

# MIG/MAG Tandem welding

Quick, flexible, economic

**CLOOS**

Weld your way.

[www.cloos.de](http://www.cloos.de)



"Coming together is a beginning, keeping together is progress; working together is success."

Henry Ford



The process for more productivity



## Further development of the double wire process

Two electrically independent arcs burn in a common molten pool. The high deposition rate of two wires results in weld speed or volume filling. Different process combinations are reached by the electrical separation of the wire electrodes. You can select the electrical parameters independently from each other. This possibility opens up entirely new combinations and results in enormous deposition rates of up to 25 kg/h and a higher reduction of the heat input.

### Tandem Rapid

- Combination of the processes Rapid Weld and Control Weld
- For components of thin plate thicknesses
- Very high welding speed
- Very low heat input
- Increase in efficiency

### Tandem Speed

- Combination of the processes Speed Weld and Control Weld
- For components of medium plate thicknesses
- Very high welding speed
- Very high deposition rate
- Increase in efficiency

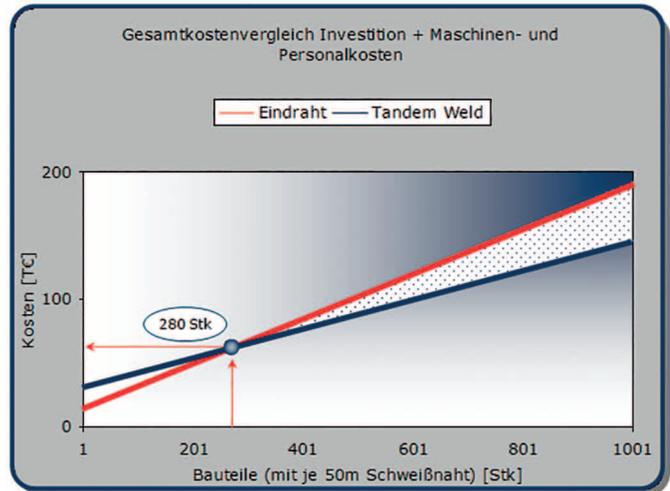
### Example calculation

Material: Steel  
 Weld shape: Gravity position  
 Wire: 1.2 mm  
 a-size: 5

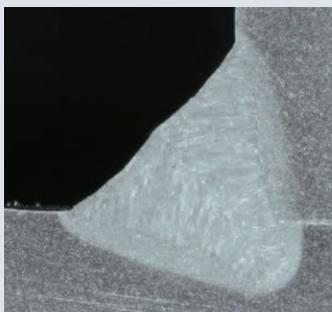
	Single wire	Tandem
Speed (cm/min)	50	150
Wire 1 (m/min)	8.5	18.0
Wire 2 (m/min)		13.5
Deposition rate (kg/h)	4.44	16.44

## Advantages

- Less shielded gas consumption per m weld seam
- Reduced heat input in the component, thus low distortion
- Improved tolerance bridging ability
- No limitation of the plate thickness
- No material restrictions
- Welding in any direction due to the symmetric design of the Tandem torch
- All sensor possibilities – from arc to laser sensor
- Very simple operation and parameter finding due to latest technology



## Technologies



### Technical data

- Material 10mm
- Opening angle: 0°
- Wire: SG2 Ø1.6mm
- Shielded gas: 82%Ar/18%CO<sub>2</sub>
- Pos.: PB
- Vd: (10.5 / 7.5) m/min
- Vs: 110 cm/min



### Technical data

- Material 8mm
- Opening angle: 0°
- Wire: G3Si1 ø 1,2 mm
- Shielded gas: 82%Ar/18%CO<sub>2</sub>
- Pos.: PB
- Vd: (19.5 / 12) m/min
- Vs: 150 cm/min

