

/ Perfect Welding / Solar Energy / Perfect Charging



SHIFTING THE LIMITS



**THE PERFECT JOINT IS POSSIBLE.  
NOW THAT THE INTELLIGENT  
REVOLUTION IS COMPLETE WITH  
TPS/i ROBOTICS.**

# THE PERFECT JOINT SINCE 1945

/ Fronius has been developing innovative complete solutions for arc welding since 1945. Day-in, day-out, we're working at full power on our vision: to decode the "DNA of the arc". Our goal is to produce the perfect joint. But this also means throwing tried-and-tested things overboard, and starting over and over again. We don't take any chances either; every little detail is analysed, and all system components are tested thoroughly. It is with this knowledge that we create the technological revolutions that have made Fronius the global technology leader and Europe's market leader in welding technology.



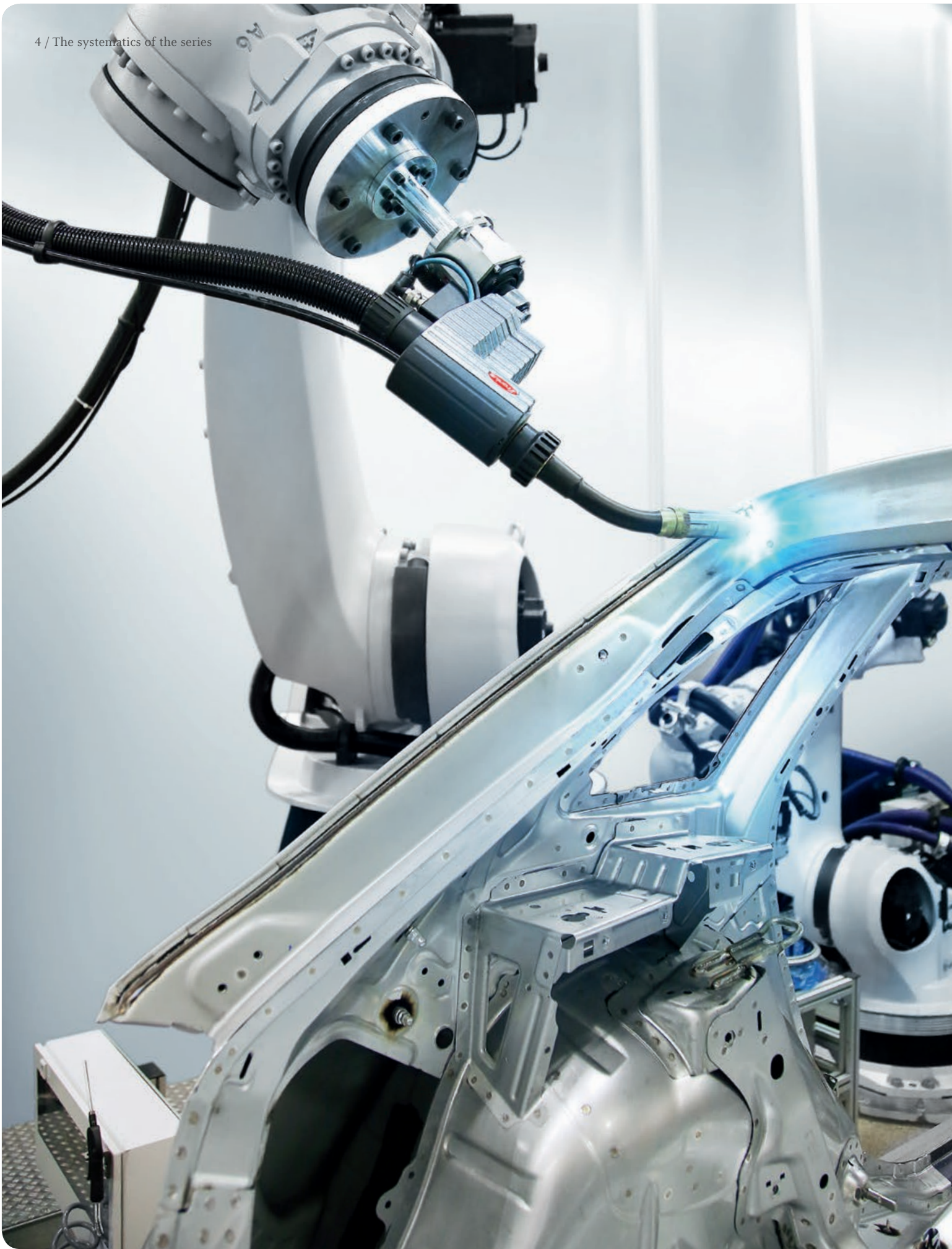


# THE INTELLIGENT REVOLUTION

/ The TPS/i for manual welding was the Intelligent Revolution of 2013/2014. Thanks to this innovative technology, environmental influences and other sources of error are radically reduced. The result is a completely new welding experience with indisputable benefits in terms of quality and uniformity.

