at your company.

## 2. Consulting

Draft of a concept, calculation of demand oriented equipment features and joint development of an offer with our team.

## 3. Design

Design of tools, machines, automation, process and auxiliary devices based on the plant concept.

## 4. Execution

Flexible expansion of present or development of new processing automatic manufacturing cells from partial to full automation.

### Advantages

- Increase in output by minimising the overall cycle and process time
- Personnel-related savings depending on the level of automation
- Reduced WIP
- Saving in terms of overall production costs
- Minimal space requirement
- Degree of automation adapted to actual needs
- Manufacturing based on optimised production process sequence

### Basic requirements

- Processes suited for automation
- Interface compatibility of machines, which are integrated in the system



# Automation INTELLIGENT & DEMAND-ORIENTED

### WAFIOS Tube Automation GmbH

The demand for smart, reliable, flexible automated production processes with low downtimes is constantly increasing.

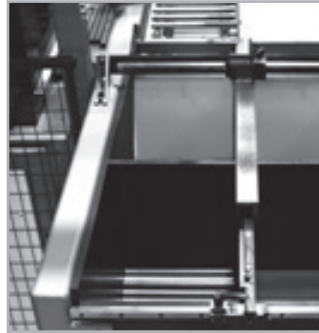
We produce not only standard machines for tube processing by bending or forming but also design complete systems and production cells based on your requirements.

We create customised solutions that can be integrated into present systems as well. We use the experience from more than 1000 machines and 100 manufacturing cells we have produced in the last 30 years from concept to implementation.

The continuous quality control of each production step is as important as a smooth process and precise machines.



# Automation Examples



Feeding



Pressing



Punching



Measuring

## Plant example 1

### Fully automatic production cell for belt tensioner

- |                        |                            |
|------------------------|----------------------------|
| 1. Tube Loader         | 7. Special forming machine |
| 2. Clock belt          | 8. Punching machine        |
| 3. Endforming machines | 9. Measuring station       |
| 4. Portal handling     | 10. Safety fence           |
| 5. Robot               | 11. Operator panel         |
| 6. Buffer              |                            |

### Special features

- Fully automatic - up to 6 robots in the cell
- Special forming machine: Workpiece is flattened and contour-stamped
- Integrated measuring station



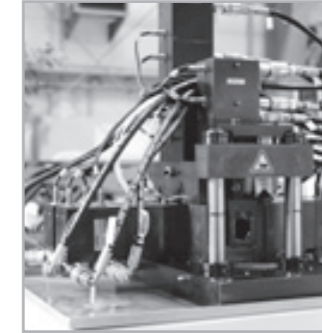
## Automation Plant examples



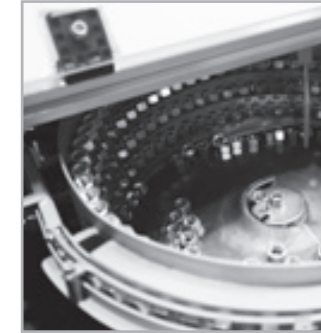
Chain loader



Weld seam detection



Punching



Screw nut feeder

## Plant example 2

### Bracket bending cell for factory transport trolley

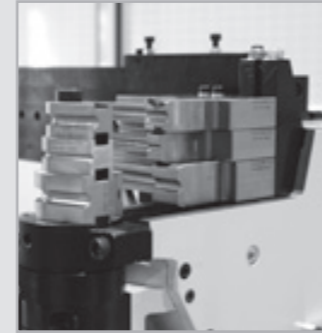
- |                     |                       |
|---------------------|-----------------------|
| 1. Chain loader     | 1. Endforming machine |
| 2. Feed units       | 2. Nut feeder         |
| 3. Punching machine | 3. Rack               |
| 4. Twister          | 4. Safety fence       |
| 5. Bending head     | 5. Operator panel     |

### Special features

- Weld seam detection and workpiece positioning
- Nut feeding takes place in the forming machine



