

/ Perfect Welding / Solar Energy / Perfect Charging



SHIFTING THE LIMITS



**LSC**  
**LOW SPATTER CONTROL**

**"OUR AIM IS TO CREATE  
THE PERFECT ARC FOR  
ANY APPLICATION!"**



## **LSC: A MODIFIED DIP TRANSFER ARC WITH EXTREMELY HIGH ARC STABILITY.**

/ The result: high quality weld seams with minimal spattering and an increased deposition rate.

Because the TPS/i power source platform enables large amounts of additional information to be processed so powerfully, the process phases occurring during the short circuit (start and break-up of the short circuit) can be recognised extremely quickly.

During critical process phases such as the short circuit or droplet detachment, the current is reduced as quickly as possible to create a steadier process with less spatter.

### **HIGHLIGHTS**

/ Minimal spattering

/ Reduced heat input and increased deposition rate with root pass welding

/ Perfect penetration

/ High welding speed

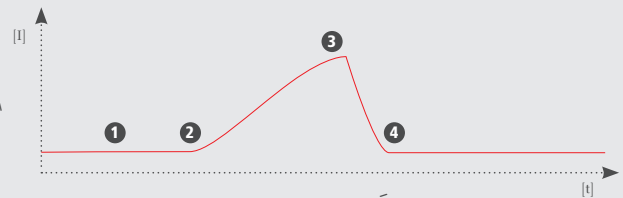
/ Supports welding with 100% CO<sub>2</sub>

/ Two perfectly coordinated characteristics: “Root” and “Universal”

/ New stabilisers for penetration and arc length

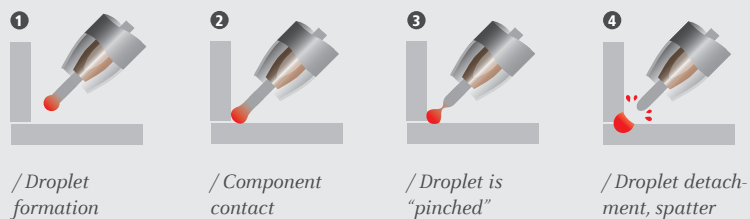
## THE TPS/i DIP TRANSFER ARC IN COMPARISON

/ With the development of the TPS/i power source platform, the dip transfer arc has been significantly improved. Now LSC raises the bar even higher. Less spatter and higher process stability, combined with the new stabilisers, enable extraordinary results.

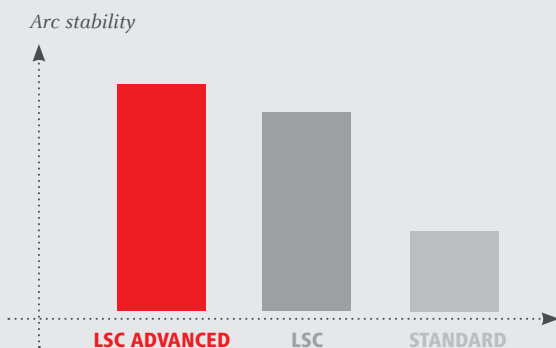


### STANDARD DIP TRANSFER ARC

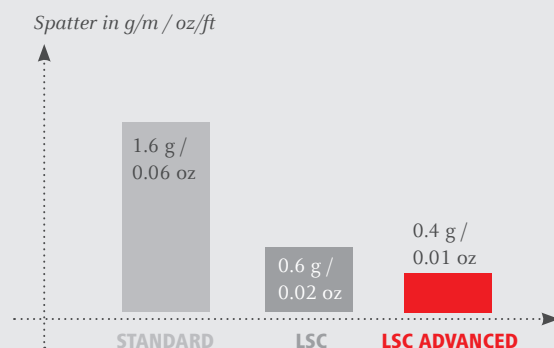
/ As soon as the short circuit is detected the current is increased. The arc ignites at a relatively high short circuit current and high arc pressure. This can lead to welding spatter and instabilities.



