

/ Perfect Welding / Solar Energy / Perfect Charging



SHIFTING THE LIMITS



**WELDING SOLUTIONS FOR THE
AUTOMOTIVE INDUSTRY**

SOLUTION-ORIENTED FOR OUR CUSTOMERS

With more than 50 years of experience in the automotive and supply industry, Fronius is the market leader for automated robotic welding systems. Almost all well-known vehicle and component manufacturers are among our customers.

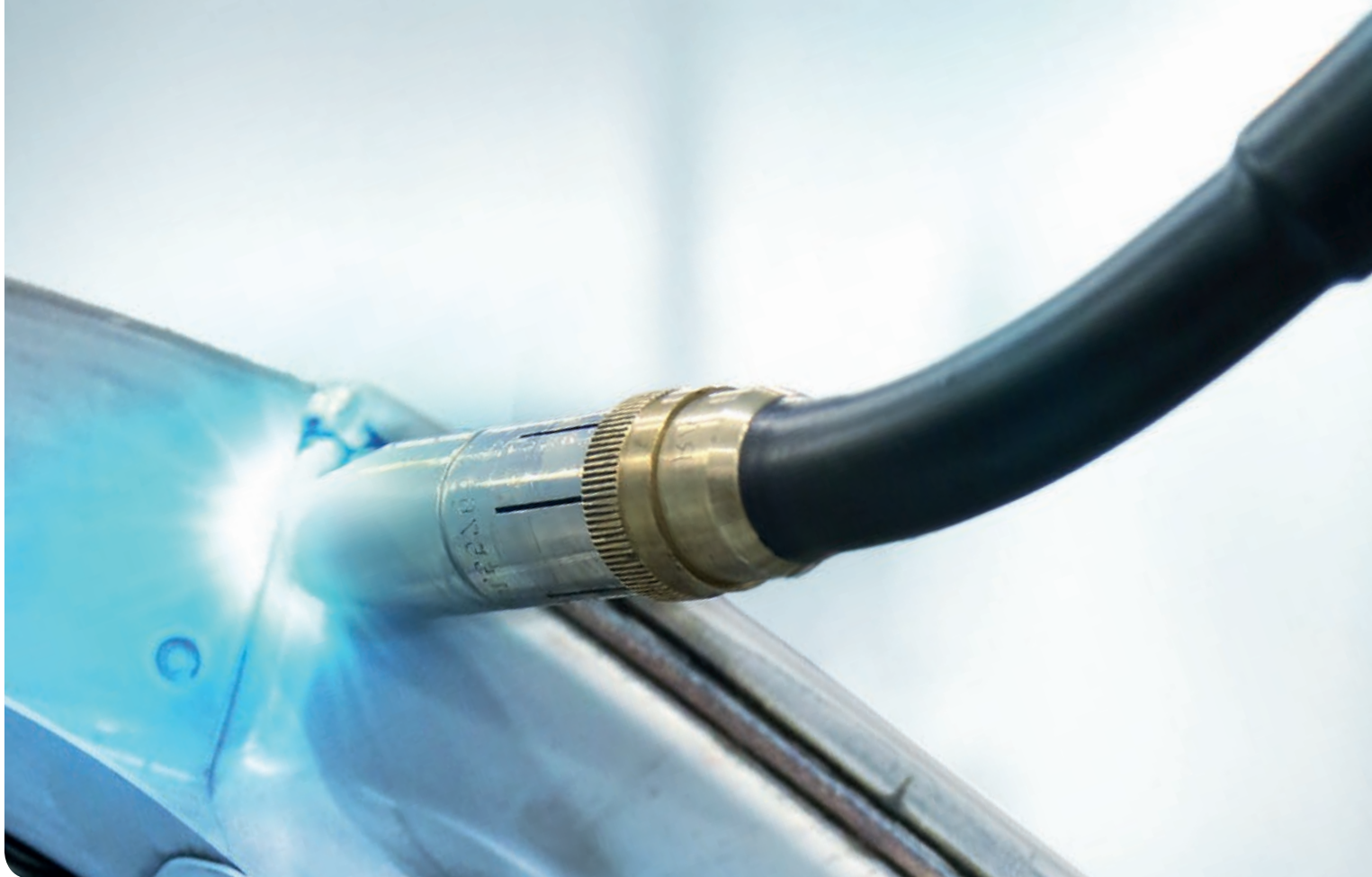
Our products are manufactured in close collaboration with industry. Working together with our customers, we also solve difficult tasks and make the seemingly impossible possible.