At the same time we have optimised this technology with all the features that meet the specific challenges of robotic welding - the Intelligent Revolution is in production. All this leads to the highest weld seam quality, lower reject rates, energy efficiency and easy maintenance, all of which keep downtimes to a minimum.







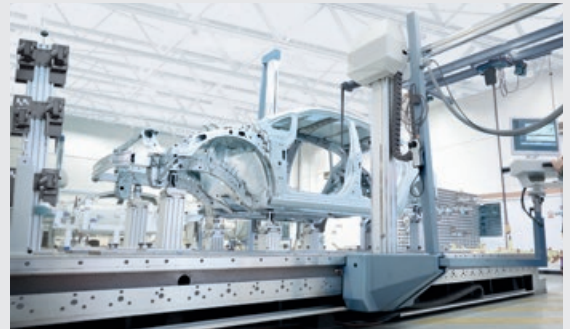
# THE SYSTEMATICS OF THE SERIES

/ Industrial series production has its own rules: defined quality, defined process times, defined costs. And in theory, boundless reproducibility. In reality however, there is a multitude of influencing factors that can increase reject rates or downtimes and thus impact on the overall profitability of the production operation.

/ These include operating faults, variations in the quality of the material or the effects of thermal deformation during the welding process. If a fault is not discovered and rectified immediately, the robot will reproduce it all along the assembly line. The issue here is that the robot must be able to think in order to evaluate a problem for itself.

In developing the TPS/i, we put the user's perspective at the heart of all our deliberations; instead of developing an additional feature for a power source, we instead wanted to tailor the welding process perfectly to the needs of individuals. We also took the entire production context into consideration while improving our robot welding systems.

The result: unsurpassed quality, highest efficiency and maximum reliability. In other words, profitable welding processes for all automated series production lines.



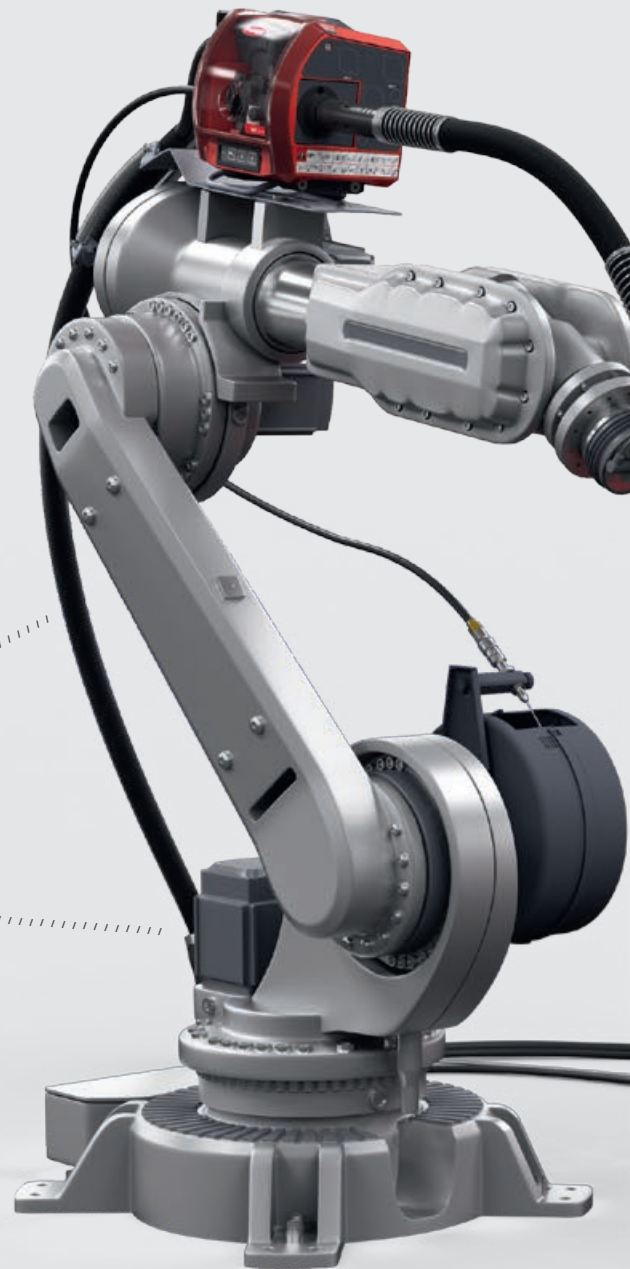
## THE INTELLIGENT REVOLUTION IS IN PRODUCTION

# TPS/i ROBOTICS

/ TPS/i Robotics is a milestone for automated welding production. The starting point for our development was the analysis of the specific challenges of robotic welding. Our goal was not isolated detail improvements, but a systematic approach that combined the intuition and intelligence of a human with the productivity of a machine.