### HIGH PROCESS STABILITY



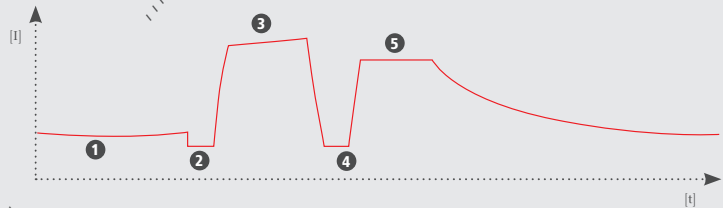
### EXTREMELY LITTLE SPATTER





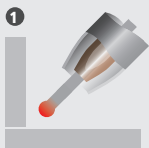
## LSC ADVANCED

/ The TPS 400i LSC Advanced power source platform was developed to open up the advantages of the LSC process for longer hosepacks as well. The integrated LSC Advanced module enables the necessary process control for the LSC process. Moreover, excellent results can also be achieved in the intermediate arc.

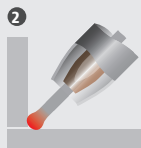


## LSC DIP TRANSFER ARC

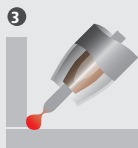
/ The LSC principle of reignition at a relatively low current level constitutes a significant difference with regard to the standard dip transfer arc. The short circuit is triggered at a low current level, which leads to soft reignition and a stable welding process.



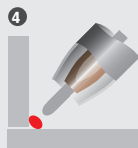
/ Droplet formation



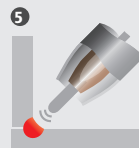
/ Component contact: current is reduced, lower droplet load



/ Droplet is "pinched"



/ Droplet detachment: current is reduced, spattering is minimised



/ Deeper penetration is achieved by increasing the current

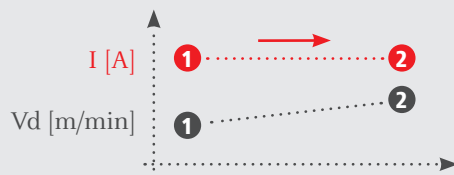
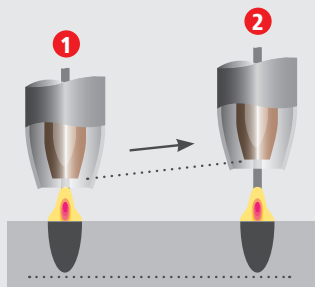
# INTELLIGENT STABILISERS FOR PENETRATION AND ARC LENGTH

## PENETRATION STABILISER

/ Due to the additional wire control, the current and penetration remain constant if the distance between the welding torch and the component changes. The arc becomes dramatically more stable, and the penetration is much more constant.

### WITH PENETRATION STABILISER

/ When the penetration stabiliser is activated, the penetration remains even, despite stick out changes.



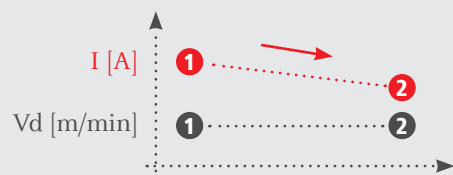
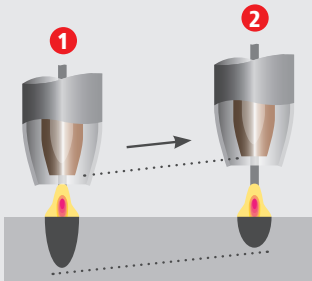
/ Stick out 15 mm / 0.59 in  
Vd = 10 - 13 m/min /  
0.39 - 0.51 in/min  
300 A  
6 mm / 0.24 in steel



/ Stick out 30 mm / 1.18 in  
Vd = 10 - 13 m/min /  
0.39 - 0.51 in/min  
300 A  
6 mm / 0.24 in steel

### WITHOUT PENETRATION STABILISER

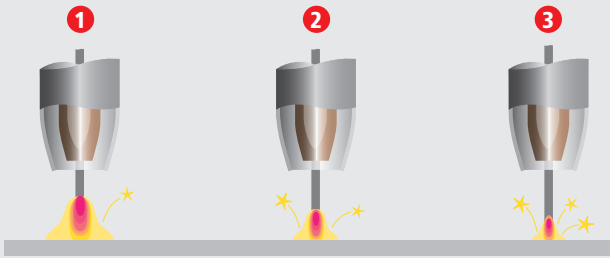
/ If the penetration stabiliser is deactivated, the penetration is reduced if a stick out change occurs.