**Welding power source**  
QINEO Pulse 600

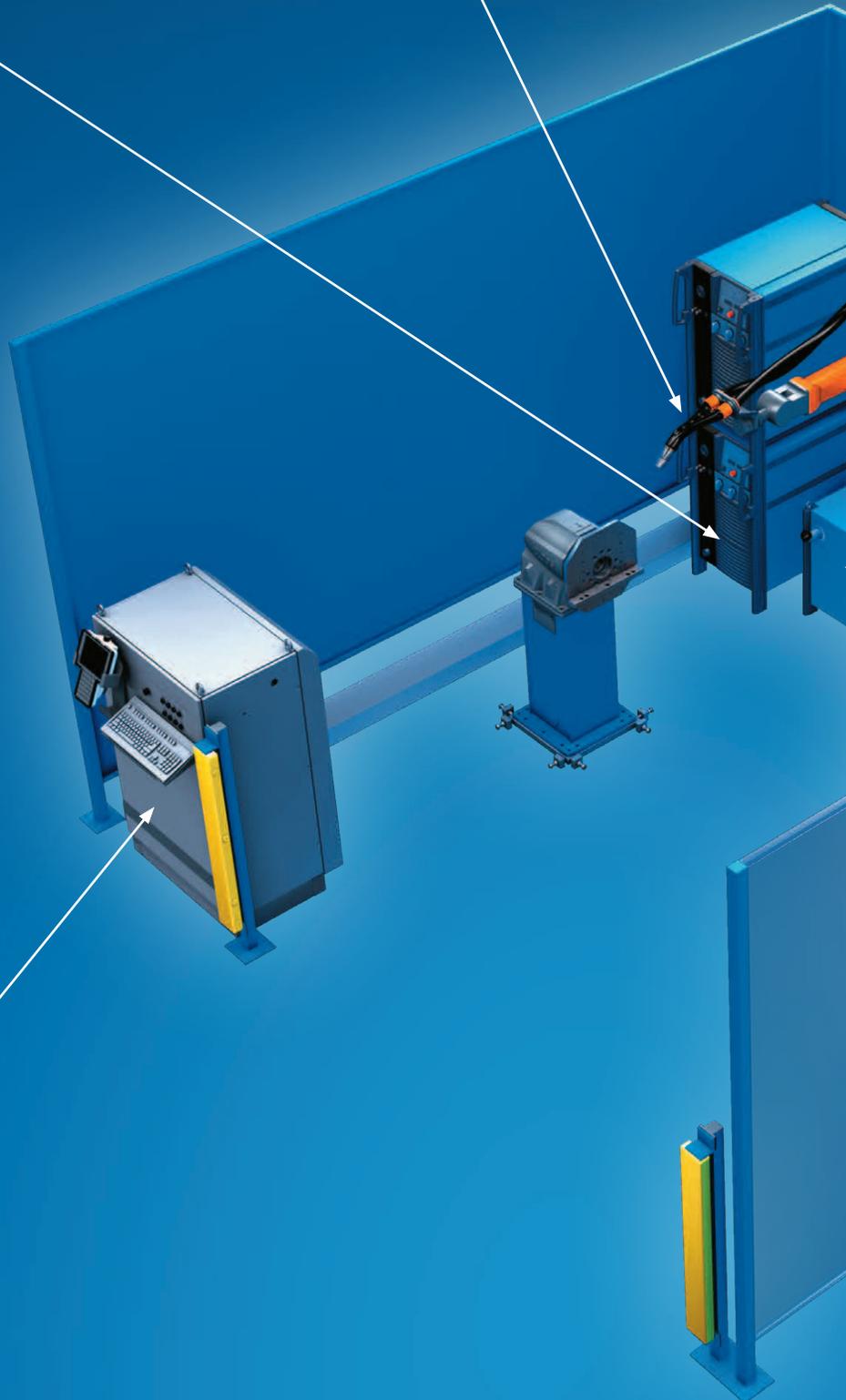


**Tandem welding torch**  
ZMW 950



Interface

**Robot controller**  
Basic/Advanced



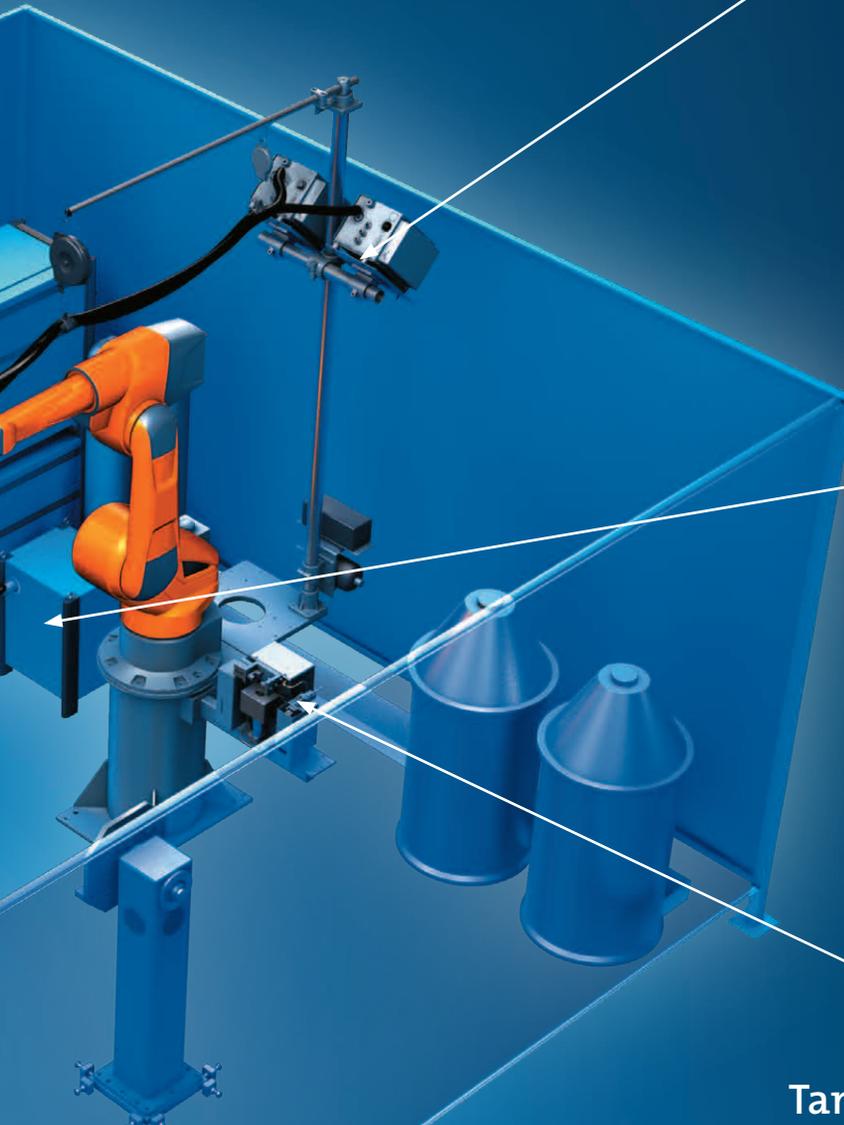
Wire drive  
QINEO WD-A



External cooling unit  
Cooler QN EC 1750-1 P



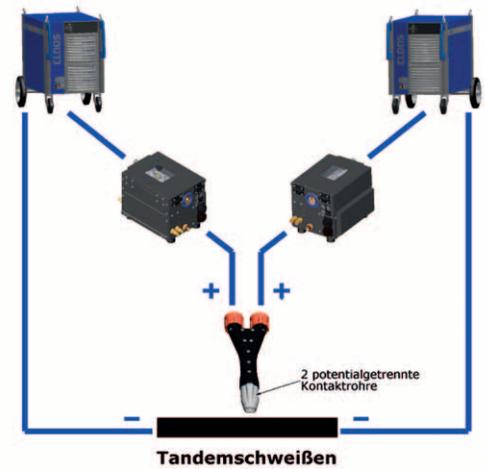
Tandem welding torch cleaning unit  
CMR-6



## QINEO Tandem Package

### 2x QINEO PULSE 600 with

- Kit Tandem **NEW!**
  - Kit Seam tracking
  - Kit Gas nozzle sensor
  - Kit CAN interface
  - Premium (in RPU)
  - Wire feed QWD-A (right and left)
  - Cable assemblies CAG 6.0 m
  - External cooling EC1750 **NEW!**
  - Robot cable assemblies CAW 3.0 m
  - ZMW 950 Tandem welding torch **NEW!**
  - Tandem welding processes
- **Rapid amortisation**  
due to an excellent price/performance ratio
  - **Easy handling**  
as the Tandem adjustments base on synergy
  - **Cycle time reduction**  
thanks to high welding speeds
  - **Know How**  
thanks to long-term market leadership



## QINEO Welding power sources

No matter whether it is for 350, 450 or 600 amps, each QINEO PULSE offers five different welding processes for a large variety of applications. Every QINEO PULSE is equipped with a synergy mode and two fine adjustments. The synergistic characteristic curves can therefore be perfectly adapted to external factors.

