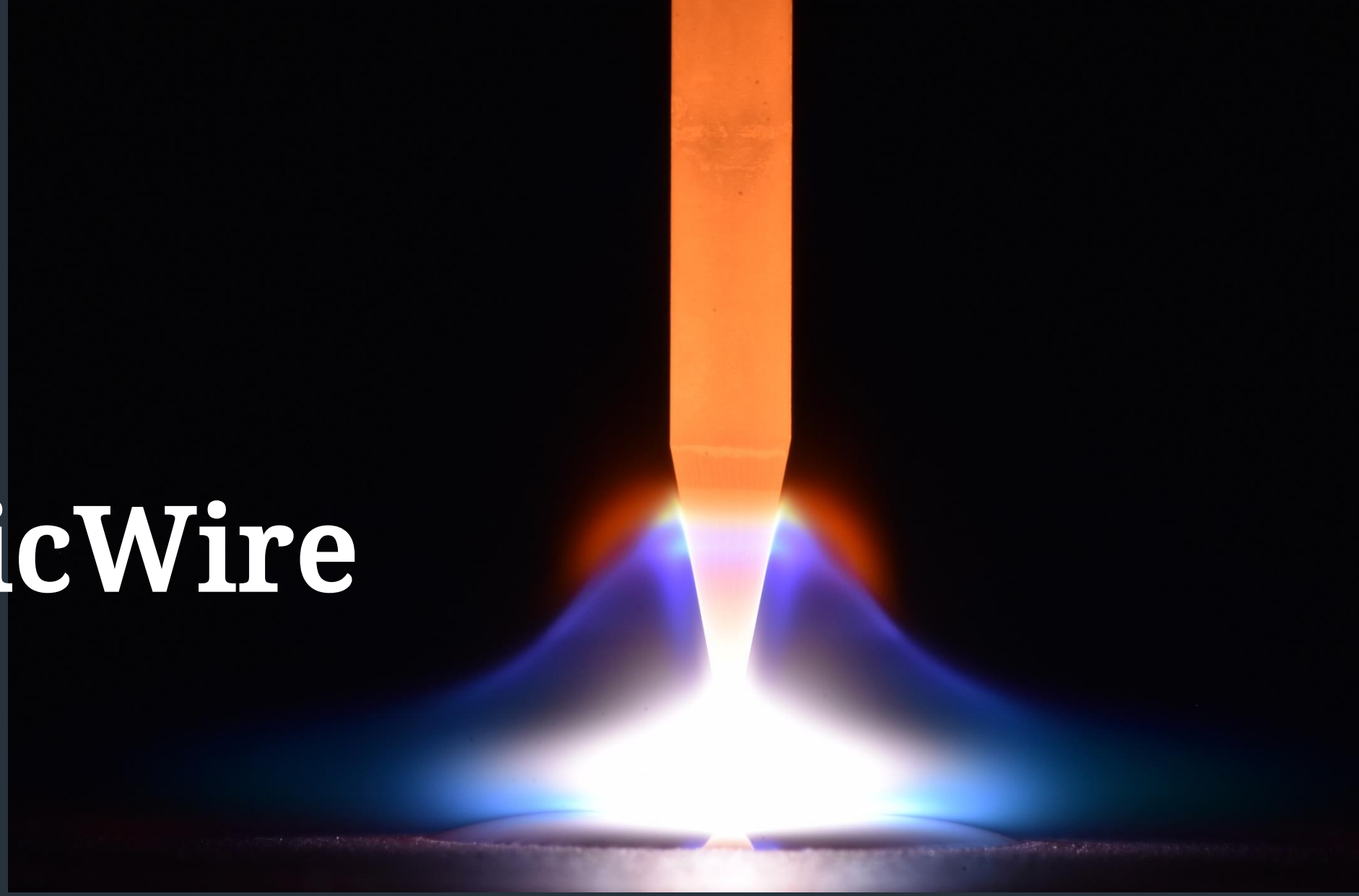
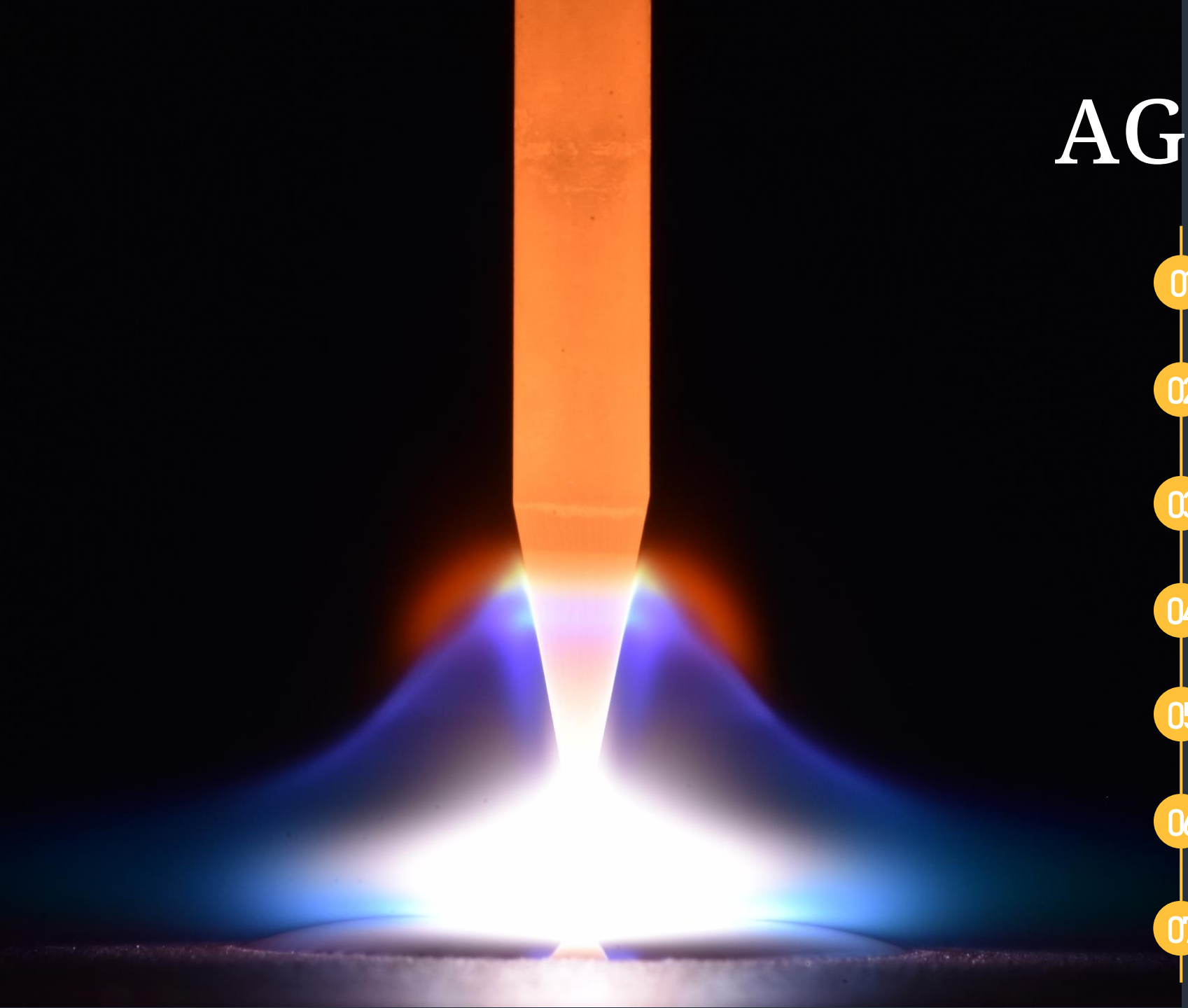
TIG DynamicWire



Fronius International, Willinger Martin, Lattner Peter, Sider Josef, Ahörndl Julian, 08-2023-v03
Information Class: Official



AGENDA

01 Introduction & definition

02 Basic principle

03 Process videos

04 Application advantages

05 Comparison
Cold- vs. DynamicWire

06 How-to
(incl. wire feed speed correction)

07 Welding demo

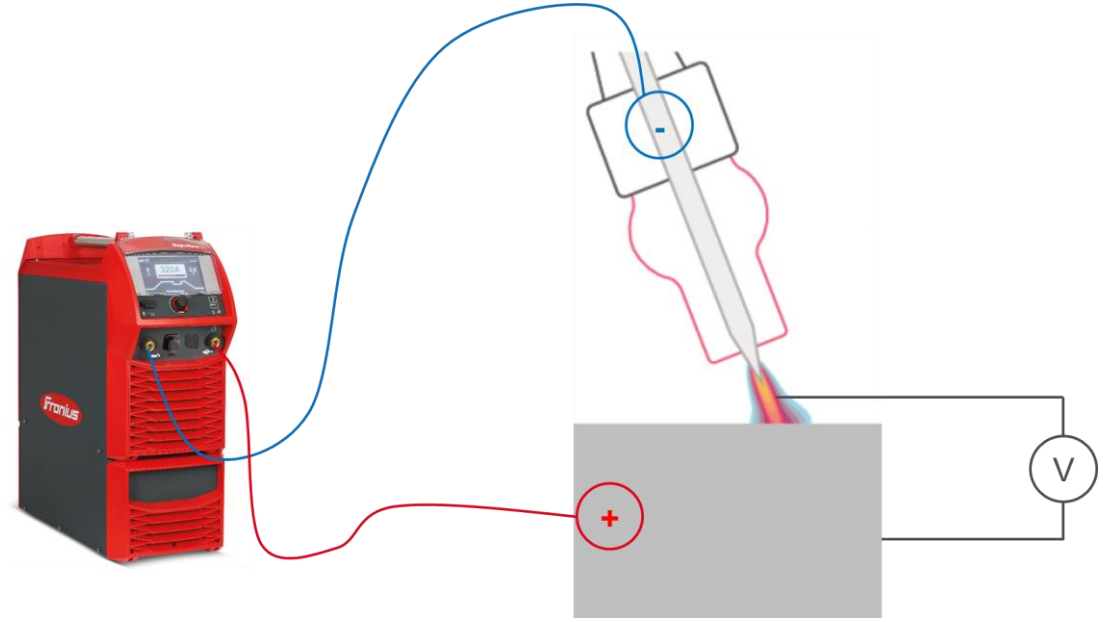
Introduction & definition

TIG DynamicWire is based on active control of the wire feed.