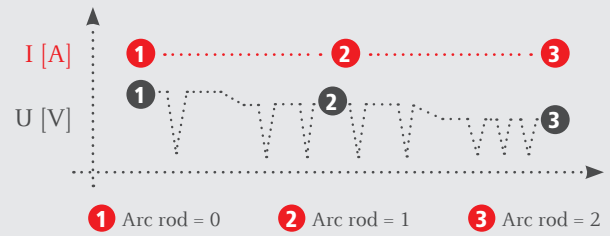
/ Stick out 15 mm / 0.59 in  
Vd = 10 m/min /  
32.81 ft/min  
300 - 250 A  
6 mm / 0.24 in steel



/ Stick out 30 mm / 1.18 in  
Vd = 10 m/min /  
32.81 ft/min  
300 - 250 A  
6 mm / 0.24 in steel



/ The arc length stabiliser reduces the arc length until controlled short circuit behaviour occurs.



## ARC LENGTH STABILISER

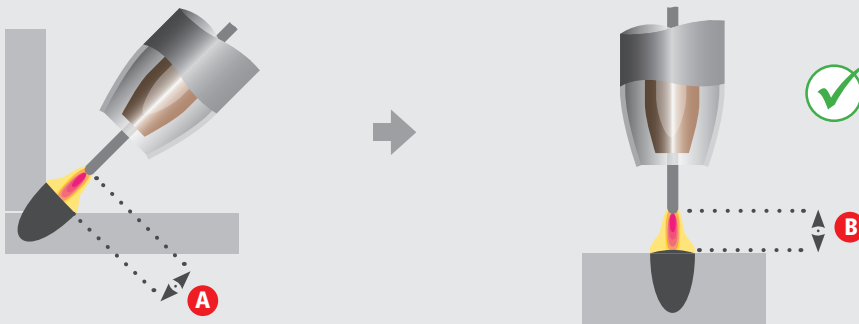
/ By reducing the arc length, the arc length stabiliser in the spray arc with LSC Universal enables stable and regular short circuit behaviour, with the arc always being maintained at the same short length. There is no need for the user to carry out

manual readjustment in the event of external interference (e.g. caused by changing welding torch position, material misalignment, changing sheet thicknesses or uneven heat extraction).

### WITH ARC LENGTH STABILISER

/ The set arc length remains the same in spite of a change in the welding torch position.

Arc length **A** = Arc length **B**



### WITHOUT ARC LENGTH STABILISER

/ The set arc length is reduced when the welding torch position is changed and manual correction of the arc length is necessary.

Arc length **A** > Arc length **B**



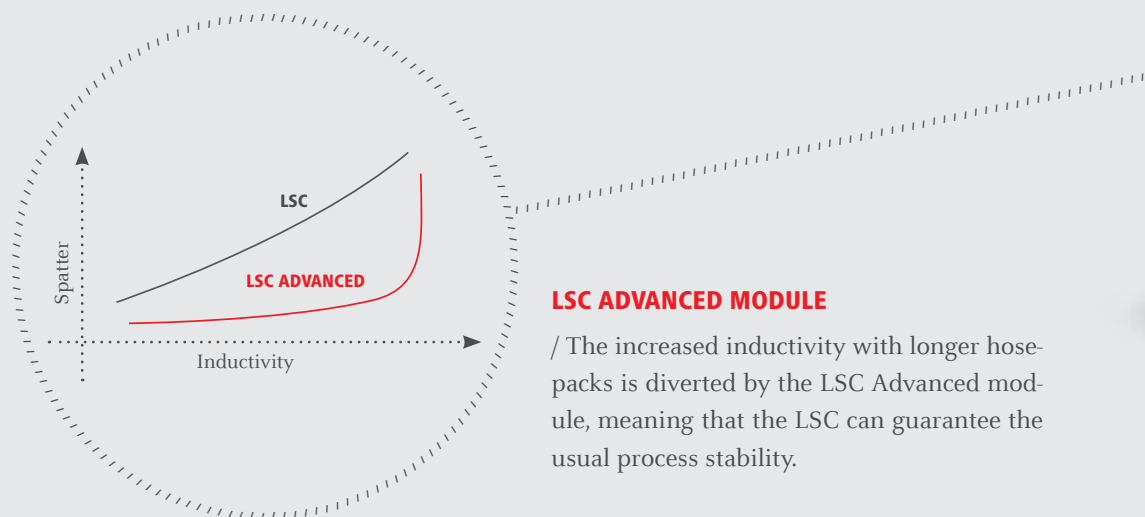
## LSC ADVANCED

/ Inductivity is defined by the length and design of the grounding (earthing) cable and hosepack – longer hosepacks therefore lead to an increase in inductivity. Increased inductivity means more spattering and lower process stability.