In addition every QINEO PULSE can be equipped with different operating modules – from ECO for manual welding up to the PREMIUM version for automated processes. For all pulsed arc welding requirements: QINEO PULSE.



## ZMW 950 Tandem welding torch

The requirements on a welding torch are constantly increasing.

The new ZMW 950 Tandem welding torch meets the demands of the market. Its capacity of more than 950A it is the basis for excellent welding results.

The main features of the new Tandem welding torch are the integrated water hoses and gas nozzle sensor cables and the gas nozzle which was optimised in form and load.



## Pulsed arc synchronisation

When welding with pulsed arc processes it is very useful to change or adjust the pulse frequency of the individual power sources. Basically the two pulse currents can be controlled synchronously, asynchronously or alternating.

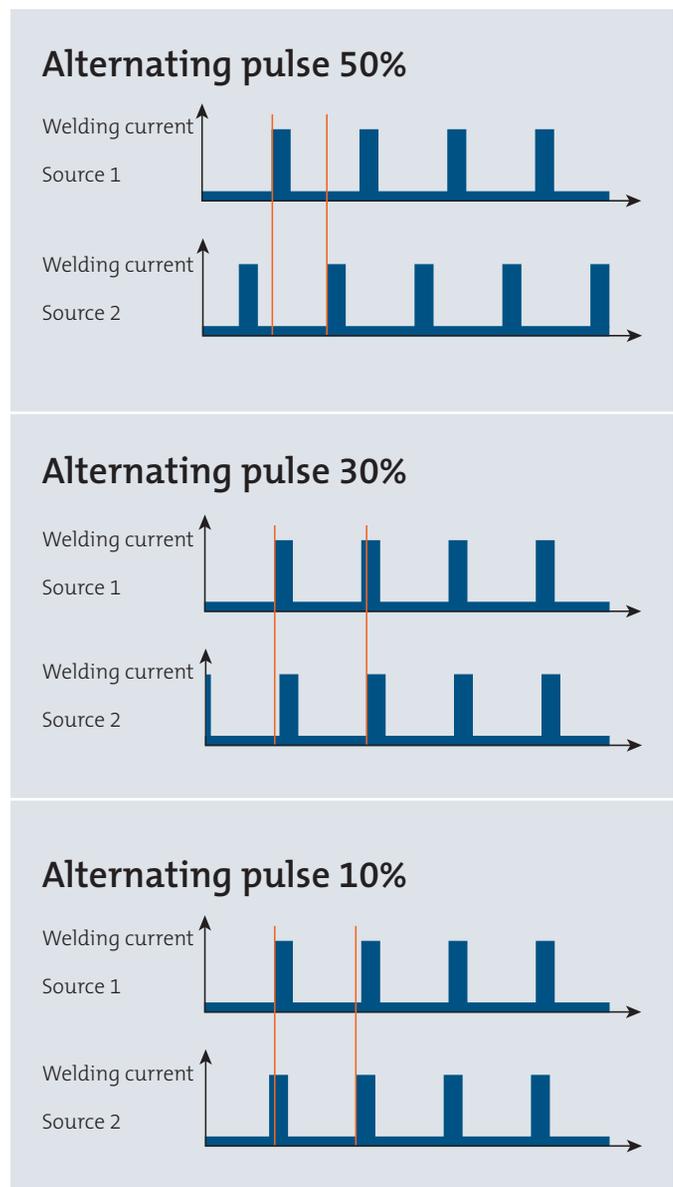
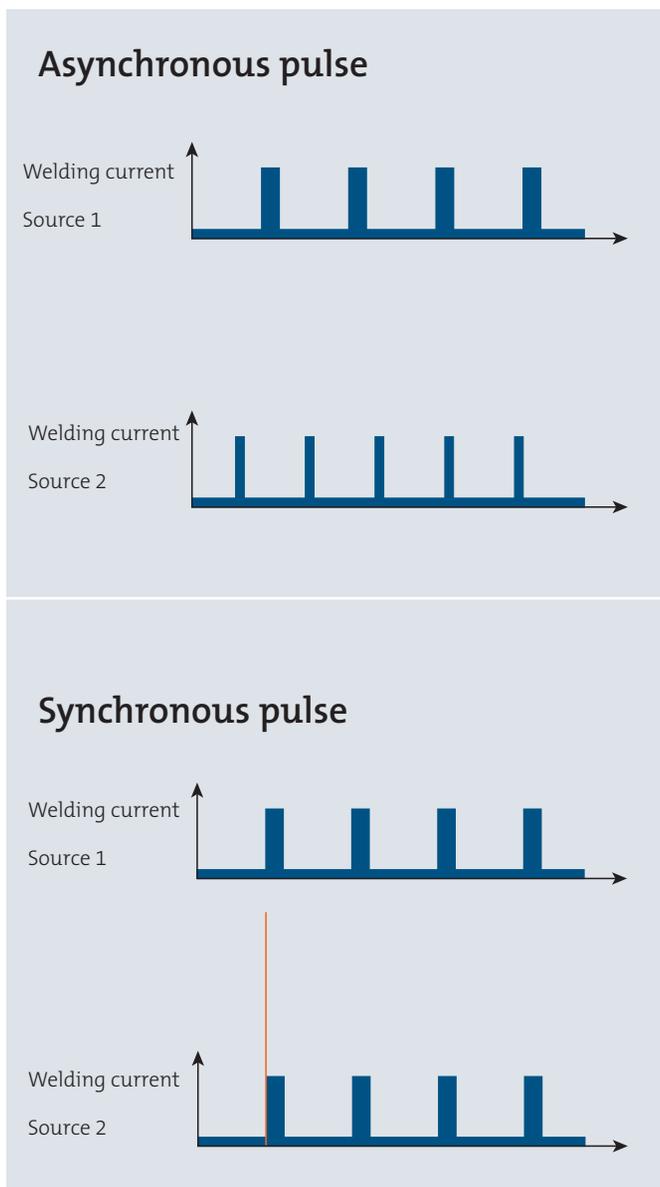
When the two power sources are synchronously controlled, the pulse form and pulse frequency are the same and they run exactly parallel. When they are asynchronously controlled, the pulse form and/or pulse frequency are different. So, one of the power sources can run with a higher frequency or a shorter pulse time and vice versa.