In order to meet the stringent demands of the automotive sector, we are constantly developing our processes to be

even better – and offer innovative solutions which continue to push the physical and mechanical boundaries of welding technology. Productive, efficient and reliable.

Fronius not only stands for excellent product quality, but also outstanding service. We provide our customers with

the support they need – quickly, competently and globally. From planning and development to commissioning and training to maintenance and servicing: Fronius offers one stop customised welding systems. You can rely on our experience and know-how.



SEAM TRACKING & WELD SEAM APPEARANCE

Seam tracking detects deviations, such as those that can occur as a result of thermal deformation, and adjusts the track of the welding torch accordingly. The result is a more accurate weld seam and the prevention of welding errors.

With the new high-speed system architecture, the arc can be measured and analysed even more accurately. The result: a perfect weld seam appearance.

HIGH WELDING SPEEDS

Our components are perfectly coordinated from the power source via the wirefeeder to the welding torch, which means significantly greater speeds for the same weld seam quality.

LESS REWORK

Greater process reliability combined with our new stabilisers assures extraordinary results with little spatter. This also means less rework.

BEST GAP-BRIDGING ABILITY

Our mastery of the arc is unrivalled. The precision of our control systems means that we achieve an excellent gap-bridging ability.

DATA DOCUMENTATION AND INTERCONNECTION

Interconnected power sources enable central updating and significantly reduce downtimes by means of complete data documentation.

DIFFERENT MATERIALS

We offer the optimum welding process for each material, thereby assuring the perfect weld seam for almost all base materials.

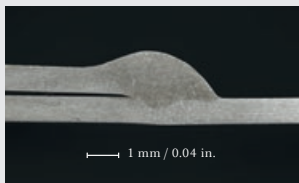
REPRODUCIBILITY

100% reproducibility and perfect process control assure a consistently high weld seam quality and appearance.

BODY IN WHITE MATERIALS AND JOINING TECHNOLOGIES

Whether steel, aluminium or mixed applications – Fronius offers the optimum welding process.

1 GALVANIZED STEEL



CMT: I: 200 A, U: 16.2 V

ADVANTAGES

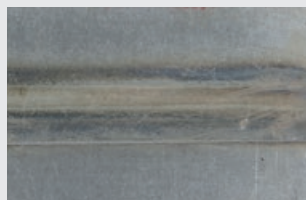
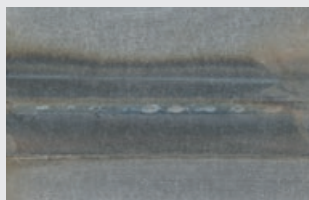
- / Practically spatter-free welding and brazing on galvanised steel
- / Low distortion due to optimised heat input
- / Low porosity
- / Stable arc
- / Optimum penetration
- / High welding speeds

2 HIGH-STRENGTH AND ULTRA STRONG STEELS

ADVANTAGES

- / Practically spatter-free welding of hot pressed components
- / Lower heat input (up to -50%) than with conventional gas metal arc welding.

