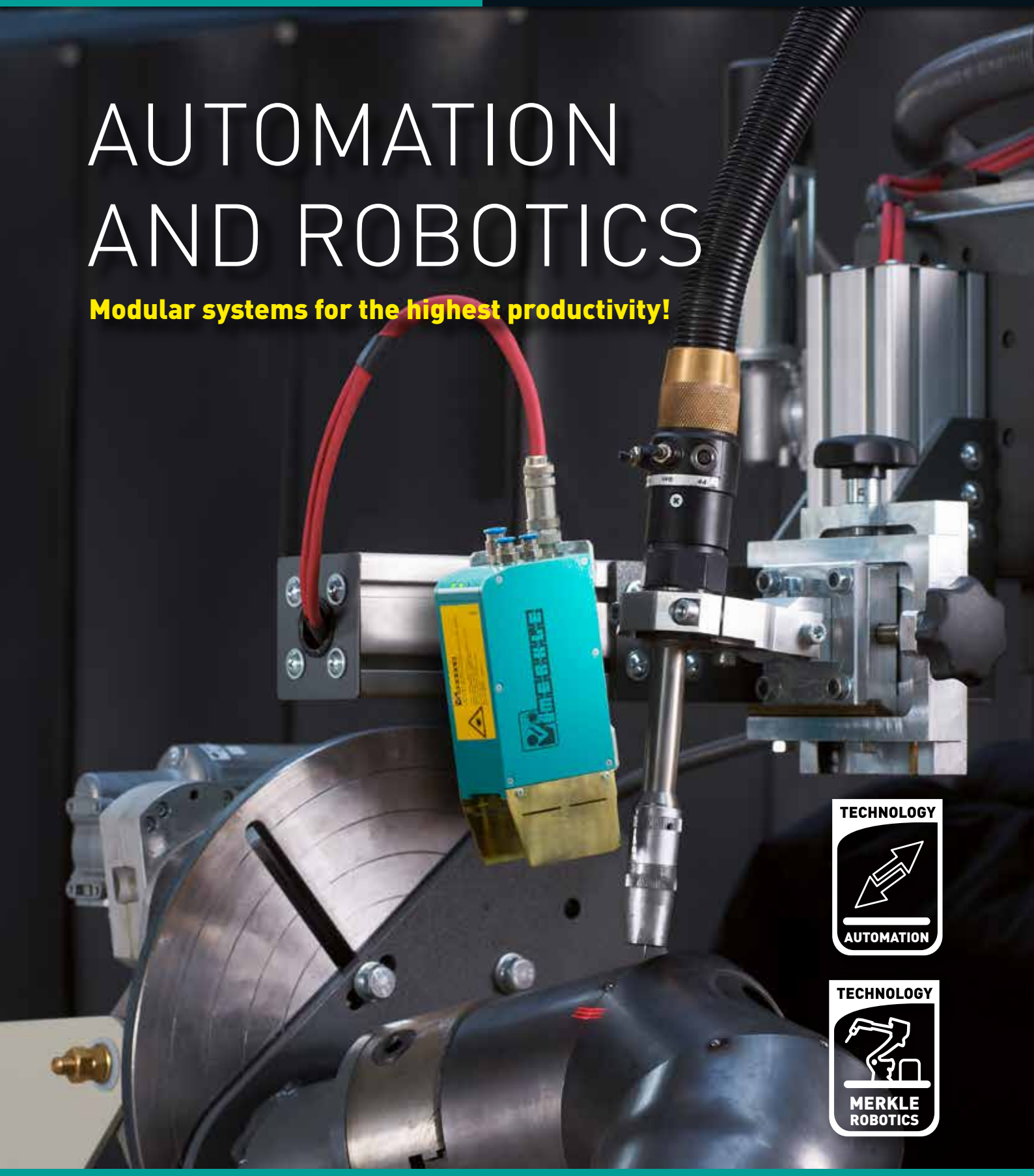
AUTOMATION AND ROBOTICS

Modular systems for the highest productivity!



TECHNOLOGY AUTOMATION

TECHNOLOGY MERKLE ROBOTICS

www.merkle.de

From modular components to highly productive robotic systems!

AUTOMATION AND **ROBOTICS** FROM MERKLE!

Merkle solutions for automation and robotics are as varied and flexible as the differing requirements for the welding tasks involved in small, medium and mass production. Merkle has offered modular systems for over 50 years as an answer to the automation of welding processes. From the outset we have strived to offer highly efficient, and at the same time, economical solutions for all types and sizes of production organisations.

Thus we have developed a modular system, which covers every desired degree of automation perfectly.

The basis of all Merkle system is always a high performance power source, which is based on our total experience resulting from over 55 years' know-how in welding engineering and production. Our customers are enterprises in the most demanding industries including automotive, aerospace, pipe construction, machine construction and many more.

We always supply perfect, customized solutions, from individual components to complete automated welding systems.

Merkle automation solutions are simple to use, are of the highest quality, and can be expanded systematically in all levels to meet the demands of today's and tomorrow's production.

For today's welding process demands in mass production there is no way of ignoring the possibility of automation with robots. Merkle offers high performance welding power sources, high precision welding torches, extremely reliable peripheral components, highly intelligent software, right up to the possibility to interface with every well-known robot on the market, giving you the perfect automated welding solution package.

Whether MIG/MAG and PulseARC, TIG or plasma, for every welding process our systems will enable your next quantum leap in productivity.

Speak with our specialists.
Welcome to the Merkle World of Welding!

MADE IN GERMANY

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TECHNOLOGY AUTOMATION

TECHNOLOGY MERKLE ROBOTICS

Technology for MIG/MAG- and the PulseARC-Process!

MERKLE POWER SOURCES

With the power sources HighPULSE 352, 452 and 552 RS Merkle offers a perfectly balanced performance program for all demands in the automation of your welding processes.