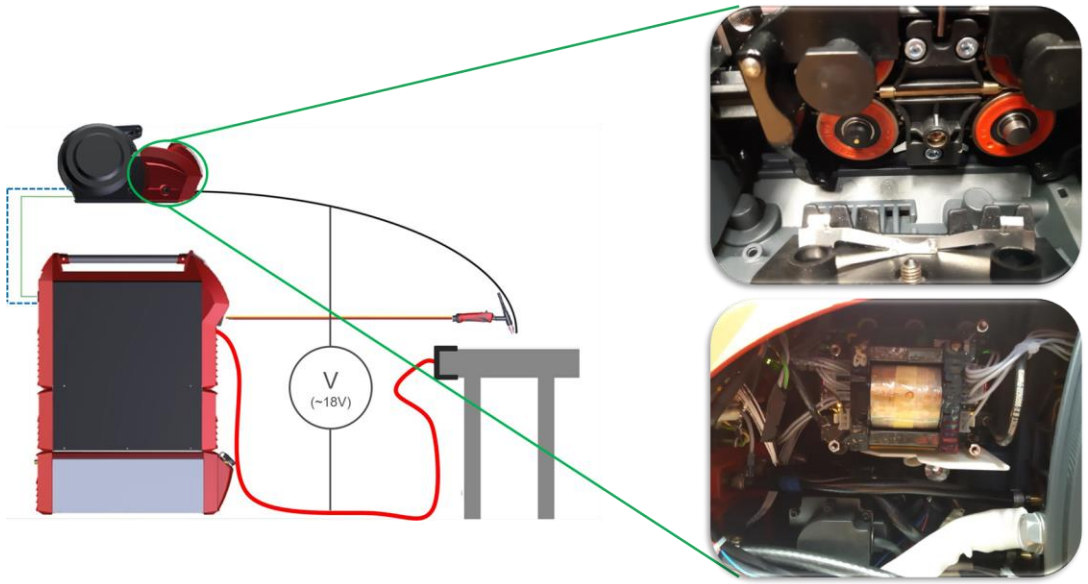
- The actively interacting wire control expands the parameter window and simplifies handling.
- The wire feed speed automatically adjusts to the amperage, arc length and seam type.
- TIG Dynamic Wire works in Synergic mode!
  Current and wire feed speed do not have to be set separately.
- There are individual characteristics for different wire diameters and alloys.
- The fine-tuning of the wire feed speed can be done using the wire correction.

TIG DynamicWire is currently only available for manual applications with iWave 300i-500i

Basic principle

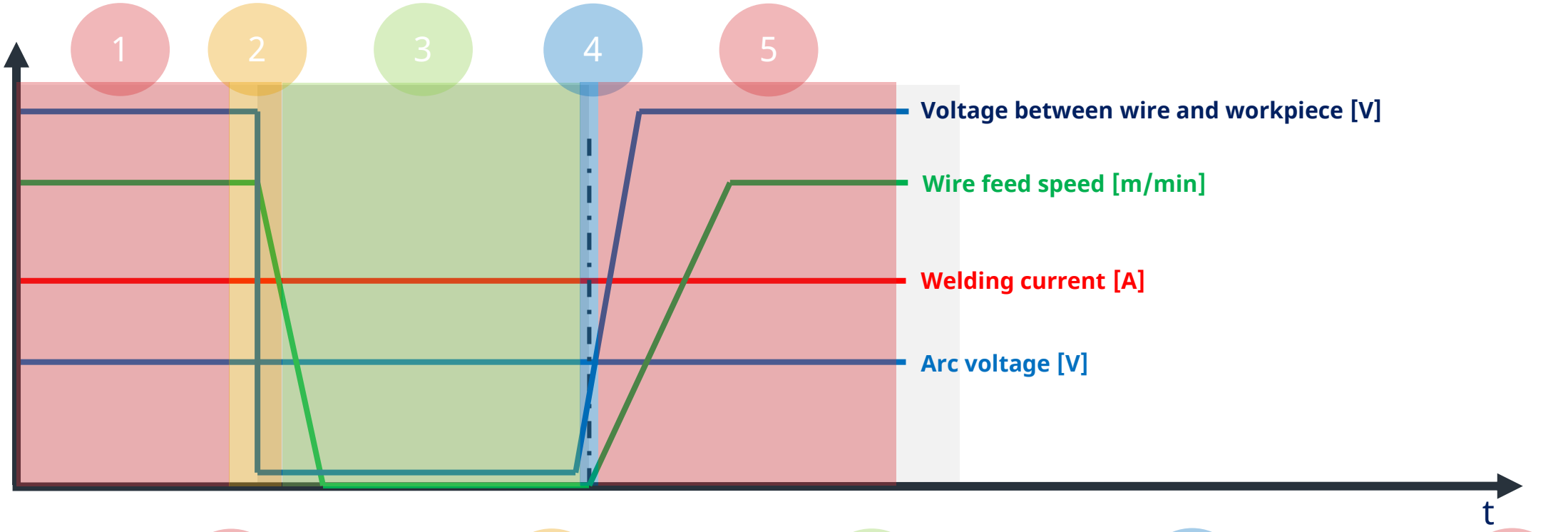


A **voltage** can be measured between the workpiece and the wire.



An **additional sensing interface** has been added to the existing SR63. In addition, the print "**WiVolt**" is needed to measure the voltage between the base material and the wire.

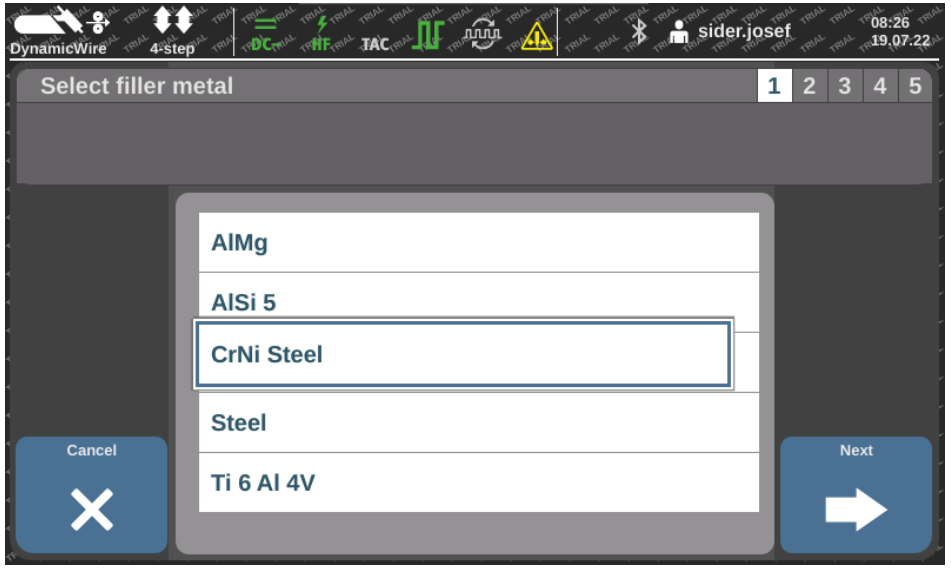
Basic principle TIG DynamicWire



TIG synergic lines

Fronius is the world's first provider of an active wire regulation for TIG cold wire welding!

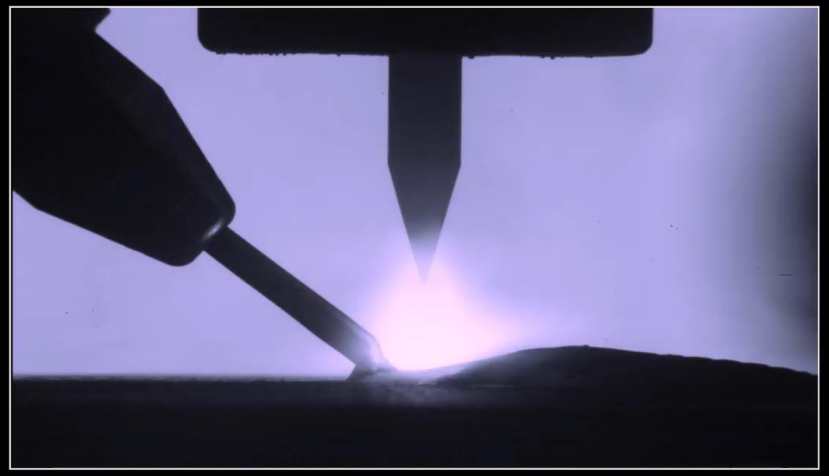
Different synergic lines for the most common filler materials are available as soon as the welding package TIG DynamicWire is activated!



TIG DynamicWire

Videos [1/2]

TIG DynamicWire / Pulse



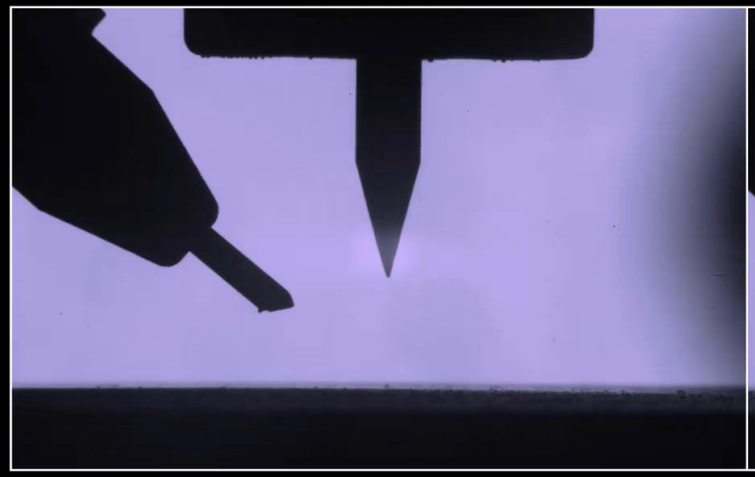
TIG wire correction

-5 0 +5

Videos [2/2]