-50% HEAT INPUT



DIP TRANSFER ARC: I: 97 A, U: 18.1 V CMT: I: 98 A, U: 11.8 V

STEEL APPLICATIONS

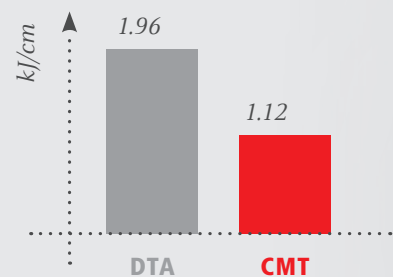
PROCESSES

Standard/LSC
Pulse/PMC
CMT/CMT Braze+

For process descriptions,
see page 12/13

MIXED GAS M 21

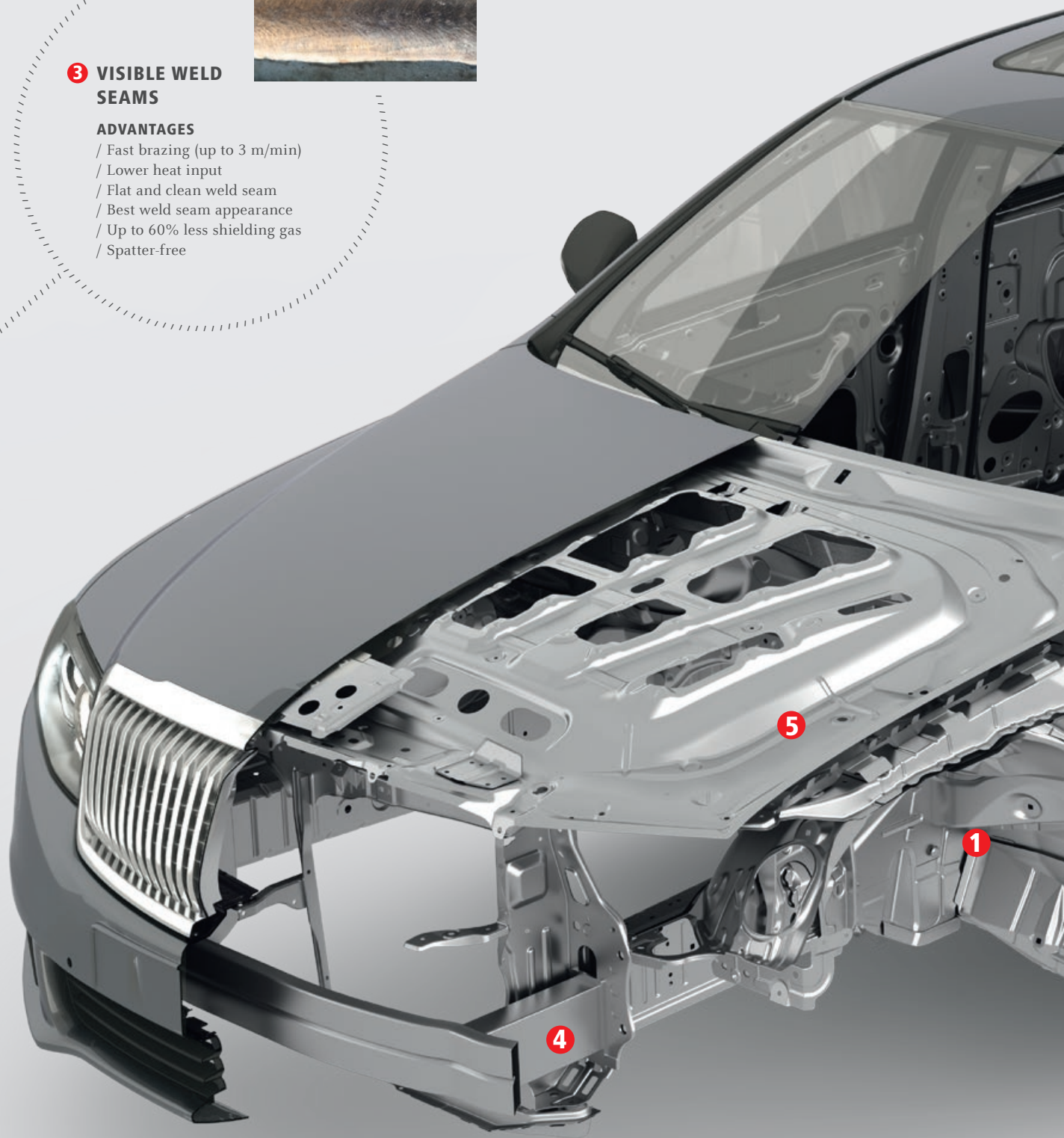