The HighPULSE line consists of Synergic PulseARC welding power sources which are especially designed for the interface with Robots and CNC controllers. Based on modern and highly efficient, high performance 100 kHz inverter power modules and 32 bit high speed processors.

HighPULSE Power Sources:

Type	WELDING CURRENT
HighPULSE 352 RS	20 - 350 A, 60 %
HighPULSE 452 RS	20 - 450 A, 50 %
HighPULSE 552 RS	20 - 550 A, 40 %

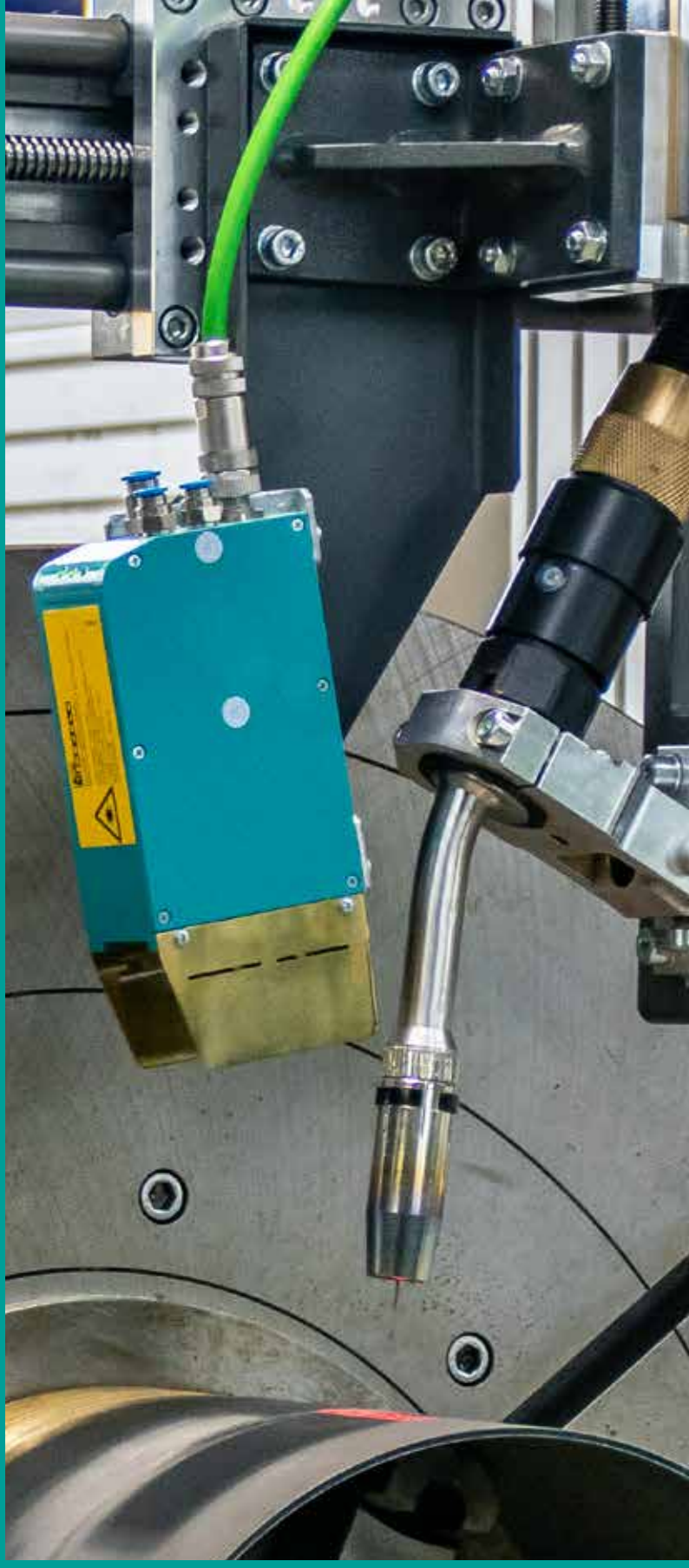
OUR POWER SOURCES ARE PERFECTLY SUITED FOR THE FOLLOWING WELDING PROCESSES:

- MIG/MAG
- PulseARC
- MIG Brazing
- High-Performance Welding (HighPULSE 552 RS)
- DeepARC
- ColdMIG
- HighUP
- ProSWITCH
- Interpulse

INTERFACE OPTIONS:

Various versions of interface for control of the welding power sources are available:

- Merkle Q.MACS
- Bus interfaces:
  - DeviceNet
  - CANopen
  - Profibus
  - Interbus
  - ProfiNet
  - Ethernet
  - other bus interfaces on demand
- Analog interface
- Digital job operation



TACTILE SENSOR

A simple mechanical surface scan in 2 axis, e.g. height and sideways correction, is possible with the tactile sensor. The mechanical movement through the tactile sensor is transmitted over the electrical controller directly to the motorized slides. Various exchangeable sensor tips are available to enable a constant and precise control when riding over spot welds, stamped holes etc.

LASER SENSOR

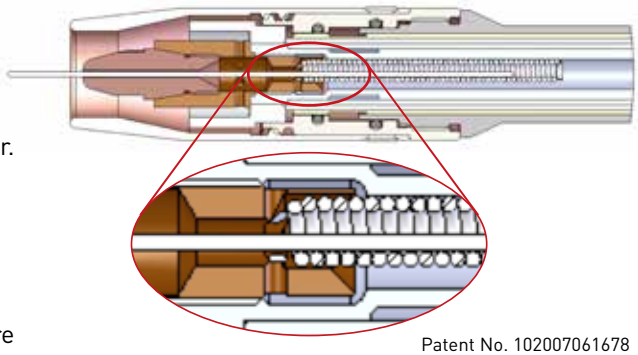
The laser sensor is used to achieve a contactless scan of the weld bead position. Three parallel beams of light illuminate the welding joint. The outputs are analog signals for controlling the torch by motorized slides in height and horizontal movement. To enable a successful scanning of the joint, a Hi-Lo, a lip, or an air gap of at least 0.2 mm (0.008") is required.