In the case of alternating pulse forms the two frequencies are shifted. The shift can be freely adjusted between 10% and 90%. Thus the welding process can be exactly matched to the welding task. For example, it can be useful for some applications to have

a synchronisation of the pulse frequency, in some other cases an alternating pulse of the two power sources is appropriate.

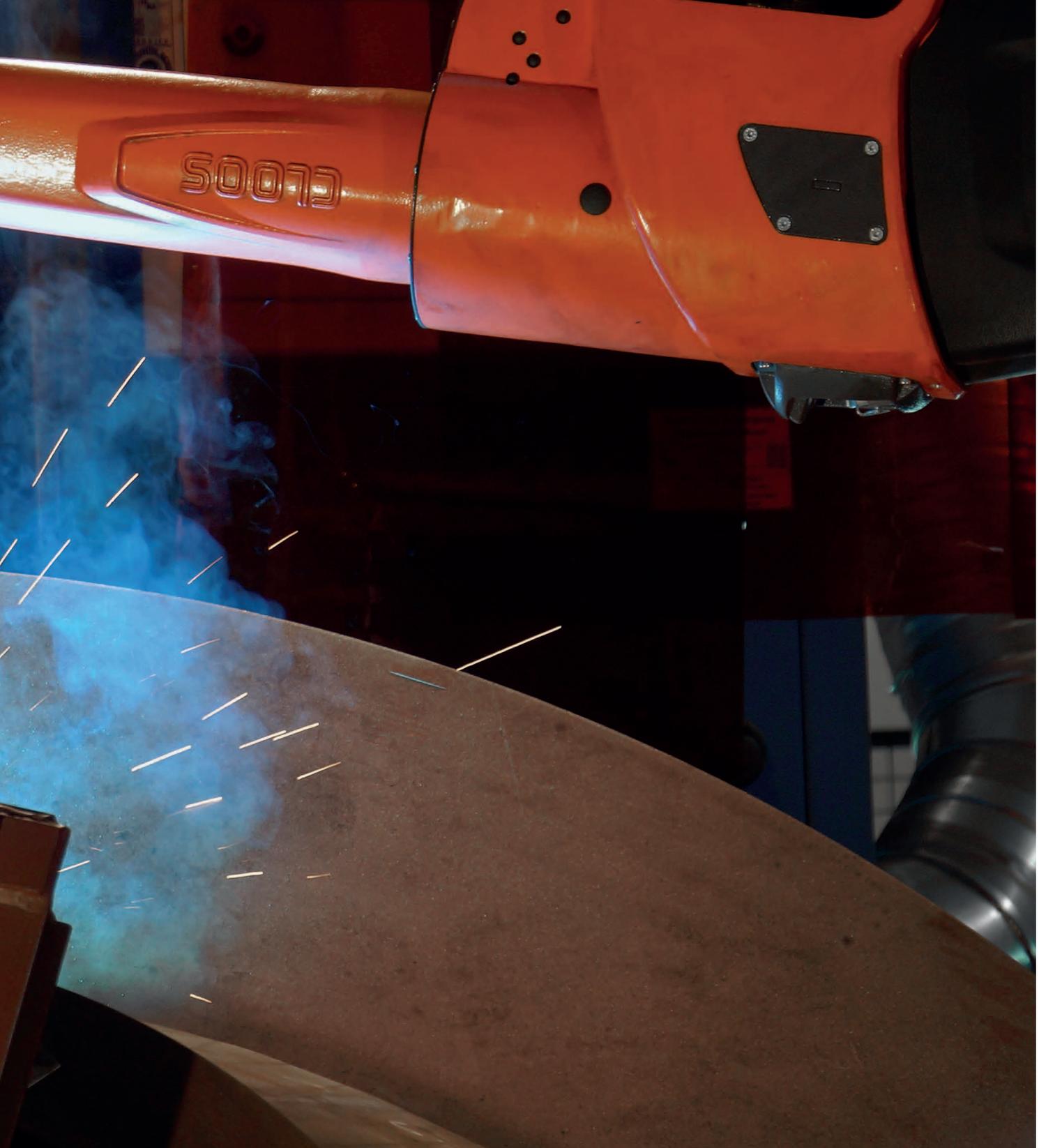
In the steel industry many welding processes do not need a pulse synchronisation. But when welding aluminium materials an alternating pulse has been proven in practice. We recommend to determine the optimum pulse sequence by tests.

It helps to use pulsed arc variations to avoid unwanted interactions (e.g. the arc blow) of the power sources, particularly if several power sources shall be operated in a welding system at the same time.



