



**Weld Overlay**  
**Solutions** | **2017**

2017 Polysoude

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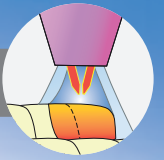
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## Icons & Legends

-  TIG Cold Wire technology
-  TIG Hot Wire technology
-  TIG<sup>er</sup> technology
-  Computer Numerical Controller (CNC)
-  Conventional Controller
-  Programmable motion (motorised)
-  Non-programmable motion (manual or motorised)



## GTAW/TIG & TIG<sup>er</sup>

Main advantages of TIG CW/HW compared to other processes: all position use, excellent surface quality, clean without spatters... Zero defects.

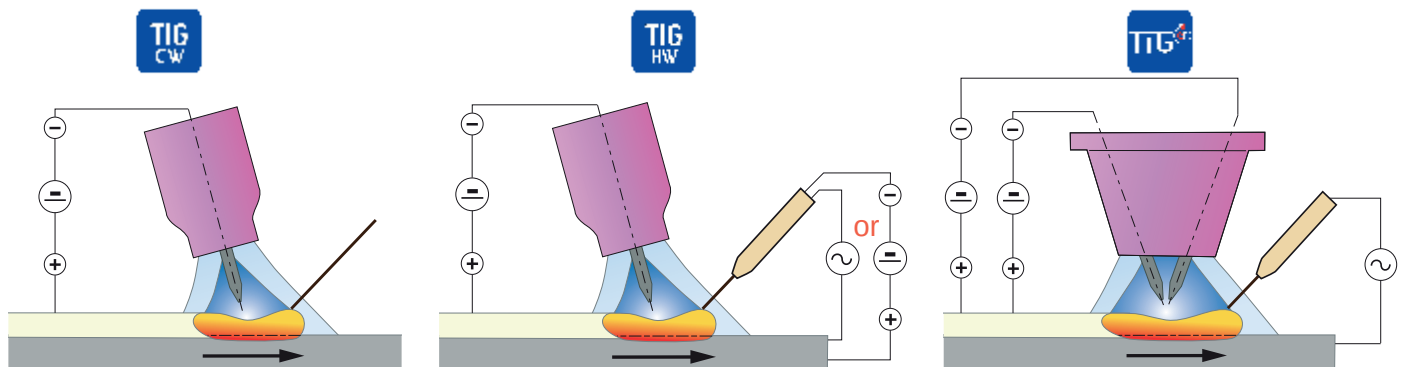
The TIG<sup>er</sup> technology is a Polysoude innovation based on the TIG (GTAW) process and designed to guarantee quality, increase significantly the deposition rate and reduce dilution.



	TIG CW	TIG HW	TIG <sup>er</sup>
Electrode	1	1	2
Wire	CW	HW - DC or AC	HW - AC
Arc type	Single arc	Single arc	Two arcs in one
Deposition rate			
Single torch (*)	up to 1 kg/h	up to 2.5 kg/h	up to 6 kg/h
Twin torch (#)	-	up to 4 kg/h	up to 9 kg/h
Minimum I.D. before weld overlay considering 2 layers	28 mm	34 mm	100 mm

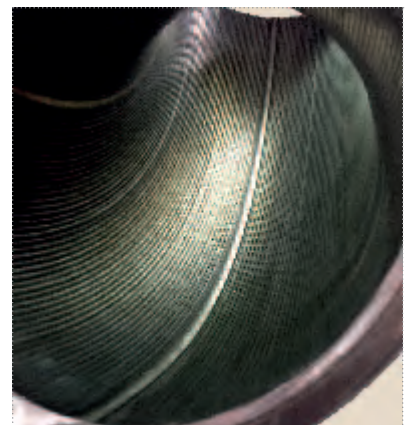
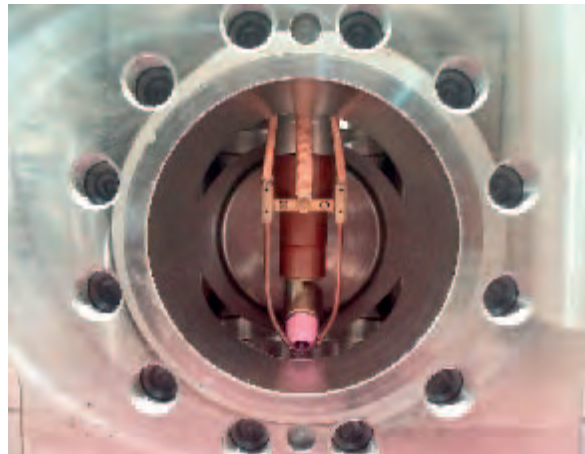
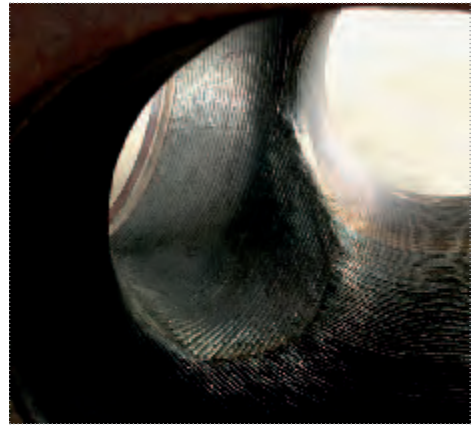
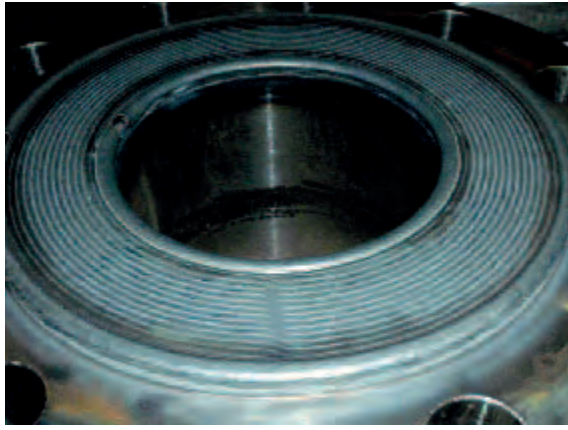
(\*) Maximum deposition rate given for reference, produced under optimal conditions (welding position, application type, base material, surface and filler wire)

(#) The deposition rate in "Twin" configuration is a balance between the optimal characteristics for the first layer (the lowest possible thickness and therefore dilution) and the weld overlay speed for the simultaneous execution of the first and second layer.