Patented technology for perfect welding results

RELIABILITY AND FUNCTIONALITY

Patented: Forced Wire Contact:

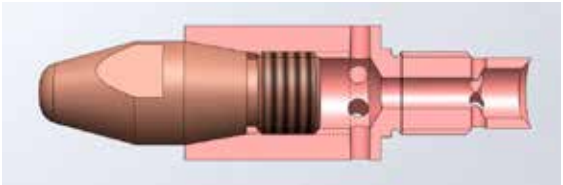
- This Merkle patent ensures that the wire is forced into contact with the contact tip through eccentric feeding into the tip holder. A permanent electrical contact between wire and contact tip is thus guaranteed under all conditions.
- The result is perfect quality, process safety and reliability even under the most difficult operating conditions.
- For the reliable evacuation or wire dust evacuation channels are integrated into the tip holder.



Patent No. 102007061678

Conical Contact Tip:

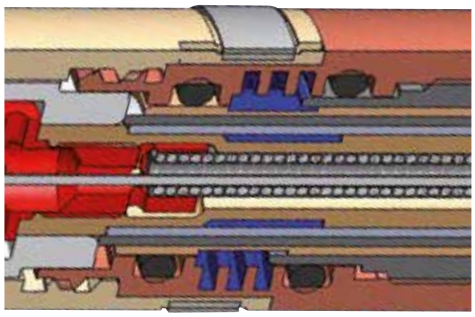
- The contact tip is received conically into the tip holder. This increases the contact area and improves cooling.



Twin Chamber Cooling System:

Our proven cooling systems ensures:

- Optimal cooling of the gas nozzle directly through the water jacket.
- Systematic and reliable transport of heat from the inside of the torch.



The first choice for automation and robotics!

WELDING TORCH
ROB 505/355 W

Automation and Robotic Welding Torch ROB 505 W:

Three versions are available: straight, 22° bent or 45° bent. All three versions impress through a robust construction, with the torch neck manufactured in stainless steel, capable of withstanding the most arduous conditions. With the quick change mechanism a simple exchange of torch bodies is possible. The TCP remains accurate even after a torch body change.

Standard and High Performance Gas Nozzles:

Both types of gas nozzle offer, through a combination of push-on and screw fixing, an optimized heat conductance and a perfect mechanical restraint. The High Performance gas nozzle is designed for extreme heat loads.

Gas nozzle	Standard version	High performance version
Duty cycle* 60 %	450 A (36.5 V)	500 A (39.0 V)
Duty cycle* 100 %	400 A (34.0 V)	450 A (36.5 V)

* With MIG/MAG using mixed gas 82/18

Optional Push-Pull System:

When welding with aluminium wires, very thin welding wires, or long hose assemblies, we recommend the use of our push-pull gearbox. The system is attached between the welding torch body and the fixing flange. It ensures that a permanent tensioning load is applied to the welding wire, guaranteeing a reliable and constant wire feed under the most difficult conditions.

Hollow Wrist Robot Welding Torch ROB 355 W:

The Merkle welding torch for hollow wrist robots offers all the benefits of our forced wire contact and twin chamber cooling. The hose package allows an unlimited rotation about its own axis and therefore a 360° rotation of the robot welding torch about the robot arm axis.

Technology leading solutions for the highest usability!

PERIPHERY COMPONENTS

Water Cooling Unit WK 325:

- Mounting directly under the welding power source (if required)
- Highly effective cooling capabilities due to the high performance water pump and high performance heat exchanger
- Optional connector on the welding power source as well as coolant pressure monitoring over the electrical connection on the rear of the machine

Torch Cleaning System with integrated Wire Trimming Station:

- Mechanical cleaning
- Milling head available as spare/wear part
- Function for applying anti spatter spray

Intergrated Crash Protection:

A totally reliable damage limitation system resulting from the fully intergrated crash protection for standard and hollow wrist robots:

Standard Crash Protection

- Protects the robot and torch from major damage
- Collision protection with an especially long shutdown stroke whilst still maintaining the highest levels of TCP precision
- Mounting flange for all common robot types

Hollow Wrist Crash Protection

- Suitable for hollow wrist robots
- Unlimited rotation possibilities for the hose package
- Transportation of coolant feed and return

Precise wire feed control for best results!

WIRE FEEDING SYSTEMS

Standard Wire Feed Unit ROB DV 26

For standard robots, hollow wrist robots and automation

- 4 roller gearbox, 0.5 - 25 m/min
- Button for gas test
- Purge function
- Compact design, only 5 kg

High Performance Wire Feed Unit ROB DV 32

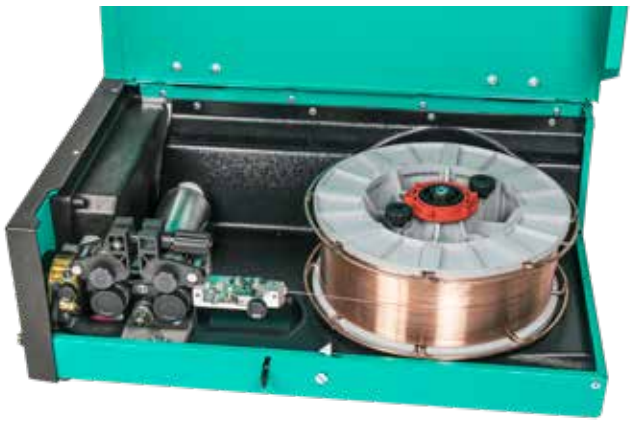
For standard robots and automation

- 4 roller gearbox, 0.5 - 30 m/min
- Wire straightening module (option)
- High performance motor
- Gas test and purge functions

Wire Feed Unit Auto DV 31

For Automation

- Room for an internal wire spool D300/15

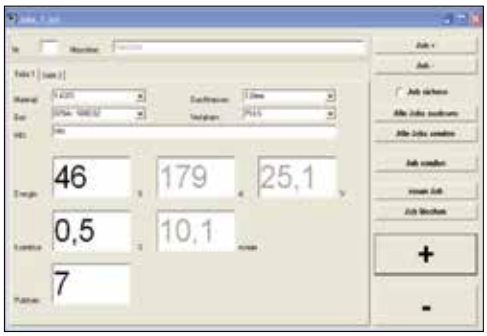


Perfect Solutions for all of your Hardware!

