

watts müller
made in the usa

müller opladen
made in germany

3D profiling & automated welding

Forward-looking solutions for
optimized processes



From a pioneer to an innovative problem solver in 3D cutting and welding

Innovative technologies, intelligent software, robust construction and modern design are the four cornerstones of our machine manufacture activities – in Germany and the USA.

At our German Opladen and Erkelenz locations and our American location in Puyallup near Seattle, we produce 3D profile cutting machines for round pipes, tanks, dished-ends, square & rectangular pipes and steel beams as well as automated welding solutions for the toughest requirements in the metalworking industry. The machines and our software solutions are used in all segments of thermal cutting and welding and represent the first and the most important stage of a modern production process.

The high quality of workmanship and the many years of experience of our staff are an assurance of integrated solutions for complex cutting and welding tasks – worldwide.

■ History

Müller Opladen is a tradition-steeped German engineering company that can look back on an almost century-long history since its founding in 1919. Watts Mueller is a US company that was founded by Don Watts as Watts Specialties in the early 1980s.

It focused in its early years on the production of small pipe-cutting machines for welding schools. Müller Opladen became a shareholder of Watts Mueller in 2016.

■ Philosophy

Our philosophy is based on an understanding of our customers' needs and solutions geared to these requirements. This also entails serving our customers in a spirit of partnership throughout the life-cycle of our machines.

■ Research and development

In collaboration with our customers, our engineers in Germany and in the United States are constantly developing new solutions. Thanks to our extensive experience in the fields of CAD, software programming, developing electronic control systems, isometric projection and application-oriented cutting and welding processes, we can ensure that our technologies are always state-of-the-art.

■ Service

The over 1,000 machines at work each day in 72 countries demonstrate the reliability of our products. Our service centers in Germany, USA, Russia, the United Arab Emirates, India, Singapore and Brazil ensure direct communication and machine availability.



Assembly in Opladen



Assembly in Puyallup

■ **3D profile cutting machines**

Since the construction of the first mechanical oxy-fuel pipe profile cutting machine with 3 axes in the early 1950s, it has since undergone consistent further development. Today, our machines equipped with up to 9 axes are capable of profiling round pipes, tanks and dished ends as well as square & rectangular pipes and beams. The machines of the current generation are equipped today above all with plasma cutting technology and efficient materials handling systems (logistics). Our software solutions for process planning and control relating to the cutting of various components and for data interchange between the machine and the CAD/CAM systems optimize the production process on the customer site on the principle of Industry 4.0.



Torch head of a pipe profile cutting machine

■ **Automated welding solutions**

Since taking over the ARC KON engineering firm specializing in automated welding systems in 2003, we have steadily expanded our automated welding business unit. Along with such standard products as positioners, roller beds and columns & booms, we can now also offer customized solutions. These customized solutions support the welding process by automating and coordinating the movements of the workpiece and welding head. The effectiveness, robustness and easy handling of our products ensure high-quality and efficient production.



Automated welding head

Tailor-made solutions for industrial sectors worldwide

You will find us wherever pipes, tanks, beams and other components for the metalworking industry have to be thermally three-dimensionally cut or welded. Owing to our leading position in the 3D pipe profiling machine segment, we serve customers on all five continents mainly in the following sectors:

- Offshore plant construction
- Wind turbine construction
- Steel construction
- Mechanical contracting and process plant engineering
- Pressure vessel construction
- Shipbuilding
- General plant and equipment engineering

Listed below are some of our more than 1,000 reference customers in 72 countries.



Offshore plant construction: platform



Wind turbine construction



Steel construction

Selected reference customers Country

Aker Solutions	Norway
COOEC	China
Dragados	Mexiko, Spanien
Keppel Group	Singapur
Larsen & Toubro	Indien, Katar, Oman, Saudi Arabien, VAE
Saipem	Brazil, Canada, Congo, Italy, Nigeria
Sonamet	Angola, Nigeria
Techint	Brazil
Bilfinger Mars Offshore	Poland
Cimtas	Turkey
Dragados	Spain
Navacel	Spain
ST3	Poland
Steel Engineering	United Kingdom
Tata Steel	United Kingdom
Vitkovice Power Engineering	Czech Republic
Afcons	India
Cimolai	Italy, Venezuela
Cimtas Celik	Turkey
Eiffage Metal	France
Kurganstalmost	Russia
Stahlrohr	Germany
Unger Steel	Austria, UAE
Zamil Steel	Saudi Arabia



Mechanical contracting and process plant engineering



Pressure vessel construction



Shipbuilding



General plant and equipment engineering

Selected reference customers	Country
Alstom	Germany
Cairn	India
CB&I	USA
Enerfab	USA
GEA	Germany, USA
Piping Systems	USA
Ponticelli	France, Nigeria
Tranter	China, Germany, USA

Brask	USA
Chart Energy	USA
Eferest	Germany
Energy Weldfab	USA
North Shore	USA
Nuovo Pignone	Italy
Suncore	Canada
Vilmar	Romania

Bay Shipbuilding	USA
Cochin Shipyard	India
GSI	China
HDW	Germany
IHC Merwede	Netherlands
Nakilat	Qatar
Samsung	South Korea
Thoma-Sea	USA

Arcelor Mittal	Luxemburg
Bombardier	Germany
Bornemann Pumpen	Germany
Gottwald Port Technology	Germany
KSB	Germany
Siemens	Germany
Th. Witt Kältetechnik	Germany
Tyco Waters	Australia

Complete product range for challenging 3D cutting tasks

Our thermal 3D profile cutting machines are available in the MO Compact, Watts, MO Classic, MO Heavy-Duty and MO Robo series. The machines of the MO Compact, Watts, MO Classic and MO Heavy-Duty series intended essentially for round pipes operate with macro-controlled or freely programmable software, so the machines can be programmed with already available cutting macros or with the aid of our CAD/CAM systems.

The machines of the MO Robo series designed mainly for beams have a freely programmable software architecture that facilitates the autonomous generation of the cutting profiles offline with the use of CAD/CAM modules.

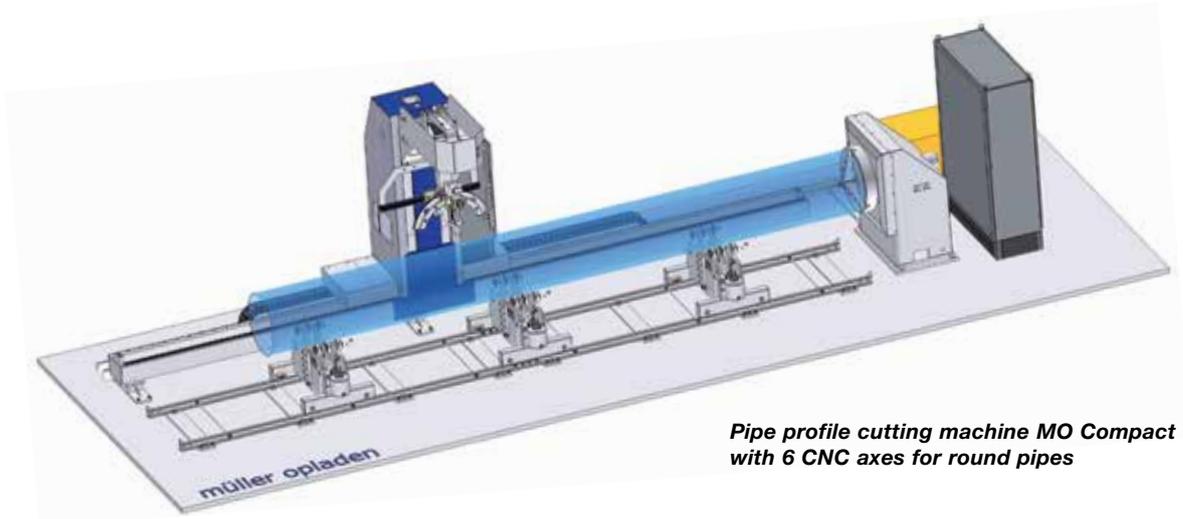
Plasma and oxy-fuel are available as cutting processes. The main differences between the various series can be seen from the table on the following pages.

The CNC-axes of a pipe profile cutting machine can be as follows:

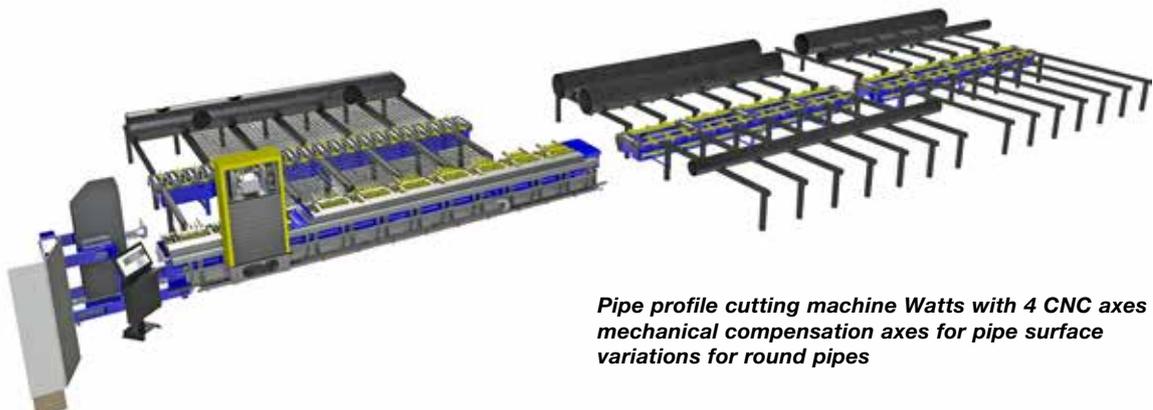
1. Rotation of the workpiece inside the chuck system (Y-axis)
2. Longitudinal movement of the cutting head along the workpiece axis (X-axis)
3. Oscillatory movement of the cutting head (B-axis)
4. Rotation of the cutting head (C-axis)
5. Height adjustment of the cutting head by a measuring system in the event of surface deviations of the workpiece (Z-axis)
6. Torch distance correction in relation to the cutting angle during the cutting process (W-axis)*
7. Transverse movement of the cutting head at 90° to the workpiece axis (V-axis)**