## Workpieces and application examples



*Courtesy of CFHI, Newtesol, NVO, AMPO, Paipu, RocMaster and Subsea Services*






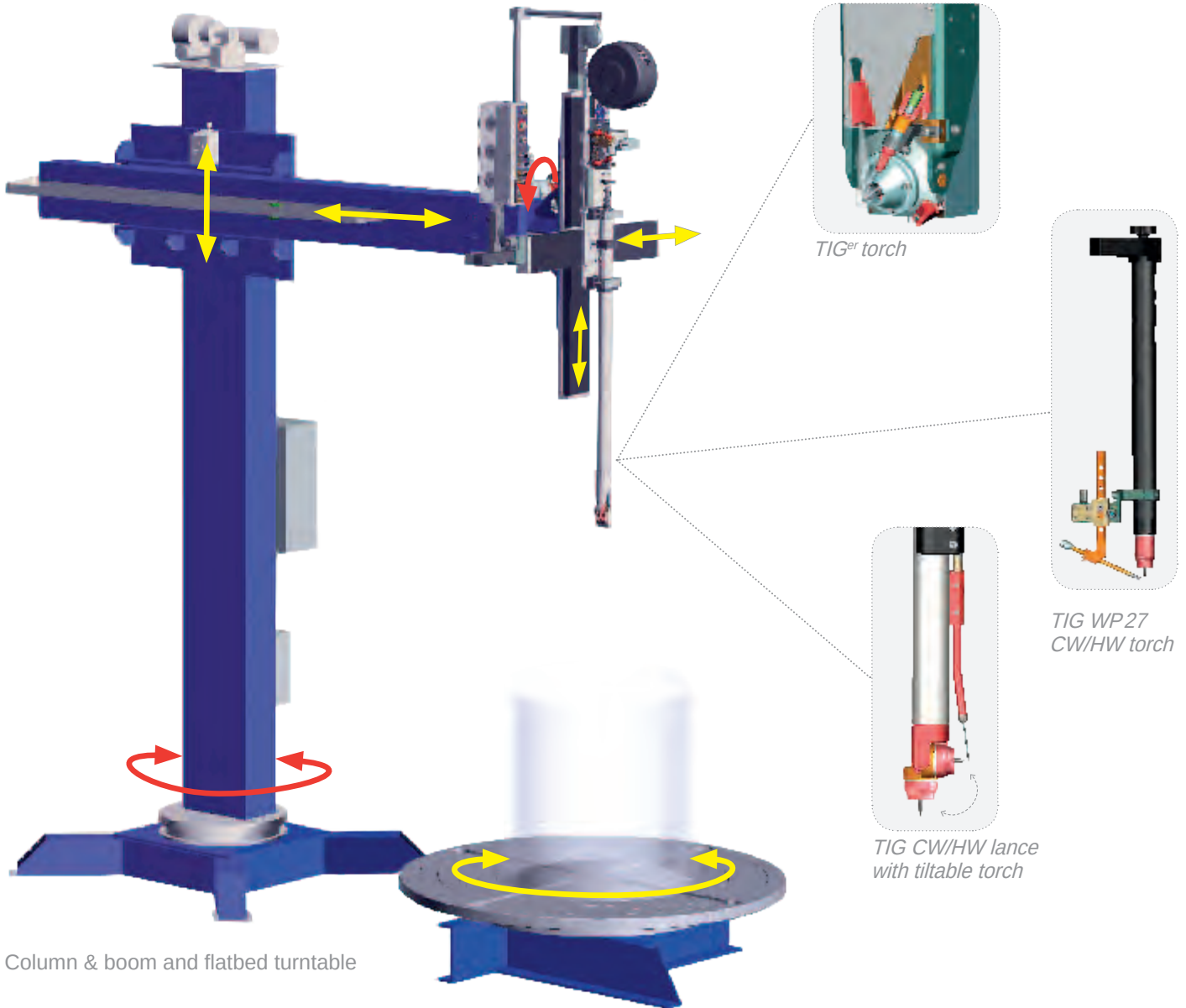
## Column & boom and flatbed turntable



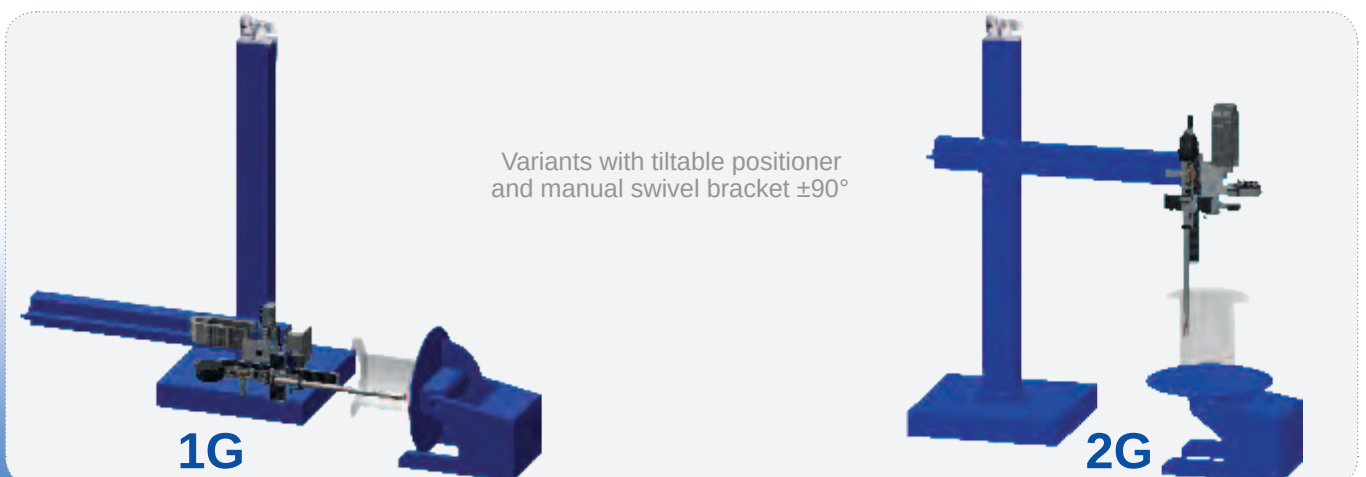


## ► Advantages

- Ease of setup
- Compact, modular standard design
- Versatility: vertical and all other weld overlay positions
- Two possibilities of cross slide mounting (front or side mounted)
- Delivered with library of typical weld overlay programmes
- Flexibility: wide range of lances and torches
- Multiprocesses:   



Column & boom and flatbed turntable





## ► Programming software

Two solutions depending on the workpieces complexity to be cladded:

### ► Main items

- Column and boom
- Cross slides
- Wire feeder
- Lance/torch
- Flatbed turntable
- Multiprocess power source

### ► Variants / options

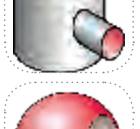
- High resolution video monitoring
- Tiltable positioner
- TIG HW or TIG<sup>er</sup>
- Manual swivel bracket  $\pm 90^\circ$  (cross slide tilting)
- High temperature bellows
- DAQbox - tool for productivity management and data acquisition



Conventional controller



CN Controller

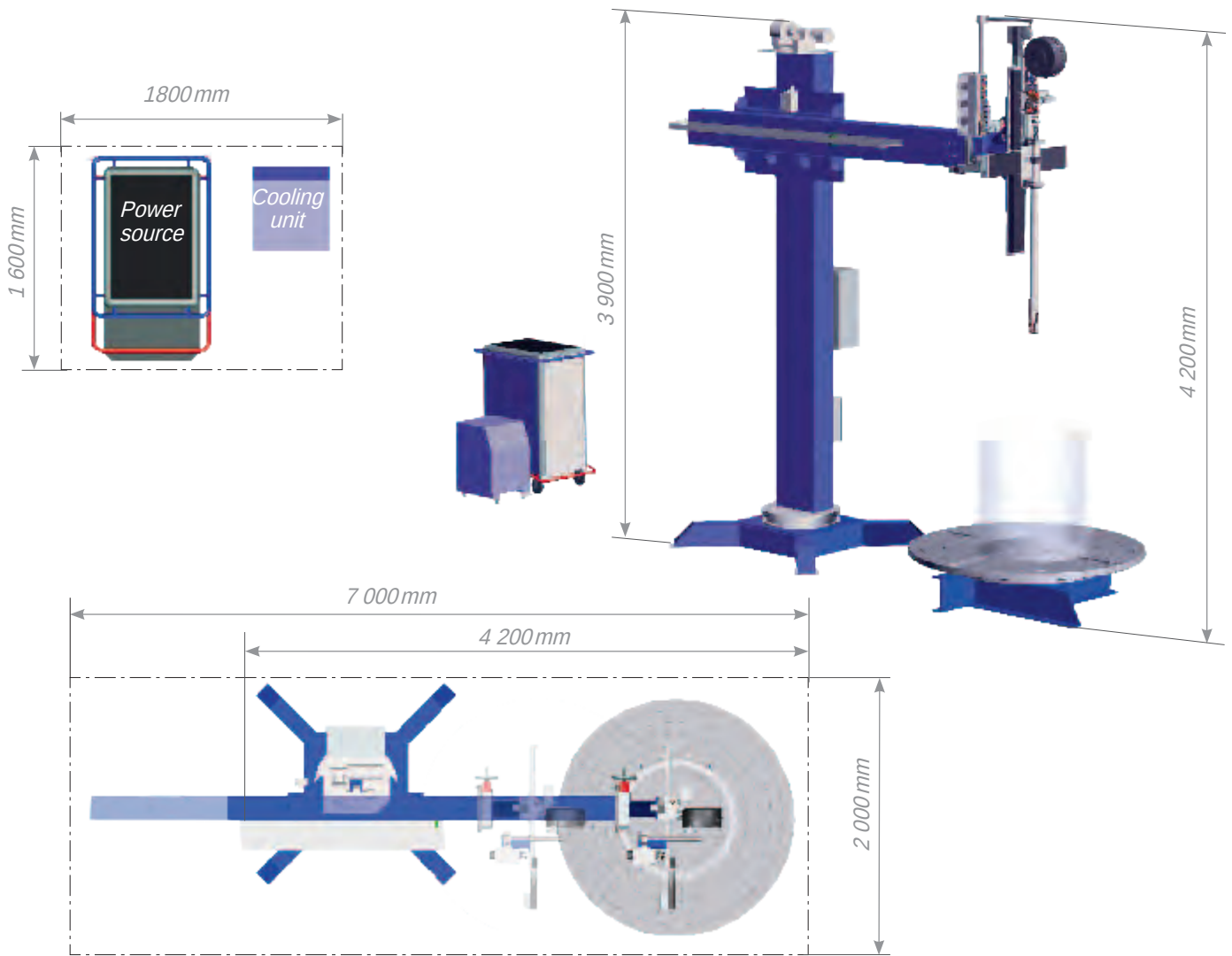


## ► Technical data

Column & boom	3 m x 2 m
Maximum height under boom	3 m
Vertical stroke (max.)	2 m
Horizontal stroke (max.)	2 m
Maximum load on boom end	250 kg
Cross slides stroke	1 m x 0.6 m
Wire feeder	0.5 to 14m/min
Compatible with wire spool	Ø300 mm - 15 kg
Capacity of the flatbed turntable	3t - Ø1.5 m
Capacity of the positioner	2t - Ø1 m
Maximum length of weld overlay lance	1 m