SOFTWARE PRODUCTS

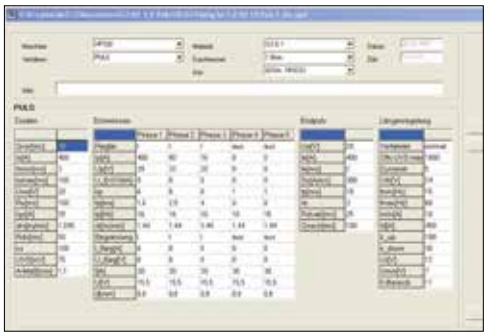
Merkle ProJOBpro

The perfect software for the creation and documentation of your welding jobs. Can be used in online or offline mode.



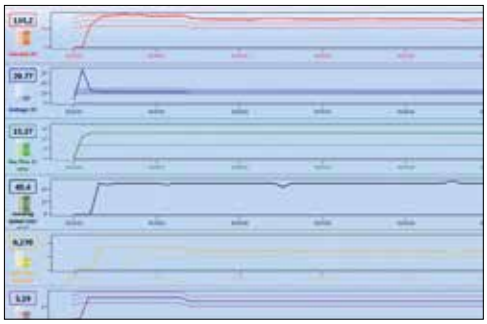
Merkle ProDOC

The software allows programming, changing and administration of welding programs within the power source.



Merkle Q.MACS

Our newest software is capable of monitoring, controlling and recording all welding parameters, whilst simultaneously providing values for machine time, arc-on time, wire and gas consumption to name just a few functions, and this also with multiple robots welding one component simultaneously. Online and offline monitoring with practically unlimited network capabilities round off this automation software.



Control as you need and like!

FROM **STATIONARY** TO **WIRELESS**

Four different hardware solutions:

1. PC/Laptop

Use a standard PC or laptop

2. Panel-PC, integrated

Integrated into the automation control board

3. Panel-PC, mobile

Mobile solution: connected to the power source via a cable

4. Tablet-PC, wireless

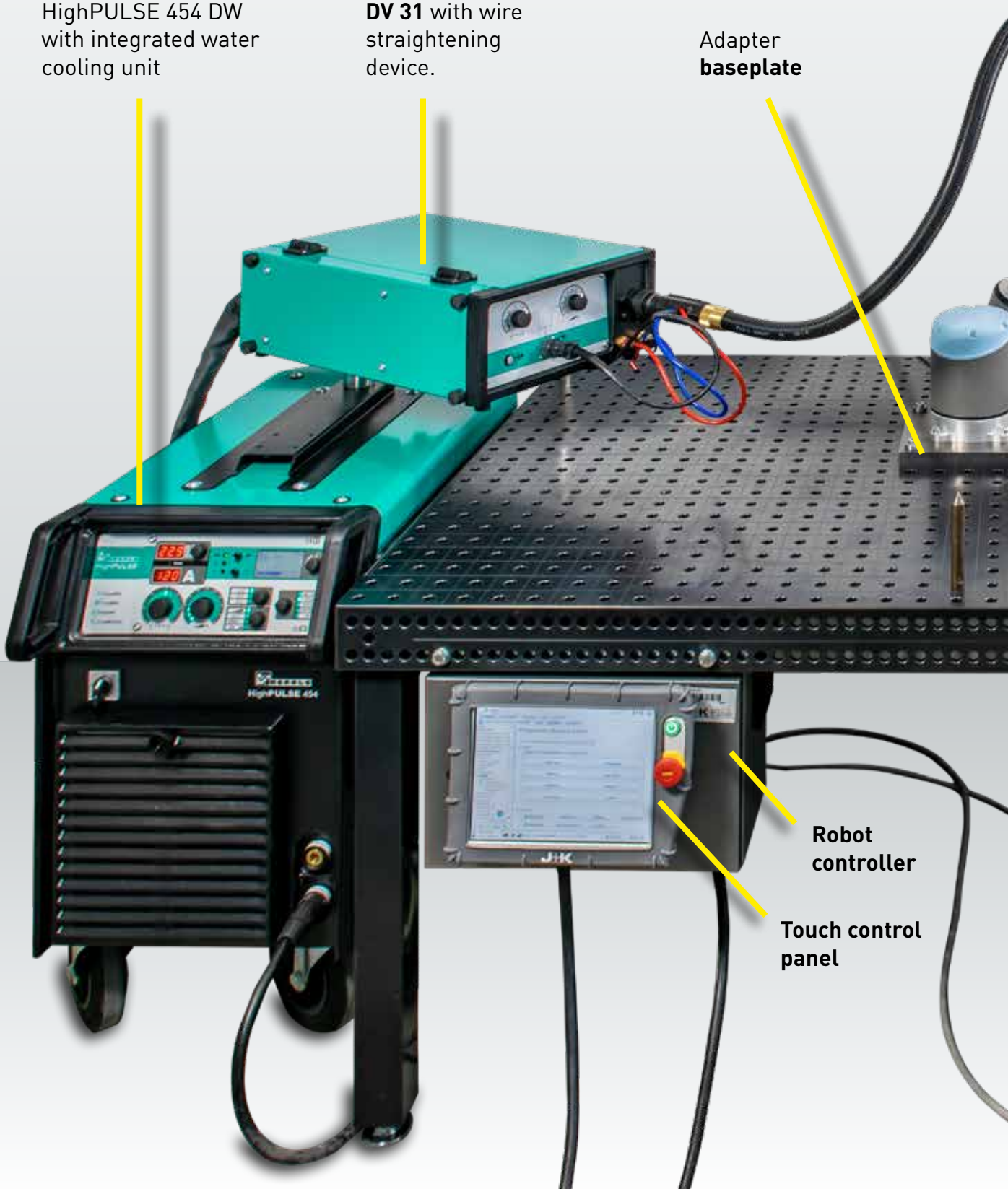
Wireless using WiFi connection to the power source