* Available for the MO Compact, MO Classic and MO Heavy-Duty series

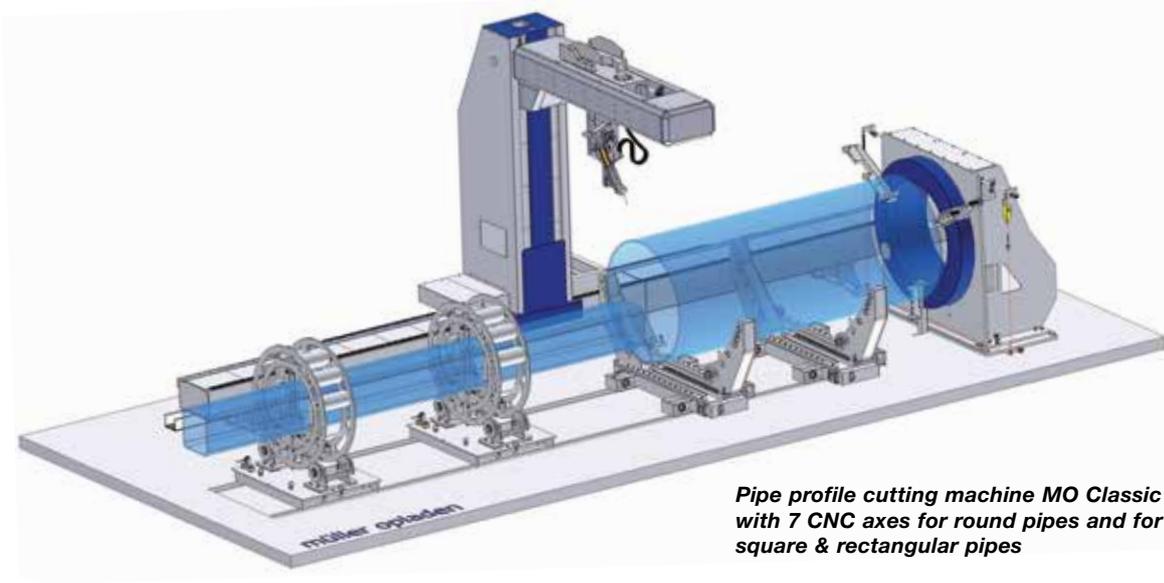
** Available for the MO Classic series



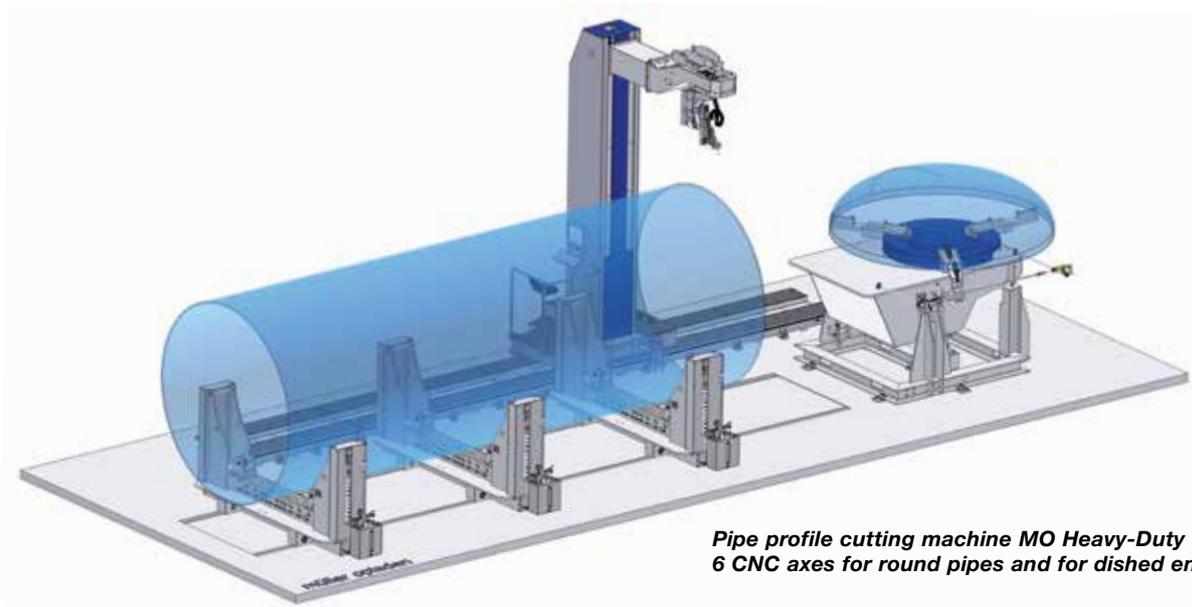
Pipe profile cutting machine MO Compact with 6 CNC axes for round pipes



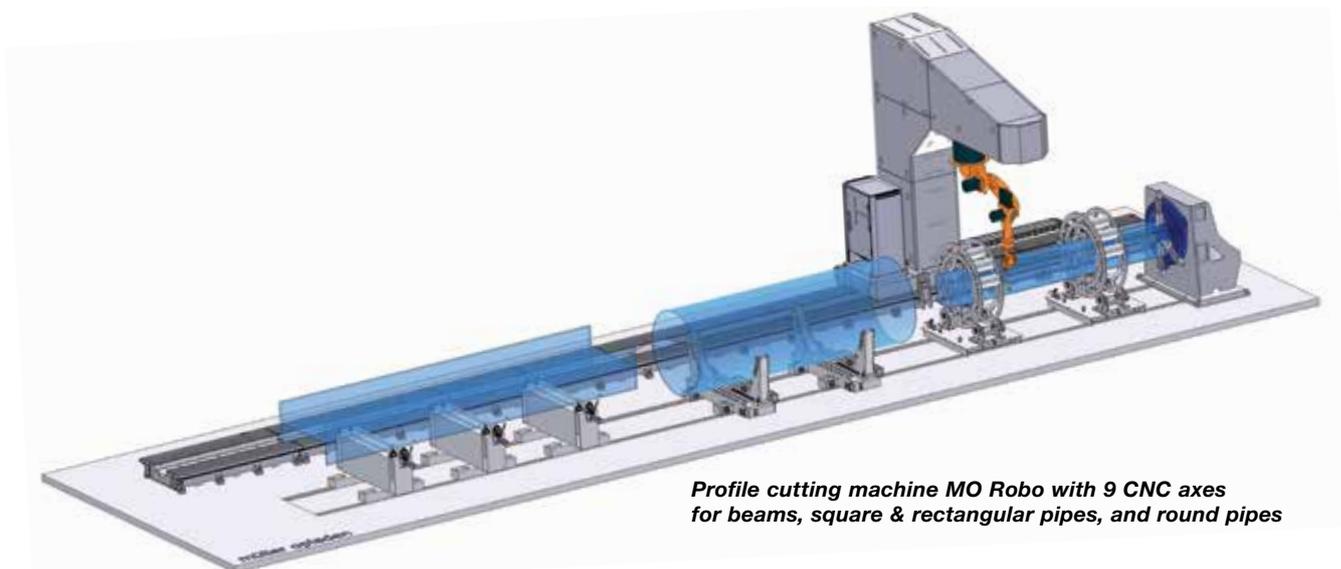
Pipe profile cutting machine Watts with 4 CNC axes and 2 mechanical compensation axes for pipe surface variations for round pipes



Pipe profile cutting machine MO Classic with 7 CNC axes for round pipes and for square & rectangular pipes



Pipe profile cutting machine MO Heavy-Duty with 6 CNC axes for round pipes and for dished ends



Profile cutting machine MO Robo with 9 CNC axes for beams, square & rectangular pipes, and round pipes

Comparison of the main technical data of the MO Compact, Watts, MO Classic, MO Heavy-Duty and MO Robo series

Technical data:	MO Compact	Watts
Application fields:	Workshops/construction sites	Industry
Transportability:	Transportable, stationary	Stationary
Maximum pipe length in mm:	12,000	18,000
Maximum pipe weight in kg:	4,000	12,000
Minimum cuttable pipe diameter in mm:	50	40
Maximum cuttable pipe diameter in mm:	914	1,220
Maximum load of pipe carriage in kg:	2,500	-
Round pipe cuttability:	x	x
Cuttability of cones:	-	-
Square & rectangular pipe cuttability:	-	-
Beam cuttability:	-	-
Dished end cuttability:	-	-
Cutting area behind chuck:	-	-
Automatic workpiece logistics:	-	x
Maximum number of CNC axes:	6	4+2
Drive design of CNC axes:	Standard	Standard
Pipe tracing:	Electromechanical	Electromechanical
Torch carriage track construction:	Column construction	Frame construction
Mobile operator's platform:	-	-
Height-adjustable operator's platform:	-	-
Torch guidance system:	Azimuth torch head	Parallelogram torch head
Oxy-fuel cutting:	x	x
Maximum cuttable wall thickness, oxy-fuel, in mm:	60	90
Maximum torch tilt angle, oxy-fuel, in °:	60	70
Omniflow automatic gas control system:	-	-
Plasma cutting:	x	x
High-definition plasma cutting:	-	x
Minimum cuttable wall thickness, plasma, in mm:	1	2
Maximum cuttable wall thickness, plasma, in mm:	35	80
Maximum torch tilt angle, plasma, in °:	45	45
Machine/plasma system communication interface :	x	x
Cutting angle correction:	x	x
Start-position optimization:	x	x
Joint compensation:	x	x
Automatic piercing and piercing optimization:	x	x
Library of standard cutting macros:	x	x
Library of special cutting macros:	-	x
Freely programmable software architecture:	-	-
Work scheduling software:	x	x
Nesting software:	x	x
CAD/CAM software:	x	x
Plasma marking system:	-	x
Airscriber lettering and/or marking system:	x	-
Inkjet lettering and/or marking system:	-	-
Label printing system:	x	x

* Applicable to machines with a pipe diameter of up to 1,220 mm

** Only applicable to machines with a pipe diameter of up to 2,032 mm

MO Classic	MO Heavy-Duty	MO Robo
Industry	Industry	Industry
Stationary	Stationary	Stationary
24,000	24,000	12,000
20,000	40,000	12,000
50*/80	200	50/80
2,032	4,064	1,220
7,500	15,000	7,500
x	x	x
x	x	-
x	-	x
-	-	x
x	x	-
x	x	x
x	x**	x
7	6	9
High dynamics	High dynamics	High dynamics
Electromechanical, laser	Electromechanical, laser	Electromechanical
Column or floor construction	Floor construction	Floor construction
x	x	-
-	x	-
MP torch head	MP torch head	Robot torch head
x	x	x
150	180	120
70	70	70
x	x	x
x	x	x
x	x	x
1	1	1
80	80	80
45	45	45
x	x	x
x	x	-
x	x	-
x	x	-
x	x	-
x	x	-
x	x	-
x	x	x
x	x	-
x	x	x
x	x	x
x	x	x
x	x	x
x	x	-

Cost effective compact systems for smaller pipes

The MO Compact series comprises standardized, compact machines with the key basic functions for round pipes up to a diameter of 914 mm and up to a pipe weight of up to 4 metric tons. The machines are all equipped with 6 CNC-controlled axes.