Other sizes of C&B, flatbed turntable, positioner, available on request

## ► Layout and utilities



Utilities	
C&B with flatbed turntable/positioner	400 V - three-phase - 24 kVA
Power sources - TIG CW/HW	400 V - three-phase - 33 kVA
Power sources - TIG <sup>er</sup>	400 V - three-phase - 1x33kVA + 1x28kVA
Video control panel	230 V - single phase - 6 kVA
Cooling unit	230 V - single phase - 4 kVA

## ► Product item numbers

	TIG POW <sub>er</sub>	TIG <sup>er</sup> POW <sub>er</sub>	TIG CNC	TIG <sup>er</sup> CNC
Standard vertical weld overlay installation (including C&B, cross slides, wire feeder, power sources and cooling unit)	0033260002	0033260003	On request	On request
Flatbed turntable 3t	0038002002			
Tiltable positioner 2t	0038001501			
Manual swivel bracket ±90° for cross slides	0033260101			
Digital display for torch position and step-over	0018666605			
Data acquisition system	0033269901			
High temperature bellows for cross slides	0033380580			
Torches and lances	see chapter Technical appendix, paragraph Torches and lances			






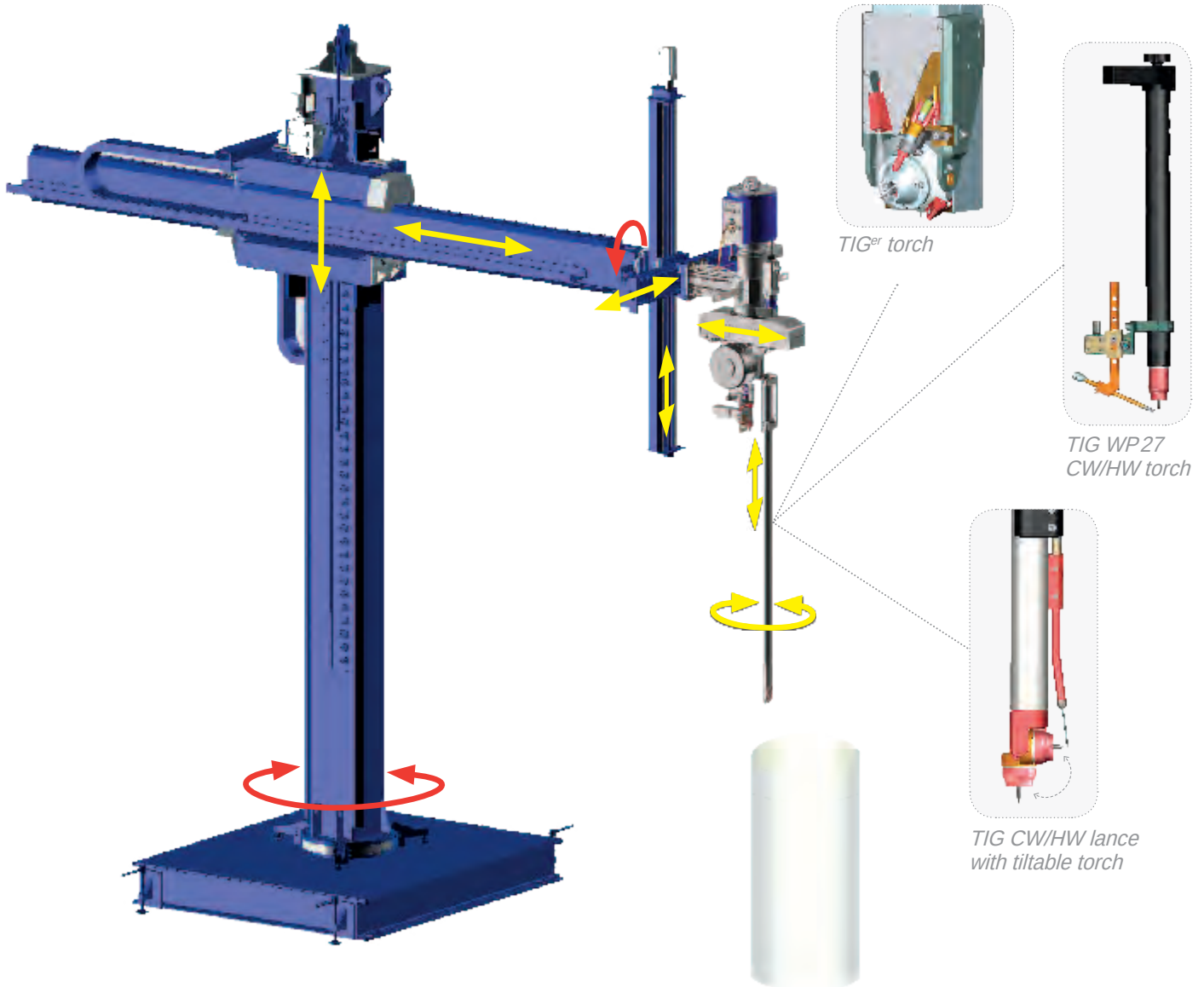
## SPX endless rotation head



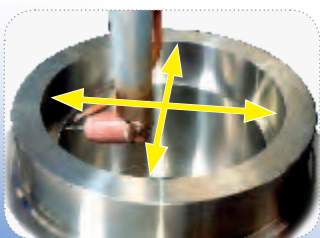


## ► Advantages

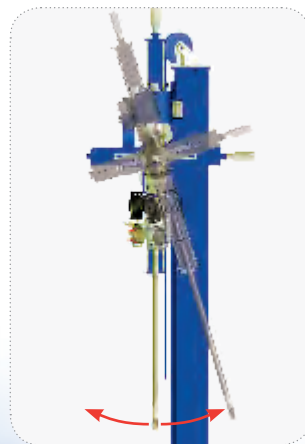
- Ease of setup
- Flexibility
- Wide range of use for both simple and complex workpieces
- Multiprocesses:   
- Increased productivity due to endless rotating head
- Autocentring programme for the lance



Column & boom with SPX endless rotation head



Autocentring



Tiltable cross slides with SPX head  
(manual swivel bracket ±90°)



Column & Boom with platform



## ► Programming software

Two solutions depending on the workpieces complexity to be cladded:

### ► Main items

- Column & boom
- Heavy Duty cross slides
- SPX endless rotation head equipped with wire feeder and AVC cross slides
- Lance/torch
- Multiprocess power source

### ► Variants / options

- High resolution video monitoring
- Flatbed turntable
- C&B platform (power source, control cabinet...)
- Manual swivel bracket  $\pm 90^\circ$  (SPX head tilting)
- Extension bracket for large workpiece diameters
- DAQbox - tool for productivity management and data acquisition