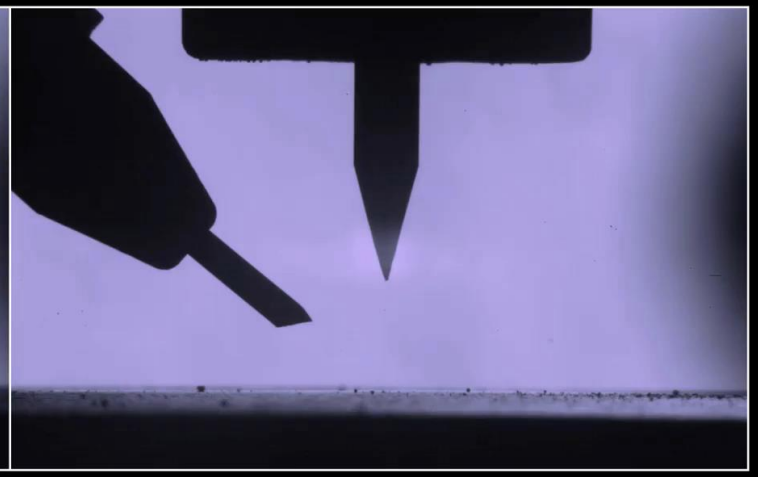
Drahtposition Start

2mm



* Wire position (start): 2mm
  Start delay: 0,3s
  End delay: 0,3s
  Wire retract (end): 2mm

aus



* Wire position (start): off
  Start delay: off
  End delay: off
  Wire retract (end): off

Start – stop with TIG DynamicWire

SAMPLE

8mm sheet metal SS

1.4301 fillet weld

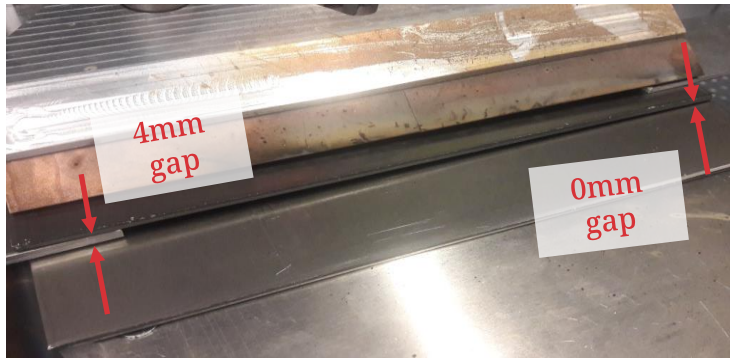
Practical advantages

Dynamic wire control results in a number of application-related advantages, e.g.

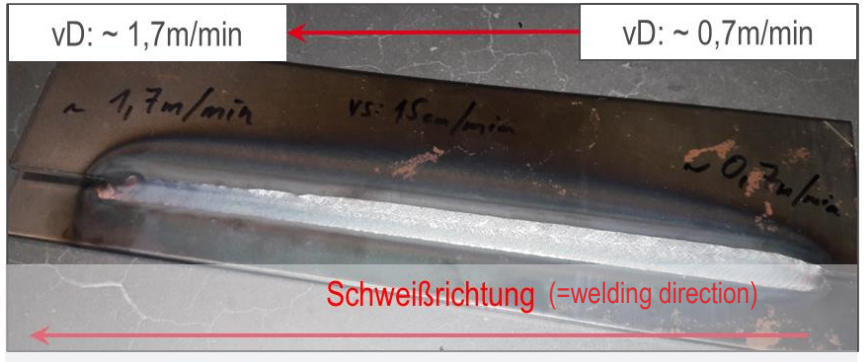
- **Improved wetting behaviour** (exitation of the weld pool)
- Helps in case of **component tolerances** because the wire feeding regulates the amount of filler material
- **Application-specific set-ups / characteristics** are available
- **Simplified manual welding**, as tolerances and changes in arc lenght are corrected by the process
- Wire and current no longer have to be set separately thanks to **TIG SynergicMode**

Wire control in case of tolerances

The average wire feed speed adapts to the arc length or to the gap that has to be bridged because of TIG DynamicWire, e.g. variating gap between 4 and 0mm



Weaving OFF



Weaving ON

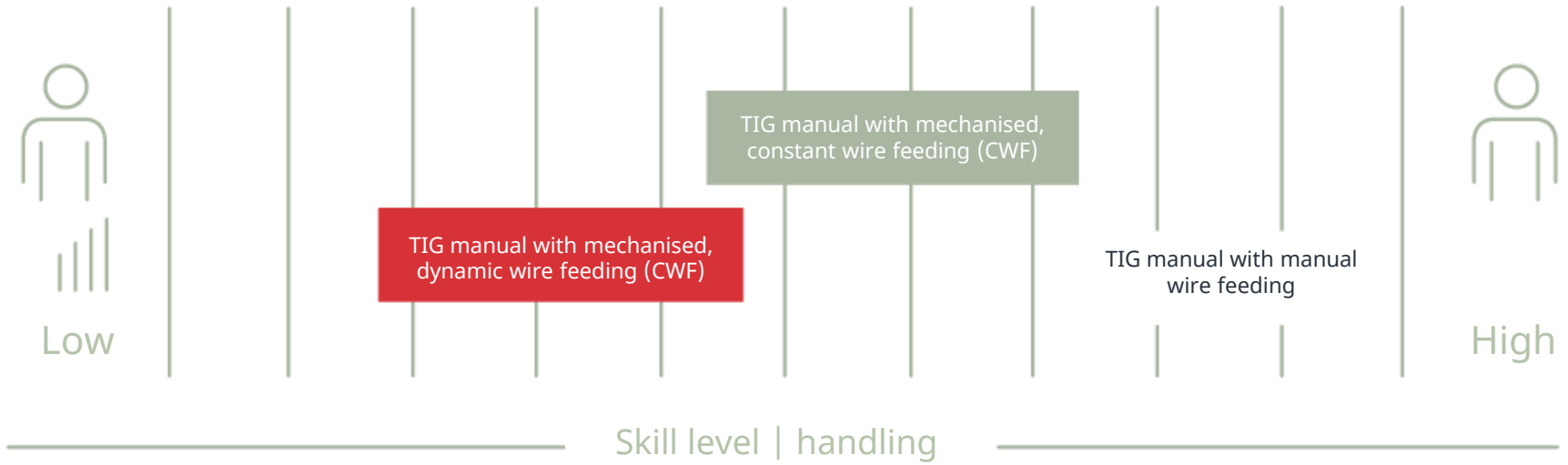
Wire feeding for manual applications

Change of tungsten electrode with TFC system

(Tungsten Fast Clamp, similar to „lead pencil system“)

Comparison of TIG Cold- vs. DynamicWire

„The easiest way of TIG cold wire welding!“



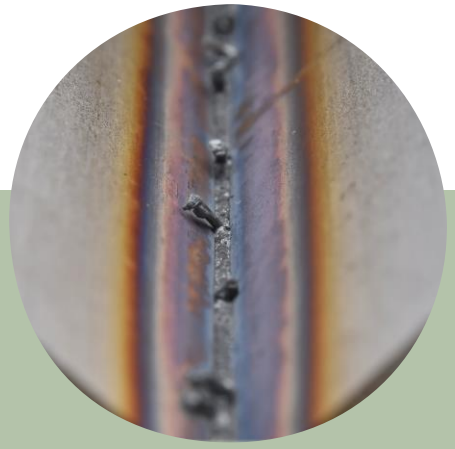
Comparison | V-seam

COLDWIRE

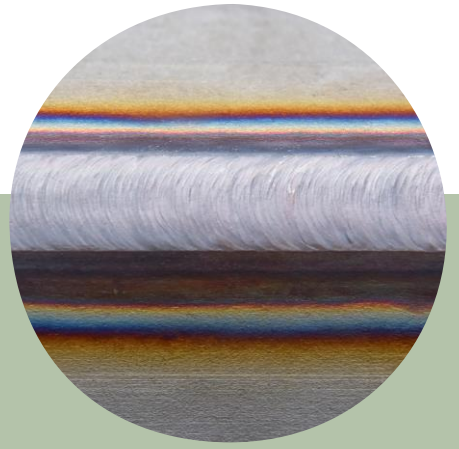
DYNAMICWIRE

Comparison | V-seam

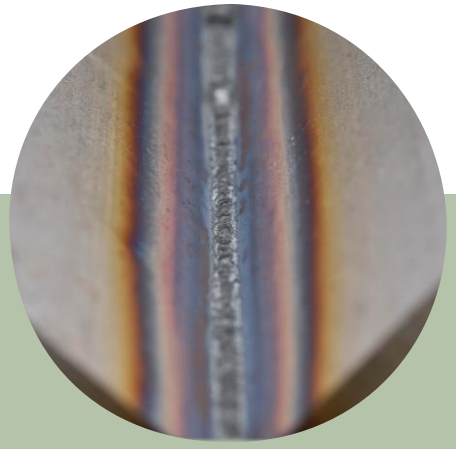
Weld seam



Root



Weld seam



Root

COLDWIRE

DYNAMICWIRE

Comparison | Z-weaving

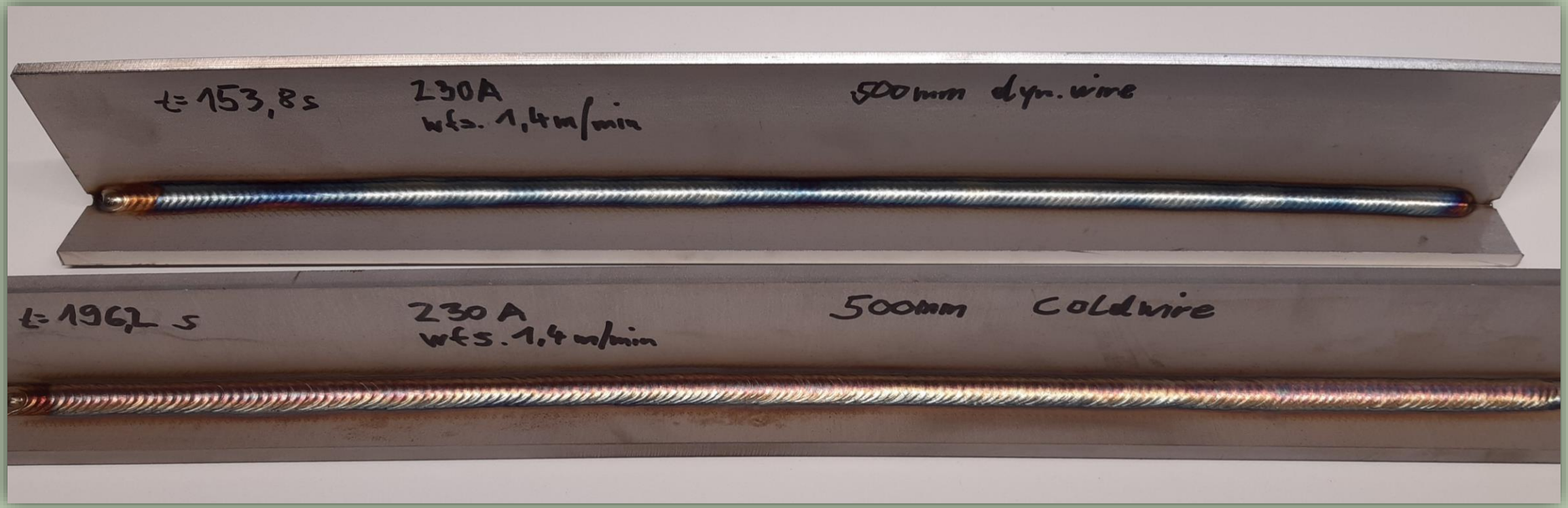
COLDWIRE

DYNAMICWIRE

Comparison TIG ColdWire vs. DynamicWire manual

NEW

Comparison TIG CW vs. DynamicWire



Manual weld
Test blade Stainless Steel 1.4301
Dimension: 500 x 50 x 6 mm

Fillet weld
Position: PB (2F)
Filler material: ER 316LSi ø1.2mm

Comparison TIG CW vs. DynamicWire

WeldCube documentation data

ColdWire

Seam

Welding state	Ok
Weld details	Details
Weld date	3/14/2023 8:42:47 AM +01:00
Duration	196.2 s
Wire consumption (length)	4.474 m
Energy	404.67 kJ
Wire consumption (volume)	5059.9731 mm³