# Schottel Marine propulsions

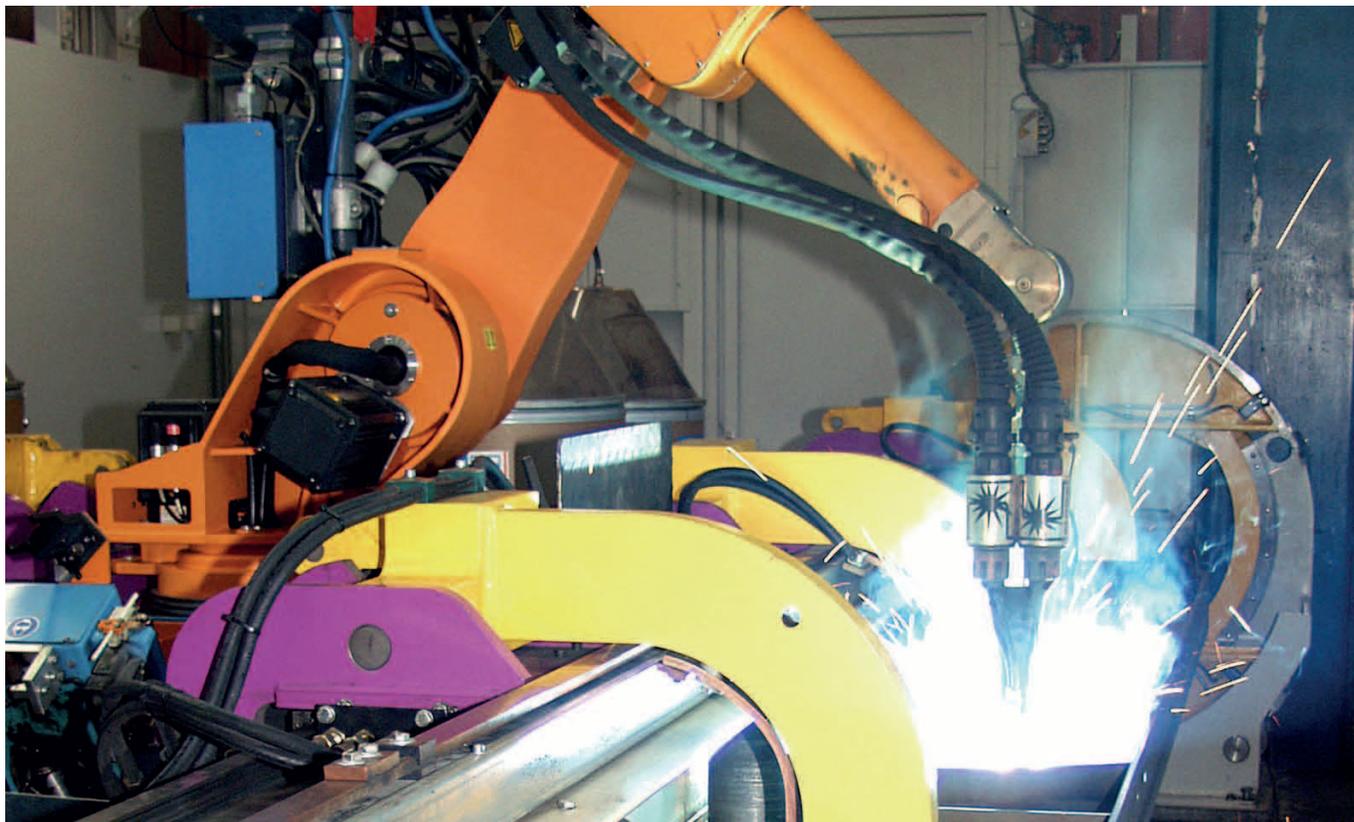




## Project description

Extreme agility is the particular feature of ships which are equipped with a Schottel propulsion system with a 360° range of rotation. Thus, turning manoeuvres within the narrowest space or landing without tug boats are possible. One propulsion component is exposed to high forces: the structural support tube. It houses the deflection gear for the power transmission to the propeller and is the connection to the body. In the case of such high demands the weld seam quality is very important. The structural support tube is TANDEM welded. The most

important advantage of the Tandem process is: Less material tension and distortion by avoiding high heat input. A 30 tonne L positioner turns and swivels the support tube into the best gravity position for welding. A rotary C frame with vertical stroke enlarges the robot working range and allows welding components with different dimensions.



## Project description

Products of everyday life, raw materials for the processing industry or final from the manufacturer to the port of shipment - they all have something in common: they are transported on a trailer of our customer Schmitz Cargobull. Two robots weld the I-beams of the trailer. A floor-mounted linear track makes it possible to weld a nearly 20 m long beam without interruption. After a 180°

turn of the beam the robot joints the back weld passes. Finally, the stiffening flanges of the beam are welded. The Tandem welding process considerably reduces the welding time. Compared to single wire welding systems the production efficiency is much higher.



## Project description

On a surface of nearly 900 m<sup>2</sup> four CLOOS robots weld waste containers in different sizes and shapes.

The welding times per component are between 2.5 to almost 6 hours. The five working stations are connected by a conveyor system. So the containers which weigh up to 3 tons and are fixed on vehicles can be transported

from one station to another. At present, Faun uses four working stations for production. In station 5 employees generate programs for new workpiece variants. This further increases the degree of utilisation of the whole robot system.