Material: 1 mm steel

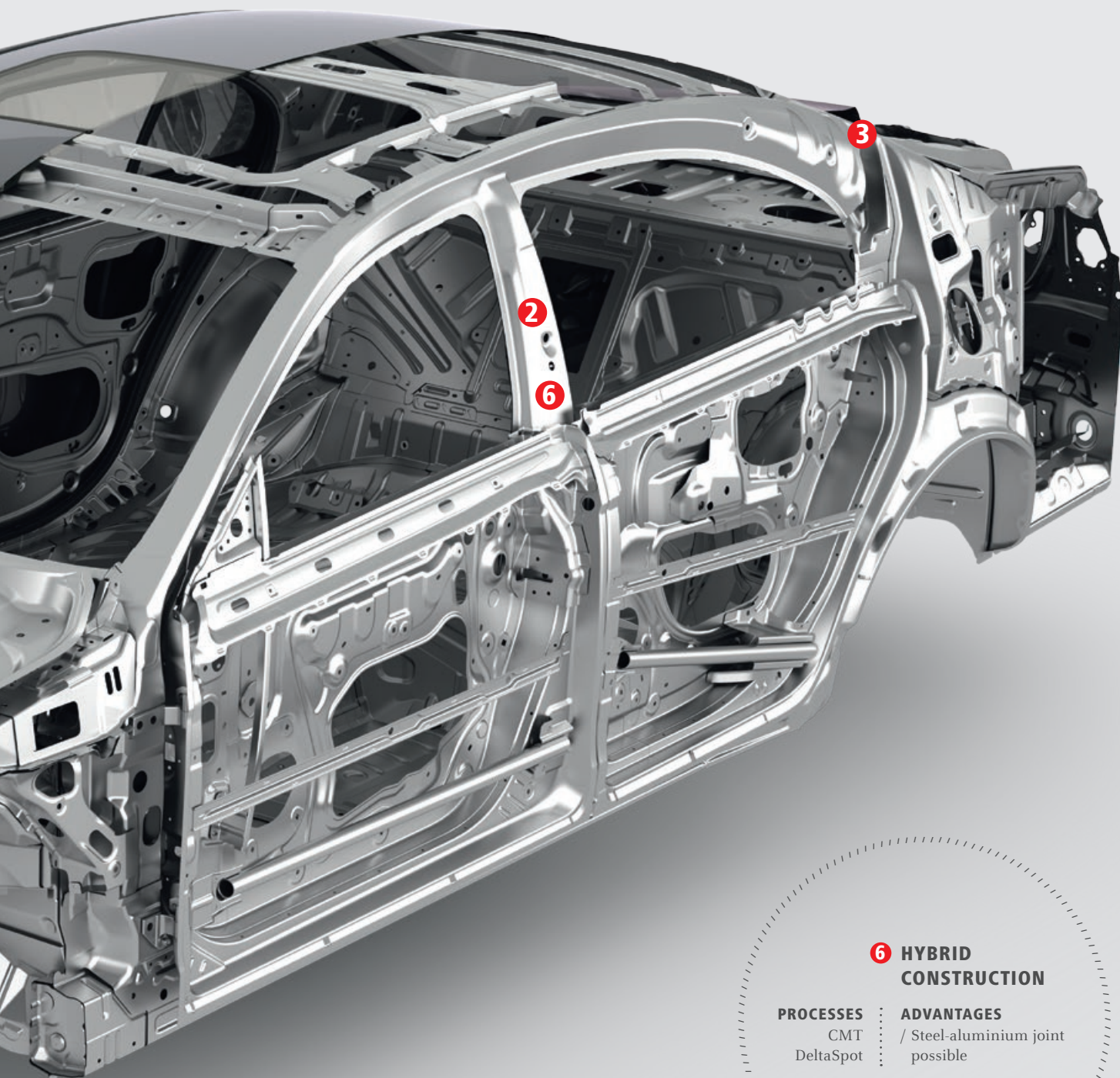


3 VISIBLE WELD SEAMS

ADVANTAGES

- / Fast brazing (up to 3 m/min)
- / Lower heat input
- / Flat and clean weld seam
- / Best weld seam appearance
- / Up to 60% less shielding gas
- / Spatter-free