Detailed information can be supplied on request.

MO 400/6 Compact

with 6 CNC axes for round pipes with a maximum diameter of 406 mm inclusive of transport frame, Kjellberg PA-S45 W plasma cutting system, height-adjustable chuck and fixed-height pipe carriages



MO 900/6 Compact

with 6 CNC axes for round pipes with a maximum diameter of 914 mm inclusive of the Hypertherm HPR130XD plasma cutting system, oxy-fuel cutting system, height-adjustable chuck, manual ball gutter and hold-down

Technical information / Machine series:	MO 400/6 Compact	MO 600/6 Compact	MO 800/6 Compact	MO 900/6 Compact
Weight of standard machine in kg:	4,500	5,000	5,500	6,000
Number of CNC axes:	6	6	6	6
Max. workpiece weight in kg:	4,000	4,000	4,000	4,000
Min. - max. clampable pipe diameter in mm:	50 - 406	50 - 610	50 - 812	50 - 914
Max. size of chuck opening in mm:	-	-	-	-
Min. - max. clampable square & rectangular pipe dimensions in mm:	-	-	-	-
Min. - max. clampable beam width in mm:	-	-	-	-
Min. - max. clampable diameter for dished ends in mm:	-	-	-	-
Min. - max. cuttable workpiece length in mm: *	300** - 12,000	300** - 12,000	300** - 12,000	300** - 12,000
Min. - max. wall thickness for cut- ting with oxy-fuel / plasma in mm:*	5-60 / 5-35	5-60 / 5-35	5-60 / 5-35	5-60 / 5-35
Max. torch angle with oxy-fuel / plasma in °: ***	+/- 60 / 45	+/- 60 / 45	+/- 60 / 45	+/- 60 / 45

* With torch in vertical position

** With additional clamping device up to 50 mm (depending on pipe parameters)

*** Up to 55° when special plasma cutting sources are used



Perfect solutions for pipe cutting plus logistics

The Watts series comprises standardized machines with sophisticated logistics for round pipes up to a diameter of 1,220 mm and up to a pipe weight of 12 metric tons. The machines are all equipped with 4 CNC-controlled axes and 2 mechanical compensation axes for pipe surface variations.

Furthermore the machines can be supplied with only 2 CNC axes as well. However, due to the 2 missing axes, these less expensive solutions generate the cutting shape but without constant weld bevel preparation. The machines are generally fabricated with comprehensive logistics solutions and a floating chuck. All machines of the MO Compact, MO Classic and MO Heavy-Duty series (applicable to machines with a pipe diameter of up to 2,032 mm) can be also equipped with the logistics solutions of the Watts series.

Detailed information can be supplied on request.



Watts W-244

with 4 CNC axes for round pipes with a maximum diameter of 610 mm inclusive of the Hypertherm HPR 130 plasma cutting system, floating chuck and semiautomatic conveyor system

Watts W-364

with 4 CNC axes for round pipes with a maximum diameter 914 mm inclusive of the Hypertherm HPR 260 plasma cutting system, floating chuck and full automatic conveyor system with discharge solution for the pipe store



Watts W-122

with 2 CNC axes for round pipes with a maximum diameter of 355 mm inclusive of the Hypertherm MaxPro 200 plasma cutting system, floating chuck and manual adjustable pipe support units

Technical information / Machine series:	Watts W-124 W-122	Watts W-244 w-242	Watts W-364 W-362	Watts W-484 -
Weight of standard machine in kg:	10,000	11,000	13,000	15,000
Number of CNC axes:	4+2 / 2+2	4+2 / 2+2	4+2 / 2+2	4+2 / 2+2
Max. workpiece weight in kg:	5,000	10,000	12,000	12,000
Min. - max. clampable pipe diameter in mm:	50 - 355	50 - 610	75 - 914	75 - 1,220
Max. size of chuck opening in mm:	-	-	-	-
Min. - max. clampable square & rectangular pipe dimensions in mm:	-	-	-	-
Min. - max. clampable beam width in mm:	-	-	-	-
Min. - max. clampable diameter for dished ends in mm:	-	-	-	-
Min. - max. cuttable workpiece length in mm: *	300** - 13,300	300** - 13,300	300** - 13,300	300** - 13,300
Min. - max. wall thickness for cut- ting with oxy-fuel / plasma in mm:*	5-90 / 2-80	5-90 / 2-80	5-90 / 2-80	5-90 / 2-80
Max. torch angle with oxy-fuel / plasma in °:	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45

* With torch in vertical position

** With additional clamping device up to 50 mm (depending on pipe parameters)

*** Up to 55° when special plasma cutting sources are used



Unparalleled combination options for a huge range of workpieces

The MO Classic series covers our classical machines primarily for round pipes with a maximum diameter of up to 2,032 mm and up to a pipe weight of 20 metric tons. It is also suitable for square & rectangular pipes and dished ends. The maximum dimensions can be seen in the table of technical data.

Thanks to numerous technical optional extras, these technologically complex machines can be individually adapted to customers' specific needs. The various machines of the MO Classic series can be equipped with up to 7 CNC axes. The 7th CNC axis is necessary for cutting square & rectangular pipes.

Detailed information can be supplied on request.

MO 600/6 Classic

with 6 CNC axes for round pipes with a maximum diameter of 610 mm inclusive of the Kjellberg HiFocus 360i plasma cutting system, oxy-fuel cutting system, stationary multi-point extraction system, height-adjustable chuck and fixed-height pipe carriage



MO 1200/7 Classic RS

with 7 CNC axes for round pipes with a maximum diameter of 1,220 mm and square & rectangular pipes of 420 mm x 420 mm maximum inclusive of the Kjellberg HiFocus 360i plasma cutting system, oxy-fuel cutting system, height-adjustable chuck and fixed-height pipe carriages

MO 1500/6 Classic RD

with 6 CNC axes for round pipes and dished ends with a maximum diameter of 1,524 mm inclusive of Hypertherm HPR 400XD plasma cutting system, oxy-fuel cutting system, stationary multi-point fume extractor, 7-nozzle inkjet lettering and marking system, and adjustable scissor-type pipe carriages



Technical information / Machine series:	MO 600/6 Classic	MO 1200/6 Classic	MO 1500/6 Classic	MO 2000/6 Classic
Weight of standard machine in kg:	7,000	9,000	11,000	13,000
Number of CNC axes:	6-7	6-7	6-7	6-7
Max. workpiece (round pipe) weight in kg:	12,000	12,000	15,000	20,000
Min. - max. clampable pipe diameter in mm:	50 - 610	50 - 1,220	80 - 1,524	80 - 2,032
Max. size of chuck opening in mm:	400	650	950	950
Min. - max. clampable square & rectangular pipe dimensions in mm:	100 x 100 / 240 x 240	100 x 100 / 420 x 420	100 x 100 / 640 x 640	100 x 100 / 640 x 640
Min. - max. clampable beam width in mm:	-	-	-	-
Min. - max. clampable diameter for dished ends in mm:	400 - 610	400 - 1,220	400 - 1,524	400 - 2,032
Min. - max. cuttable workpiece length in mm: *	300** - 24,000	300** - 24,000	300** - 24,000	300** - 24,000
Min. - max. wall thickness for cut- ting with oxy-fuel / plasma in mm: *	5-150 / 1-80	5-150 / 1-80	5-150 / 1-80	5-150 / 1-80
Max. torch angle with oxy-fuel / plasma in °: ***	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45

* With torch in vertical position

** With additional clamping device up to 50 mm (depending on pipe parameters)

*** Up to 55° when special plasma cutting sources are used



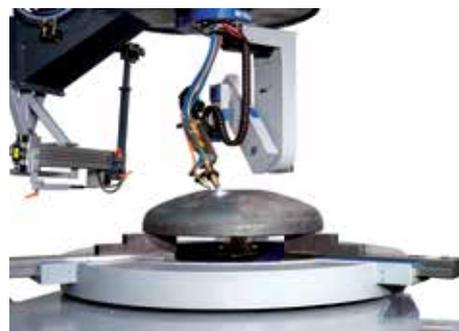
Heavy-duty machines for large and heavy pipes

The MO Heavy-Duty series comprises machines for round pipes and/or dished ends with a maximum diameter of up to 4,064 mm and up to a pipe weight of 40 metric tons. The technology is based on that of the MO Classic series. Owing to the large workpiece dimensions and weights, the machines of this series have an extremely solid design. The machines are all equipped with 6 CNC-controlled axes. Detailed information can be supplied on request.