Machine

Name	GTSMiWave500i MP+CWF
Machine serial number	33414261
Firmware version	3.5.2-30264.29663
Model	iWave 500i AC/DC
Machine location	Fronius Wels/GTSM WAC/Manual Booth/Portable Machine
IP address	10.6.47.65

DynamicWire

Seam

Welding state	Ok
Weld details	Details
Weld date	3/14/2023 8:49:11 AM +01:00
Duration	153.8 s
Wire consumption (length)	4.278 m
Energy	322.7 kJ
Wire consumption (volume)	4838.5422 mm³

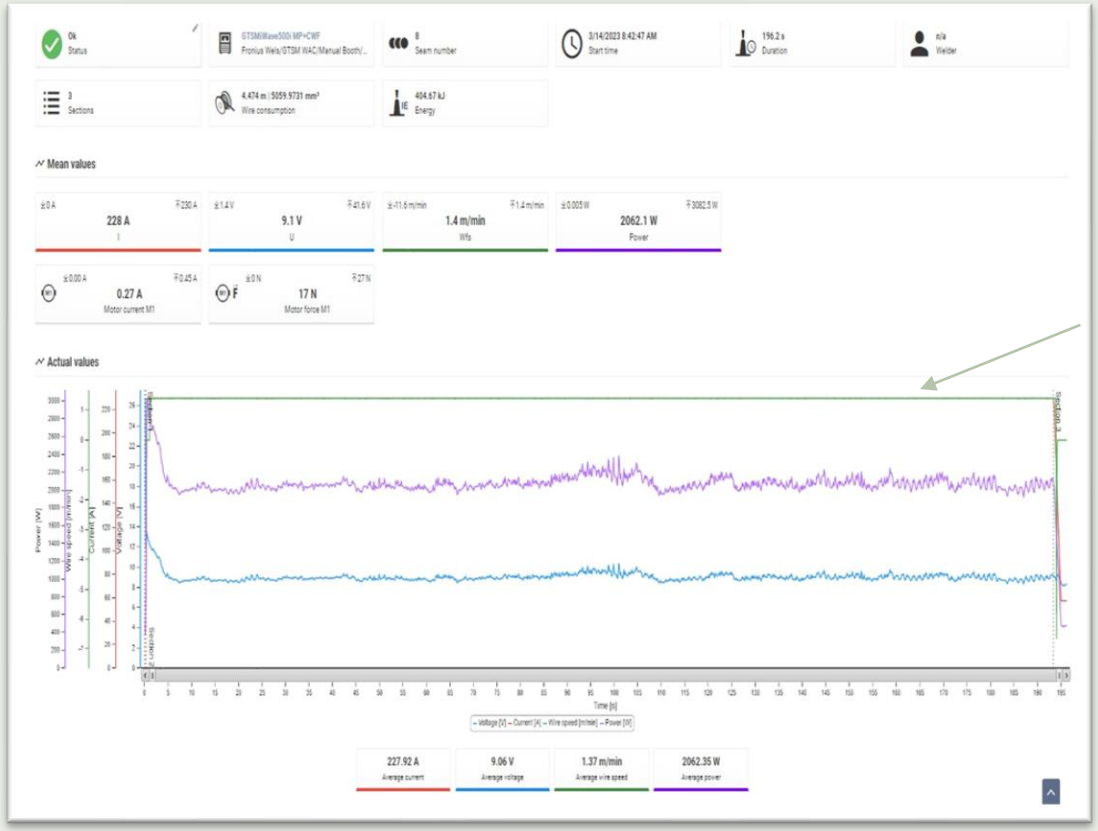
Machine

Name	Joe*s500erl-Wave+CWF
Machine serial number	33246853
Firmware version	3.5.2-30264.29663
Model	iWave 500i AC/DC
Machine location	Wels/Labormeile/PlasmaLab
IP address	10.6.47.20

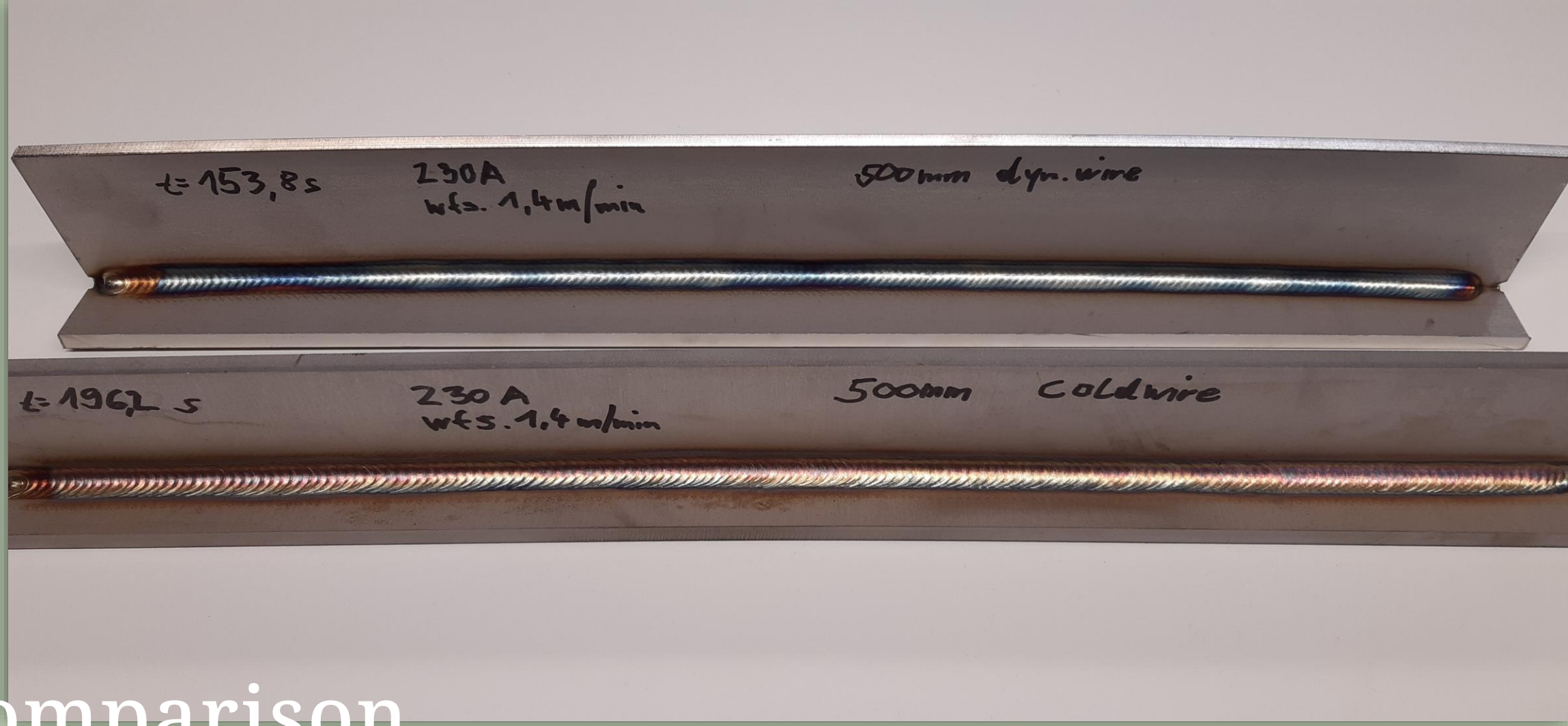
Comparison TIG CW vs. DynamicWire

Screenshot WeldCube

ColdWire wfs: 1.4m/min

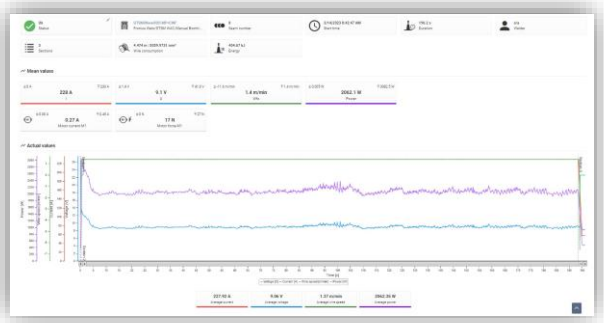


DynamicWire average wfs: 1.4m/min



Comparison
TIG CW vs. DynamicWire

Time saving with TIG DynamicWire



ColdWire

Energy input: 404.67 kJ
Seam length: 480mm

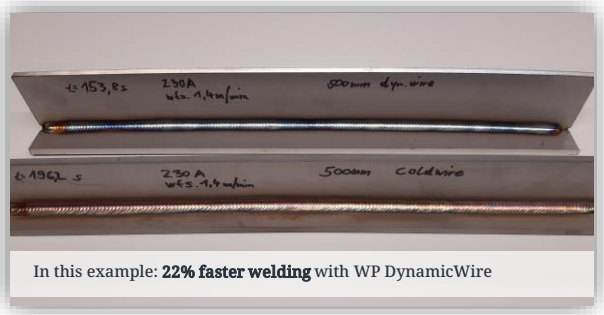
196.2 sec.

vs.

