

/ Battery Charging Systems / **Welding Technology** / Solar Electronics



SHIFTING THE LIMITS



INTELLIGENT REVOLUTION

/ Trans Process Solution: TPS/i



/ Ever since 1950, Fronius has been developing innovative comprehensive solutions for arc- and resistance welding. Day-in, day-out, we're working at full power on our vision: to "decode the DNA of the arc". The aim is to make available the perfect welding system. This also means throwing tried-and-tested things overboard, and radically starting all over again: analysing every smallest detail, and putting all system components to the acid test. Armed with this knowledge, we then create real revolutions. All this has made Fronius both the welding sector's worldwide technological leader and the European market leader.

A man in a brown suit is captured mid-jump, leaping over a dark, angular, geometric structure that resembles a modern building or sculpture. The background is a bright blue sky filled with soft, white clouds. The man is smiling and has his arms outstretched, conveying a sense of freedom and achievement.

**WE WANTED TO CHALLENGE
WELDING SYSTEMS
EXISTING LIMITS. 'INNOVATION'
INTELLIGENT QUALITY.**

**CREATE A
THAT TRANSCENDS
THE RESULT IS AN
QUANTUM LEAP.**

INTELLIGENT REVOLUTION



THE STARTING-SHOT FOR THE INTELLIGENT REVOLUTION IN WELDING TECHNOLOGY

/ With its radically new MIG/MAG welding-appliance platform TPS/i, Fronius is leading the industry into a new era. TPS/i transcends or shifts the boundaries that previously applied.

/ With it, users benefit from using individually customisable appliances that can also be subsequently upgraded and that stand out for their high intelligence and extensive communications functions.

/ This makes the appliances easier to operate, multi-functional and able to deliver virtually limitless performance.

INTELLIGENT REVOLUTION: THE SYMBIOSIS OF INTERACTION, INDIVIDUALITY AND IMPROVEMENT

/ The TPS/i is a universal genius. It was conceived and designed from first principles, from the ground up. As a result, it has decisively improved the welding properties, optimised the communication between man and machine, and perfected the handling. Its modular design concept makes it easy to adapt it to users' individual welding-needs. With the TPS/i, we have already arrived in the future of welding.

INTERACTION

A NEW WORLD OF COMMUNICATIONS

/ The TPS/i is much more than just a tool – instead, it is a welding partner that communicates with the user in many different ways. The intuitive plain-text display gives users information on all machine parameters in the form of descriptive texts, and the system automatically detects all available components and warns of any incompatibilities. Among many other features, the mini-display integrated into the Jobmaster torch lets users control the power source from the welding workplace. Remote maintenance and system analysis are possible via Internet.

/ Plain-text display



/ The graphical user interface makes the machine easy and intuitive to operate. It is extremely robust, and users can operate it even with their gloves on.

/ Plug & Weld



/ Automatic component detection: simply plug in (no tools needed), and the machine automatically detects what components are available.

/ JobMaster



/ Same control functionality on the torch as on the display. Ideal when working far away from the power source.

/ SpeedNet



/ This high-speed bus creates an intrasystem network that allows data to be exchanged between the system components 200 times faster.

/ Optimised cooling



/ Radically new cooling concept, right through to the gas nozzle of the torch. For cool, precise working, and longer endurance times of wearing parts.

IMPROVEMENT

SUPERIOR WELDING PROPERTIES

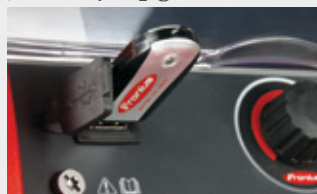
/ The central functions of the TPS/i have been structured completely newly. The much faster processor performance means that many new control variables can now be measured. This makes it possible to analyse – and so to control – the weld process even more accurately, with several very positive effects: less spattering in the dip-transfer arc process, improved droplet detachment, an even more stable arc at the same time as higher welding speeds, controlled ignition properties, and much else besides. Welding has never been as simple, and with such impressive quality.