MO 2500/6 Heavy-Duty

with 6 CNC axes for round pipes with a maximum diameter of 2,540 mm inclusive of oxy-fuel cutting system, fixed chuck and height adjustable, hydraulic pipe carriages



MO 4000/6 Heavy-Duty RD

with 6 CNC axes for round pipes and dished ends with a maximum diameter of 4,064 mm inclusive of Hypertherm HPR 400 plasma cutting system, oxy-fuel cutting system, height-adjustable operator stand, tilting chuck and hydraulic scissor-type pipe carriages



Technical information / Machine series:	MO 2000/6 Heavy-Duty	MO 2500/6 Heavy-Duty	MO 3000/6 Heavy-Duty	MO 4000/6 Heavy-Duty
Weight of standard machine in kg:	18,000	22,000	24,000	28,000
Number of CNC axes:	6	6	6	6
Max. workpiece (pipe) weight in kg:	40,000	40,000	40,000	40,000
Min. - max. clampable pipe diameter in mm:	200 - 2,032	200 - 2,540	200 - 3,048	200 - 4,064
Max. size of chuck opening in mm:	950	1,200	1,200	1,500
Min. - max. clampable square & rectangular pipe dimensions in mm:	-	-	-	-
Min. - max. clampable beam width in mm:	-	-	-	-
Min. - max. clampable diameter for dished ends in mm:	400 - 2,032	400 - 2,540	400 - 3,048	400 - 4,064
Min. - max. cuttable workpiece length in mm: *	300 - 24,000	300 - 24,000	300 - 24,000	300 - 24,000
Min. - max. wall thickness for cutting with oxy-fuel / plasma in mm: *	5-180 / 1-80	5-180 / 1-80	5-180 / 1-80	5-180 / 1-80
Max. torch angle with oxy-fuel / plasma in °:	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45

* With torch in vertical position

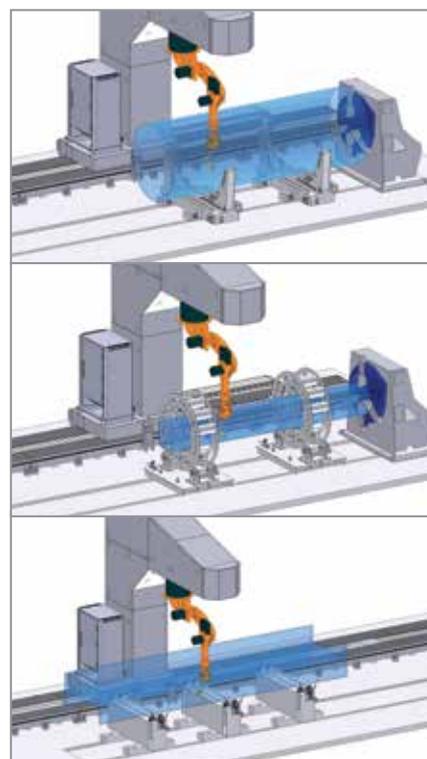
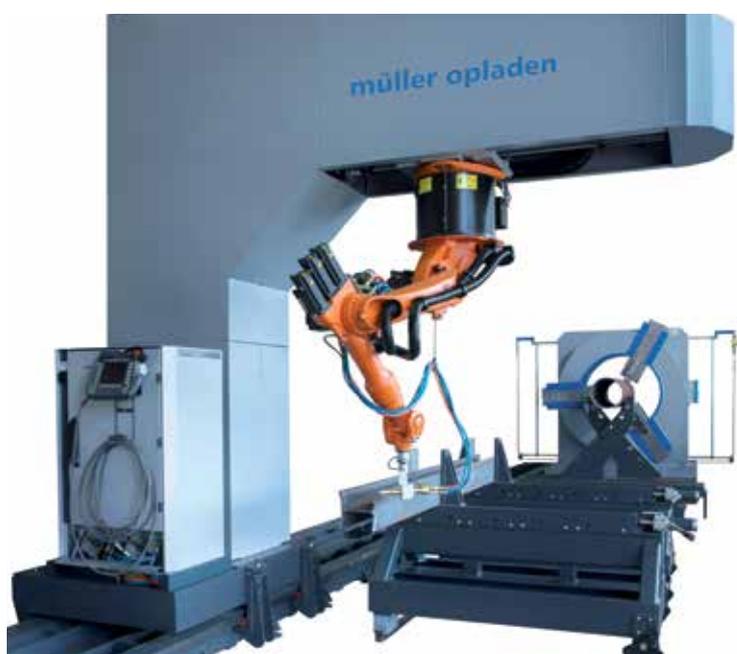


Versatile robot systems for even more degrees of freedom

The MO Robo series covers robot-controlled machines that are mainly intended for the comprehensive cutting of beams (H, U, L and I). They are also capable of cutting round pipes and square & rectangular pipes. Beams can be cut up to a web width of 1,200 mm and up to a weight of 12 metric tons. The maximum dimensions can be seen in the table of technical data.

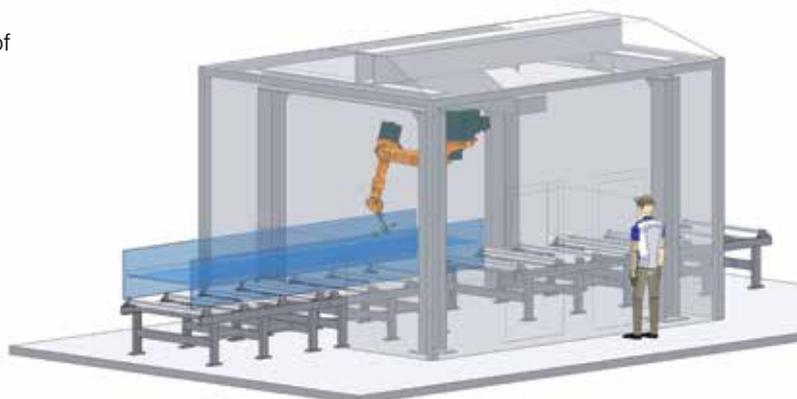
If the various workpieces – beams, square & rectangular pipes or round pipes – are to be profiled, the machines are equipped with 9 CNC-controlled axes. The workpieces are loaded onto the beam cutting bed by a crane. Alternatively, we can also supply the machine exclusively for beams with a cutting cell and automated infeed and outfeed.

Detailed information can be supplied on request.



MO 1200/9 Robo BRS

with 9 CNC axes for beams with a maximum width of 1,200 mm and round pipes with a maximum diameter of 1,220 mm inclusive of oxy-fuel cutting system, fixed chuck, beam cutting bed and height-adjustable, scissor-type pipe carriages



Technical information / Machine series:	MO 200 Robo	MO 600 Robo	MO 800 Robo	MO 1200 Robo
Weight of standard machine in kg:	7,000	12,000	13,000	16,000
Number of CNC axes:	7-9	7-9	7-9	7-9
Max. workpiece weight in kg:	4,000	8,000	12,000	12,000
Min. - max. clampable pipe diameter in mm:	50 - 406	50 - 610	50 - 812	50 - 1,220
Max. size of chuck opening in mm:	400	400	400	650
Min. - max. clampable square & rectangular pipe dimensions in mm:	100 x 100 / 240 x 240	100 x 100 / 240 x 240	100 x 100 / 240 x 240	100 x 100 / 420 x 420
Min. - max. clampable beam width in mm:	50 - 200	50 - 600	50 - 800	100 - 1,200
Min. - max. clampable diameter for dished ends in mm:	-	-	-	-
Min. - max. cuttable workpiece length in mm: *	300 - 12,000	300 - 12,000	300 - 12,000	300 - 12,000
Min. - max. wall thickness for cutting with oxy-fuel / plasma in mm:*	5-120 / 1-80	5-120 / 1-80	5-120 / 1-80	5-120 / 1-80
Max. torch angle with oxy-fuel / plasma in: °	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45

* With torch in vertical position



Comprehensive software support for process-oriented production

Our software solutions for machines and processes make our customers' production workflows more efficient. Our machines for the thermal cutting of 3D contours are not therefore isolated elements, but part of an integrated process chain.

With our CAM modules, we are able to link our machines to upstream and downstream workflows to significantly reduce production time, material costs and errors.

The software MOCAM® and/or the macro-based Corobs® software are the basis for the MO Compact, Watts, MO Classic and MO Heavy-Duty machine series.

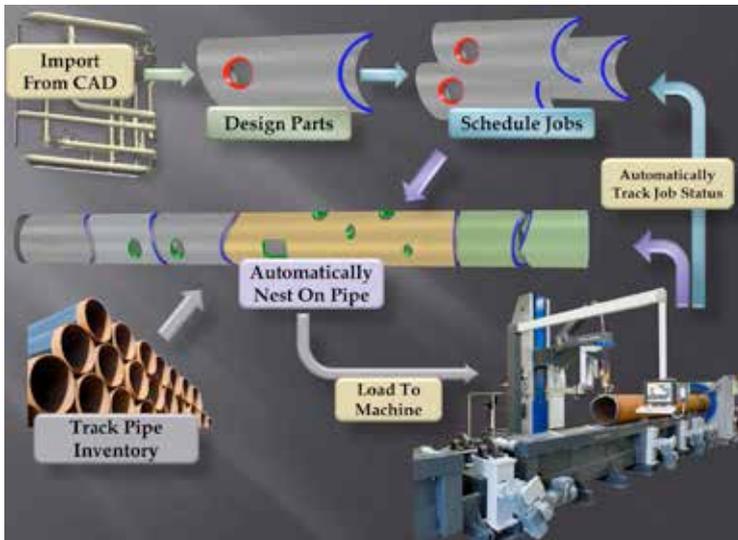
The AlmaRobo® software is the basis for the MO Robo series.

■ MOCAM® CAD/CAM system for the MO Compact, Watts, MO Classic and MO Heavy-Duty machine series

MOCAM® is a comprehensive CAD/CAM system for the purpose of modeling cutting geometries, for nesting numerous parts to be cut on a single pipe, for assigning cutting functions to one or several machines while taking into account their respective capacity, for keeping track of current working process stages at the machines and for calculating and recording cutting times and costs.

MOCAM® also provides extensive reporting functions for calculation or documentation purposes. Furthermore, MOCAM® provides comprehensive reporting for downstream costing and documentation purposes. MOCAM® can be fully integrated in a company's workflow as an autonomous software system for the modeling of pipes or by importing drawings from a multitude of CAD software systems.