6 HYBRID CONSTRUCTION

PROCESSES

CMT
DeltaSpot

ADVANTAGES

/ Steel-aluminium joint
possible



ALUMINIUM APPLICATIONS

4 ALUMINIUM ARC WELDING

PROCESSES

Pulse/PMC
CMT
LaserHybrid

ADVANTAGES

/ High stability of the arc
/ Lowest heat input
/ Steel-aluminium joints possible
/ Minimal spattering
/ High gap-bridging ability

CMT

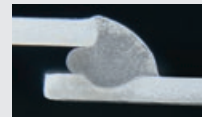
2 mm
1 mm
2 mm



I: 100 A, U: 18.9 V, Vd: 4.5 m, Vs: 60 cm/min

CMT PULSE

2 mm
2 mm
2 mm



I: 97 A, U: 16.9 V, Vd: 5 m, Vs: 60 cm/min

CMT ADVANCED PULSE

2 mm
2.5 mm
2 mm



I: 97 A, U: 11.9 V, Vd: 6 m, Vs: 60 cm/min

BEST GAP-BRIDGING ABILITY

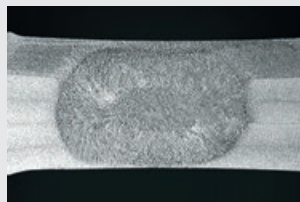
5 ALUMINIUM RESISTANCE SPOT WELDING

PROCESSES

DeltaSpot

ADVANTAGES

/ Complete process-reliable, reproducible joining of aluminium with short cycle time
/ Irrespective of joint direction and combination of sheet thickness, the perfect solution for lightweight construction designs
/ Spatter-free process



DELTASPOT

3-layer aluminium joint

Material: EN AW 6014, EN AW 6016

VEHICLE COMPONENTS AND JOINING TECHNOLOGIES

In addition to the vehicle manufacturers, the supply industry too has stringent productivity requirements of welding: short process times, smallest reject rates, minimum failure rates, and minimum amount of rework. Fronius has the answers here with its optimised welding processes and characteristics.

CHASSIS COMPONENTS



Video: Perfect ignition on robot

PROCESSES

Standard/LSC
Pulse/PMC
CMT (Twin)
LaserHybrid

ADVANTAGES

- / High speeds due to process stability
- / Low heat input
- / Stable penetration
- / High arc stability
- / Low-spatter welding
- / Flying start – reduced cycle time with PMC



STANDARD

Penetration: 0.9 mm, 45%



LSC

Penetration: 0.6 mm, 30%



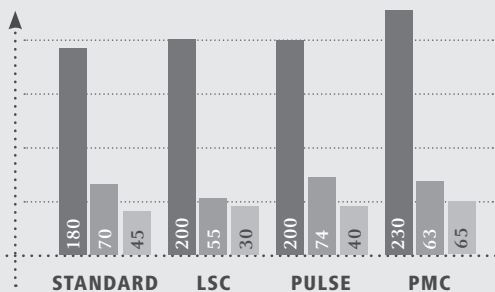
PULSE

Penetration: 0.8 mm, 40%



PMC

Penetration: 1.3 mm, 65%



■ Welding speed [cm/min]
■ Energy yield [kJ/length]
■ Penetration [%/material thickness]