INDIVIDUALITY

MODULAR CONCEPT

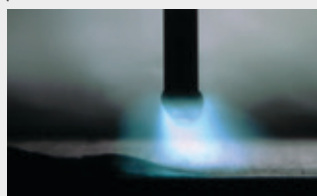
/ One machine – endless possibilities. The TPS/i is modularly designed. This means that the core of the machine is a future-oriented standard module which can easily be extended, even now. For example, the machine can have the functionality of a pulsed-arc power source added to it simply by carrying out an upgrade. New characteristics are easy to upload to it, from a USB stick or via the Internet connection, in the same way as for firmware updates. This modular architecture makes the TPS/i ready for whatever the future may bring. In this way, capabilities that are still undreamed-of can one day be the norm – all on the same machine. Revolution today, evolution tomorrow: You're in for some surprises!

/ Easily upgradeable



/ Upgrades are extremely easy to perform, from a USB stick or the Internet. For new weld processes, characteristics, applications, firmware updates etc. etc.

/ Fit for the future



/ With its combination of upgrade-functionality and premium hardware, the TPS/i remains 'state-of-the-art' for years to come.

INTERACTION: THE DIRECT LINK BETWEEN MAN AND MACHINE.

/ The TPS/i interacts intelligently with the user. It gives users dependable help with making settings, selecting the right options and centrally updating the components. As a result, the system is quicker, easier and safer to operate.

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.



XPLORER AND WELDCUBE

/ Quick and easy networking: the TPS/i can be read out and analysed via the new and revised Xplorer. Networking and data communication between several different machines are made possible by the new WeldCube.



SMART VIEW

/ For connecting and analysing the machine via smart devices.

JOBMASTER

/ The colour mini-display brings the intelligence of the system very much to the fore. This puts control of the main welding parameters right into the user's hand.

**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.

**CENTRAL UPDATING**

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

"ME AND MY POWER SOURCE – WE TALK PLAIN TEXT TO EACH OTHER. EXACT INFORMATION FOR THE EXACT WELDING TASK I WANT TO ACCOMPLISH."

Werner Karner, Magna Steyr Engineering Fahrzeugtechnik AG & Co KG



INDIVIDUALITY: THE ABILITY TO ADAPT SIMPLY TO EVERY NEED

/ The TPS/i is incredibly versatile. One moment it's still a standard welding machine, the next it has been upgraded into a pulsed-arc power source. New characteristics or additional applications are just as easy to upload onto it as firmware updates. This means that the TPS/i can be tailored completely individually to whatever welding challenge a user has. A welding machine that can be several different ones at the same time. Something that was not possible in this way before.




FeeL SERVICE PACKAGES

- FeeL Doku
- FeeL Quality
- FeeL ...
- FeeL Remote Service

APPLICATIONS

- SFI
- SyncroPuls
- EcoMode cooling
- User administration

PROCESSES

| | | | | |
|----------|--------------|---|-----|--------------|
| Standard | LSC | Pulse | PMC | CMT |
| | LSC Advanced |  | | CMT Advanced |

HARDWARE

- Cooling unit
- Wirefeeder
- Welding torch
- RC unit
- Trolley



POWER CLASSES

- 270
- 320
- 400
- 500
- 600

**"THE WELDING SYSTEM FOR EVERY CASE.
LESS HASSLE, MORE PERFORMANCE.
MY INVESTMENT IN THE FUTURE."**



IMPROVEMENT: AN ARC THAT'S AHEAD OF ITS TIME.