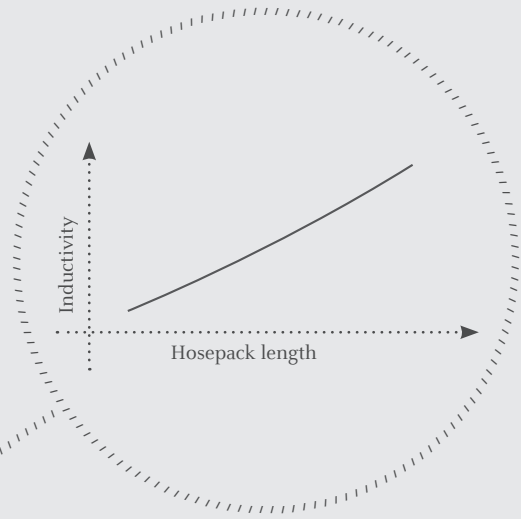
The TPS 400i LSC Advanced power source was developed to solve precisely these problems. The built-in LSC Advanced module inside the power source guarantees that the inductivity generated in the hosepack is diverted. This ensures a more constant droplet detachment with less welding spatter in the dip transfer and intermediate arcs.

## BENEFITS

- / Improved process stability in the area of the intermediate arc
- / Optimum weld properties and process stability even with long hosepacks
- / LSC Advanced module with power electronics switch
- / Minimal spattering
- / No additional sensor line needed







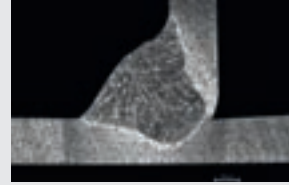
**LONG HOSEPACKS**

/ Inductivity rises with longer hosepacks.



## LSC UNIVERSAL

/ LSC Universal delivers perfect welding results for overlapped, fillet and edge welds, as well as filler passes and final runs.



Wire dia.: 1.2 mm / 0.05 in  
 Filler wire: G3Si1  
 U: 18.3 V  
 I: 160 A  
 Vd: 4 m/min / 13.12 ft/min  
 Vs: 50 cm/min / 19.69 in/min  
 Gas: 100% CO<sub>2</sub>

## BRAZING

### LSC ADVANCED



Wire dia.: 1 mm / 0.04 in  
 Filler wire: CuSi-3  
 U: 13.7 V  
 I: 123 A  
 Vd: 6.1 m/min / 20.01 ft/min  
 Gas: 100% Ar



Wire dia.: 1 mm / 0.04 in  
 Filler wire: CuSi-3  
 U: 13.1 V  
 I: 71 A  
 Vd: 3.7 m/min / 12.14 ft/min  
 Gas: 100% Ar



Wire dia.: 1 mm / 0.04 in  
 Filler wire: CuSi-3  
 U: 13.1 V  
 I: 69 A  
 Vd: 3.6 m/min / 11.81 ft/min  
 Gas: 100% Ar

## COMPARISON OF PENETRATION IN THE VERTICAL-UP WELD SEAM

### STANDARD MAG PROCESS



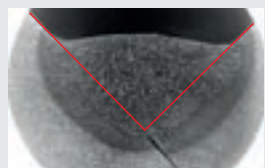
Wire dia.: 1.2 mm / 0.05 in  
 Filler wire: G3Si1  
 U: 18.4 V  
 I: 183 A  
 Vd: 5.2 m/min / 17.06 ft/min  
 Gas: Ar +15-20% CO<sub>2</sub>  
 Gas flow: 12 l/min / 2.64 gal./min