The workplace of **TOMORROW** – available **TODAY**!

Power source: Merkle HighPULSE 454 DW with integrated water cooling unit

Wire feeder DV 31 with wire straightening device.

Adapter **baseplate**

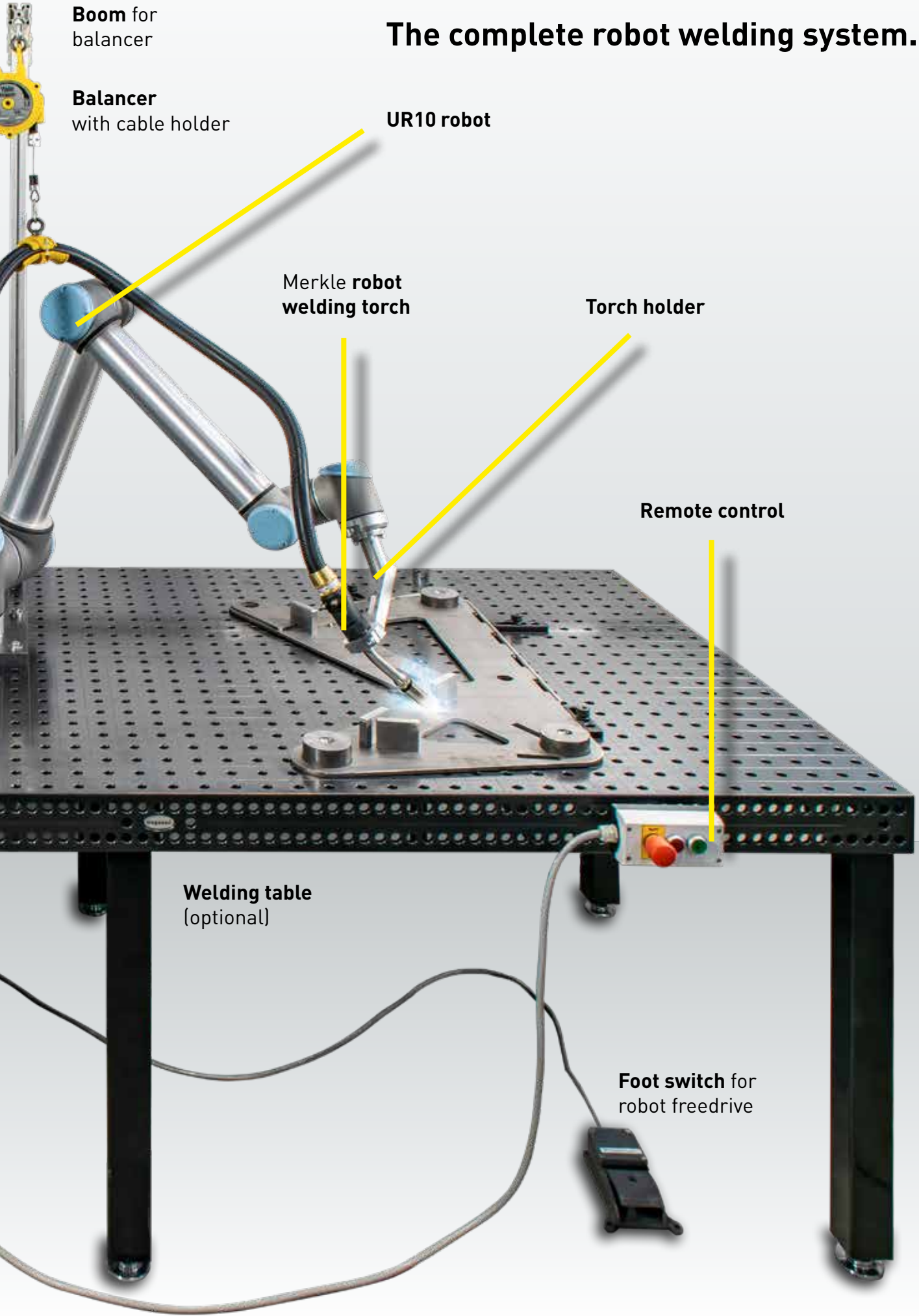


Robot controller

Touch control panel

Merkle Weld**ROB**

The complete robot welding system.



MERKLE CONFIGURATION

COMPLETE SOLUTIONS FOR AUTOMATION AND ROBOTICS!

With over 40 years experience in the field of automation and robotics, Merkle offers complete system solutions for small, medium and mass producing companies. The overviews show examples for the configuration of a complete solution for standard as well as for hollow wrist robots and for automation systems.