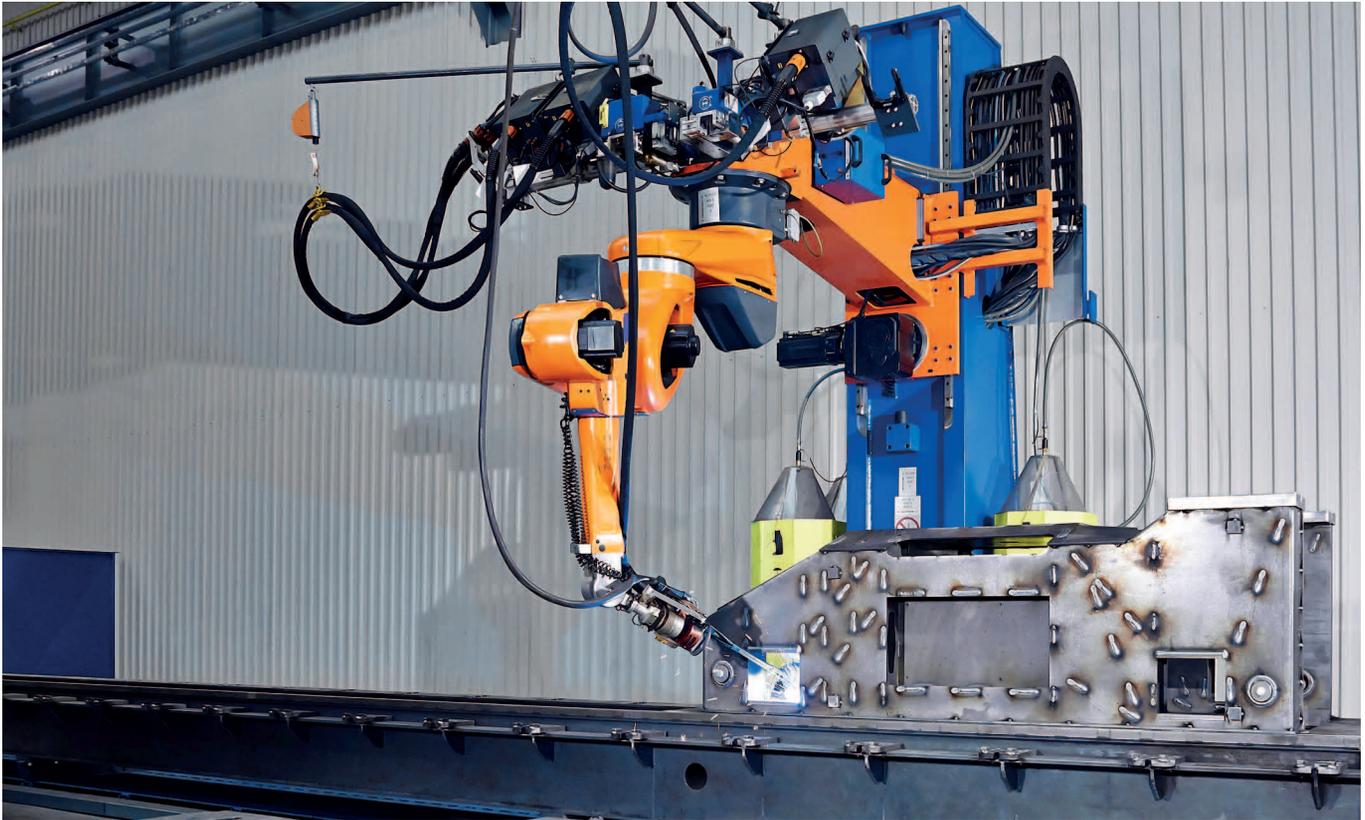


## Project description

Many of the modern 4-axes goods wagons travel on rails through Europe. Container wagons, wagons to transport coils, tanks and gas containers etc., almost everything travels on 2-axes Y bogies.

Because of the high production quantity and the required weld quality, automation is worthwhile to weld these components. The two-station robot system always

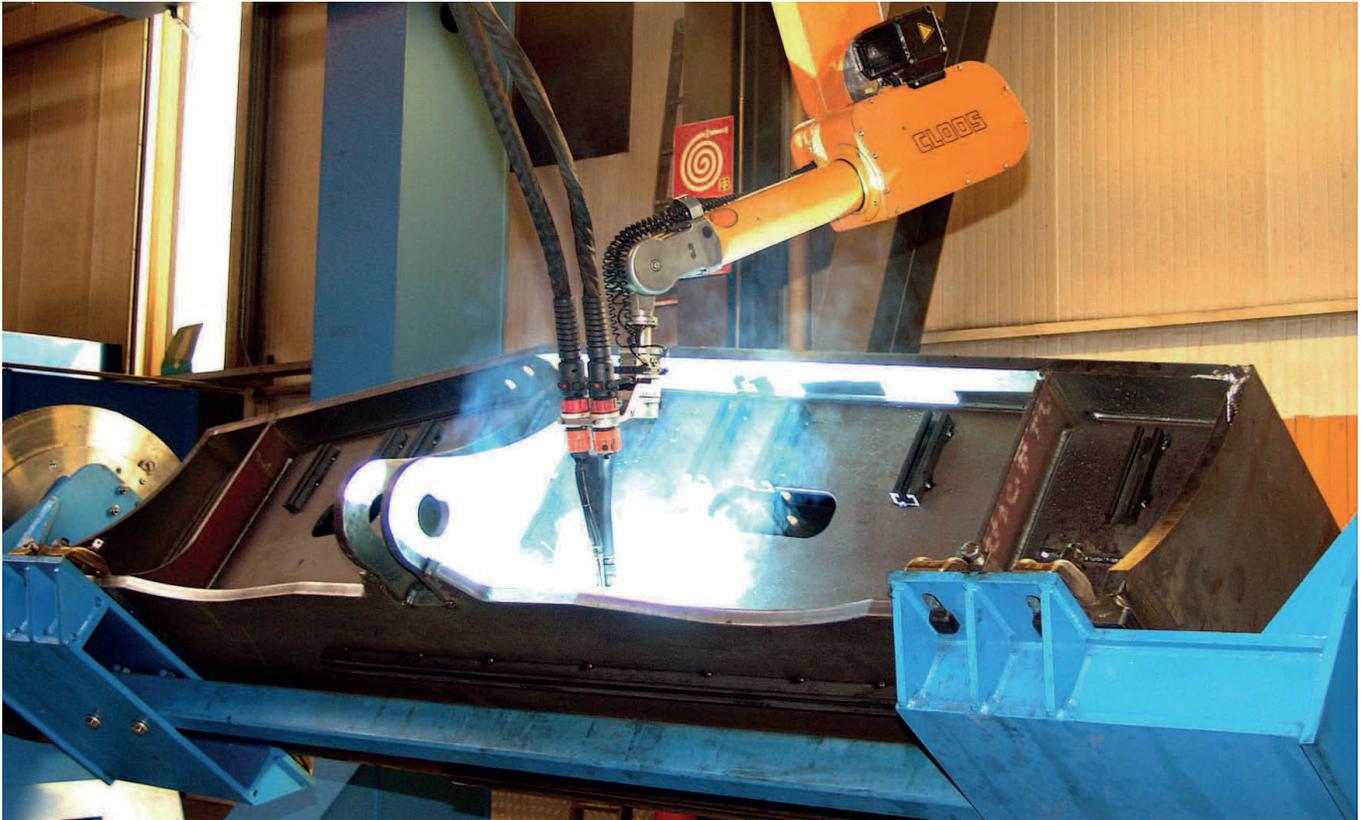
swivels and turns the the bogie frame into a perfect welding position. An overhead-mounted linear track with vertical stroke enlarges the robot working range and allows the change between the two welding stations.