### FLUX CORE WIRE



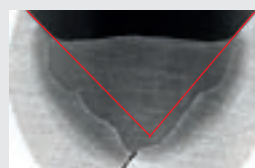
Wire dia.: 1.2 mm / 0.05 in  
 Filler wire: E81T-Ni  
 U: 22.7 V  
 I: 152 A  
 Vd: 8 m/min / 26.25 ft/min  
 Gas: Ar +15-20% CO<sub>2</sub>  
 Gas flow: 15 l/min / 3.30 gal./min

### LSC WITH PENETRATION STABILISER



Wire dia.: 1.2 mm / 0.05 in  
 Filler wire: G3Si1  
 U: 18 V  
 I: 171 A  
 Vd: 5.2 m/min / 17.06 ft/min  
 Gas: Ar +15-20% CO<sub>2</sub>  
 Gas flow: 10 l/min / 2.20 gal./min

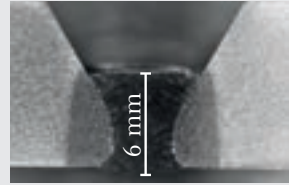
### LSC WITH PENETRATION STABILISER



Wire dia.: 1.0 mm / 0.04 in  
 Filler wire: G3Si1  
 U: 19.8 V  
 I: 154 A  
 Vd: 7.5 m/min / 24.61 ft/min  
 Gas: Ar +15-20% CO<sub>2</sub>  
 Gas flow: 10 l/min / 2.20 gal./min

## LSC ROOT

/ With challenging root passes where a higher arc pressure is required, the LSC Root characteristic impresses above all with its ease of use and perfect root formation.



Wire dia.: 1.2 mm / 0.05 in  
 U: 15.7 V  
 I: 145 A  
 Vd: 3.6 m/min / 11.81 ft/min  
 Gas: Argon + 15-20% CO<sub>2</sub>

## ADJUSTABLE ARC PRESSURE

### DYNAMIC WHEN NEGATIVE



/ High arc pressure  
 / Increased root profile  
 / Suitable for small air gaps  
 / Vertical-down and overhead positions

### DYNAMIC AT 0



/ Normal arc pressure  
 / Suitable for root passes from PA to 2 o'clock  
 / Very good weld seam formation

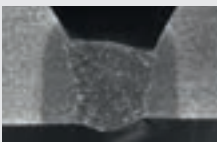
### DYNAMIC WHEN POSITIVE



/ Low arc pressure  
 / Suitable for PA with a large air gap  
 / Very good weld seam formation

## COMPARISON OF ROOT PROFILES

### ELECTRODE (RUTILE/E6013)



Position: vertical-up  
 Electrode dia.: 2.5 mm / 0.10 in  
 U: 22.82 V  
 I: 83.44 A

### TIG



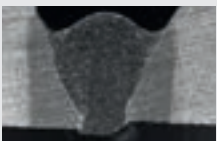
Position: vertical-up  
 Wire dia.: 2.0 mm / 0.08 in  
 U: 9.3 V  
 I: 123 A  
 Gas: 100% Ar  
 Gas flow: 10 l/min / 2.20 gal/min

### DIP TRANSFER ARC VERTICAL-DOWN



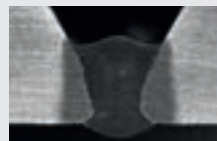
Position: vertical-down  
 Wire dia.: 1.2 mm / 0.05 in  
 U: 16.65 V  
 I: 140.7 A  
 Vd: 3.6 m/min / 11.81 ft/min  
 Gas: Ar + 18% CO<sub>2</sub>  
 Gas flow: 12 l/min / 2.64 gal/min

### DIP TRANSFER ARC VERTICAL-UP



Position: vertical-up  
 Wire dia.: 1.2 mm / 0.05 in  
 U: 15.68 V  
 I: 101.7 A  
 Vd: 2.5 m/min / 8.20 ft/min  
 Gas: Ar + 18% CO<sub>2</sub>  
 Gas flow: 12 l/min / 2.64 gal/min

### LSC ADVANCED VERTICAL-DOWN



Position: vertical-down  
 Wire dia.: 1.2 mm / 0.05 in  
 U: 14.69 V  
 I: 145.8 A  
 Vd: 3.6 m/min / 11.81 ft/min  
 Gas: Ar + 18% CO<sub>2</sub>  
 Gas flow: 10 l/min / 2.20 gal/min

# 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 3,000 employees worldwide and has been granted more than 1,000 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.

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