## EFFICIENCY

/ Efficiency is a prerequisite for commercial success. And this is just one area where TPS/i Robotics is setting new standards. Program setup, welding speed and maintenance provide the highest levels of competitiveness and profitability in modern series production.



## RELIABILITY

/ Progress is an ongoing process. With TPS/i Robotics, our customers are kept constantly up-to-date with the latest technology - even in the future. The modular system design, the ability to update our software and the constant development of our processes are the best guarantees for future-proof production.



## QUALITY

/ Fronius welding systems have always been the industry standard for the ultimate in quality. Our mission is to decode the arc, with the goal of producing seemingly impossible joints between materials. In addition to a range of functions that improve the arc, TPS/i Robotics ensures complete process documentation.









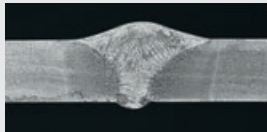
# QUALITY

/ We have been the global technology leader in welding technology for years - a position that we were able to reach through continuous research and development. Our goal: the perfect arc for every application. Our mission: to decode the “DNA of the arc”. This means that we can guarantee our customers weld seams of uncompromising quality.

/ The high-speed architecture of our system enables us to conduct a faster and more precise analysis of the arc, which we can then better control. The result is a low-spatter dip transfer arc plus a faster and more reliable pulsed arc.

Stabilisers ensure uniform penetration and a consistently short arc, and thus high welding speeds. In summary, welding processes that are more stable, faster and cleaner. Attributes that no other power source even comes close to matching.

## WITHOUT PENETRATION STABILISER



/ Stick-out 15 mm  
 $V_{wire} = 10 \text{ m/min}$   
 $I: 300 - 250 \text{ A}$   
 Steel 6 mm



/ Stick-out 30 mm  
 $V_{wire} = 10 \text{ m/min}$   
 $I: 300 - 250 \text{ A}$   
 Steel 6 mm

## WITH PENETRATION STABILISER

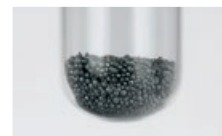
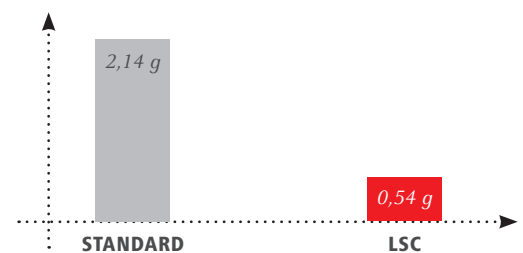


/ Stick-out 15 mm  
 $V_{wire} = 10 - 13 \text{ m/min}$   
 $I: 300 \text{ A}$   
 Steel 6 mm



/ Stick-out 30 mm  
 $V_{wire} = 10 - 13 \text{ m/min}$   
 $I: 300 \text{ A}$   
 Steel 6 mm

Spatter [g/m]



/ Standard dip-transfer arc  
 $V_{wire} = 6.0 \text{ m/min}$   
 $I: 140 \text{ A}$   
 $U: 18.6 \text{ V}$   
 Steel 5 mm



/ Dip-transfer arc with LSC  
 $V_{wire} = 6.0 \text{ m/min}$   
 $I: 128 \text{ A}$   
 $U: 18.2 \text{ V}$   
 Steel 5 mm





# EFFICIENCY

/ The optimisation of system productivity can be implemented at various stages: in process preparation, in process speed and ultimately in process finalisation, by avoiding errors. On the one hand unproductive periods are thereby reduced, on the other the production process is accelerated.

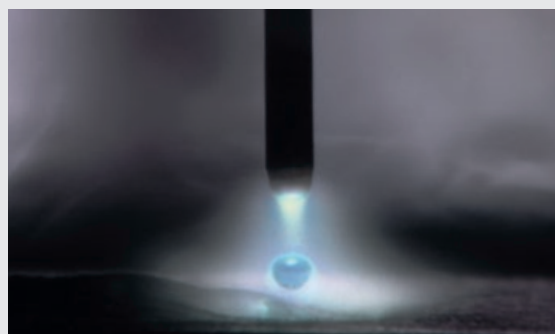
/ Programming a new process, converting the system or switching between various process steps can be very time-consuming. TPS/i Robotics has numerous improvements when it comes to setup, maintenance, control and conversion, meaning that costly downtimes are kept to a minimum.