## Project description

SSI Schäfer commissioned a high performance CLOOS robot welding machine for its complex welded assemblies. The robot, type QRC360E is equipped with a torch changing system and uses 2 welding processes. Robot welding is made with the high-capacity Tandem Weld process and the pulsed arc Speed Weld process. An extended special welding torch and the eccentric axis integrated in the

robot mechanics give the robot system the necessary working area and flexibility to weld the complex component perfectly.

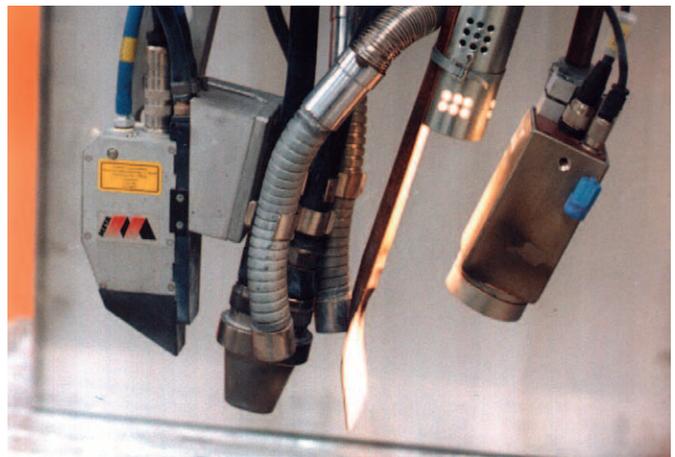
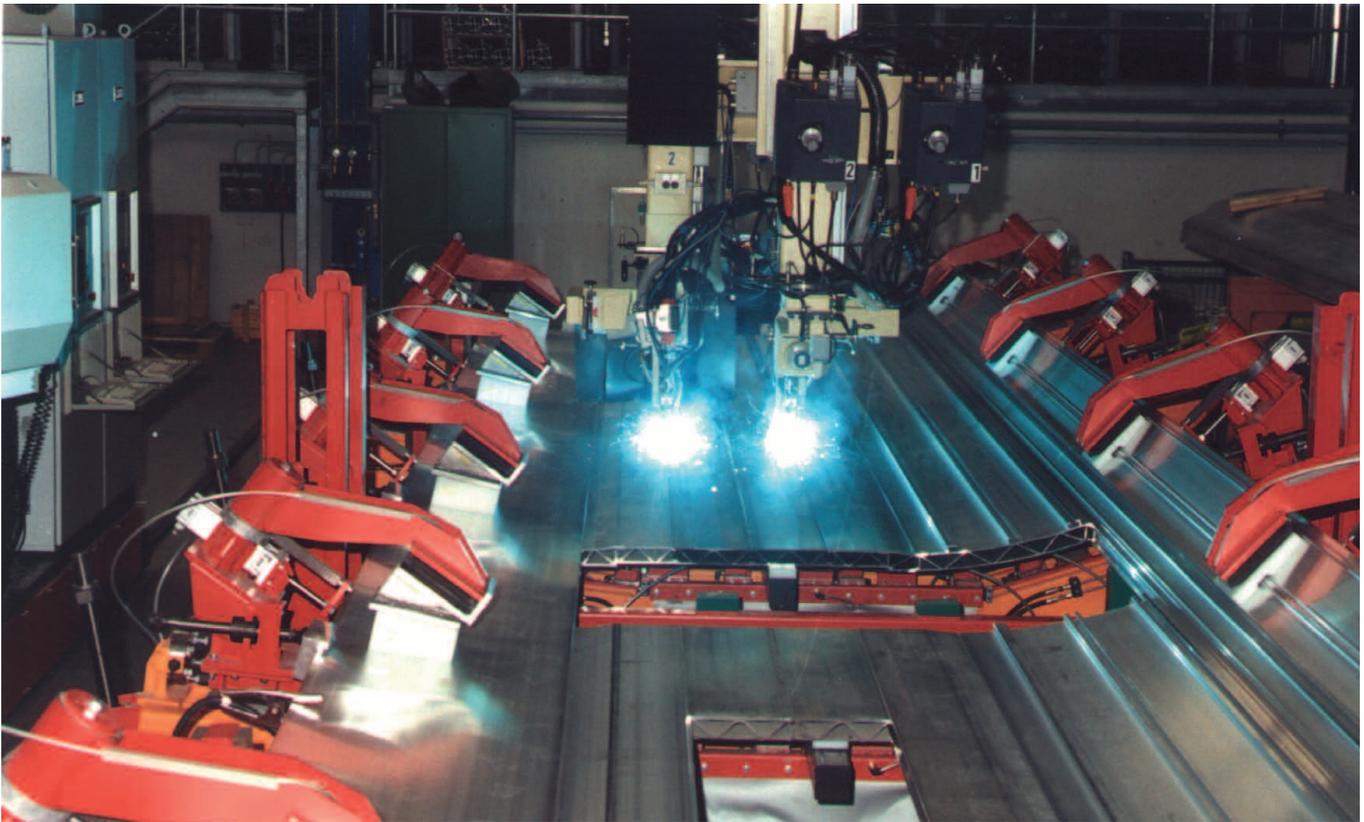


## Project description

You ski? Or use a rope way to climb the mountains for hiking? Then you certainly used a lift of our customer Leitner.