DynamicWire

Energy input: 322.7 kJ
Seam length: 480mm

153.8 sec.



In this example: **22% faster welding** with WP DynamicWire

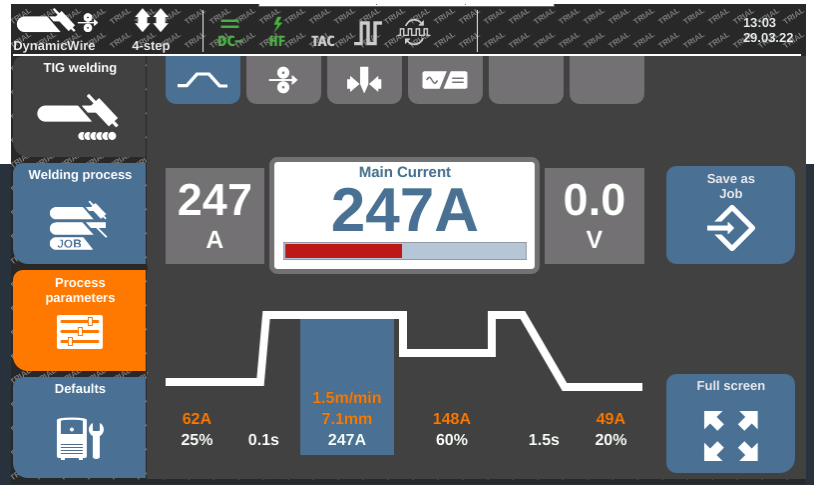
Time saving with DynamicWire
... compared to ColdWire (mit CWF 25i)

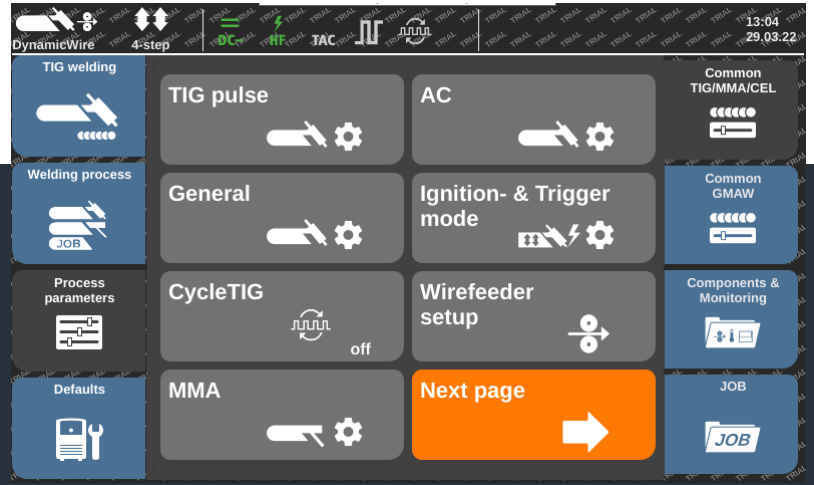
[wfs: 1.4m/min, 500mm sheet metal, 230A]

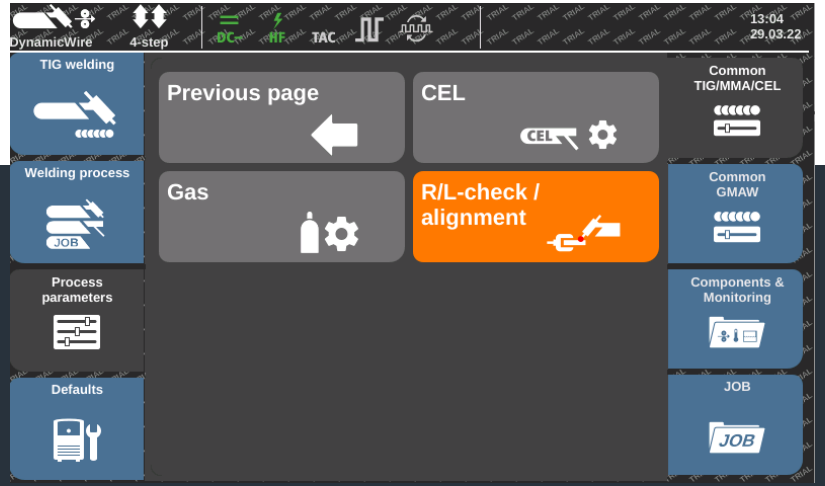
42.4 sec.
[22% faster welding]

How-to

Resistance alignment (R/L)





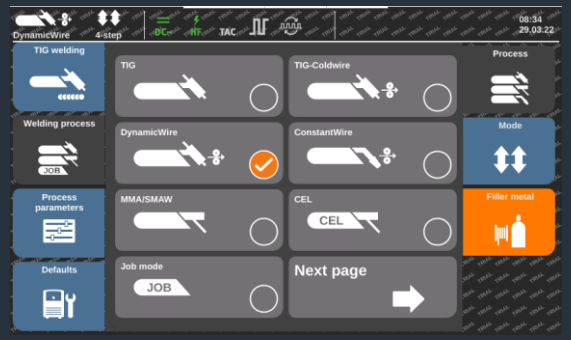


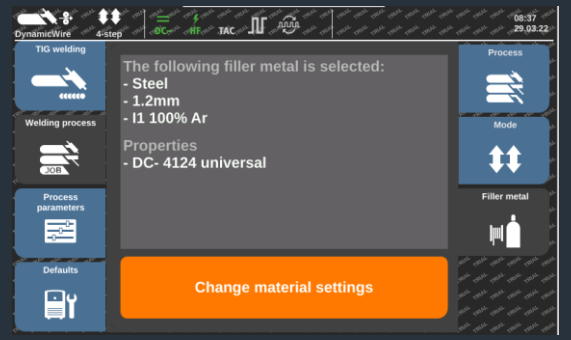
MOST IMPORTANT SET-UP FOR SUCCESSFUL TIG DYNAMICWIRE WELDING !

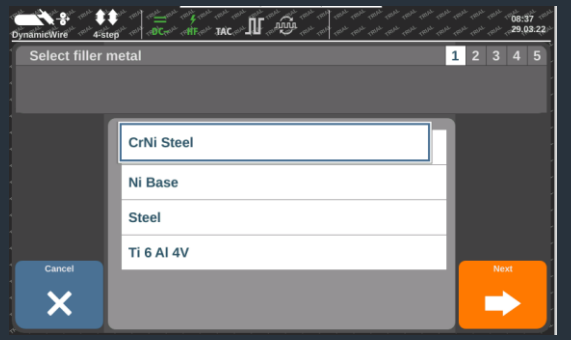
Steps to follow on the MCU

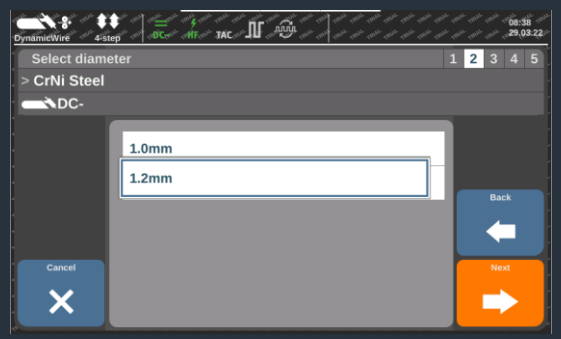
EXAMPLE

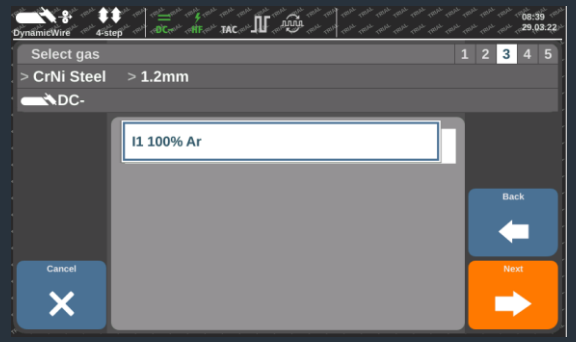
Sample setup for 8mm SS1.4301 sheet metal (500mm) fillet weld with Filler Material ER316LSi 1.2mm PA-position