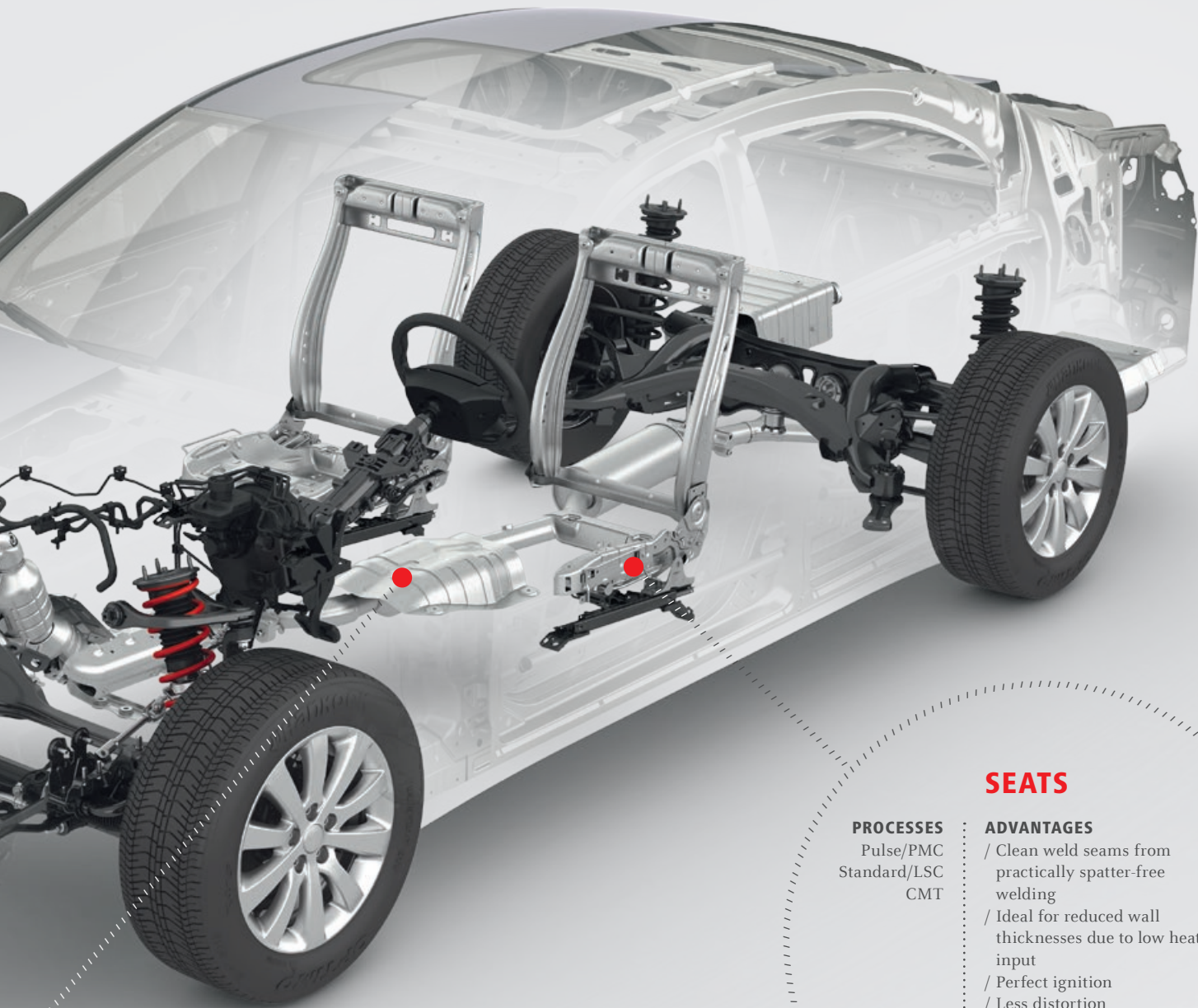
EXHAUST SYSTEM

PROCESSES

Pulse/PMC
Standard/LSC
CMT
TIG/Plasma

ADVANTAGES

- / Optimised characteristics for exhaust pipes
- / Practically spatter-free welding
- / High speeds
- / Good gap-bridging ability
- / Suitable for thin sheets



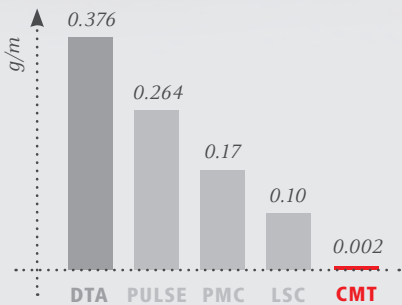
SEATS

PROCESSES

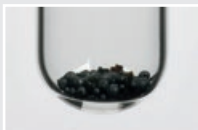
Pulse/PMC
Standard/LSC
CMT

ADVANTAGES

- / Clean weld seams from practically spatter-free welding
- / Ideal for reduced wall thicknesses due to low heat input
- / Perfect ignition
- / Less distortion
- / Suitable for thin and ultra-strong sheets
- / Mixed gas/100% Co2 gas
- / Suitable for high-strength and ultra-strong steel



/ Dip transfer arc



/ Pulse



/ PMC



/ LSC



/ CMT

**UP TO 99%
LESS SPATTER**

THE PERFECT ROBOTIC WELDING SYSTEM FOR YOUR PRODUCTION LINE

Fronius offers the latest technologies for the automotive industry.