# Automation Examples



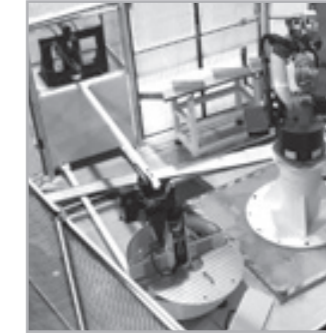
Feeding

TWISTER

Barcode scanner

Bending tools

## Automation Plant examples



Rotating wall for finished parts

Bending head with mandrel unit

Vertical feeding magazine

## Plant example 3

### Fully automatic bending cell with parts recognition

1. Clock belt
2. Barcode scanner
3. Twister Robot
4. Bending heads
5. Conveyor belt
6. Safety fence
7. Operator panel

### Special features

- **Parts identification by barcode scanner:**  
A scanner identifies the bar code on the tube and the relevant bending program and process sequence is accessed



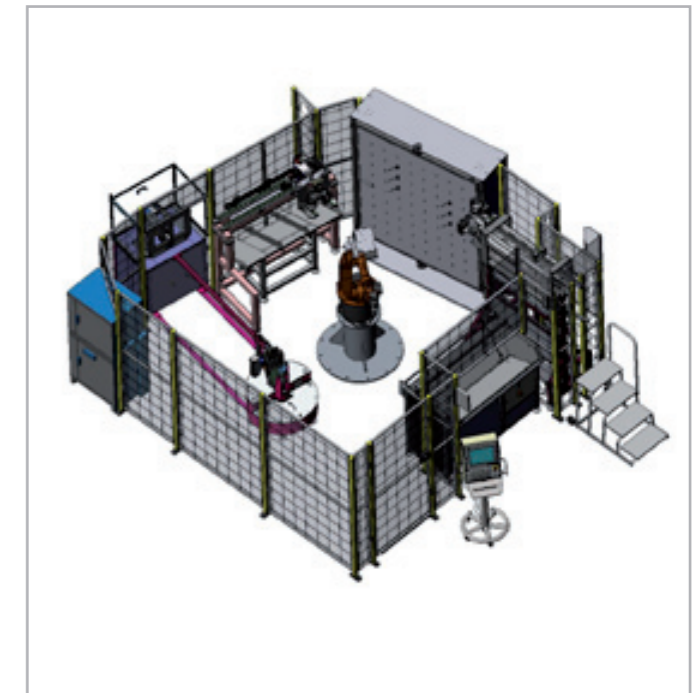
## Plant example 4

### Twister bending cell for fluid lines

1. Vertical feeding magazine
2. Tube Loader
3. Rotating wall for finished parts
4. TWISTER
5. Bending head
6. Safety fence
7. Operator panel

### Special features

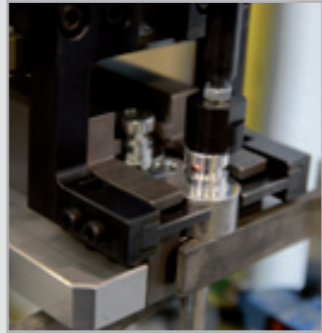
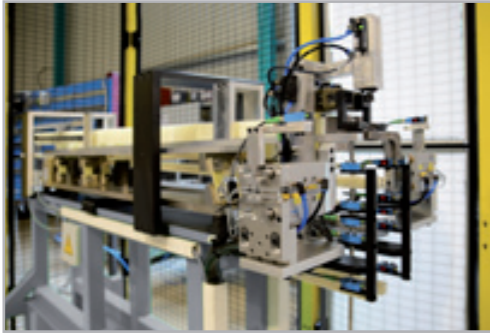
- Bending head with mandrel unit
- Vertical feeding magazine for different lengths
- Rotating wall for finished parts