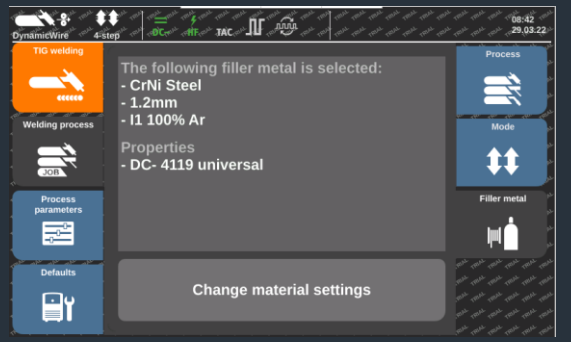




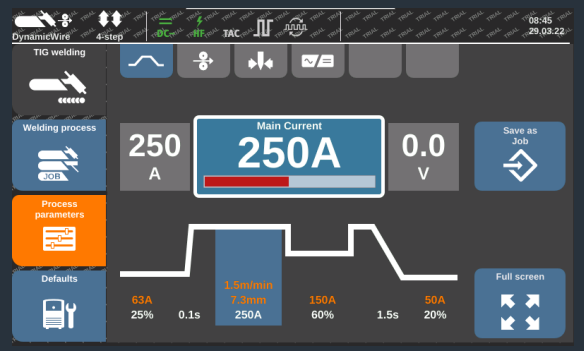


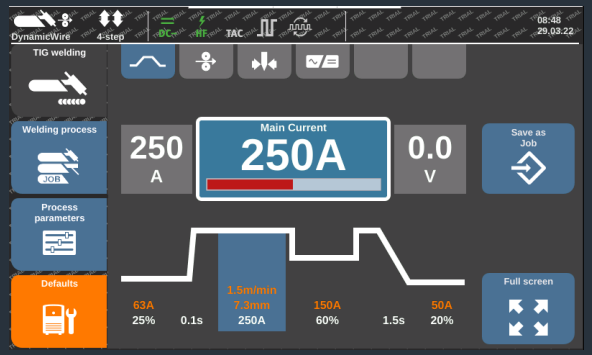


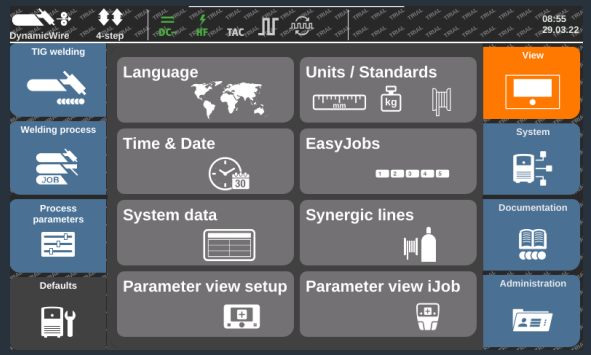


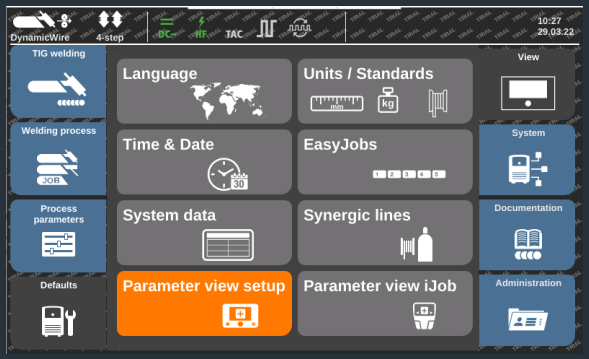


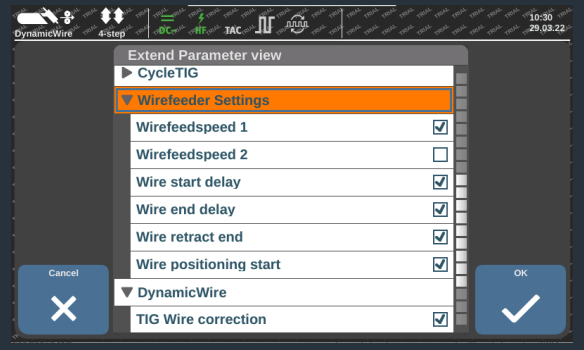
Additional settings on the MCU

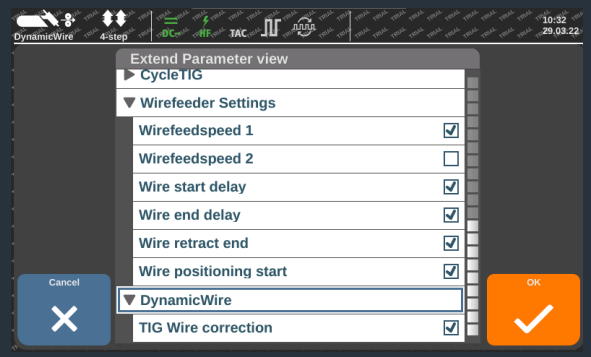




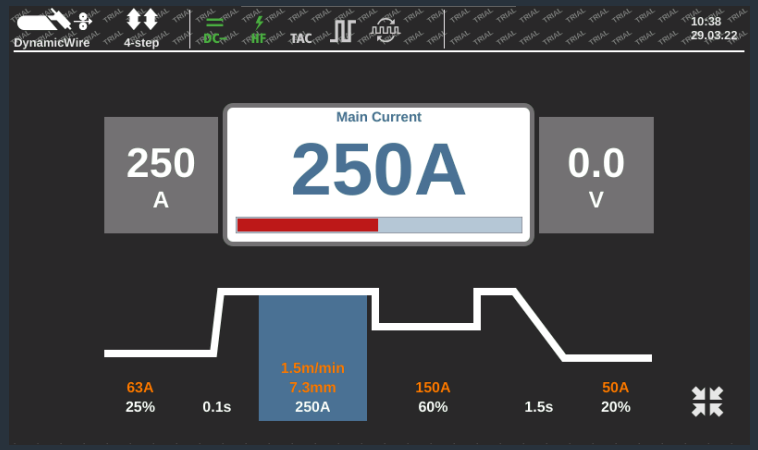


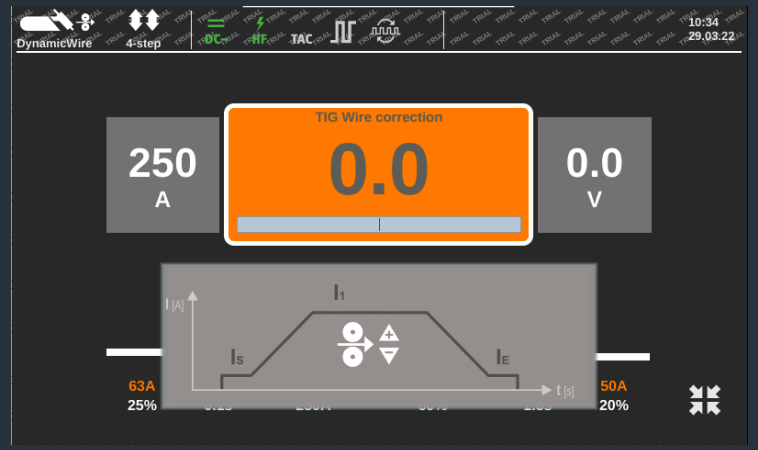


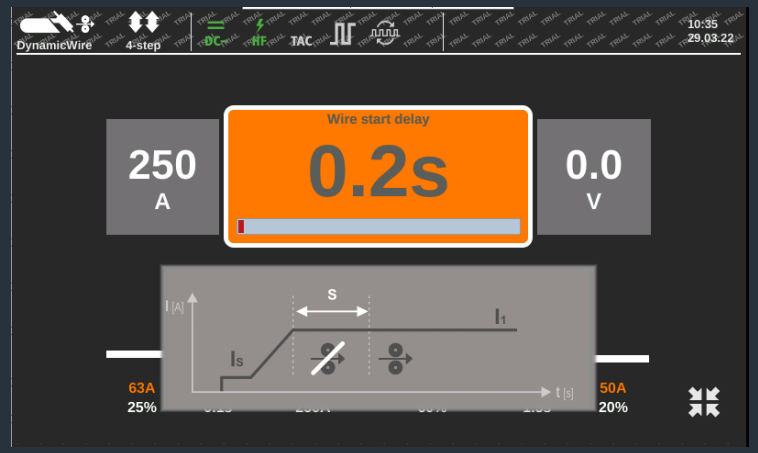


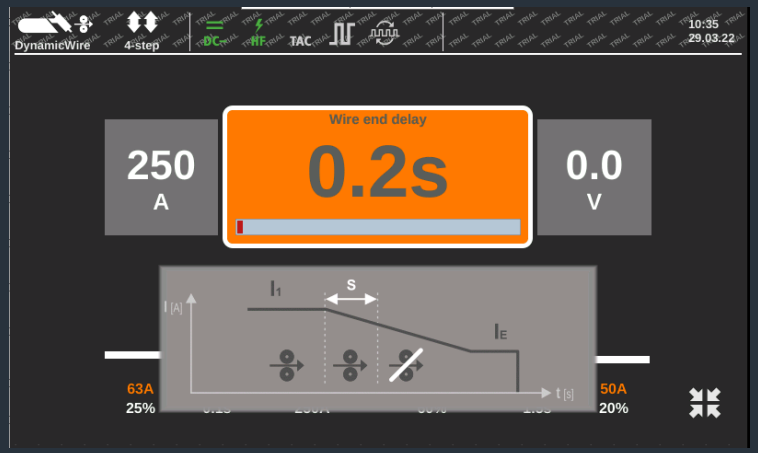


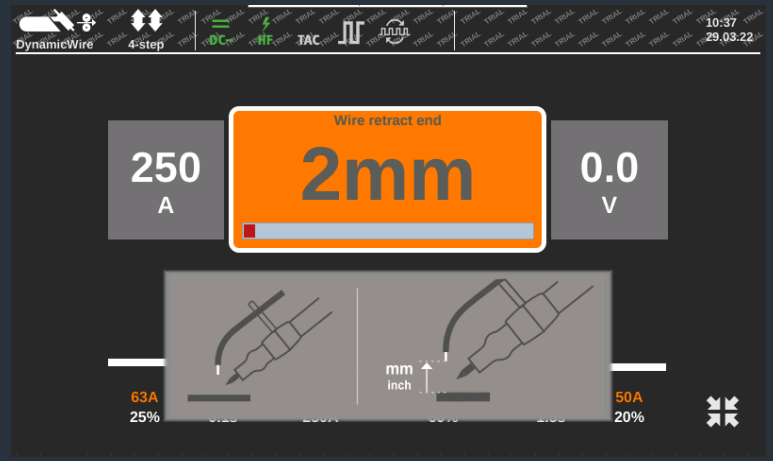
Additional settings on the MCU









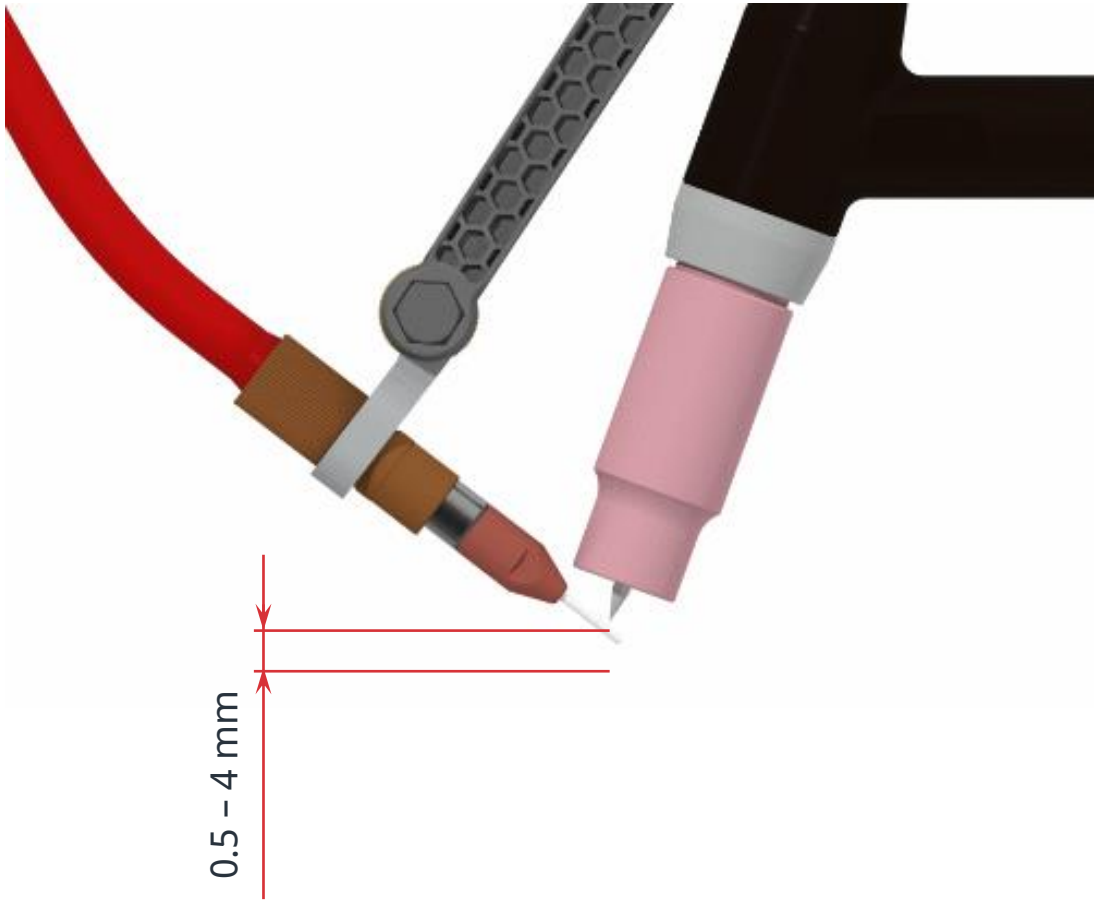


Recommended wire distance

Wire distance to the tungsten electrode

Current range [A]	Wire distance to tungsten elctrode [mm]
40 - 150	0.5 – 1.5
150 - 260	1.5 – 2.5
260 – 320	2.4 - 4

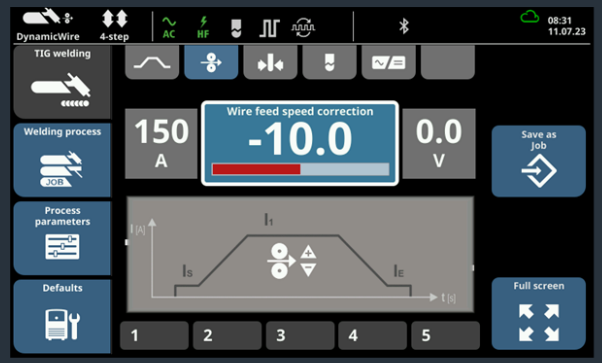
Universal setting: 2 mm

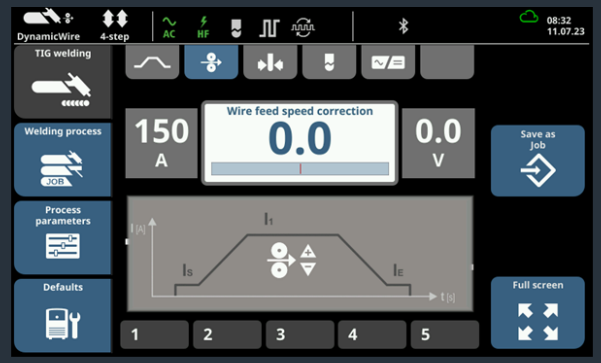


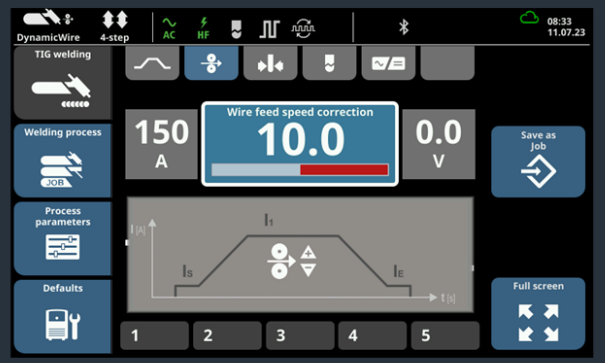
Wire feed speed correction

Wire feed speed correction