AUTOMATIC COMPONENT DETECTION

/ The system always recognises which components are connected at any point in time, and warns of any incompatibilities. This makes inefficient misadjustments nearly impossible.

CENTRAL UPDATING

/ Synchronised update levels: all the components are always updated together, within the system.

INTERFACE

FUNCTION

Designed for the communication of the future.

ADVANTAGE

/ Integrated Ethernet interfaces
– network compatible system
/ Plug-in fieldbus interfaces – easy to replace

COMPATIBILITY WITH ALL ROBOT MANUFACTURERS

FUNCTION

Interfaces to the control systems of all robot manufacturers.

ADVANTAGE

The TPS/i communicates quickly and easily with robots from various manufacturers.

TOUCHSENSING AND SEAM TRACKING

FUNCTION

The position of the component and the weld seam are detected and monitored.

ADVANTAGE

Differences in the starting position of the component are recognised by the Touch sensor and compensated for. Seam tracking detects deviations, such as those that can occur as a result of thermal deformation, and adjusts the track of the welding torch accordingly. The result is a more accurate weld seam and the prevention of welding errors.

MAGNETIC CRASHBOX

FUNCTION

After a physical impact with the welding torch, it releases itself from its magnetic holder.

ADVANTAGE

Damage to the welding torch can be avoided, the reset accuracy is so precise that the process can be continued without readjustment.



CMT

TRIED AND TESTED IN THE AUTOMOTIVE INDUSTRY

/ The “cold” welding process CMT means excellent results with all materials, the world's most stable arc, and precision process control. This offers virtually endless possibilities: practically spatter-free weld and brazed seams, steel and aluminium welded joints, the welding of ultra-light gauge sheets starting from 0.6 mm – and much more.

LSC

(LOW SPATTER CONTROL)

/ With the development of the TPS/i power source platform, Fronius has significantly improved the standard arc. Now LSC raises the bar even higher: less spatter and higher process stability, combined with new stabilisers, enable extraordinary results. With the LSC principle, the short circuit – unlike with the standard dip transfer arc – occurs at a relatively low current level. This ensures a gentle reignition and stable welding process.

INNOVATIVE PROCESSES FOR THE AUTOMO- TIVE INDUSTRIE

PULSE/PMC

(PULSE MULTI CONTROL)

/ PMC means a modified pulsed arc. Combined with the new, powerful TPS/i power source platform, it achieves even better welding results during pulse welding. The powerful hardware enables an extremely fast response during welding, whereby the arc can be controlled even more effectively. The advanced SynchroPulse process and the new penetration and arc length stabilisers simplify the proven welding process.

CHARACTERISTIC FEATURES FOR LSC/PMC

/ New functions such as the penetration and arc length stabilisers sit alongside improved functions to provide significantly more control over the arc. As a result, hardly any spatter arises during gas shielded arc welding of steel, aluminium and high-alloy steels. A consistently good penetration with fewer notches is assured and the user can weld more quickly and more cost effectively than ever before.

ADVANTAGES

- / Stable arc
- / Improved ignition
- / Improved droplet detachment
- / Unchanging penetration when stick-out changes

ARC LENGTH STABILIZER

/ The arc length stabilizer keeps the arc permanently short, thereby ensuring deep penetration – without undercutting. This ensures welding at a higher speed, which benefit robot-assisted applications in particular.

PENETRATION STABILIZER

/ The penetration stabiliser is one of the latest innovations of the PMC and LSC arc characteristics from Fronius. It keeps the penetration stable by automatically responding to the changing stick-out and adjusting the wirefeeder accordingly.

CMT (COLD METAL TRANSFER)

/ For especially difficult weld seams and special requirements, we have developed and combined CMT still further. The result: three additional processes which offer the perfect solution for virtually every application – with the best welding results.