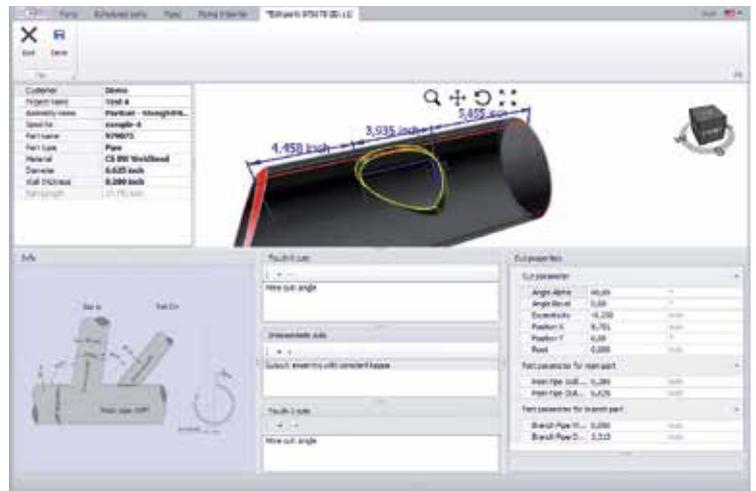
MOCAM® offers rich data in SQL views that can be pulled into Excel and other tools for reporting, and into ERP systems or other databases. MOCAM® is typically run at both the machine and in offices. In offices, CAD designers and detailers import jobs, design parts, and plan work. At the machine, machine operators nest parts on pipes and cut jobs.



Example: CAD/CAM system

■ **MOCAM® modeling module**

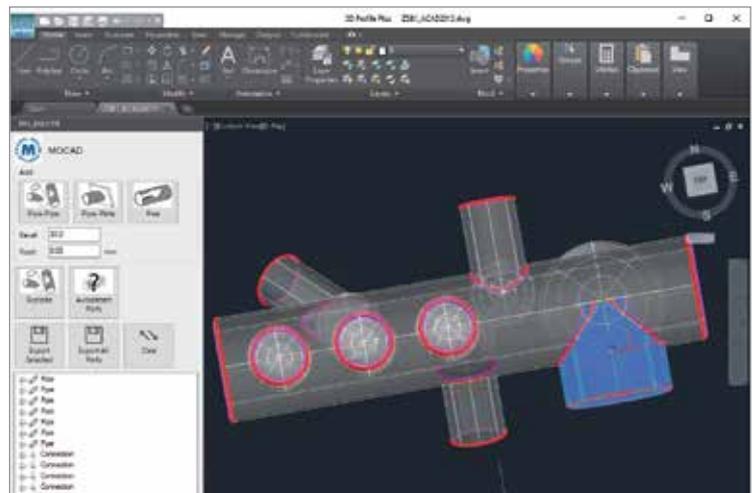
The MOCAM® modeling module permits independent production of pipe cutting contours represented in 3D with dimension contours. To begin with, a cutting contour such as a saddle cut is selected. Then, only a few parameters need be entered into a pre-set mask to allow the cutting contour to develop automatically. Repetitive contours can simply be duplicated.



Example: modeling module

■ **MOCAM® CAD import module**

MOCAM® can import parts and complete design spools of most well-known software CAD systems such as Acorn, AutoDesk, Aveva, BoCAD, COMPRESS, Intergraph, Pro CAD, Pro Engineer, Ship Constructor, Solid Works or Tekla Structures. Custom importers for special CAD systems can be developed in cooperation with customers.



Example: CAD import module

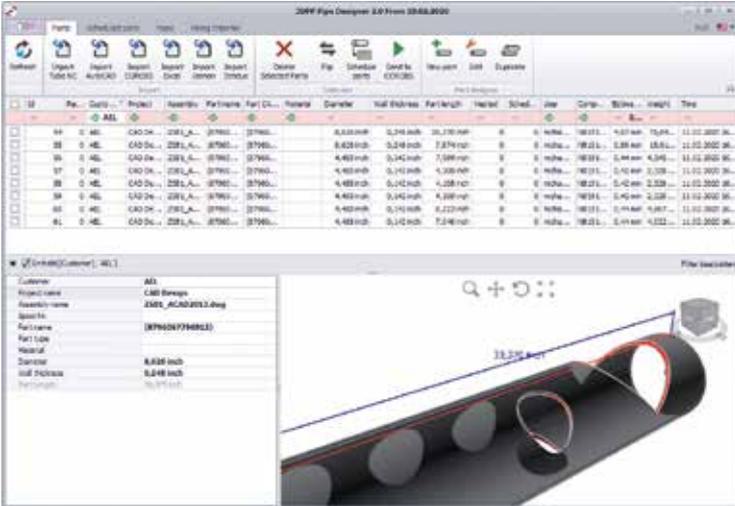
■ **MOCAM® nesting module**

Once all the parts have either been modeled or alternatively imported, MOCAM®, with a single command, automatically nests the parts on a pipe. This algorithm for such optimal nesting can save up to 10 percent in materials. The pipe segments to be cut are then shown in 3D on the monitor.

During the cutting process, both the machine operator and those using MOCAM® in offices can remotely see the machines' cutting progress. MOCAM® integrates also software that can automatically print unique labels for each part.



Example: nesting module

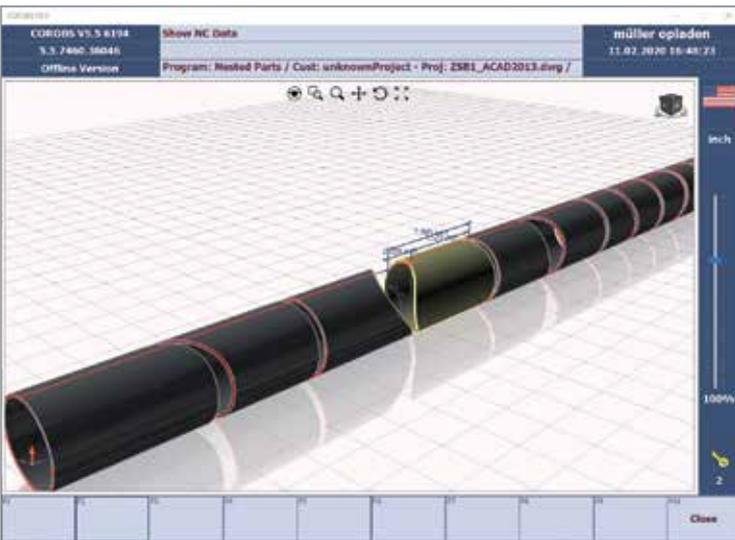


MOCAM® and SQL databases

■ **MOCAM® and SQL databases**

MOCAM® runs on top of SQL databases. These databases expose a rich set of data views for use in ERP, process management, inventory control, and custom reporting.

Our customers often integrate MOCAM® data with their ERP system, and also with Microsoft Excel to create custom live reports for job costing, scheduling and tracking, inventory control, and post-job analyses.



Example: macro-based programming

■ **Corobs® macro-based programming for the MO Compact, Watts, MO Classic and MO Heavy-Duty machine series**

Besides MOCAM®, the machine computer also uses our Corobs® software. Through selection of a wide range of cutting macros, this allows quick preparation at the workstation of the various cuts which are then directly performed on the pipe.

Page 24 shows the standard cutting macros that are supplied in a library with each machine. Page 25 shows a selection of special macros that can be optionally included in the standard library in accordance with customer needs or the branch of industry concerned.

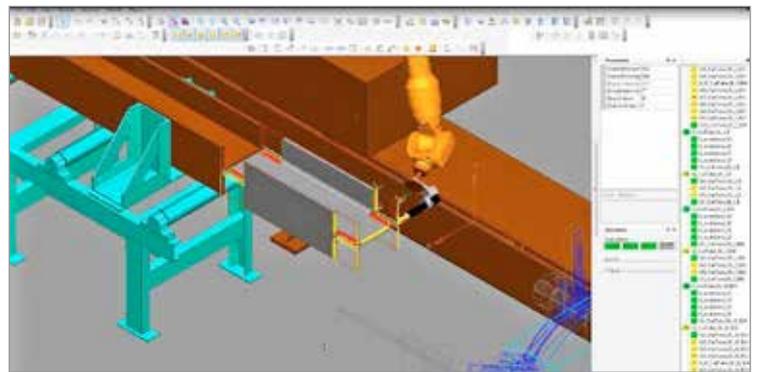
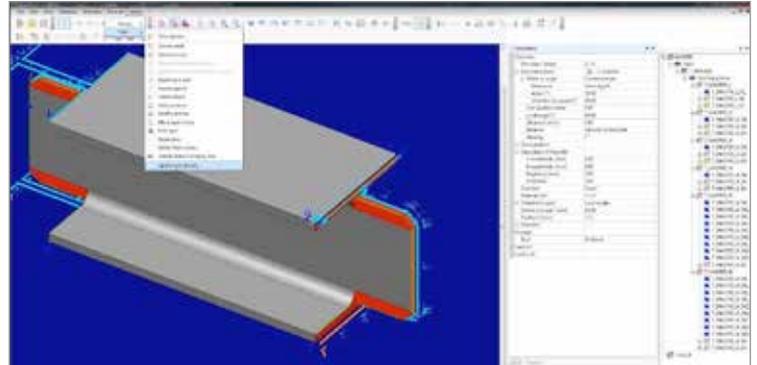
In addition to this, Corobs® offers various setting options with regard to cutting parameters and other sequential parameters with a view to optimizing the individual steps in each case and also depending on the properties and quality of the pipe. These functions are also provided by Corobs® when MOCAM® is being used since the two software systems are interconnected and adapted to each other.

■ **AlmaRobo® CAD/CAM system
for the MO Robo machine series**

AlmaRobo® is a comprehensive CAD/CAM system running on top of Alma software. This latter ranks as the comprehensive and leading CAD/CAM software for companies in the structural steel sector.

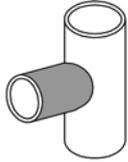
The cutting contours are generated with the aid of freely programmable software architecture. In AlmaRobo®, data import from a CAD system, preferably from Tekla Structures, is followed by the automatic definition of the cutting curves and the associated creation of a cutting file. AlmaRobo® then sets the start and end points for the cutting task. After this, the overall cutting process of a cutting file is simulated with the depiction of the machine and the workpiece before the start of cutting proper.

The CAM tools in AlmaRobo® have a design similar to those in MOCAM®.