Front without user panel

Front with digital display for amperage/voltage/wire feed speed

Front with display for manual program and process selection

External user panel for manual program and process selection

PC/Laptop

Panel-PC mobile

Welding power source

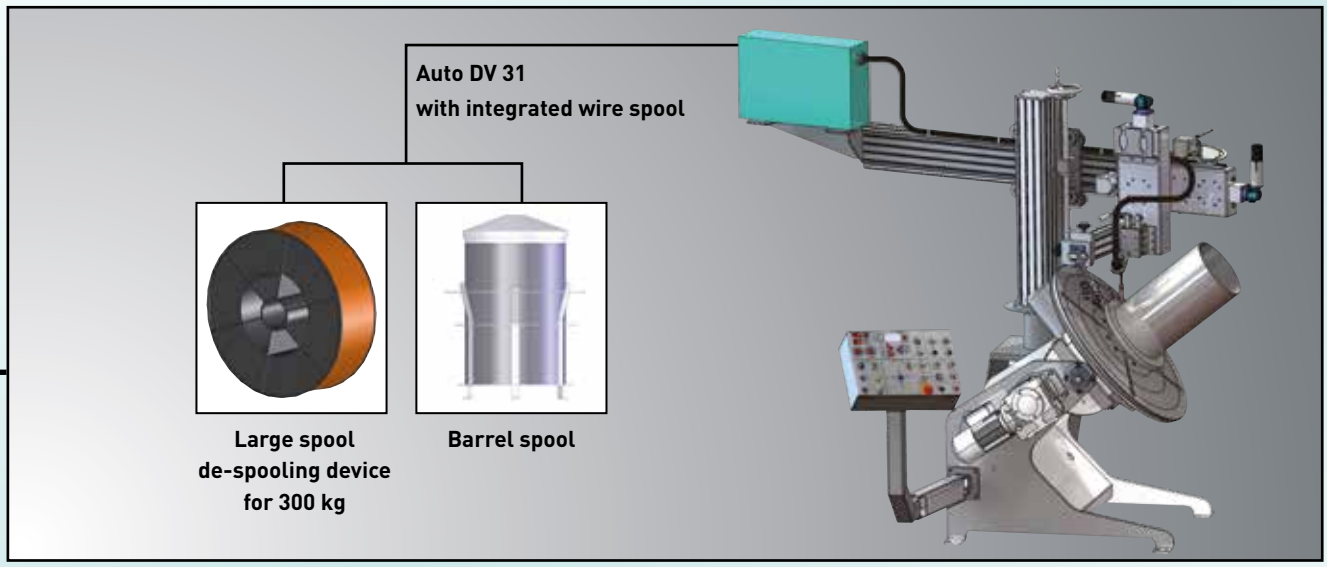
Panel-PC integrated

Tablet-PC

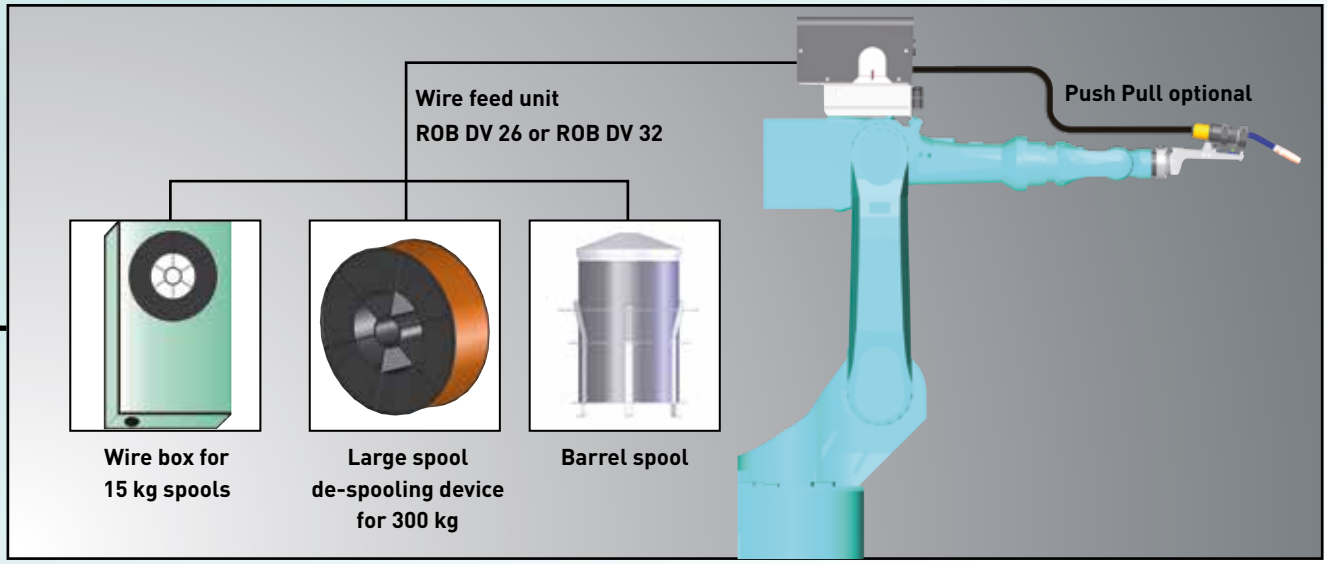
Robot/Automation controller

Water cooling

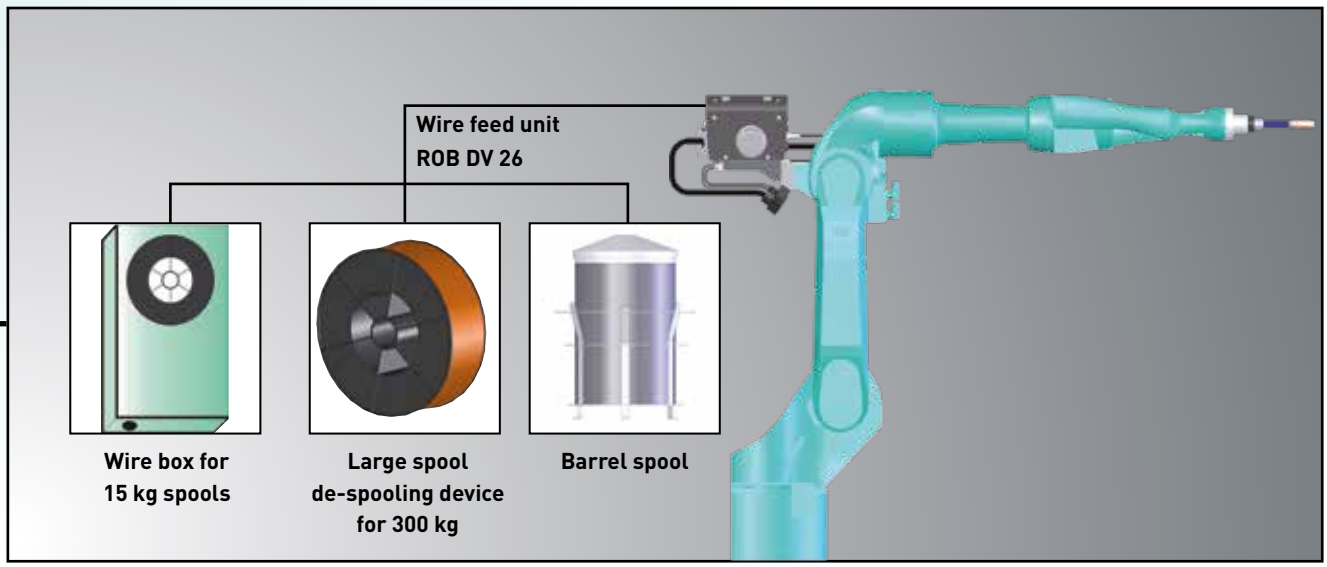
Automation



Standard Robots



Hollow Wrist Robots



Perfectly compatible automation components!

TIG WELDING

For the automated solutions in TIG welding Merkle offers perfectly compatible components and systems. This guarantees the highest productivity and reproducibility.

The systems are especially suited for use in heavy industry and designed for use in automation and robotics. The control of the machines can be achieved via a CNC or robotic interface. The parameters welding current, AC frequency and AC balance can all be controlled in this way.

Merkle HighTIG RS Welding Units

The compact and powerful welding units of the Merkle HighTIG DC RS Series (352/452/552) can be used with almost all automation and robot solutions.

The HighTIG power sources can be equipped with a water cooler and a trolley as an option.

Merkle Insquare AC/DC Units

The TIG inverter based welding systems in the Insquare series offer professional performance throughout the whole range. Three models from 320 to 600 A for DC or AC/DC welding fulfil even the highest demands on industrial welding equipment in today's production. Professionals are inspired by the perfect technology and wide range of functions of the Insquare!

DC-HIGH FREQUENCY PULSATION