CMT TWIN

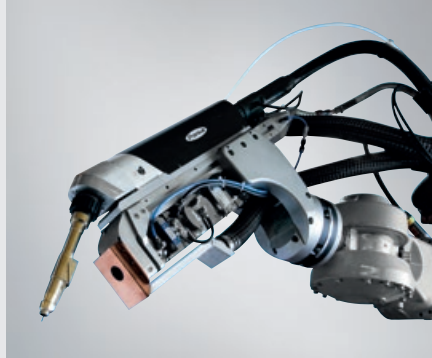


/ A simplified system configuration and synchronised start-up of two separately controllable power sources, two wire electrodes and one gas nozzle – combined with the tried-and-tested CMT process. Unbeatable arc stability coupled with deep penetration, optimum wetting to sidewalls, and low-spatter welding.

AREAS OF APPLICATION

- / Chassis components
- / Axles (trucks/cars)
- / Chassis frames
- / Large exhaust pipes (trucks)
- / Wheel rims
- / Bumpers

LASERHYBRID

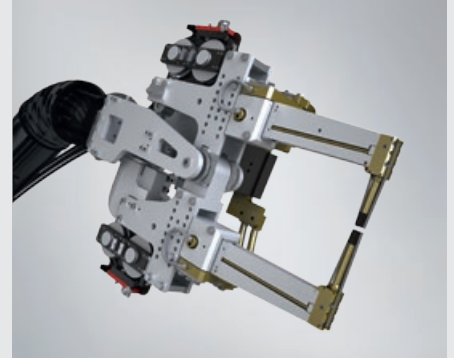


/ Fronius LaserHybrid, the laser GMAW process from Fronius, combines the advantages of the industrial GMAW and laser-beam welding processes – without any of its disadvantages. Fronius LaserHybrid marries the excellent gap-bridging ability and easy weld-seam preparation of MIG welding with the reduced heat input, deep penetration and speed of a laser. This makes it possible to carry out automated joining of different aluminium and steel items at speeds of up to 8 metres per minute, in superlative quality.

AREAS OF APPLICATION

- / Doors
- / Axles
- / Chassis components

DELTA SPOT



/ For the spot welding of aluminium, Fronius has developed the resistance welding process DeltaSpot. The special feature of this solution is the spooling process tape, which means that every welding spot is welded with an unused electrode and is 100% reproducible. This assures extremely high process reliability and minimum surface spatter. As well as being used for aluminium joints, DeltaSpot is also suitable for difficult sheet-steel joints such as those involving visually exposed spots or coated high-strength sheets.

AREAS OF APPLICATION

- / Aluminium components (doors, bonnet, boot)
- / Body in white (aluminium)

QUALIFIED AUTOMOTIVE SUPPLIER

/ QAS is a certification program for the sales and service organisation of Fronius and its partners, which is specifically customised to the requirements of the global automotive industry. Using QAS, we want to ensure that our customers can rely on us to be a highly certified and reliable partner. In other words, to guarantee the best quality – worldwide.



WE HAVE THREE DIVISIONS AND ONE PASSION: SHIFTING THE LIMITS OF POSSIBILITY.

/ What Günter Fronius started in 1945 in Pettenbach, Austria, has now become a modern day success story. Today, the company has around 3,300 employees worldwide and has been granted more than 900 patents. Our goal has remained constant throughout: to be the innovation leader. We shift the limits of what's possible. While others progress step by step, we innovate in leaps and bounds. The responsible use of our resources forms the basis of our corporate policy.

PERFECT WELDING

/ We develop products and complete systems - both manual and automated - as well as the corresponding services for our customers in the global welding technology market. We have made it our goal to decode the "DNA of the arc".

SOLAR ENERGY

/ The challenge is to make the leap to a regenerative energy supply. Our vision is to use renewable energy to achieve energy independence. With our services, inverters and energy-storage systems for optimising energy yields, we are one of the leading suppliers in the photovoltaics sector.

PERFECT CHARGING

/ As know-how leaders in the world of battery charging, we deliver exceptional solutions to create the maximum benefit for our customers. For the intralogistics sector, we are committed to energy flow optimisation for electric forklift trucks and are constantly striving for the next innovation. Our powerful charging systems for vehicle workshops guarantee safe and reliable processes.

Further information about all Fronius products and our global sales partners and representatives can be found at www.fronius.com

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