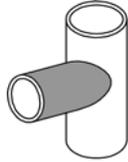


AlmaRobo® CAD/CAM system

Ready made cutting macros for greater efficiency



Saddle 90° set-on concentric



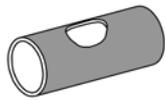
Saddle 90° set-on eccentric



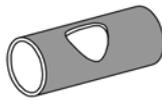
Saddle < 90° set-on concentric



Saddle < 90° set-on eccentric



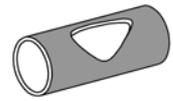
Cut out 90°
set-on concentric



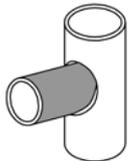
Cut out 90°
set-on eccentric



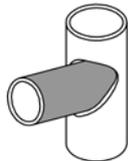
Cut out < 90°
set-on concentric



Cut out < 90°
set-on eccentric



Saddle 90° set-in concentric



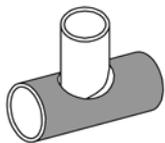
Saddle 90° set-in eccentric



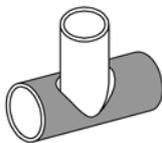
Saddle < 90° set-in concentric



Saddle < 90° set-in eccentric



Cut out 90°
set-in concentric



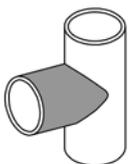
Cut out 90°
set-in eccentric



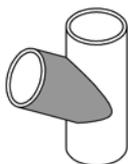
Cut out < 90°
set-in concentric



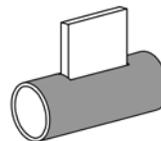
Cut out < 90°
set-in eccentric



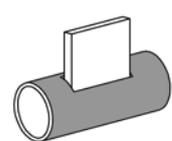
Saddle double-miter 90°



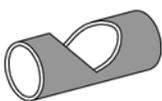
Saddle double-miter < 90°



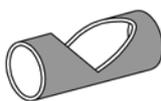
Slot concentric



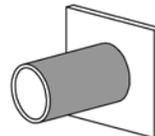
Slot eccentric



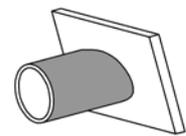
Double-miter



Double-miter

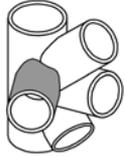


Miter 90°

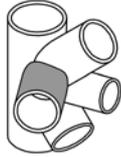


Miter < 90°

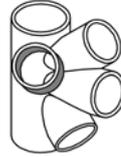
Examples of special macros for cutting profiles



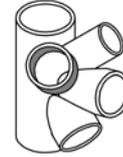
Multiple saddle 90° concentric



Multiple saddle 90° eccentric



Multiple saddle < 90° concentric



Multiple saddle < 90° eccentric



Elbow saddle concentric



Elbow saddle eccentric



Elbow saddle offset concentric



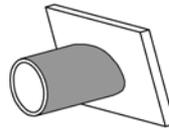
Elbow saddle offset eccentric



Offshore saddle concentric



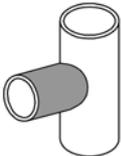
Offshore saddle eccentric



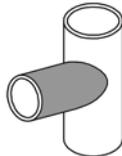
Offshore miter



Dished end penetrations



Saddle 90° set-on concentric
variable bevel



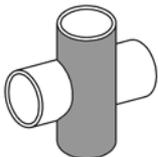
Saddle 90° set-on eccentric
variable bevel



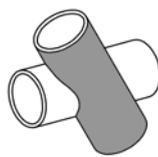
Saddle < 90° set-on concentric
variable bevel



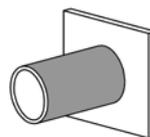
Saddle < 90° set-on eccentric
variable bevel



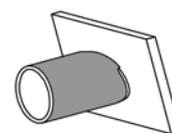
Cross cut-out eccentric square



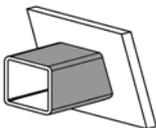
Cross cut-out eccentric angular



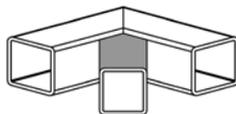
Miter 90° for fillet weld



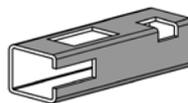
Miter < 90° for fractional
fillet weld



Miter square & rectangular pipe



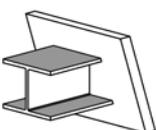
Double-miter square & rectangular pipe



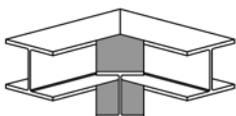
Slots square & rectangular pipe



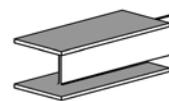
Saddle square & rectangular pipe



Miter beam



Double-miter beam



Notching beam

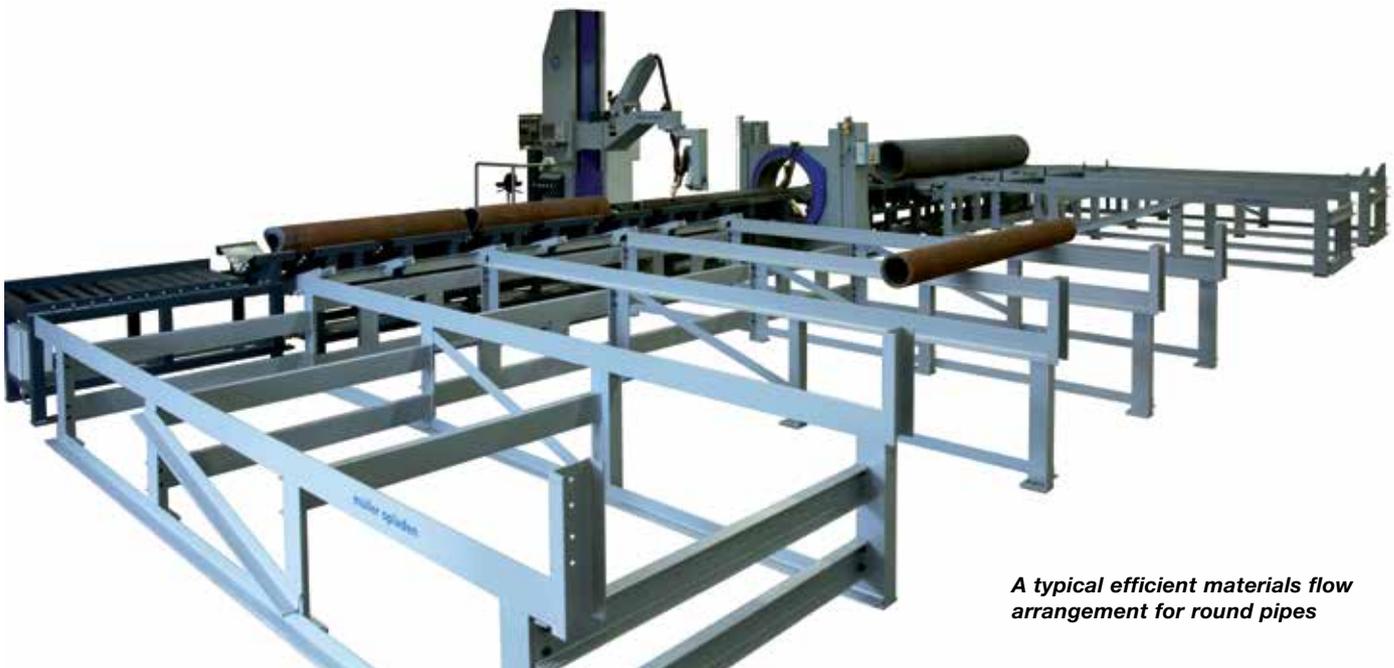


Saddle beam

Process oriented pipe logistics for 20% higher productivity

The productivity of our machines is boosted considerably by automated workpiece handling with logistics integrated in the machine concept. The illustration below shows a typical materials flow for round pipes with a loading and off-loading table, a cutting conveyor and handling systems. The pipe is transferred from the loading table onto an infeed conveyor

behind the chuck system. From here the pipe is pushed through the opening of the chuck onto the cutting conveyor in front of the chuck, where it is clamped and cut. Via an outfeed conveyor, the profiled pipe is then discharged onto the table in front of the machine, where it awaits further processing.



A typical efficient materials flow arrangement for round pipes



*Example of a Watts
Mueller cutting conveyor*

In addition to the motorized roller bed solution, the machines can also be supplied with conventional pipe support carriages suitable for a maximum pipe diameter of up to 4,064 mm and a maximum pipe weight of up to 15 metric tons. If the pipe is placed on 2 carriages, the pipe can be displaced by the manual or motorized movement of the carriages. The support rollers of the pipe carriage can be manually or hydraulically adjusted to the pipe diameter with a scissor mechanism. For a maximum pipe diameter of 610 mm and a maximum pipe weight of 2 metric tons, ball gutters can be used on which the pipe is then moved.



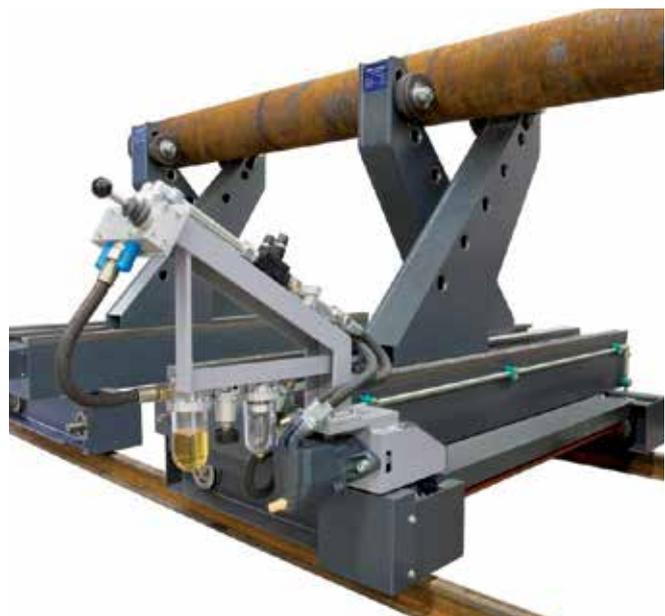
Motorized roller conveyor for pipes with a maximum diameter of 1,524 mm and a maximum weight of 15 metric tons