The perfect interaction of the processes (LSC and PMC) with the intelligent penetration and arc length stabilisers results in faster and higher quality production, along with reduced rejection rates.

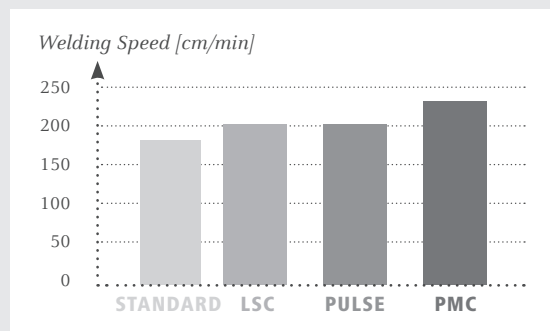
Simply put, TPS/i Robotics is therefore the most efficient welding system for automated production.



/ LSC dip transfer arc



/ PMC pulsed arc



/ Process comparison





# RELIABILITY

/ For Fronius, reliability is not just about protecting the system against physical damage, which is always ensured via thorough tests and the use of high quality materials. Our focus is more on what really counts in industrial operations: the reliability of production, even in the future. In the context of series production by robots, there are three reliability-related parameters:

## WELDING PERFORMANCE

/ We are constantly developing welding processes, functions and characteristics to be even better. The TPS/i can always be brought up-to-date using standardised data interfaces and adapted to any new challenge.

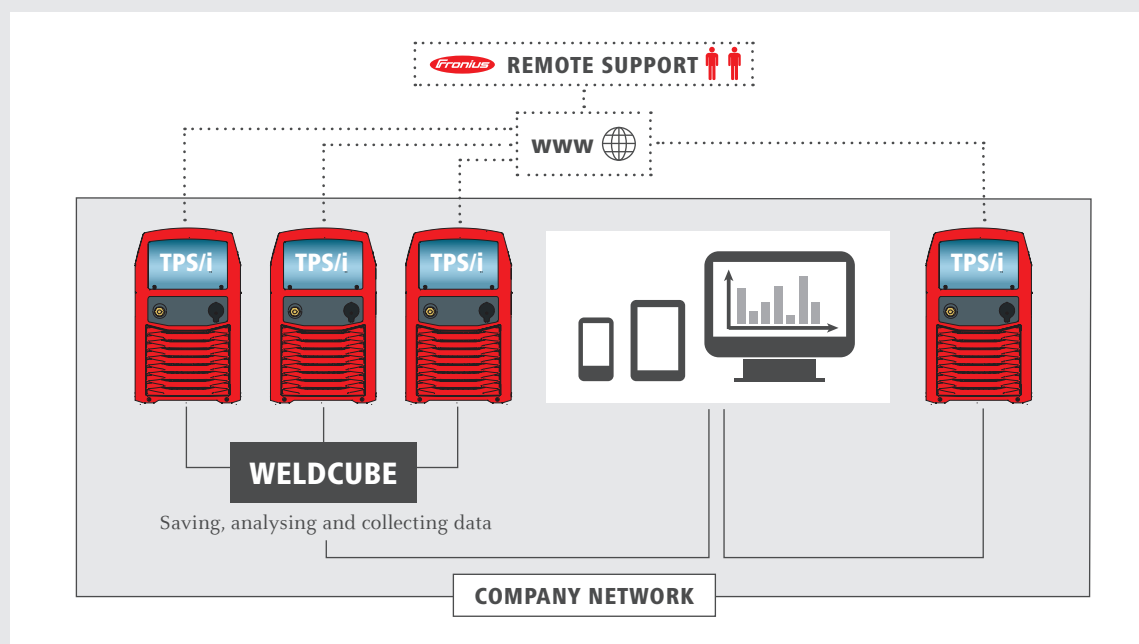
## DATA (INTERCONNECTION)

/ The WeldCube easily networks together every power source in the production line and collects and documents all relevant data. Intelligent evaluation means that future optimisation potentials can be recognised and used.

## CONNECTION

/ Customers can always reach Fronius via the remote support. A data connection can be established at any time, which enables Fronius experts to diagnose and optimise the system remotely and without delay.