The machines of the HighTIG and Insquare series are equipped as a standard with High Frequency Pulsation. The welding arc is pulsed with a frequency of up to 12 kHz. This function opens fantastic possibilities in TIG DC welding which are just not possible with a standard TIG DC welding arc.

- Noticeable concentration of the welding arc.
- Arc form similar to Plasma arc.
- Reduced heat input.
- Higher welding speed.
- Extremely stable arc.
- Perfect for corner joints.

Standard TIG weld

DC-High Frequency Pulsation (kHz)

e.g High Frequency Pulsation (kHz) of a corner joint

Always the right torch

TIG WELDING TORCHES

Merkle TIG Welding Torch TM 450 W.

The torch for automated TIG application!

The welding torch TM 450 W is available in 3 versions:

- straight
- bent, 30°
- bent, 70°

The straight version is available with options for cold and hot wire feeding and gas tow shoe. All torch heads can be exchanged easily due to the torch interchange system.

Cold/Hot Wire Feeding

The cold/hot wire feeding system KDZF/HDZF is available for the TM 450 W. It can be attached directly to the torch body.

Peripheries and Accessories

- Gas tow shoes for forming/purging gas
- Cold/hot wire control unit
- Cold/hot wire feed unit

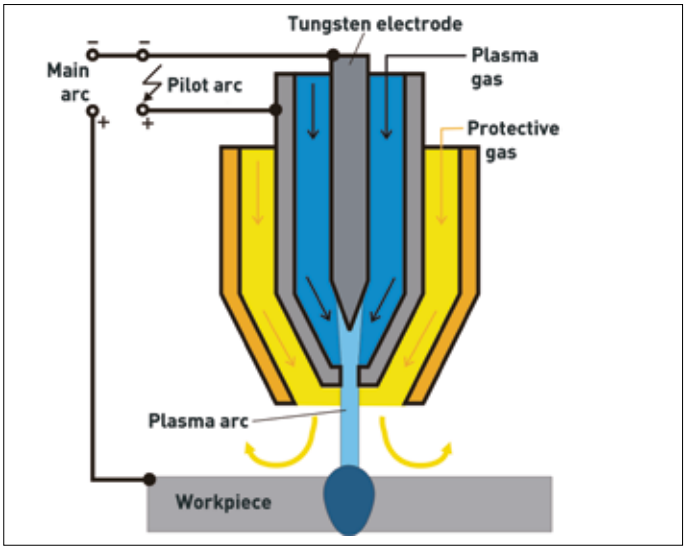
For special automation tasks!

PLASMA WELDING PROCESS

TECHNOLOGY PLASMA WELDING

Plasma welding is a modification of the TIG welding process. As in TIG welding we use a non consumable electrode (tungsten or alloy) under an inert protective gas environment. The plasma arc is extremely stable and concentrated. It forms a „keyhole" in the welding bead which can be used to fully penetrate and join the work piece.