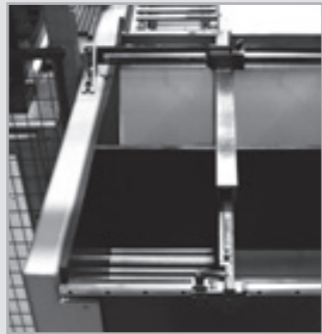


# Automation Accessories

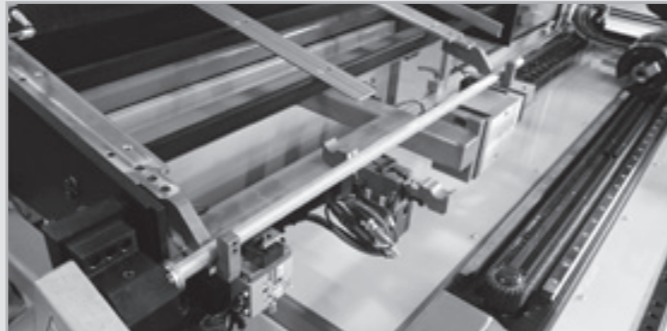
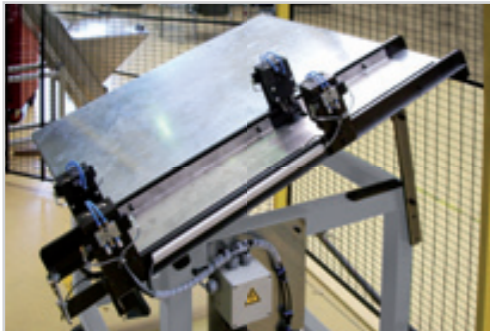
Vertical feeding  
magazines



Loader



Inclined loading  
magazines

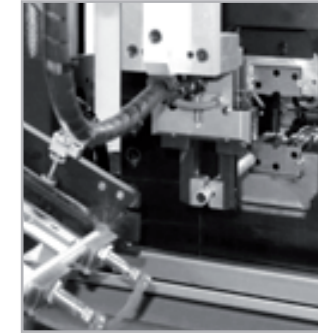
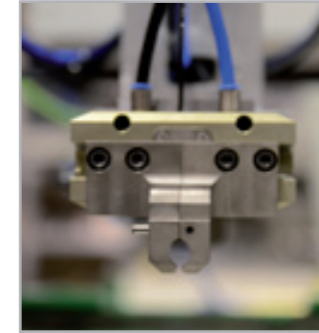
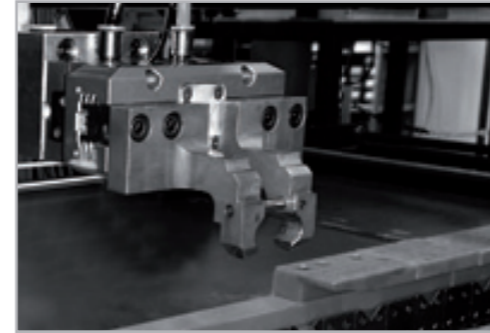


Chain loader

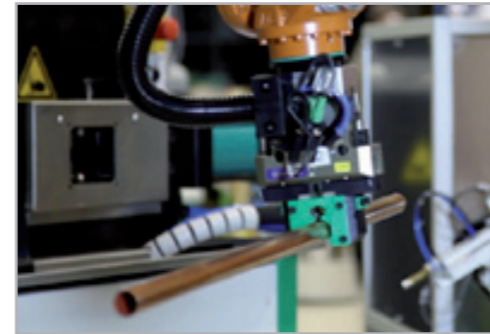


# Automation Composants d'alimentation

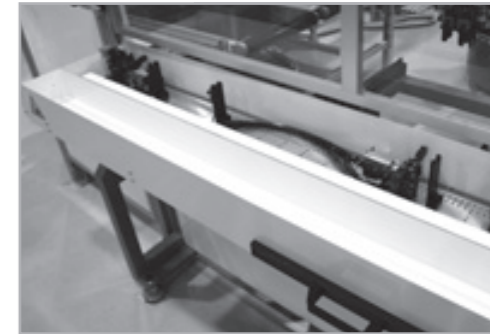
Portal handling



Robot handling



Drawer systems



Indexing belts



Conveyor belts

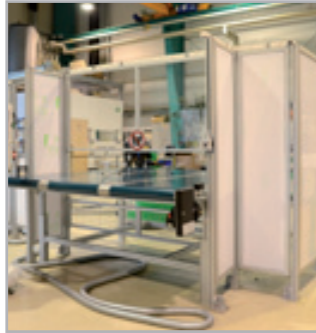


## Automation Accessories



Personal protection devices

Laser scanner or laser curtains are used in such a way that an operator cannot access the danger areas. These devices are crucial if individual machines are to be manually loaded and unloaded. The scanner stops the machine or a system in case of trespassing entering the hazard zone.



Protective enclosure

Our protective devices are appropriate and comply with the current standards. This applies for our machines as well as for our systems.



Remote service

Direct access to the machine control from our head office. With this, machine downtime is reduced and thus also reduces service cost. The connection is via the internet. The internet connection is provided by the customers.

## Automation Safety & Software



# Service



Service Hotline

Hotline: +49 7683 91900 62

**„We use internal service networks in order to provide comprehensive support“**

**We gladly offer help**

Our machines and systems are designed for continuous operation in your company. But even the most capable technology cannot avoid unexpected circumstances: a disruption in your production line.