**POWin** Conventional controller



**CNC axes** CN Controller



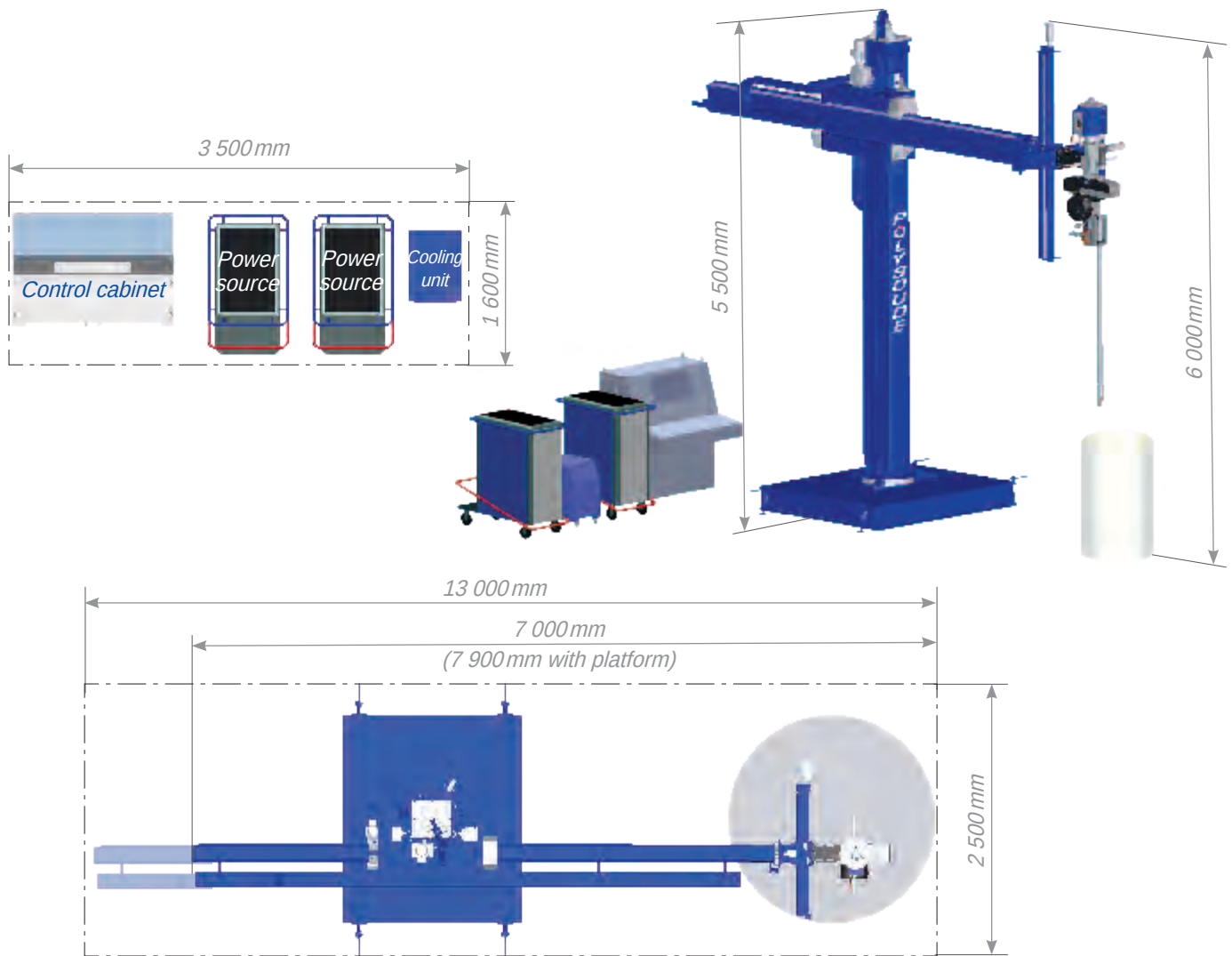
### ► Technical data

Column & boom	4 m x 4 m - Heavy Duty
Maximum height under boom	4 m
Vertical stroke (max.)	3 m
Horizontal stroke (max.)	4 m
Maximum load on boom end	400 kg
SPX head - workpiece diameter (max.)	600 mm 1200 mm with optional extension bracket
SPX head - AVC slide stroke	300 mm
HD cross slide strokes	2 m x 1 m
Wire feeder	0.5 to 14 m/min
Compatible with wire spool	Ø 300 mm - 15 kg
Capacity of the flatbed turntable (option)	15t - Ø 2.4m
Maximum length of weld overlay lance	2 m

Other sizes of C&B and flatbed turntable available on request.



## ► Layout and utilities



Utilities	
Column & Boom	400V - three-phase - 16kVA
Power sources - TIG CW/HW	400V - three-phase - 33kVA
Power sources - TIG <sup>er</sup>	400V - three-phase - 1x33kVA + 1x28kVA
Video control panel	230V - single phase - 6kVA
Cooling unit	230V - single phase - 4kVA
Flat turntable (optional)	400V - three-phase - 6kVA

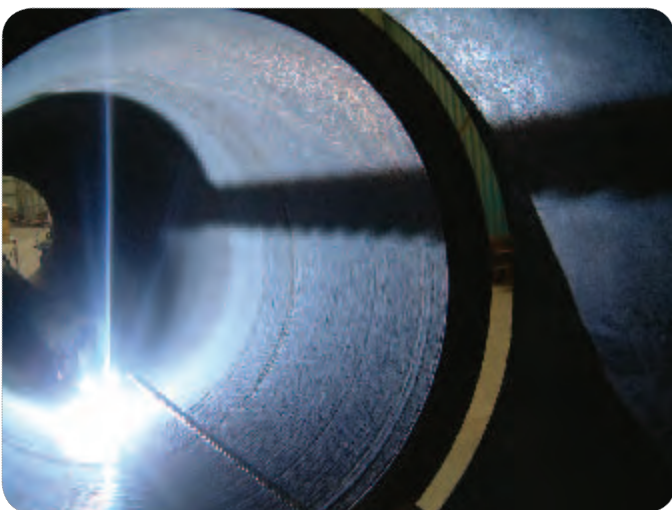
## ► Product item numbers

	TIG POW <sub>+</sub>	TIG <sup>er</sup> POW <sub>+</sub>	TIG CNC	TIG <sup>er</sup> CNC
Standard vertical weld overlay SPX installation (including C&B, HD cross slides, SPX head, power source, cooling unit)	0033690001	On request	0033690003	0033690004
Flatbed turntable 15t	On request		On request	
C&B platform	0038001007		0038001007	
Manual swivel bracket ±90° for SPX cross slides	0038001006		0038001006	
Extension bracket for SPX large diameter	0032800201		0032800201	
Data acquisition system	0033269901		On request	
High temperature bellows for SPX cross slides	0033380581		0033380581	
Torches and lances	see chapter Technical appendix, paragraph Torches and lances			