The main difference to TIG welding is the welding torch. The tungsten electrode is situated inside the torch so that the arc is totally encapsulated by the protective gas. A copper gas nozzle with a very fine drilling concentrates the plasma welding arc. The plasma welding arc length is not as critical as the TIG welding arc length. The plasma welding arc is extremely concentrated and achieves a much deeper penetration whilst at the same time maintaining a smaller heat affected zone as compared to the TIG welding arc. The plasma process is perfectly suited to automated welding.



ADVANTAGES OF PLASMA WELDING:

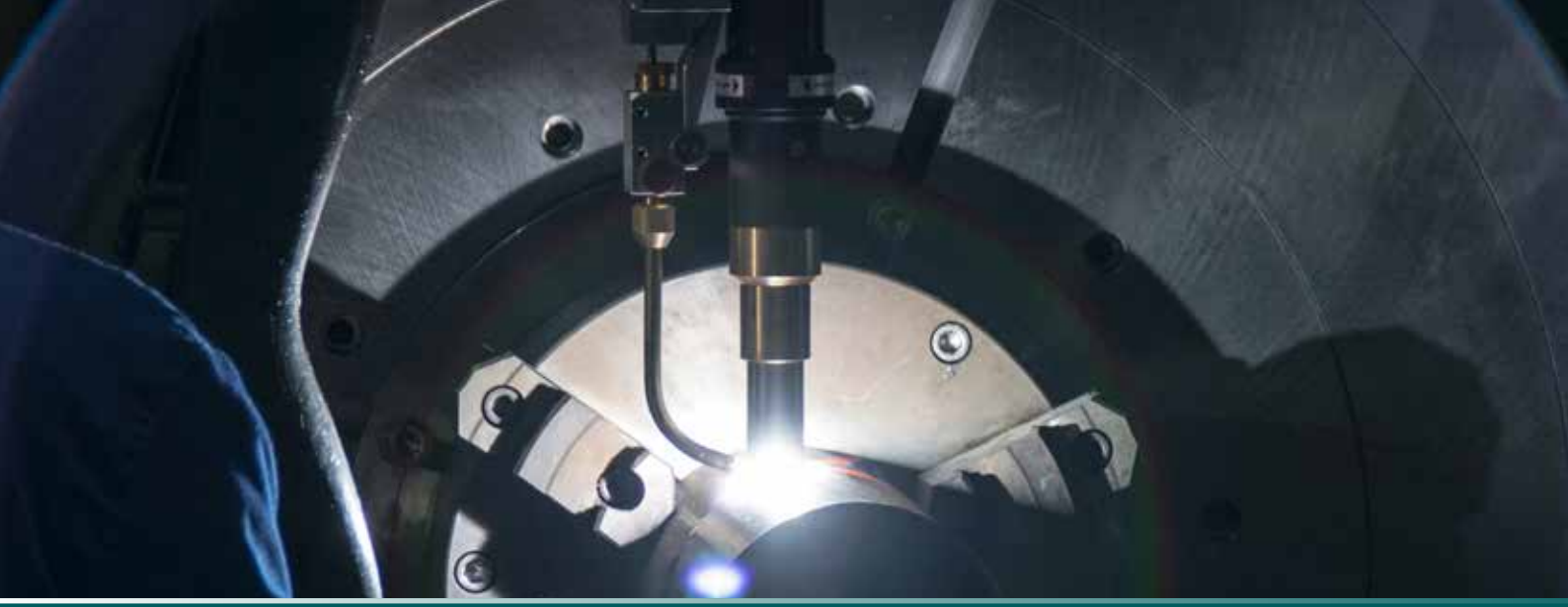
- 100 % x-ray safe welds
- Perfect penetration
- Equal formation of the root
- Low distortion
- Locally limited heat input
- Welding of low and high alloy steels
- Stainless steel welding in a single pass without edge preparation (butt weld)

APPLICATION:

- Automated pipe welding
- Container/silo construction
- Longitudinal seam welding
- Plant construction

MERKLE POWER SOURCES:

The Merkle HighPLAS 452 DC RS plasma power source offers reliable performance up to 400 A at 100% duty cycle. A water cooler and a trolley are available as options. With the appropriate interface connections the system can be used for versatile automation and robot solutions.



Special torches for extraordinary jobs

PLASMA WELDING TORCH

Merkle Plasma Welding Torch

The plasma machine welding torch PM 400 W is equipped with a quick exchange mechanism. This enables a fast and simple exchange of the welding head. The torch is water cooled and can be used up to 400 A* at 100 % duty cycle in DC mode and up to 350 A* at 100 % duty cycle in AC mode.

*: with a coolant supply flow temperature of 20 °C

Cold/Hot Wire Feeding

We supply the cold or hot wire feed system KDZF/HDZF for the plasma welding torch PM 400 W. This can be attached directly to the torch body.

Peripheries and accessories

- Gas tow shoes for forming/purging gas
- Cold/hot wire control unit
- Cold/hot wire feed unit

06/2019 EN

CREATE A SUCCESSFUL FUTURE.

With Merkle, your specialist for welding units, welding machines, torches and intelligent automation systems. With our own subsidiaries and Merkle Dealers in Germany, Europe and the rest of the world.

Welcome to the Merkle World of Welding.

PRODUCT RANGE

- MIG/MAG Welding Units
- Synergic Pulse Welding Units
- TIG Welding Units
- MMA/Stick Electrode Welding Units
- Plasma Welding and Cutting Units
- Welding and Cutting Torches
- Turntables, Booms, Parallel/Rotation Banks and Roller Drive Units
- Complete Automation Systems and components
- Merkle Robotics

MADE IN GERMANY

Merkle Schweissanlagen-Technik GmbH

Industriestr. 3 • D-89359 Koetz • Germany
Tel.: +49 8221 915-0 • Fax: +49 8221 915-40
Email: info@merkle.de

www.merkle.de