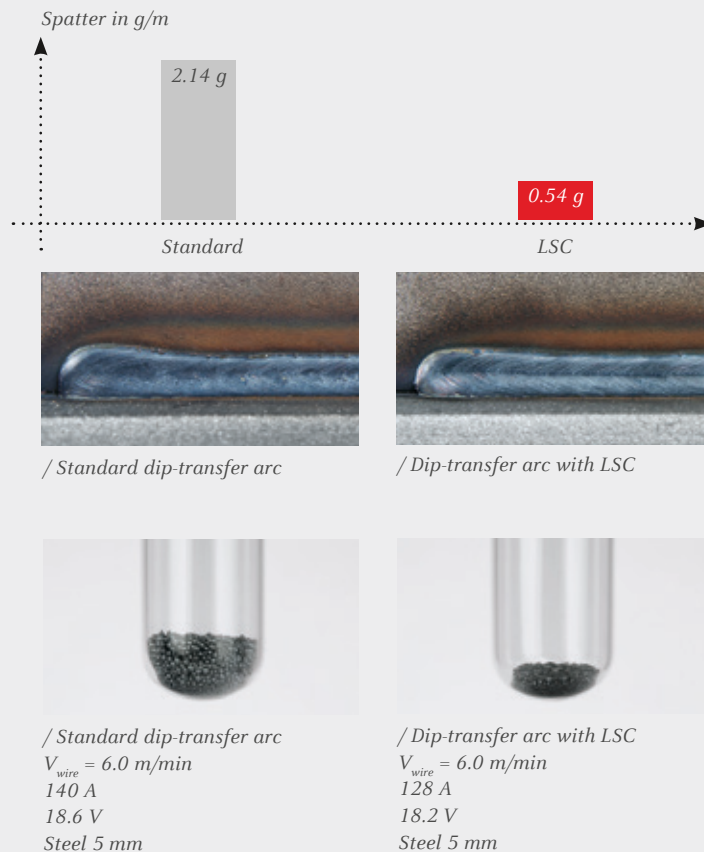
/ The new high-speed system architecture means that the arc can be measured and analysed even more accurately, enabling it to be better understood and controlled. The welcome results are a low-spatter dip-transfer arc process, a faster and safer pulsed-arc process, perfect ignition, uniform penetration, and much else besides. In a nutshell: it makes welding stabler and cleaner, yet faster. Attributes that no other welding machine comes anywhere near.

LOW SPATTER CONTROL: LSC

/ Because large amounts of additional information are processed so powerfully, the process-states occurring during the short circuit (start and break-up of the short circuit) are recognised extremely quickly. The TPS/i then automatically adjusts the current downwards. The effect of this is a uniquely low-spatter dip-transfer arc process.

An optional extra hardware configuration lowers the current even faster.

This results in still less spattering, even when long hosepacks are being used. Ideal for robot applications.



PULSE MULTI CONTROL: PMC

/ 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.



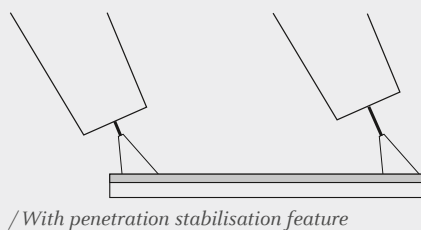
**"I CAN NOW WELD FASTER. MORE STABLY,
WITH GREATER PRECISION AND
AMAZINGLY LITTLE SPATTERING."**

Martin Malesardi, System Engineering, Fronius



PENETRATION STABILISATION FEATURE

/ The active wire control significantly compensates for the influence of torch stand-off distance on the welding result. The arc becomes dramatically more stable, and the penetration is much more constant. The operational range of this penetration stabilisation feature can be steplessly adjusted by the user.



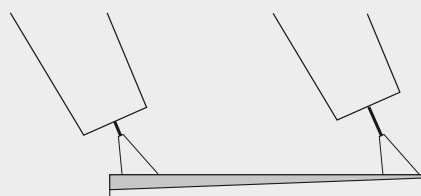
/ With penetration stabilisation feature



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



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



/ Without penetration stabilisation feature



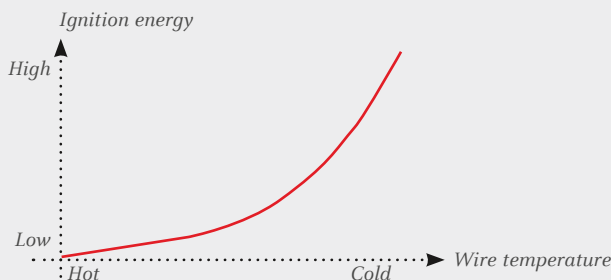
/ Stick-out 15 mm
 $V_{\text{wire}} = 10 \text{ m/min}$
300 – 250 A
Steel 6 mm