The parameter „wire feed speed correction“ allows the welder to correct the wire feed in the positive or negative range. This setting influences the pentration depth, weld seam surface, effective throat thickness and welding speed.







-10.0

Lowest value

(= less wire)

0.0

Standard setting
(wire feed speed according to stored characteristic)

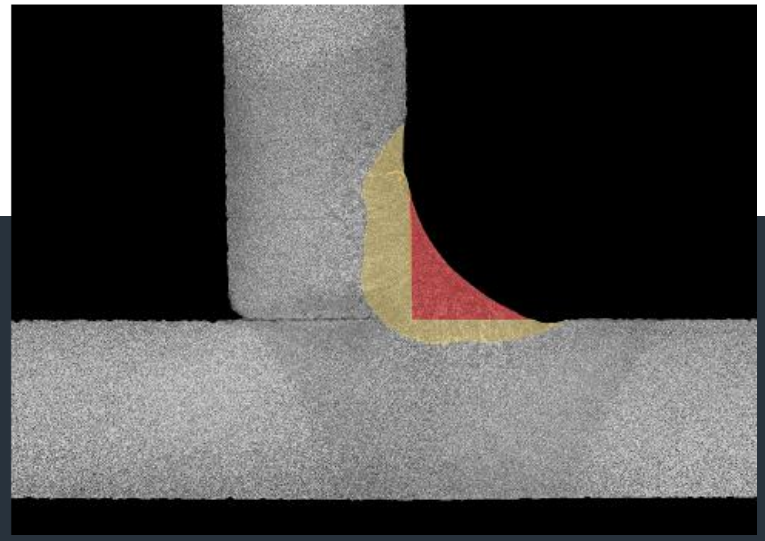
10.0

Highest value

(= more wire)

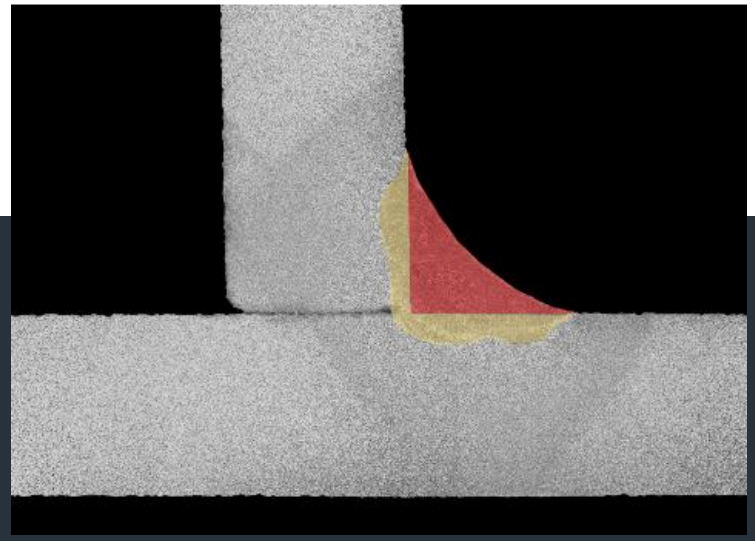
Wire feed speed correction

Influence of wire feed speed correction



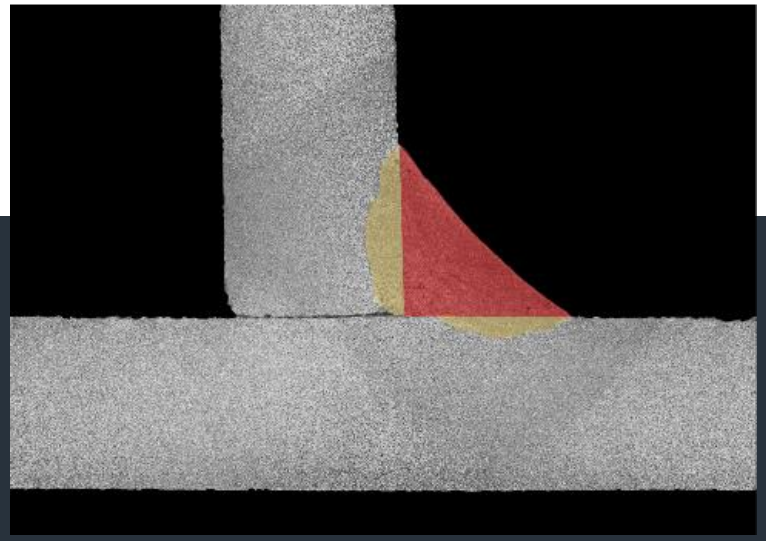
Wire feed speed correction: -10.0

Weld seam surface: 3,98 mm²
Penetration depth: 8,40 mm²
Design throat thickness: 1,5 mm
Average wire feed speed: 0,4 m/min



Wire feed speed correction: 0.0

Weld seam surface: 6,84 mm²
Penetration depth: 5,46 mm²
Design throat thickness: 2,41 mm
Average wire feed speed: 0,9 m/min



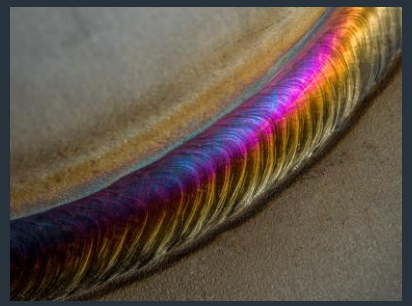
Wire feed speed correction: +7.0

Weld seam surface: 11,48 mm²
Penetration depth: 4,67 mm²
Design throat thickness: 3,21 mm
Average wire feed speed: 1,7 m/min