# Horizontal pipe weld overlay solutions



TWIN-TIG<sup>er</sup> 6m or 12m: 360° full length I.D. weld overlay



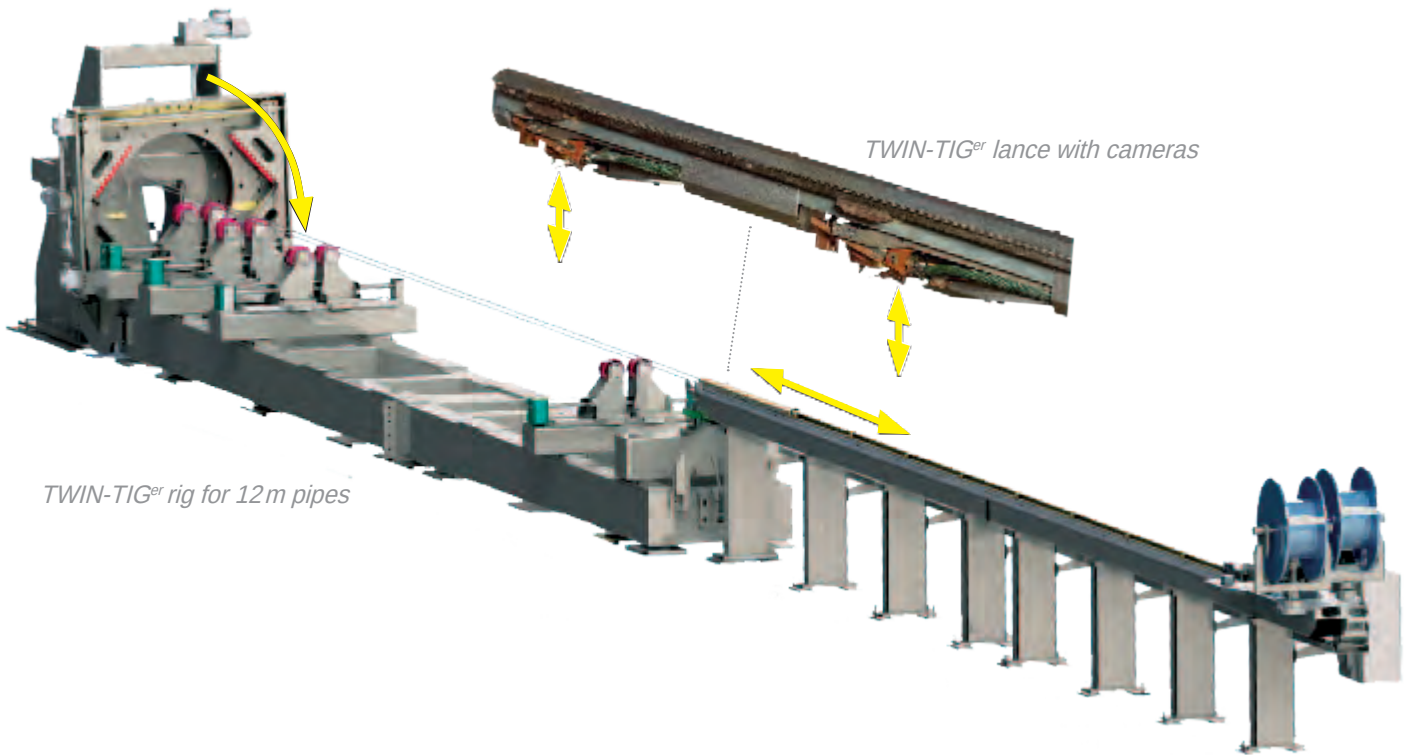


## ▶ Advantages

- Ease of setup
- Two simultaneous layers
- AVC control (independent for each torch)
- Video for continuous monitoring and relocation
- High deposition rate/high productivity

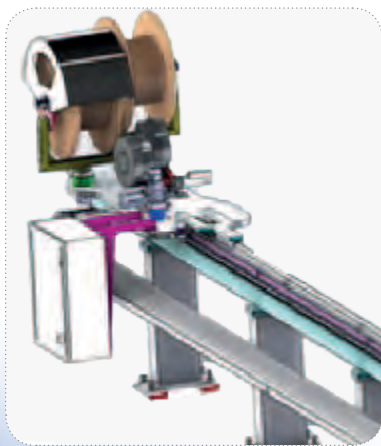


Set of PC 600-3 power sources - 2 masters and 2 slaves

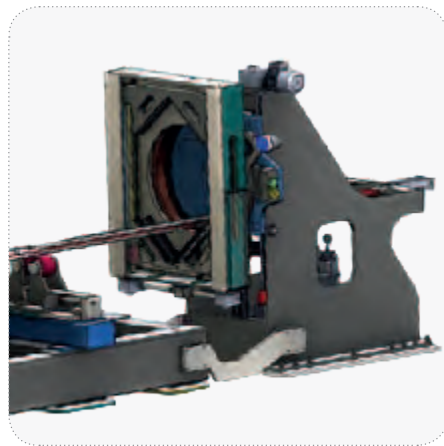


TWIN-TIG<sup>er</sup> rig for 12m pipes

TWIN-TIG<sup>er</sup> lance with cameras



Carriage with 2x250 kg or 2x15 kg wire spools



Rotator with special clamping chuck



## ▶ Control cabinet

Delivered with the machine



Weld overlay programming software  
(weld overlay parameters)



Operator touchscreen



## ▶ Main items

- Horizontal guiding beam - travel carriage - wire feeder units
- Weld overlay lance with two TIG<sup>er</sup> torches "TWIN-TIG<sup>er</sup>"
- Head stock rotator
- Special clamping chuck
- Pipe supports
- Rope tensioning system
- Set of PC 600-3 power sources (2 masters & 2 slaves)

## ▶ Variants / options

- Extra travel carriage for preheating/cooling devices
- DAQbox - tool for productivity management and data acquisition



Video 1



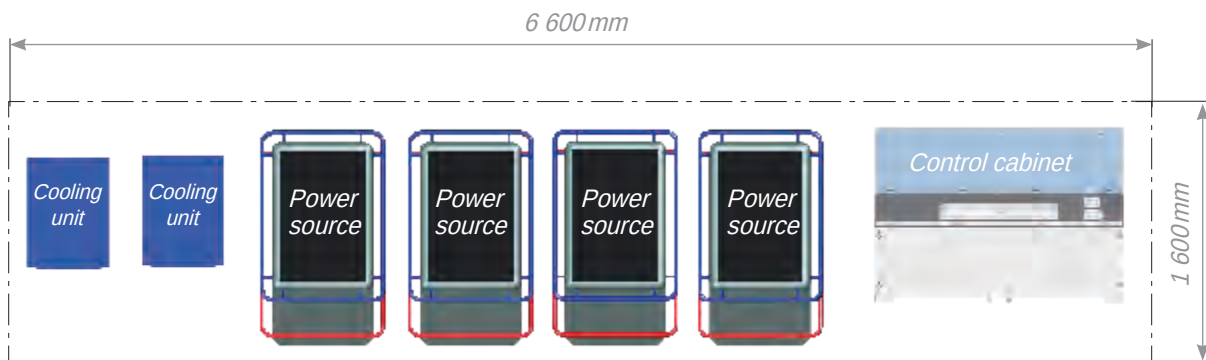
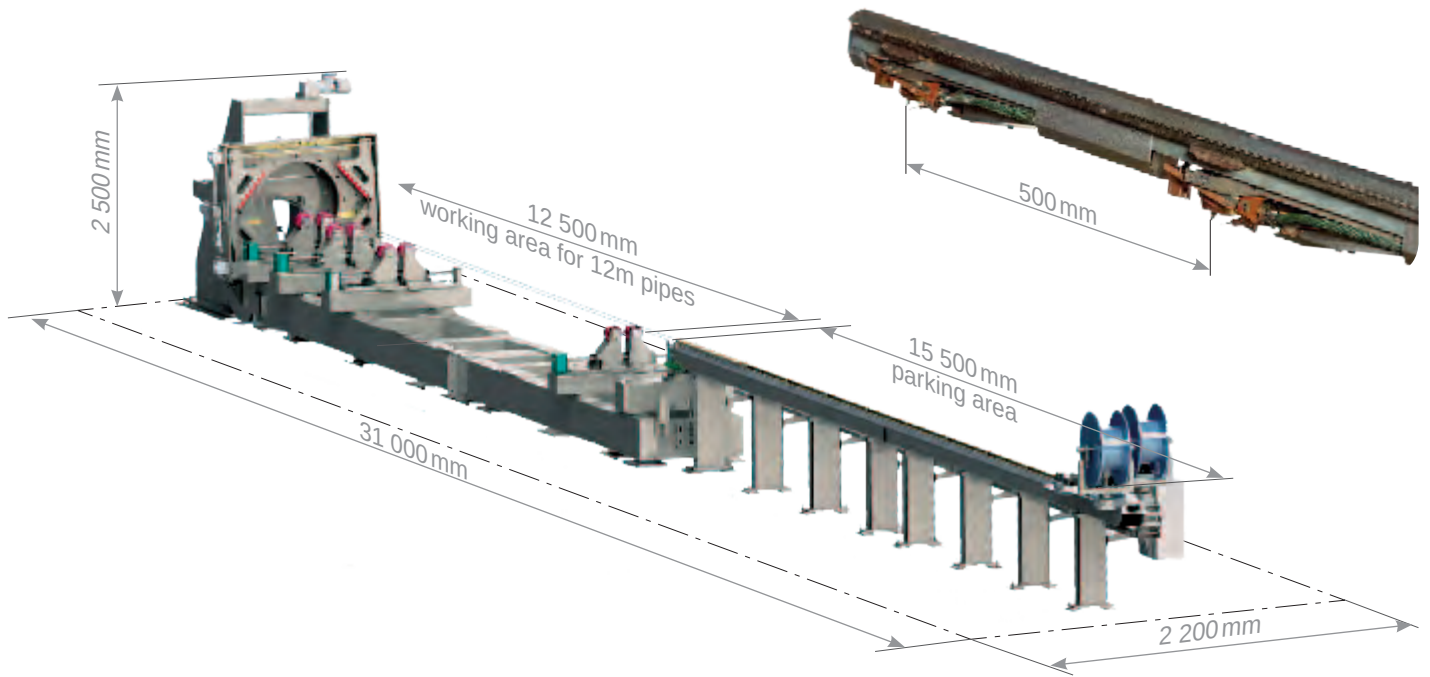
Video 2