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

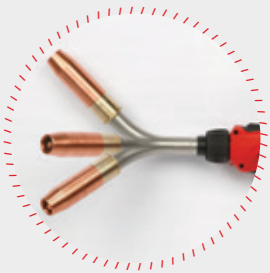
PERFECT IGNITION

/ The ignition energy is intelligently adapted to the welding operation: depending on the actual wire temperature at the instant of arc initiation, either less or more energy may be fed in as needed. This results in perfect ignition – over and over again.



THE WELDING TORCHES: UNIQUELY COOL. AND WITH COOL FEATURES.

/ The new generation of welding torches gets the very best out of gas- and water-cooled applications. The wearing parts and torch components are perfectly matched to the welding power. The cooling system has been perfected, the handling simplified, and user-comfort made even better. Maximum precision and endurance times are the result.



MULTILOCK WELDING TORCH

/ The torch body can be swivelled 360° so that even in hard-to-get-at locations, the user can always weld in the most comfortable position. The 0° position can be fixed by an anti-twist lock. The newly developed water-stop connector reliably prevents water seepage when the torch body is changed.



LED LIGHT

/ Greater convenience and better control are provided by the LED light on the handle-shell. Perfect for dark welding environments.



REVOLUTIONARY COOLING SYSTEM

/ The new welding torches set up a fresh milestone in cooling technology. On water-cooled systems, the cooling circuit has been relocated as far as possible towards the front and the outside. The pointed shape of the contact tip results in less radiant heat being absorbed. This one measure alone lowers the temperature by up to 70 °C on the wearing parts. This new cooling system makes it possible to weld for longer, and also gives the wearing parts a longer lifespan. Here's proof of how efficient it is: only around 1½ minutes after welding at 500 A, you can change the gas nozzle by hand – with no glove on! To optimally dissipate the remaining heat on gas-cooled welding torches, the gas nozzle, contact tip and nozzle stock are made of copper, and the insulating ring of ceramic material.





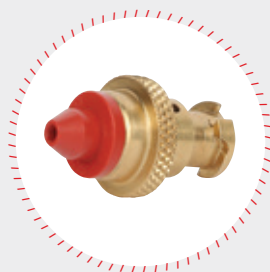
PRACTICAL AND RUGGED

/ The outer tube of the new welding torch is made of high-grade steel, and the insulating material for the torch body is located inside the tube. In this way, the surface of the torch body is protected against spatter and other extraneous damage. This makes the new generation of welding torches extremely robust and long-lived. Also, all the wearing parts are easy to change.



OPTIMISED ERGONOMIC DESIGN

/ The shape of the welding torch has been completely rethought and re-designed. The torch is now perfectly balanced and boasts an ergonomically shaped handle-shell. The wirefeed hose is swivel-mounted, and a flexible, co-rotating rubber anti-kink device prevents hose-kinking.



TOOL-FREE CHANGING OF THE INNER LINER

/ The new inner-liner clamping piece makes it easy to fix the inner liner, with no need for any tools, and this also makes the welding more precise. It also reduces gas-losses to $\leq 3\%$. The various clamping pieces are colour-coded for each of the relevant wire diameters.



PULLMIG: THE LIGHTEST PUSH-PULL WELDING TORCH IN THE WORLD

/ This new design of PullMig welding torch weighs only around a third as much as comparable models. The design is so compact that there is hardly any noticeable difference in size to conventional, manual welding torches – yet the torch delivers incomparable precision. A remarkable new development, then!

COURAGE IS WHAT FUELS REVOLUTIONS

/ Who are the people behind the ideas for the TPS/i? What potential lies in this new welding system? And what does the future of welding look like? Fronius' Head of Development Heinz Hackl reflects on 'Industry 4.0', sensory awareness in machines, and on having the courage to take out-of-the-ordinary decisions.

/ What triggered the development of the TPS/i?