Through this we can achieve maximum reliability with TPS/i Robotics: reliability in the welding process, in production and in documentation.



## ARC LENGTH STABILISER

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/ The arc length stabiliser maintains a consistently short arc, which allows higher welding speeds to be achieved.

## PENETRATION STABILISER

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/ Due to the intelligent wire control, the current and penetration remain constant if the stick out changes.

The arc becomes dramatically more stable, and the penetration is much more constant.

## PMC PULSE MULTI CONTROL

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/ The high-speed data processing and precision detection of the process status hugely improve droplet detachment. Perfect for everyone who wants to weld even faster, yet stably and with constant penetration.

# HIGHL

## LSC LOW SPATTER CONTROL

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/ A modified dip transfer arc with extremely high arc stability. High-quality weld seams can be produced with minimal spattering and at the highest welding speed.

## INTERFACE DESIGNER

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/ The Interface Designer allows the communication between the power source and the robot to be adapted to individual customer needs. A graphical user interface makes the programming easy and intuitive.



## WELDCUBE

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/ A central server unit networks and monitors every power source used in a production operation.

Any existing documentation requirements are thereby met and the component-based evaluation of the process data allows any potential for optimisation in the production line to be exploited.

## INTELLIGENCE FROM THE POWER SOURCE TO THE TORCH BODY

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/ The system always recognises which components are connected at any point in time, and warns of any incompatibilities.

# HIGHLIGHTS

## COMPATIBILITY WITH ROBOTS

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/ The TPS/i communicates quickly and easily with robots from various manufacturers. Quick integration of the welding system through robot-specific attachments.

## UPDATE

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/ A central system update of every component ensures that the software of each individual component in the system is always kept right up to date. The update can be performed without any additional hardware or software.

## ADAPTABLE PROCESSES

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/ Welding processes and characteristics can be individually adapted and enhanced. The TPS/i is ready for the welding tasks of tomorrow.

### WIREFEEDER



/ The wirefeeder is completely insulated. Despite its extremely small and compact design, it can accommodate a range of options.

### PRECISION WIREFEED

/ Improved wire guidance and highly dynamic motors are the basis of the perfect arc. An extremely quick and precise wirefeed enables responsive control interventions and high welding speeds as a result.



### TORCH XCHANGE



/ Automated torch body change function. The torch is changed automatically as needed (e.g. replacing wearing parts), which considerably reduces downtimes.



### LONG-LASTING TORCH HOSEPACK

/ Thanks to components of the finest material quality, maintenance costs - and therefore downtimes - are reduced.



### MAGNETIC CRASHBOX

/ The advanced CrashBox dramatically reduces the load on the torch body in the event of a collision, preventing damage to the torch itself. The extremely high reset accuracy allows production to be quickly resumed.



### PLAIN-TEXT DISPLAY

/ The display has been optimised with the practical demands of the welding environment in mind. The colours, viewing angle, brightness, robustness and many other factors have all been designed to ensure easy and efficient working. The intuitive plain-text display with a graphic user interface makes the machine easier than ever for the welder to operate – even with gloves on.



### INTERFACE INSIDE

/ The compact robot interface is integrated in the power source and takes care for a smooth communication between robot and power source.





## FSC - ONE CENTRAL CONNECTION POINT FOR ALL MEDIA



/ The FSC is a central connection point for all media. It lets users lock the hosepack simply and safely, with no tools, to ensure a guaranteed reliable current transfer. Shorter maintenance times and quicker replacement of wearing parts are the result.

## SPLITBOX

/ The SplitBox acts as a media connection point and control unit for push/pull systems.

## REEL

/ The REEL unreeling wirefeeder supports the wirefeed with longer wirefeed-distances. The stand-alone variant can be retrofitted without having to make any alterations to the existing welding system.



## INTERFACE ROBPRO

/ The external robot interface with extra intelligence is the home of the Interface Designer and provides space for customer-specific connectors.



### WF 25i RD

/ Perfect wirefeed, even with soft filler metals. Supports the new dynamic characteristics, e.g. PMC-MIX



### TPS 400i LSC ADVANCED

/ The integrated LSC Advanced module enables the necessary process control for the LSC process, especially for longer hosepacks.

### INTELLIGENT CONTROL OF THE COOLING UNIT

/ Intelligent control of the cooling power. As much as necessary. As little as possible. The control system guarantees maximum efficiency in the cooling system and the lowest energy consumption.

### SPEEDNET

/ A 100 Mbit/s data bus carries the exchange of data between the components. SpeedNet guarantees quicker communication, more precise process control and all system statuses to be called up in real time.



# 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](http://www.fronius.com)

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