## ▶ Technical data

Pipe	
I.D. min. (pipe length 6 m)*	135 mm (5 5/16")
I.D. min. (pipe length 12 m)*	150 mm (5 29/32")
Special clamping chuck	O.D. 24" (other diameters on demand)
Distance between torches 1 & 2	500 mm
AVC stroke (independant for each torch)	40 mm
Wire feeder (x2)	0.5 to 14 m/min
Compatible with wire spool	Ø 760 mm - 250 kg or Ø 300 mm - 15 kg
Video	1 x camera per torch

\* before weld overlay considering 2 layers

## ► Layout and utilities

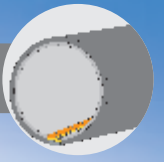


Utilities	
Power sources - TIG <sup>er</sup>	400 V - three-phase - 2x33kVA + 2x28kVA
Hollow shaft and carriage	400 V - three-phase - 16kVA
Control panel	230 V - single phase - 6kVA
Cooling unit	230 V - single phase - 2x7kVA

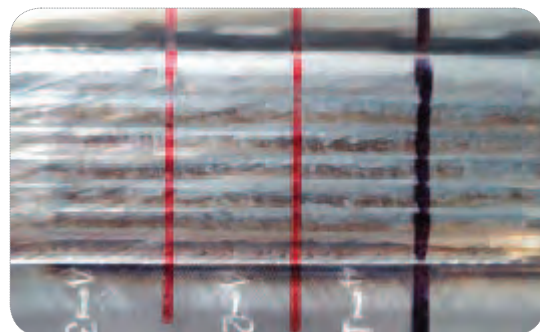
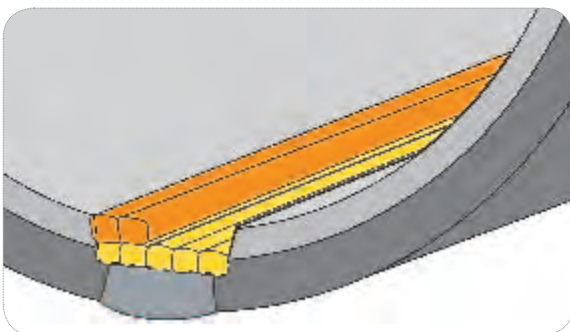
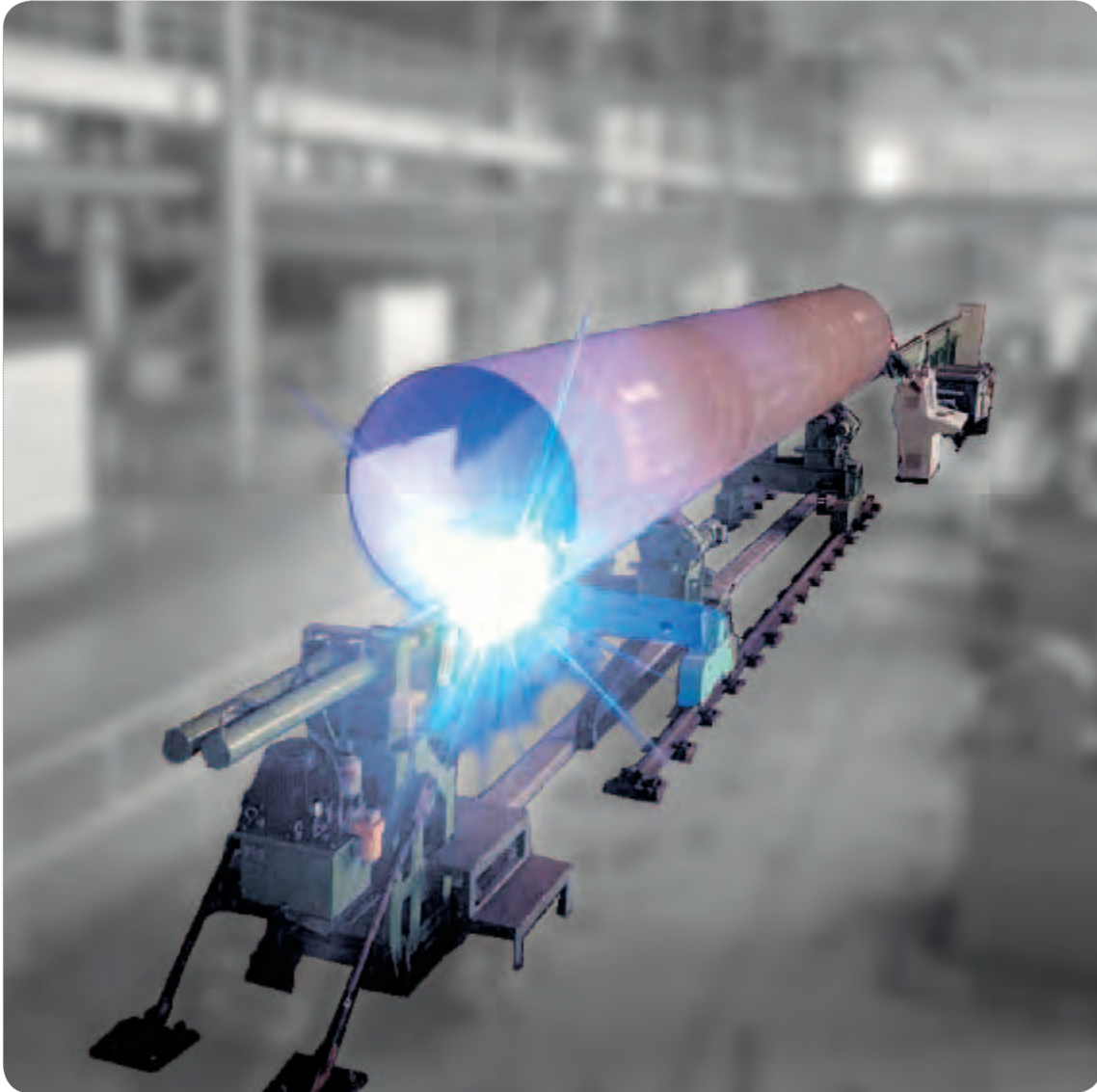
## ► Product item numbers

	6 m	12 m
Standard horizontal weld overlay installation (including horizontal guiding beam, head stock rotator, weld overlay lance with one camera per torch, set of power sources, cooling units, control cabinet)	0033730001	0033730002
Extra travel carriage for preheating/cooling devices	On request	
Data acquisition system	0033269903	

# Horizontal weld overlay pipe solutions




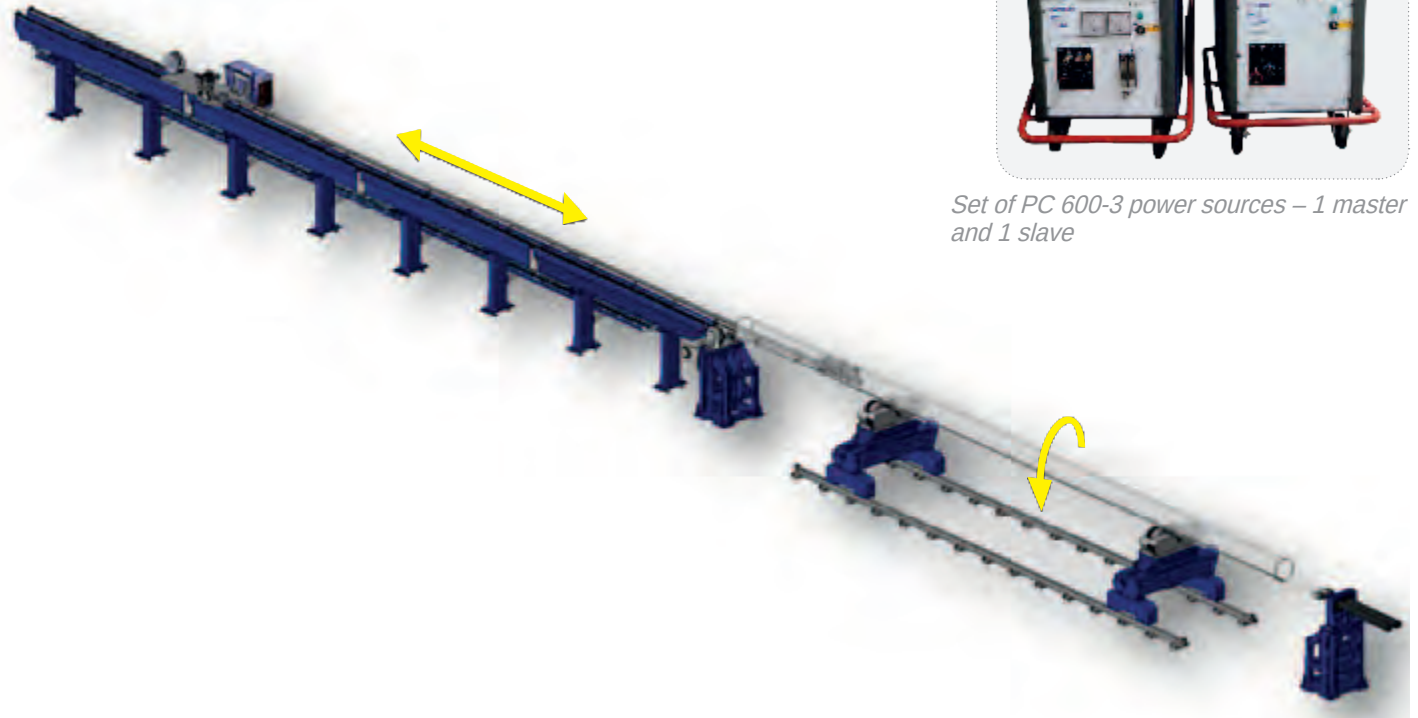
TIG<sup>er</sup> rig: Longitudinal full length I.D. weld overlay