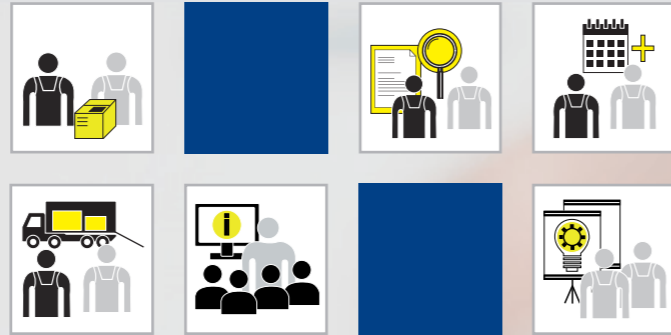
The use of remote service via internet is also an option to reduce downtime.

**„The systematic training of our service engineers is the corner stone of your satisfaction“**

**Ticket system**

Service works and malfunctions in individual machines or system components are recorded and processed using a service ticket system; this ensures proper and on-time processing.

The ticket system enables us to compile long-term statistics and evaluate quality of our products and service features, in order to continuously improve.



Service

Mail: [service@wafios-wta.com](mailto:service@wafios-wta.com)

**Service components**

- Original spare parts
- Inspection contracts
- Process development
- Warranty extension
- Training
- Relocation
- Remote service

**Warranty**

During the warranty period, the repairs are done free of cost\*. In addition, in case of repair, all necessary check and adjustment work is covered.

\* Wear parts are excluded

## Service

We focus on what is important  
**OUR CUSTOMERS**



### Service Hotline

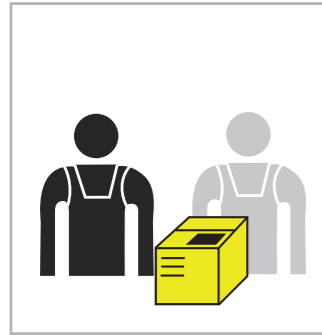
We offer prompt and reliable help.

Our service is available to you in the following manner:

**+49 7683 91900 62**

[service@wafios-wta.com](mailto:service@wafios-wta.com)

## Service Components



Original spare parts

Original spare parts are a prerequisite for the failure-free function of WTA products. They conform to the highest quality requirements. Each individual part contributes to the efficient operation of your production facility.

With our original spare parts, we offer the desired part within a very short span of time in a prompt and reliable manner.

We can prepare a customised package for a rapid access in case of need and in case of risk of long production downtime.

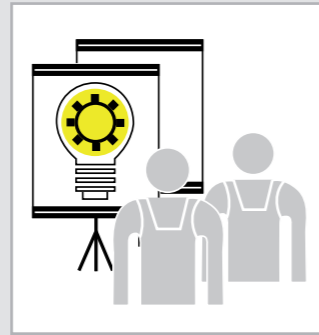


Inspection contracts

Preventive maintenance and care improves reliability and efficiency of your production process.

During regular maintenance, we take care to ensure that the reliability of machines and systems is maximised and to prevent future breakdown. Implementation of appropriate modifications is a part of this process (for example software updates) - a service, which only an OEM can offer.

Our experienced service engineer analyses your systems and can identify any irregularities.



Process development

The process development is to verify the feasibility of new or unknown processes. Here, the production process is tested, optimised and defined till the process reliability can be guaranteed.

**We offer process developments in following areas:**

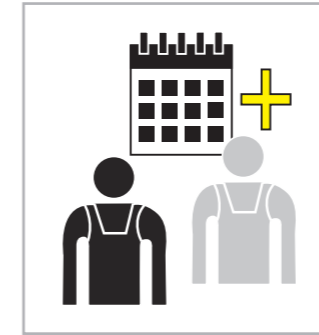
- Bending of tubes, profiles and solid materials
- Endforming and deburring of tubes and solid material
- Automation

**A trial project provides the customer with the following results:**

- Sample parts
- Detailed documentation
- Design data
- Test report

## Service

### COMPONENTS FOR COMPREHENSIVE SUPPORT

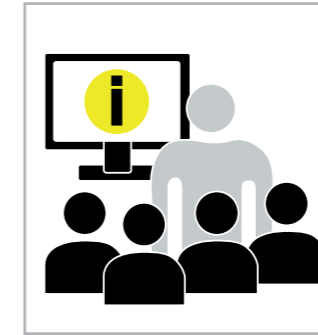


Warranty extension

With warranty extension, you have an option of flexibly extending the warranty period.