Ultimately, this 'trigger' is always the deep-seated wish to make something that's even better. Something that outdoes what has gone before. This attitude is deeply ingrained at Fronius. It's the driving force for us. Innovation always has something to do with the mysterious, the unknown. These are things that we at Fronius just can't keep away from. This focuses our energies, leading to an amazing dynamism.

What we have created with the TPS/i is nothing less than a whole new era of welding. This is the biggest innovation project in Fronius' entire history. The TPS/i has an ingeniously thought-out system architecture, right down to the smallest detail. This has never before been done in this way, with every single element genuinely being optimally matched to all the others. With all the many possibilities it envisages for networking and Internet connectivity, the TPS/i is ready and waiting for 'Industry 4.0'.

I once asked one of our developers: "What aspect of the TPS/i project are you most proud of?" His answer was this: "The fact that we took such courageous decisions." The touchscreen display, for example. Back in 2008 when we first considered it, most people initially rejected the idea. But today we're all glad that we went ahead and took this bold decision.

/ Why is Fronius able to do this?

Where does it find the necessary courage?

Well, this definitely has something to do with our ownership structure. And with sheer strength of will. You then automatically attract the right sort of people who are bold enough to take decisions like this. Because they can also rely on their good feeling. In general, we are still at a point in the research field where everything is analysed and where certain methods are applied.


But a method can never take a decision for someone. Either I believe in something – and then I go ahead and do it. Or I don't believe in it, and then I don't do it.

Being bold and courageous also means being resolute and single-minded. Saying: "We believe in this! Let's do it!" If you can then transport your conviction to the outside world, you can be sure of a good response. Because the users themselves want to be part of this "energy system", too. There is a message in the TPS/i – and in all Fronius products. And people want to be part of the message.

/ So what are the advantages of the new TPS/i?

Well, to start with there are two new welding processes, which both perform amazingly well. Because the process start-up, the process itself and finally the end of the process are all treated as one single entity. This hugely reduces spattering, for example, and increases the welding speed while still giving stable penetration. The "Arc Engine" does a great job of delivering the perfect arc. The brain of the TPS/i processes and utilises all the system-information with great intelligence. For me, this gives it a sort of "7th sense". It's just so much more aware.

As revolutionary as the TPS/i already is today, we're still only at the beginning of the future of welding. Welding is going to become even more predictable. Definitely. I mean, in terms of first you simulate it, then you weld it, and then you can be sure that everything is 100% right. This is the direction things are going to move in.

A full-page portrait of Heinz Hackl, a man with curly brown hair, wearing a blue blazer over a light blue shirt and dark jeans. He is leaning on a glass railing with his hands clasped, looking directly at the camera. The background is a modern office interior with large windows and a glass partition.

**"FOR ME, THE TPS/i HAS A
7TH SENSE. IT'S JUST SO
MUCH MORE AWARE."**

Heinz Hackl, Member of Executive Management, R&D, Fronius



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

/ What Günter Fronius started in 1945 in Pettenbach, Austria, has now become a modern day success story. Today, the company has around 3,000 employees worldwide and owns more than 850 active patents. Since the very beginning, our goal has not changed: to be the technology and quality 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.

BATTERY CHARGING SYSTEMS

/ We started a technological revolution with Active Inverter Technology and are now the know-how leaders in battery charging technology. We are driven by the aim of providing intelligent energy management systems that ensure maximum energy efficiency and battery life in intralogistics together with total safety and top performance in the vehicle workshop.

WELDING TECHNOLOGY

/ We develop welding technologies, such as entire systems for arc and resistance spot welding, and have set ourselves the task of making impossible weld joints possible. Our aim is to »decode the DNA of the arc«. We are the technology leader worldwide and the market leader in Europe.

SOLAR ELECTRONICS

/ The greatest challenge of our time is to make the leap to a regenerative energy supply. Our vision is to use renewable energy to achieve energy independence. With our grid-connected inverters and products for monitoring photovoltaic systems, we are now one of the leading suppliers in solar electronics.

v01 2013 EN

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