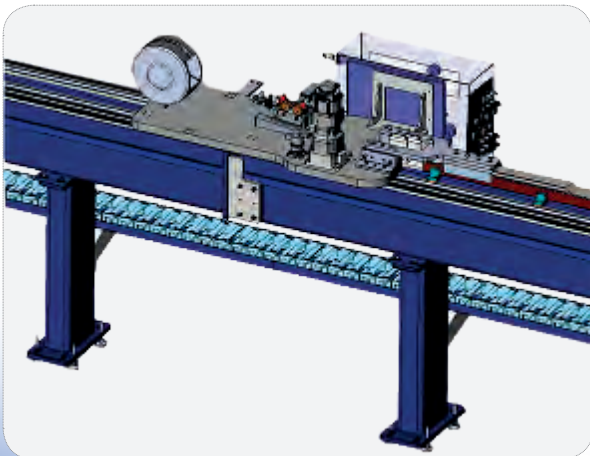
## ▶ Advantages

- A unique solution for the longitudinal seam weld overlay of metallurgically bonded pipes from the inside (after welding from outside and remachined root - not part of Polysoude supply)
- Perfectly smooth quality of the cladded surface
- Reduced deformation
- TIG<sup>er</sup> high deposition rate / high productivity
- Low dilution rate
- Process: 

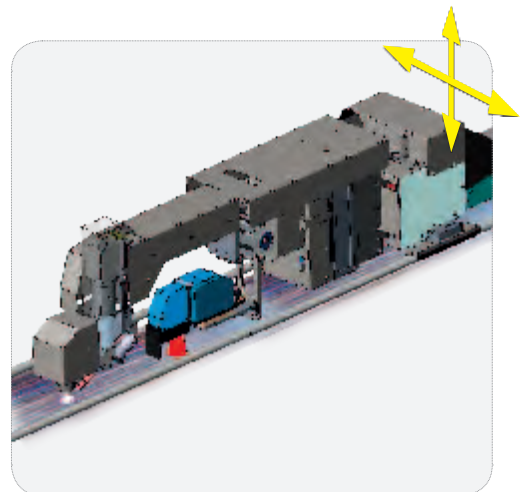


Set of PC 600-3 power sources – 1 master and 1 slave

12m longitudinal weld overlay installation with TIG<sup>er</sup> technology



Travel carriage, wire feeding assembly and connection plate



X/Y cross slide for AVC and torch centring function by laser seam tracking

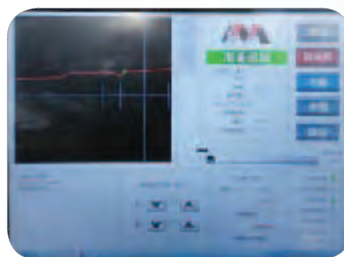


## ▶ Control cabinet

Delivered with the installation

## ▶ Equipment includes

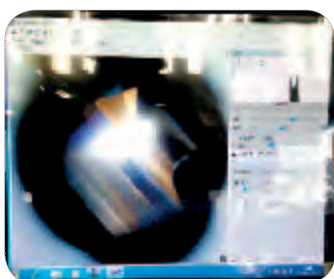
- Main frame of the installation
- 12m TIG<sup>er</sup> lance
- Travel carriage
- Rope tensioning system
- Pipe orientation roller assembly
- Set of PC 600-3 power sources (1 master & 1 slave)
- CN - control cabinet



Real time or memorised laser seam tracking



Operator touchscreen



Video system: Wide dynamic video for real time monitoring

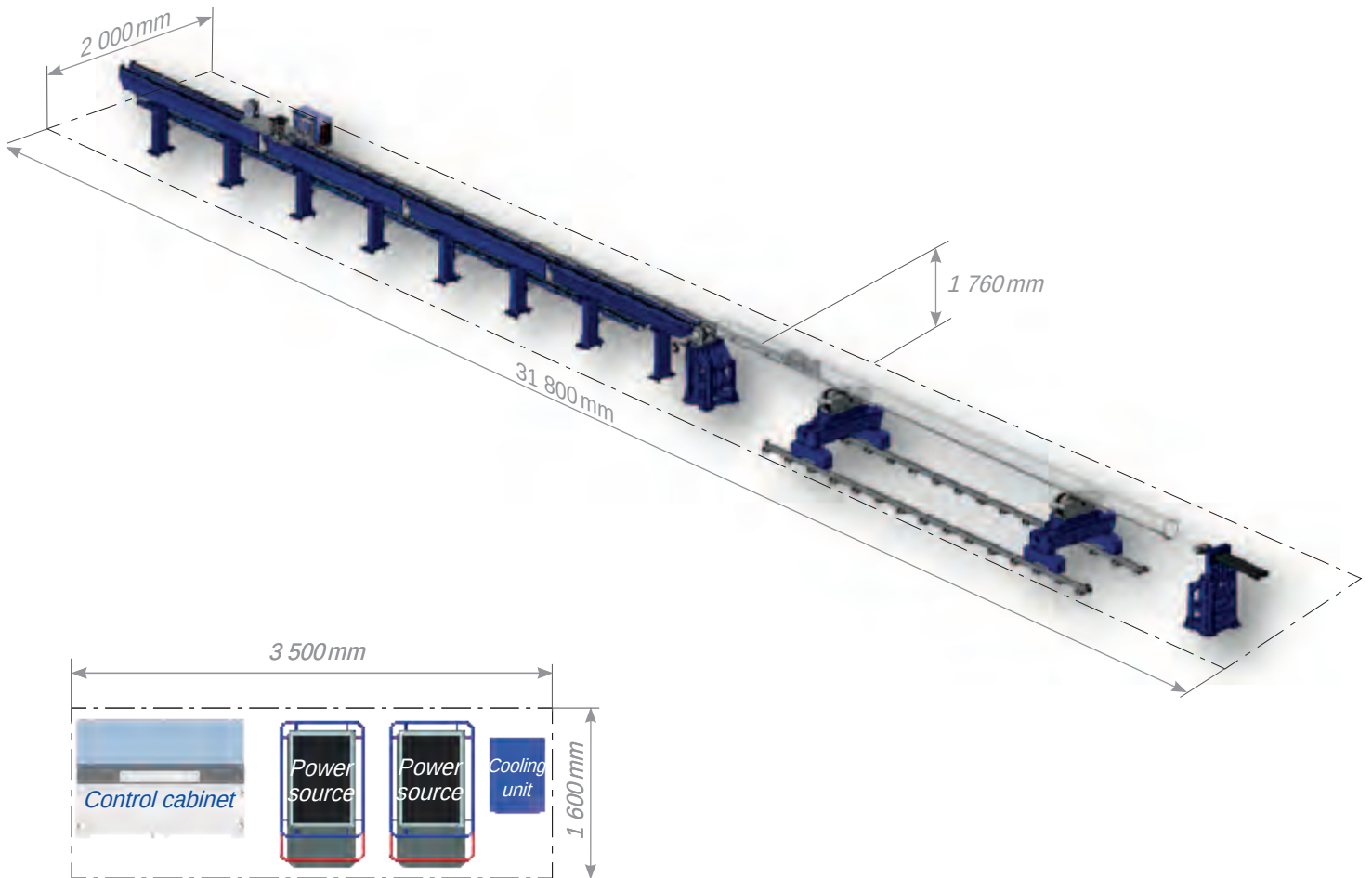


## ▶ Technical data

Tube	
O.D. max.	1422 mm (55 63/64")
I.D. min.*	350 mm (13 25/32")
Length	12 m
AVC stroke	80 mm
Crosswise seam tracking stroke	50 mm
Wire feeder	0.4 to 14 m/min
Compatible with wire spool	Ø 300 mm - 15 kg