Your investment decision for systems is thus protected to the maximum over its life cycle.

**The warranty extension covers one additional year of warranty.**



Training

Efficiency and cost effectiveness of high quality machinery depends to a large extent on the competence of the employee responsible for this.

Well trained machine operators are maximising the potential which is embodied in our technology. Therefore, training is of great importance, be it during first installation or for "advanced" training. Do not compromise on training because this investment is for long term!



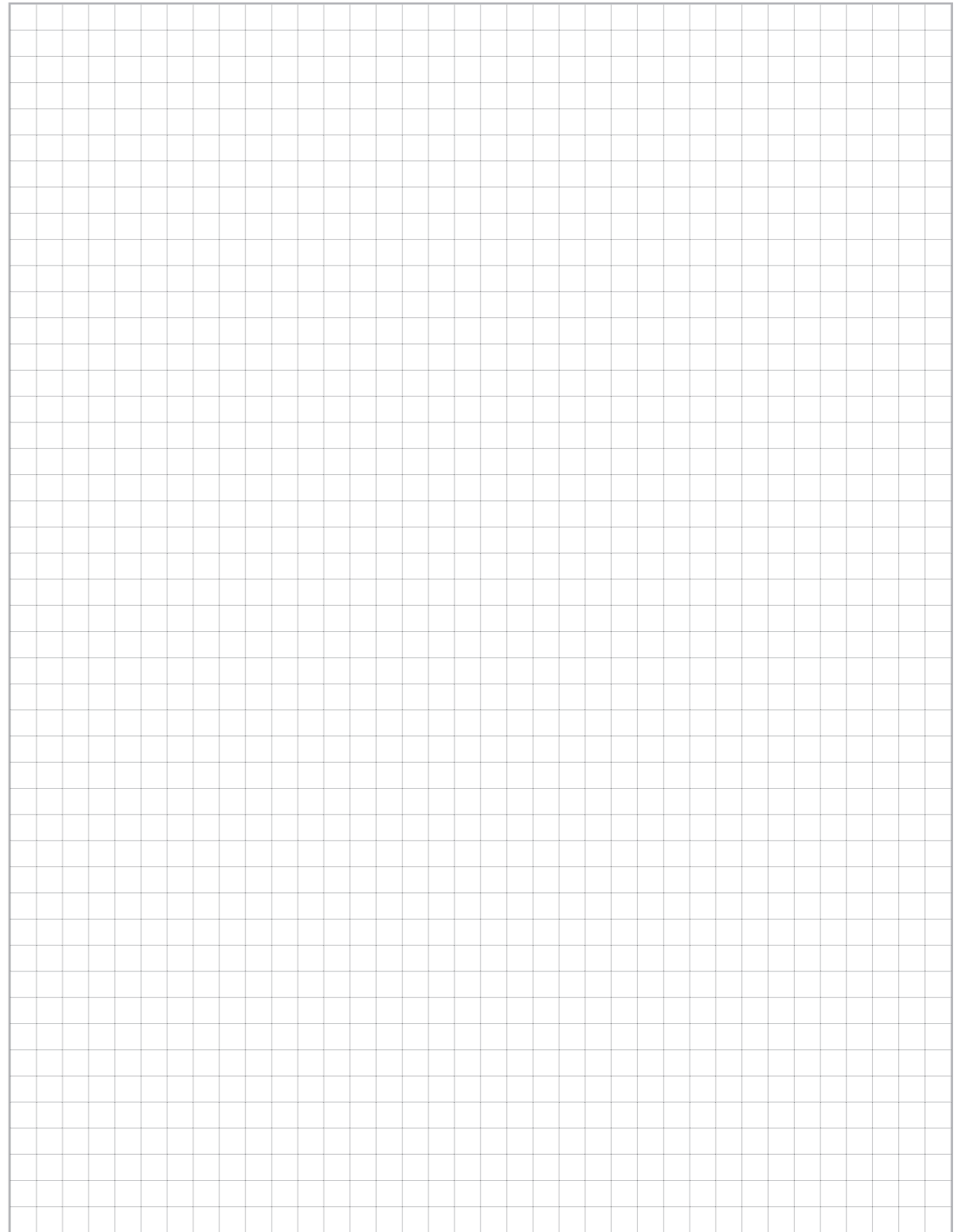
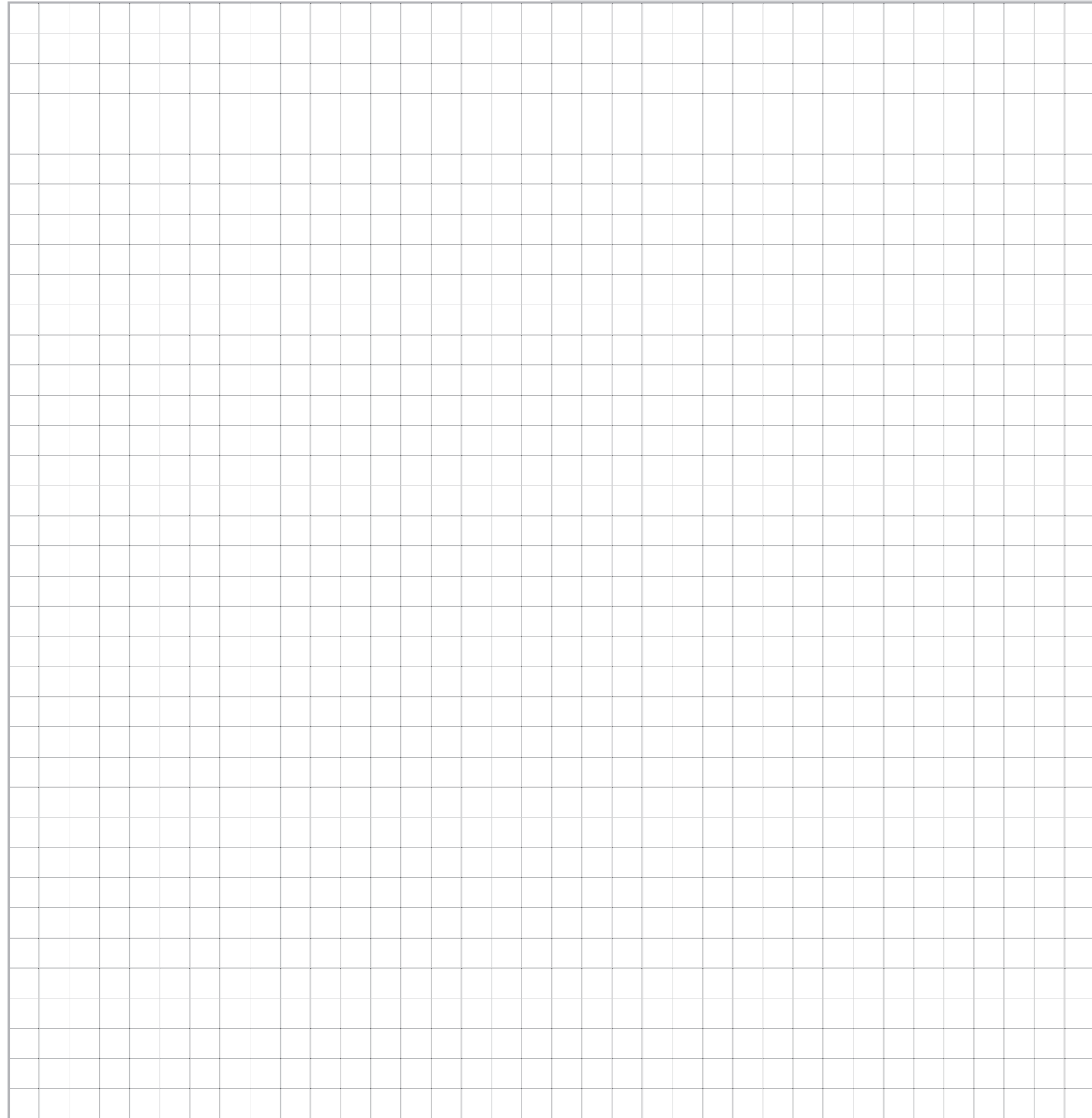
Relocation