Welding demo

TIG DynamicWire

Pipe-flange connection

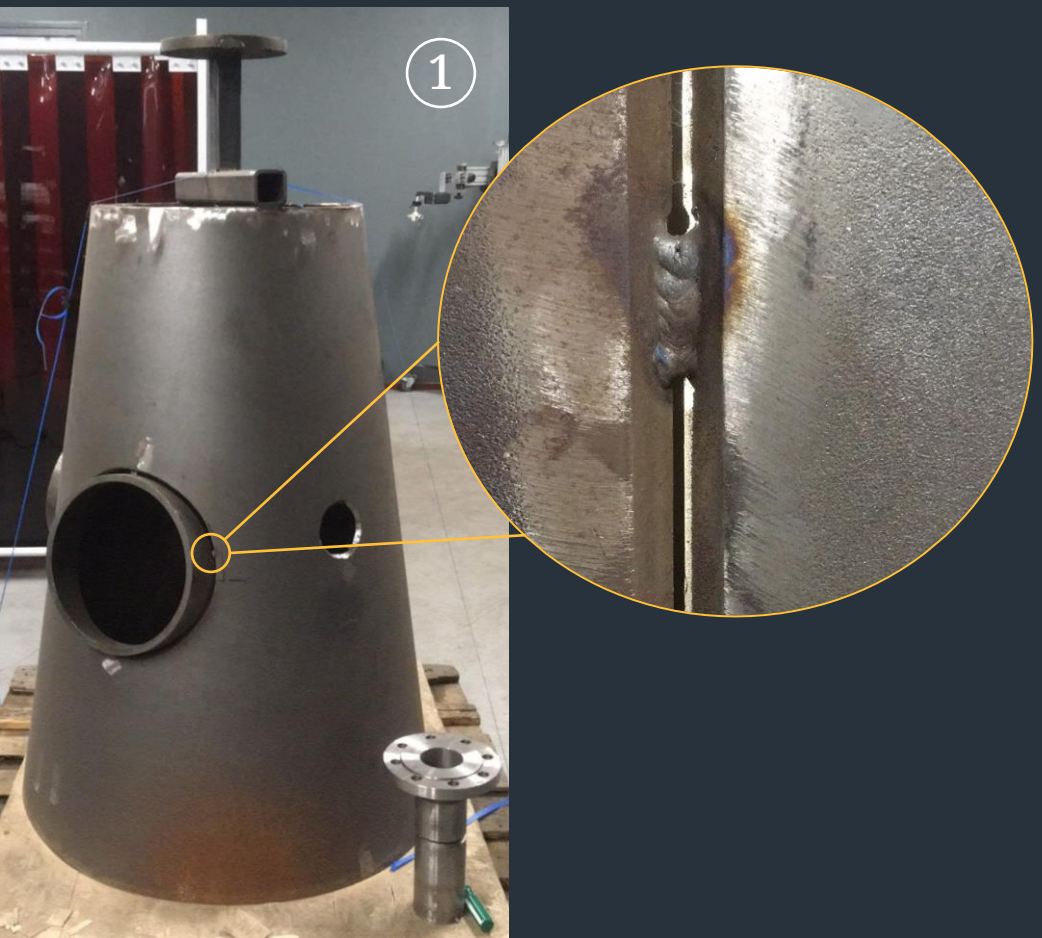


„I went to several customers to demonstrate TIG DynamicWire. All customers became enthusiastic after these demos. They were all a bit sceptical about automatic wire feed system combined with (manual) TIG welding. After seeing the process they all wanted to try the system and the simplicity and easy going with this process convinced all welder that this is a great solution!“

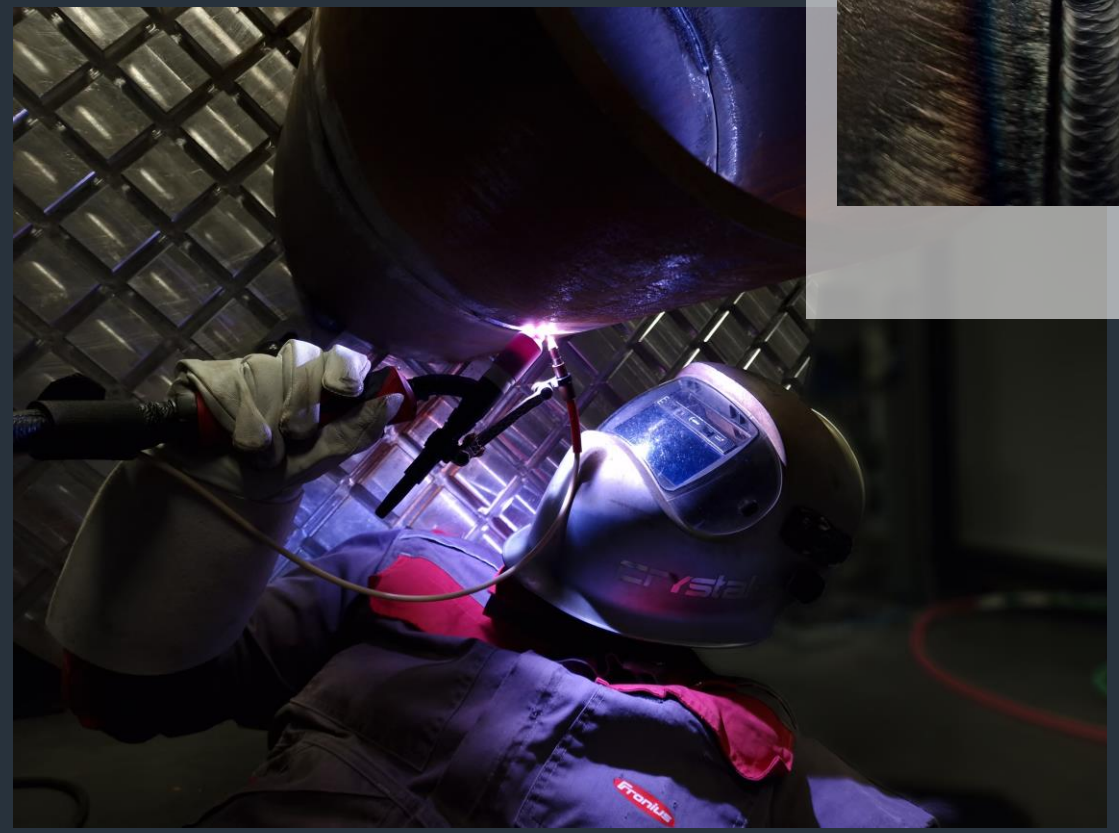
“The best welding demo was at a customer where the welder already tried 4 other systems from competitors / welding equipment manufacturers. He was really mad about the fact that his boss wanted to try another system, again…. We started our demo with a very negative welder but after seeing and trying our system he became enthusiastic. He wanted this system for his tasks! This was such a great experience! All other systems failed at the demo but ours did what a welder wants!!”

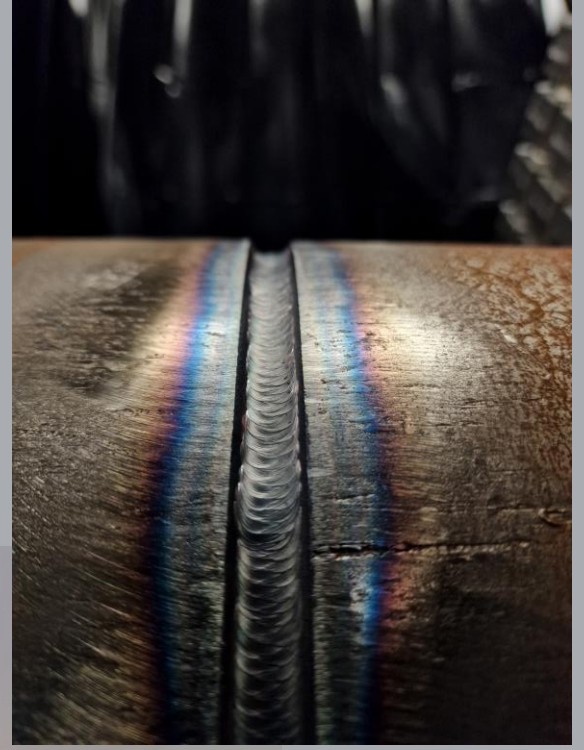
Patrick van Deuren, EQIN

Gap bridgeability, e.g.



Pipe welding [1/2]





READ MORE

Pipe welding [2/2]

1 | Root Pass

Settings:
150 A 65 IPM (1.7m/min) WFS
Travel speed ≈ 3.6 IPM (9.2 cm/min)

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2 | Hot Pass

Settings:
210 A 45 IPM (1.7m/min) WFS
Travel speed ≈ 3.6 IPM (9.2 cm/min)

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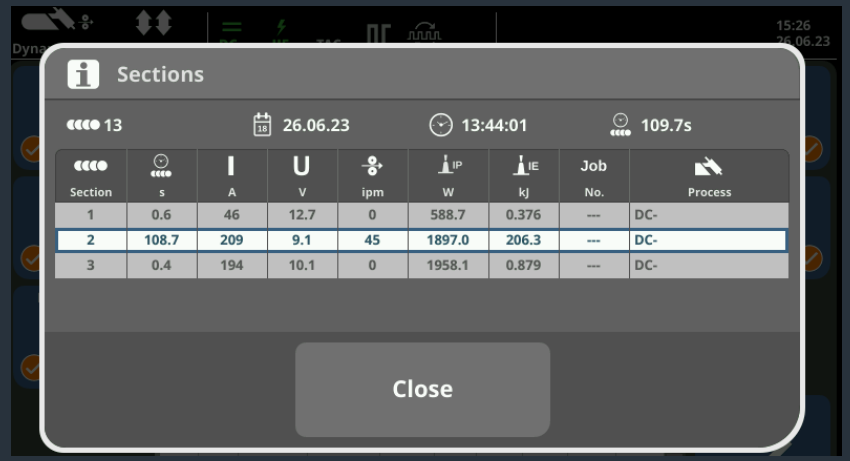

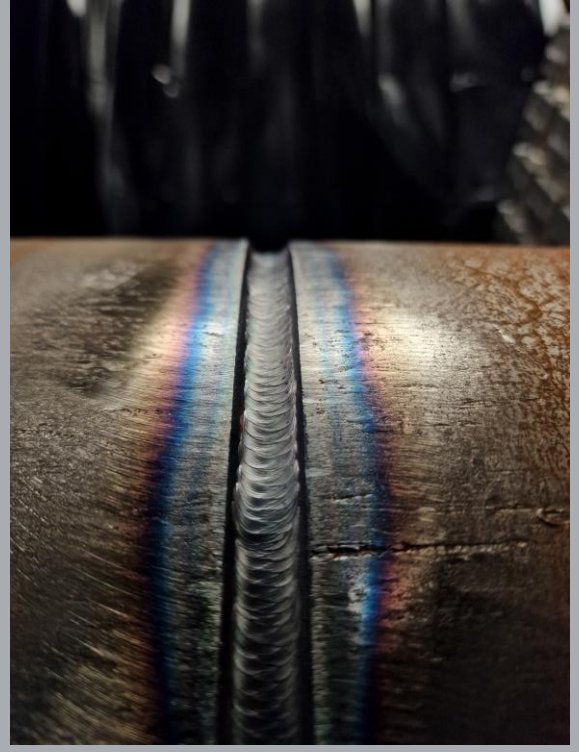

settings

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