Leitner uses a robot system to weld the longitudinal and transverse beams for gondola lifts and supports. In two stations the robot system lifts different components

of different sizes. The used Tandem welding process increases the welding speed for the long weld seams and reduces at the same time the heat input into the work-piece. Thus the reworks after welding could be reduced to a minimum.

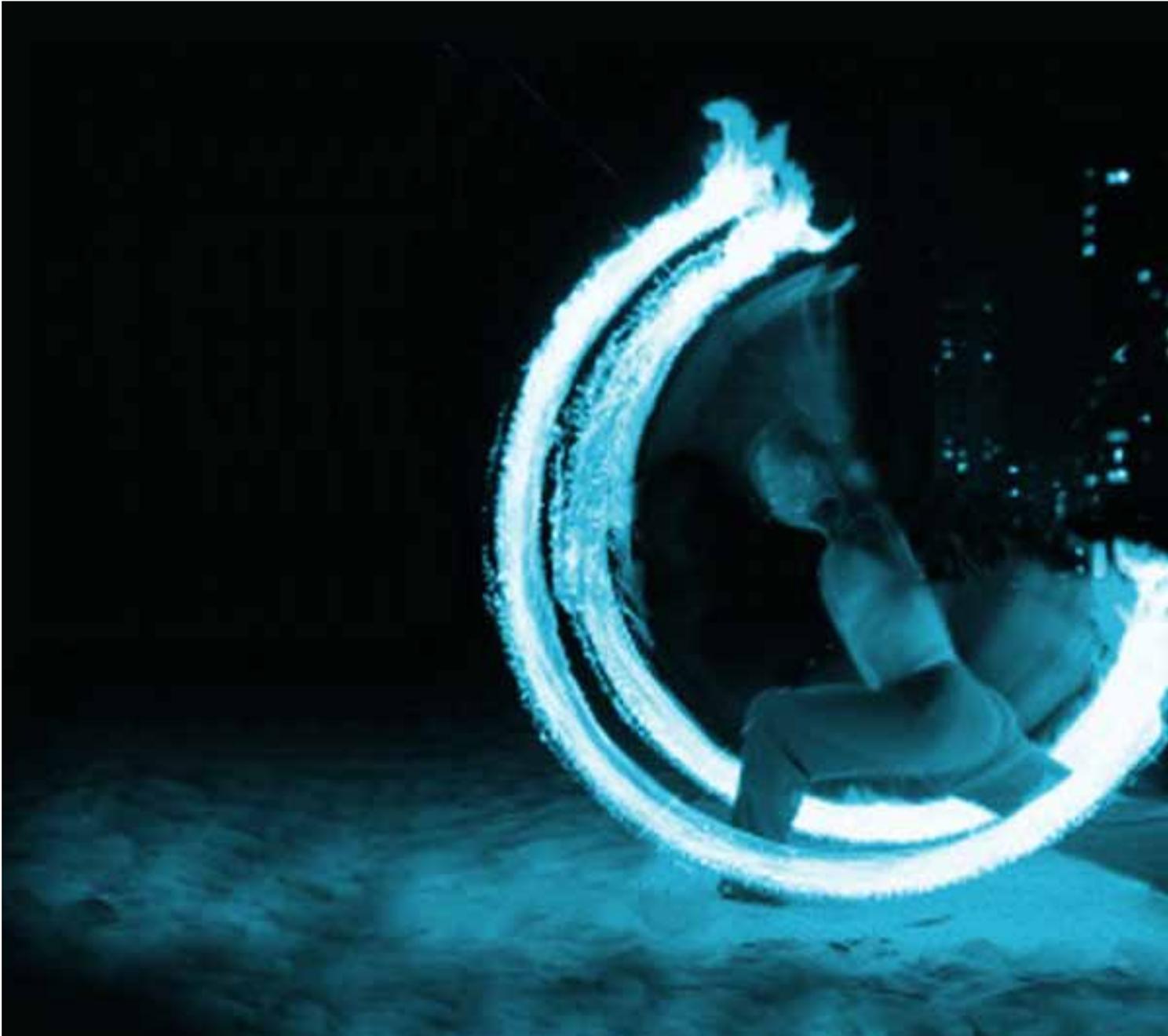


## Project description

A welding column on rails allows welding of more than 20 m long side walls of aluminium profiles for high-speed trains.

A high welding speed is reached due to the application of the Tandem Weld process.  
The result:

Low heat input into the sensitive aluminium, less rework and an increased weld seam quality. All these points lead to a considerable increase of the company's productivity.



## Weld your way!

Providing added value for our customers! This objective drives our 700 motivated employees to achieve maximum performance. We are constantly raising our bar by pushing ourselves to provide innovative welding processes and solutions that will contribute to the long-term commercial success of your company! Our process competence is at the forefront in welding and cutting of various ferrous and non-ferrous metals. We offer our customers individual solutions which are optimised and adapted specifically to your product and production requirements. Leadership and competence equals process automation and welding at its best.



Whatever your needs are, we “Weld your way.” Cloos develops, manufactures and delivers innovative solutions in more than 40 countries worldwide.

With our QINEO®, the new generation of welding machines for manual and automated applications, and QIROX®, the system for automated welding and cutting, our product range covers the entire spectrum of arc welding technology. Our product portfolio includes intelligent software, sensor and safety technology solutions – all of which are customised to meet your specific needs and requirements! Cloos provides full service solutions – all from a single source!

## qineo®

### Arc welding at the highest level

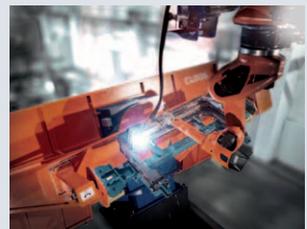
- Power sources
- Wire drive units
- Welding torches
- Connection cable assemblies
- Accessories



## qirox®

### Everything for automated welding and cutting:

- Robot mechanics
- Robot controllers
- Robot positioners
- Workpiece positioners
- Sensors
- Software



## Service Hotline

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## Service

### Service - The "Power Plus" for your production success:

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**Weld your way.**