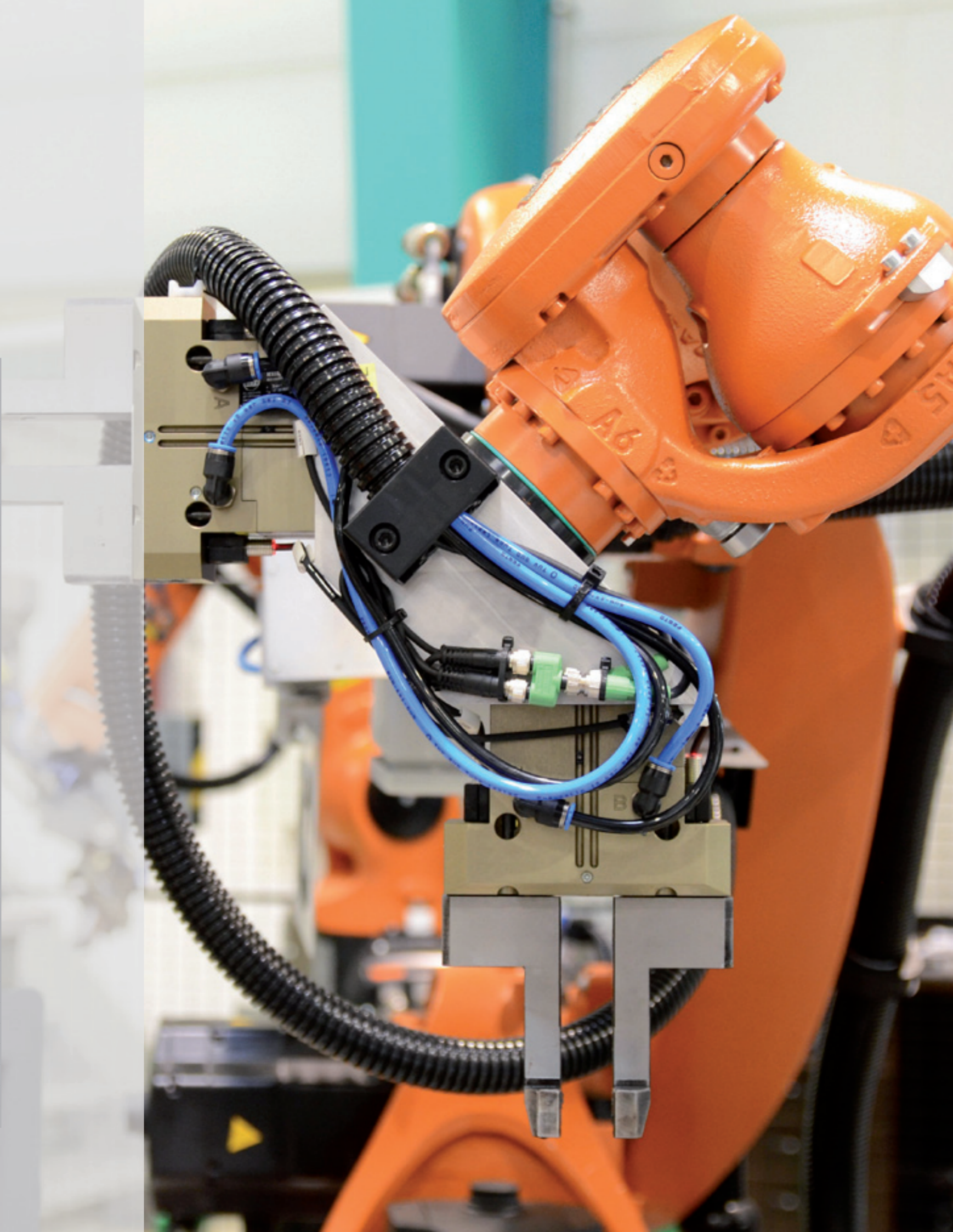
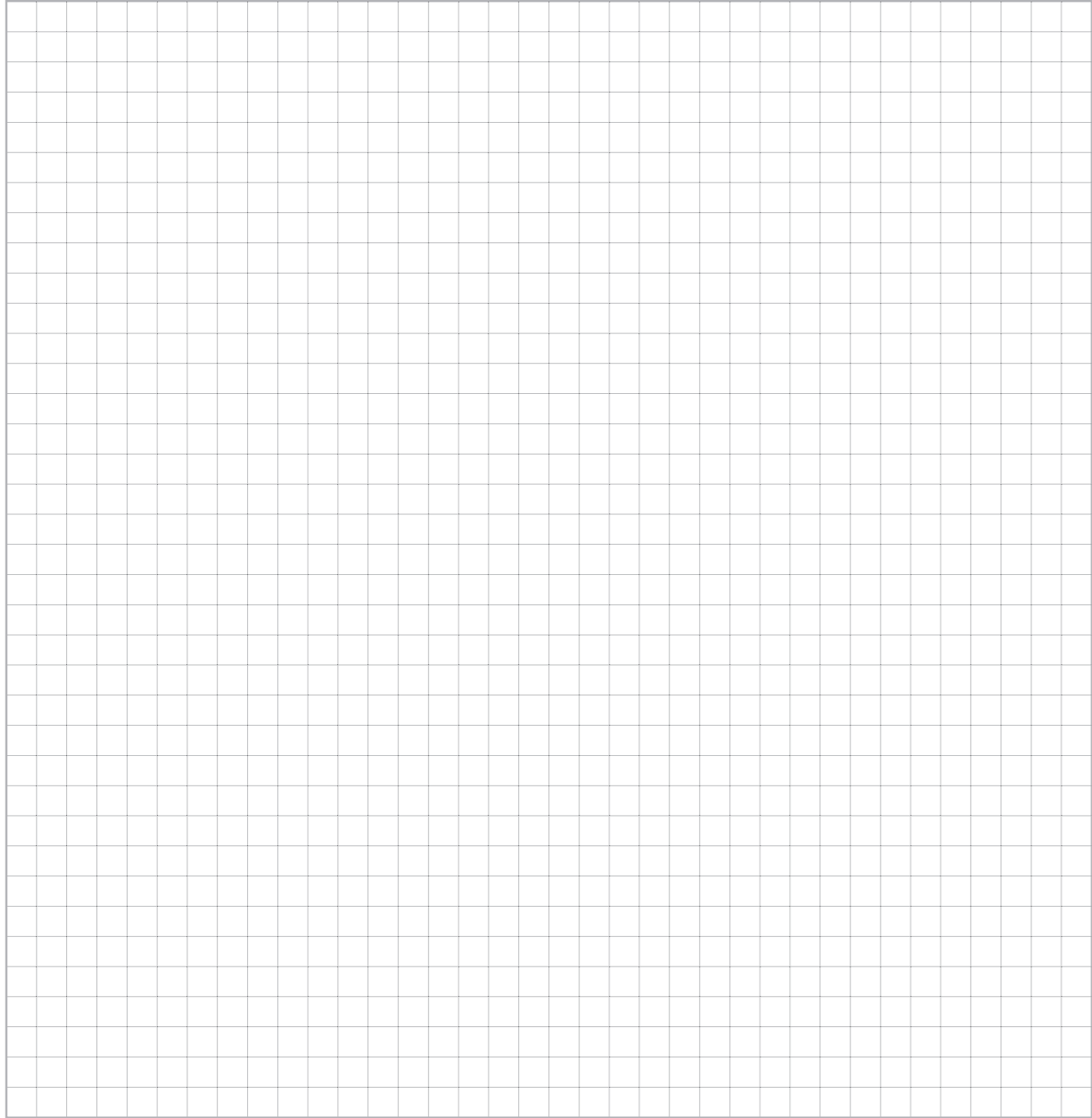
The machine relocation is a special challenge for us. We are well-equipped for your system and machine relocation and this is also in case of a tight time frame.

We can relocate your machines and systems not only within the factory premises but also over long distances. We undertake management during dismantling, transport and installation. During the preliminary stages, there is intensive consulting and understanding of on-site conditions.

This ensures smooth process of machine as well as system relocation

- Analysis of necessary measures
- Planning of transport distance
- Preparation of installation site
- Subcontractor in case of need





## Solutions



Endforming



Bending



Tube end  
processing



Laser cutting



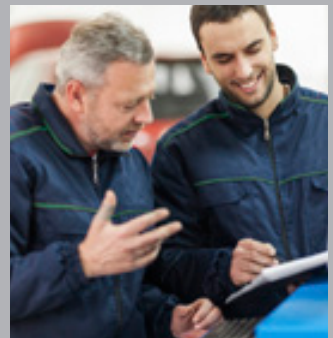
Accessories



Roll bending



Automation



Service

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99510 Apolda (Germany)

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Fax. +49 (0)7683 / 91 900 – 29