Motorized ball gutter



Manual ball gutter



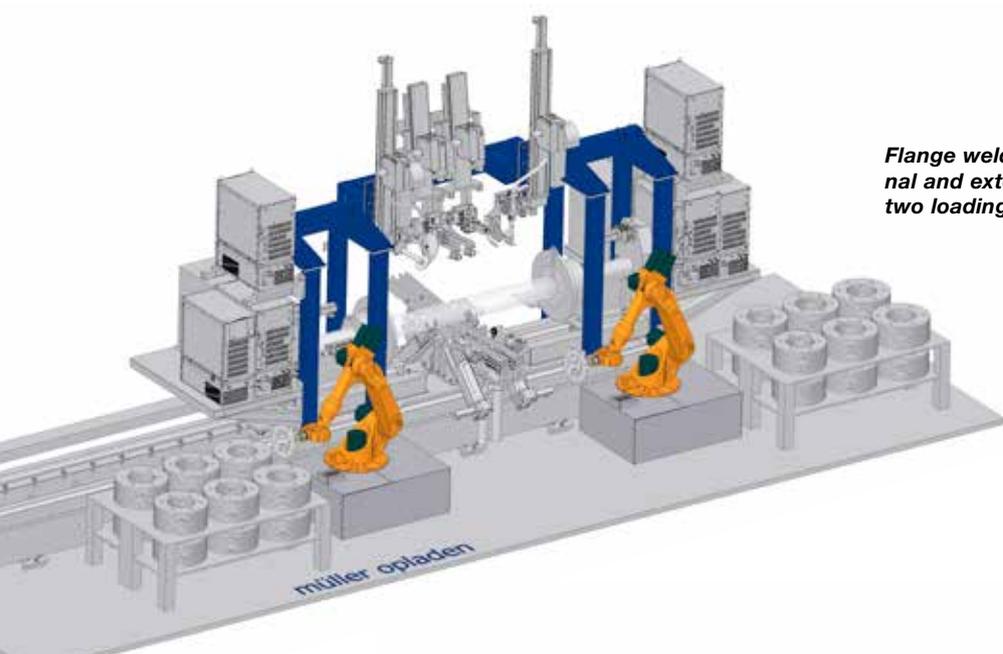
Pipe carriages for pipes with a maximum diameter of 1,524 mm and a maximum weight of 15 metric tons. Pipe carriages with pneumatic drive

Tailor made welding systems for outstanding results

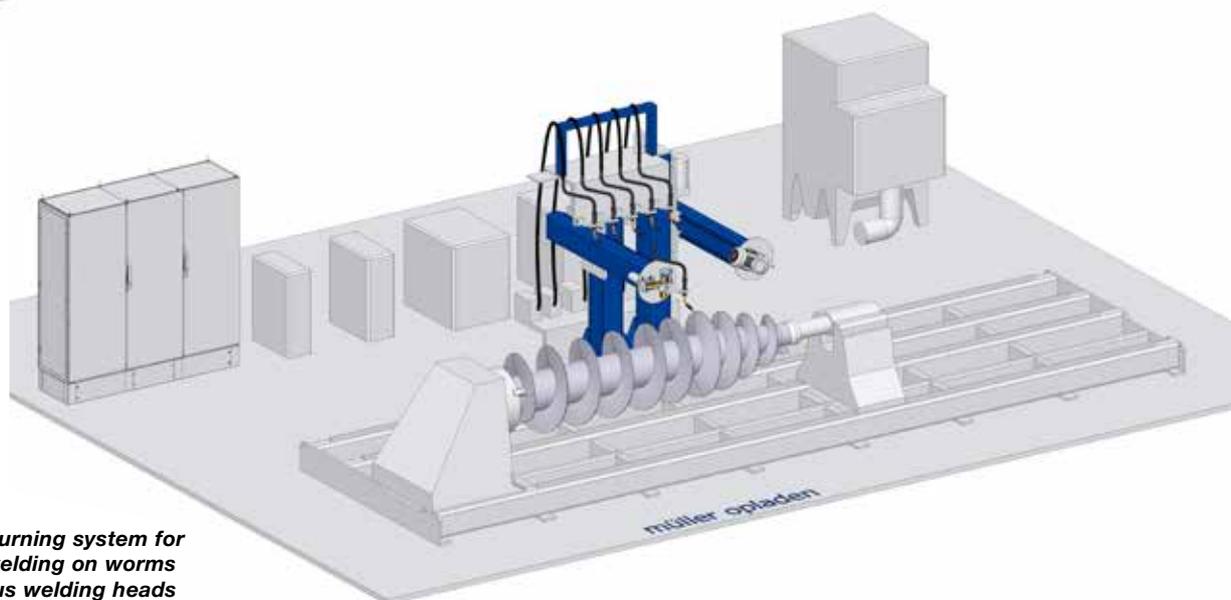
We are ideally equipped to develop and build tailor-made custom solutions for automated welding processes.

Thanks to our many years of experience and the training of our welding engineers, we mainly use TIG, MIG-MAG, submerged arc and plasma keyhole welding processes.

The illustrated machines are examples of customized solutions composed of our own system modules.



Flange welding machine for the simultaneous internal and external MAG welding with four torches and two loading robots



Tailstock turning system for build-up welding on worms with various welding heads



Robot welding cell for MAG welding with 2 axes positioner and torch cleaning station



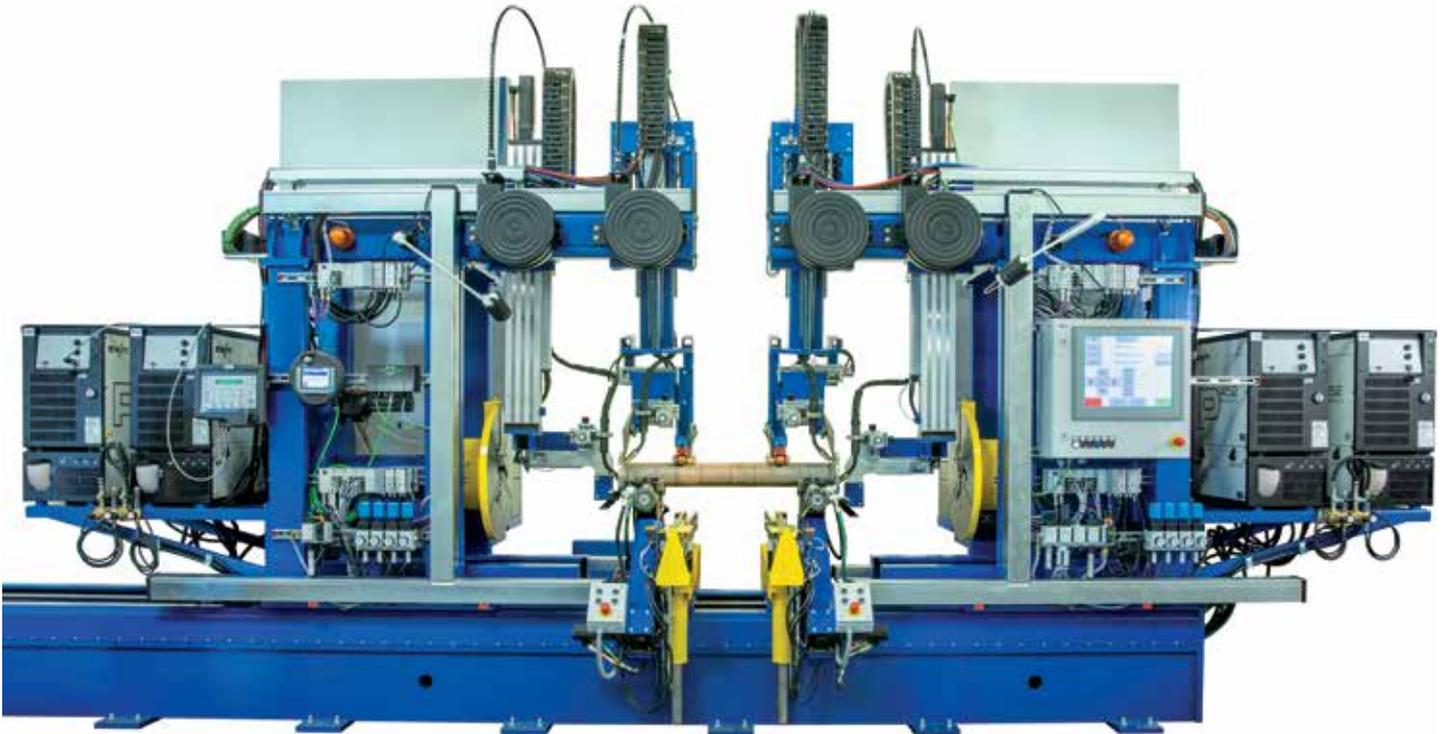
Welding station for powder plasma build-up welding on drilling heads



Circumferential welding machine for submerged arc-welding of fittings

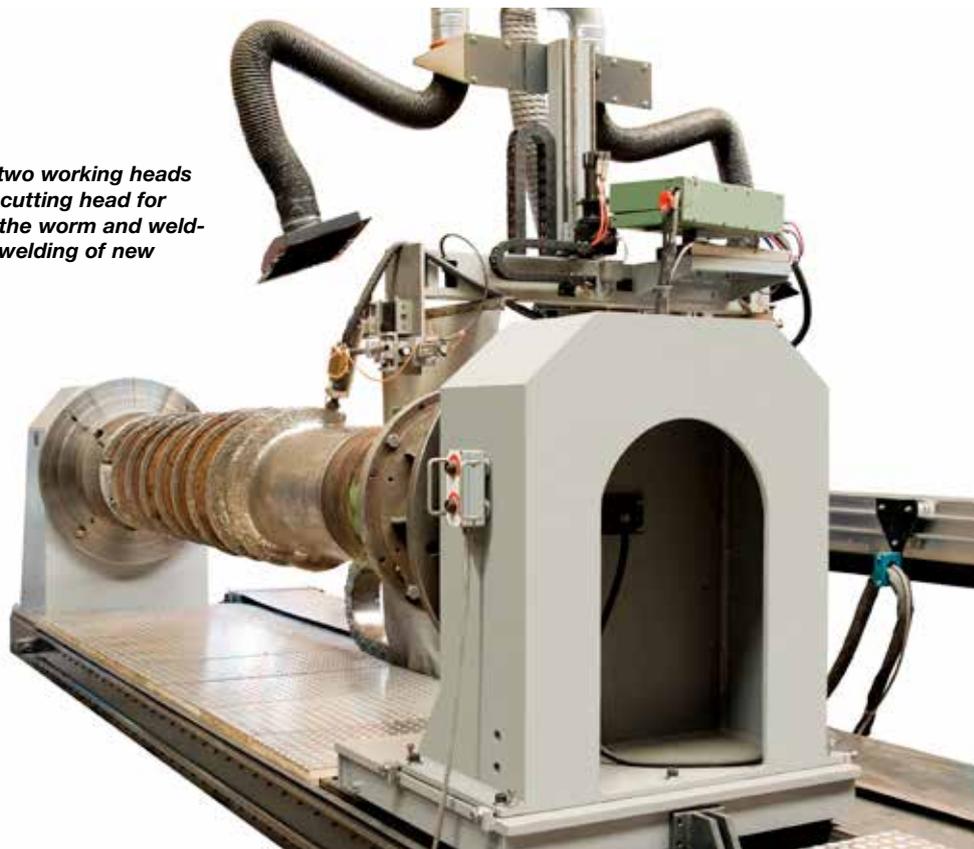
Circumferential welding tailstock with two synchronized welding heads for the plasma fine-beam welding of heat exchanger panels





Pipe flange welding machine RFSM 300/6000/7 for the simultaneous internal and external MIG welding of flanges and sockets with four torches

Tailstock turning device with two working heads on a column & boom. Plasma cutting head for burning off worn surfaces on the worm and welding head for the TIG build-up welding of new alloys on the worm surface



Proven standard components for unique solutions

Simple straight cut-off fixtures designed for a maximum load of 1,500 kg and for a maximum pipe diameter of 812 mm are used for cutting several pieces out of a pipe, with or without weld bevel preparation. These fixtures are much more economic than sawing.

The standard versions of our straight cut-off fixtures have the following features:

- Drive unit and support unit including a base frame and centrally displaceable roller consoles
- Fastening chain to prevent pipe slippage during the rotation process and to provide ground for plasma cutting
- Manually movable cutting carriage with length measuring system, torch fixture and vertical scanning mechanism for retaining the torch height and angle position on curved and non-circular pipes
- Template for torch angle positioning to generate weld bevel preparation
- Standard control
- Oxy-fuel or plasma cutting system



W-132

	Max. load in kg:	Min. – max. Ø in mm:	Min. – max. length in mm:
W-116	1,500	50 – 406	200 – 12,000
W-132	1,500	50 – 812	200 – 12,000

Table-top cutting fixtures designed for a maximum load of 50 kg and for a maximum pipe diameter of 305 mm are used for simple cut-offs with weld bevel preparation at short pipes.

The standard versions of our mechanized table-top cutting fixtures have the following features:

- Machine frame in a heavy-duty welded design
- Manuel chuck for clamping short pipes
- Torch fixture with torch angle positioning function
- Standard control
- Oxy-fuel or plasma cutting system
- Optional with cutting template for longitudinal motions along the pipe axes for the cutting of miters and saddle cuts



W-60-20-SM

	Max. load in kg:	Min. – max. Ø in mm:	Min. – max. length in mm:
W-60- 20-SM	50	50 – 305	50 – 300

Mechanized solutions for welding

Welding positioners designed for maximum loads of 50 kg to 40,000 kg have universal applications in the manual and mechanical welding of circumferential seams and in the accurate positioning of workpieces.

The standard versions of our positioners have the following features:

- Machine frame in a heavy-duty welded design
- Manual, electric or hydraulic slewing adjustment
- Fully machined turntable plates of various sizes with centering grooves and T-slots from the model MO-DT-500 and higher
- Standard control

Possible optional extras:

- Hollow bores of various diameters
- Circumferential seam welding and process controls
- Extensive system accessories such as three-jaw chucks and positioners

In addition to slewing positioners, we can also supply the following alternative series:

- Horizontal positioners
- Vertical positioners
- Slewing and hydraulically height-adjustable positioners
- Multi-axis positioners

Detailed information can be supplied on request.



MO-DT-1000



MO-DT-15000-HV with hydraulic height adjustment

	Max. load* in kg:	Shaft Ø in mm:	Slewing range in °:	Speed in RPM:*
MO-DT-30	30	–	+/- 90	0,125 – 5.0
MO-DT-50-HW-30	50	30	+/- 90	0.125 – 5.0
MO-DT-100-HW-125	100	125	+/- 90	0.125 – 5.0
MO-DT-200-HW-125	200	125	+/- 90	0.125 – 5.0
MO-DT-300-HW-125	300	125	+/- 90	0.125 – 5.0
MO-DT-500-HW-200	500	200	+/- 90	0.06 – 2.4
MO-DT-1000	1,000	–	120	0.06 – 2.4
MO-DT-2000	2,000	–	120	0.05 - 1.0
MO-DT-3000	3,000	–	120	0.05 - 1.0
MO-DT-5000	5,000	–	120	0.05 - 1.0
MO-DT-10000	10,000	–	120	0.05 - 1,0
MO-DT-15000	15,000	–	120	0.05 - 1.0
MO-DT-20000	20,000	–	120	0.05 - 1.0
MO-DT-30000	30,000	–	120	0.05 - 1.0
MO-DT-40000	40,000	–	120	0.05 - 1.0

* For centric workpieces

Mechanized solutions for welding

Our roller beds designed for maximum workpiece loads of 750 kg to 80,000 kg are used for the rotation and positioning of heavy, rotationally symmetrical workpieces like tanks or boilers for further machining or welding.

The standard versions of our roller beds have the following features:

- Drive unit including base frame and centrally displaceable motorized roller consoles
- Locking with securing pins
- Steplessly controllable rotary drives by means of self-locking worm gears with built-on DC motor
- Support unit (same design as drive unit but without drive)
- Standard control

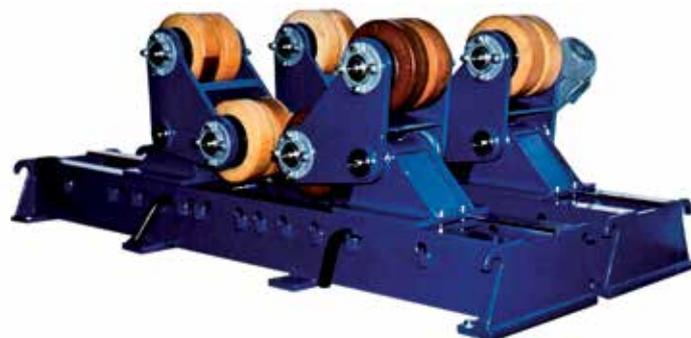
Possible optional features:

- Steel rather than Vulkollan or solid rubber wheels
- Undercarriage
- Self-centering version
MO-RB-SZ-20000-Synchron for workpiece loads of 5,000 kg to 40,000 kg

Detailed information can be supplied on request.



MO-RB-40000



MO-RB-SZ-20000-Synchron

	Max. load in kg:*	Vessel diameter in mm:	Footprint (LxW) in mm:	Height in mm:	Roller diameter in mm:	Speed range in cm/min:*
MO-RB-750	750	100 - 2,000	2,200 x 600	375	250	5 - 200
MO-RB-1500	1,500	100 - 2,000	2,200 x 600	375	250	5 - 200
MO-RB-3000	3,000	100 - 3,000	2,310 x 1,000	530	250	5 - 200
MO-RB-6000	6,000	100 - 3,000	2,310 x 1,000	530	250	5 - 200
MO-RB-10000	10,000	150 - 4,000	3,900 x 1,350	710	400	4.5 - 180
MO-RB-15000	15,000	150 - 4,000	3,900 x 1,350	710	400	4.5 - 180
MO-RB-20000	20,000	100 - 4,000	3,900 x 1,350	710	400	4.5 - 180
MO-RB-30000	30,000	100 - 4,000	3,900 x 1,350	710	400	4.5 - 180
MO-RB-40000	40,000	100 - 4,000	4,200 x 1,450	780	500	3 - 120
MO-RB-80000	80,000	100 - 4,000	4,500 x 1,650	810	500	3 - 120

* For centric workpieces

Mechanized solutions for welding

Our columns and booms – ranging from 1.5 x 1 m up to 8 x 8 m for column stroke and boom range – are used for the positioning and guidance of welding heads, welding torches and other tools. Columns & booms can thus be combined with positioners and/or roller beds in a variety of applications such as the welding of circumferential or longitudinal seams or the build-up welding of alloys on workpieces.

The standard versions of our columns & booms have the following features:

- Lean or Heavy-Duty design, depending on the maximum boom load, the smoothness of motion (low vibration) and boom length
- Guides on the column & boom consisting of gear racks and linear guides
- Standard control

Possible optional extras:

- Undercarriage
- Operator's seat mounted at the front end of the boom (Heavy-Duty version only)

In addition to the standard models mentioned above, we can also design column & boom combinations with other lengths.

Detailed information can be supplied on request.

MO-AT-8000x8000 / Heavy-Duty



MO-AT-1500x1000 / Lean



MO-AT-7000x7000 / Heavy-Duty



	Version:	Total height in mm:	Column stroke in mm:	Boom range in mm:	Max. boom load in kg:
MO-AT-1500x1000	Lean	2,200	1,500	1,000	60
MO-AT-3000x3000	Lean	4,600	3,000	3,000	150
MO-AT-4000x4000	Lean	5,600	4,000	4,000	150
MO-AT-5000x5000	Heavy-Duty	7,300	5,000	5,000	250
MO-AT-6000x6000	Heavy-Duty	8,300	6,000	6,000	400
MO-AT-7000x7000	Heavy-Duty	9,300	7,000	7,000	400
MO-AT-8000x8000	Heavy-Duty	10,300	8,000	8,000	400

Müller Opladen GmbH

Stauffenbergstrasse 14-20
51379 Leverkusen-Opladen
Germany

Phone: +49 - 21 71 - 76 62 30
Fax: +49 - 21 71 - 76 62 55
Email: mail@mueller-opladen.de
Internet: www.mueller-opladen.de

Watts Mueller LLC

2323 East Pioneer Suite. A
Puyallup, WA 98372
USA

Phone: +1 - 253 - 848 - 9288
Fax: +1 - 253 - 848 - 9295
Email: mail@watts-mueller.com
Internet: www.watts-mueller.com