\* Before weld overlay considering 2 layers

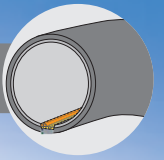
## ► Layout and utilities



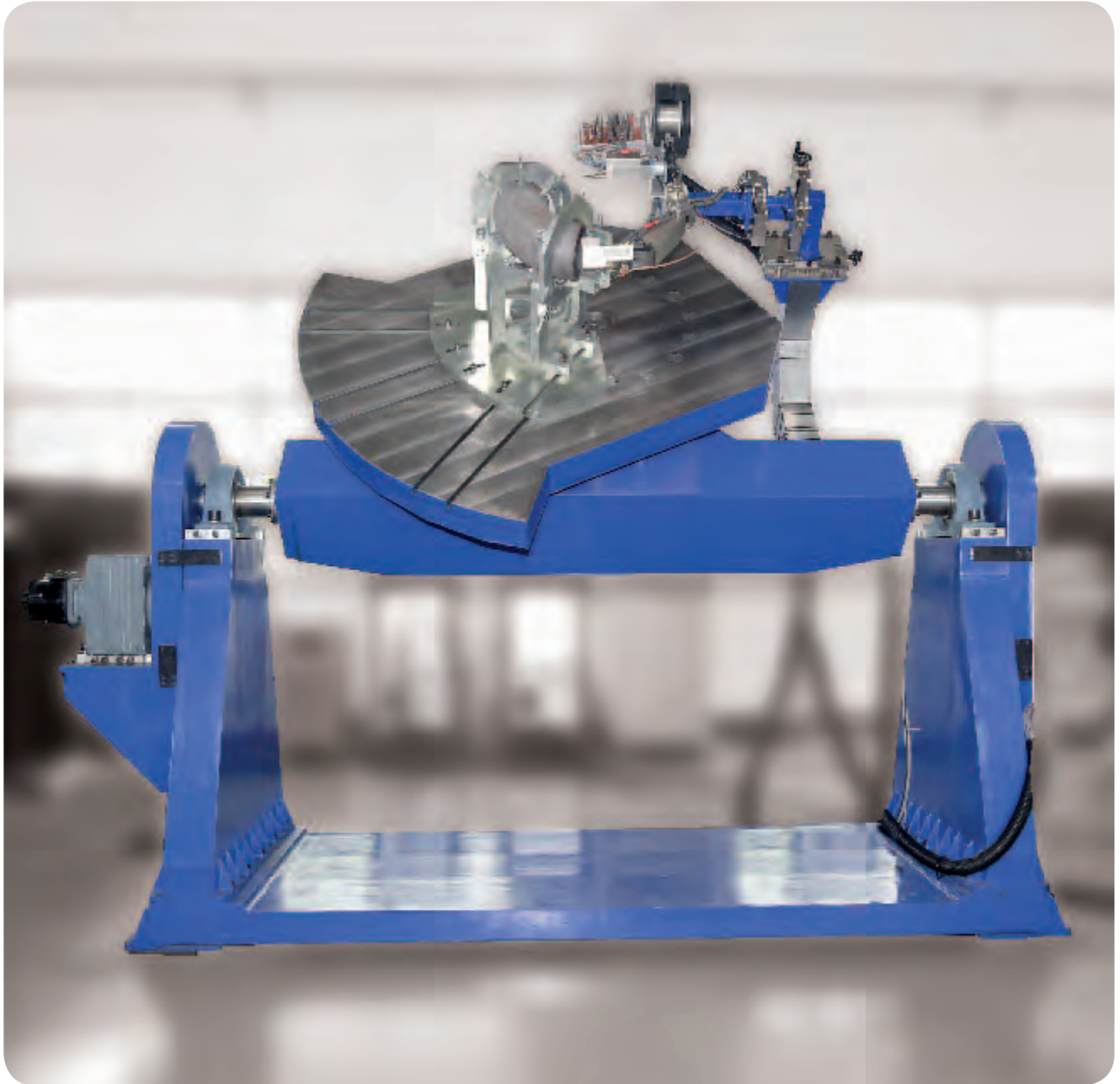
Utilities	
Power sources - TIG <sup>er</sup>	400V - three-phase - 1x33kVA + 1x28kVA
Control cabinet	230V - single phase - 2kVA
Cooling unit	230V - single phase - 4kVA

## ► Product item numbers

	12 m
Longitudinal TIG <sup>er</sup> weld overlay installation (including TIG <sup>er</sup> weld overlay lance, pipe orientation roller assembly, set of power sources, cooling unit, control cabinet)	0033950001




## TIG<sup>er</sup> 8" to 36" (1.5D)



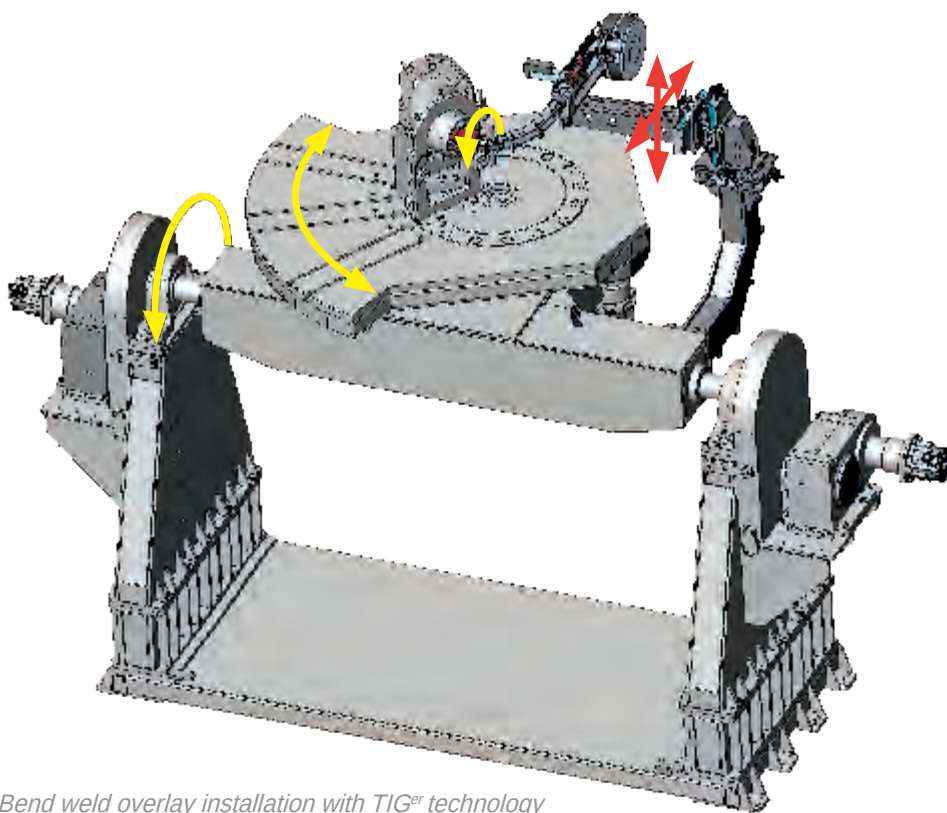


## ▶ Advantages

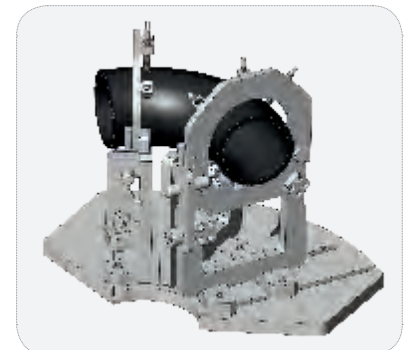
- Quick installation of the bend
- Consistent smooth surface after weld overlay in longitudinal direction
- Reduced deformation
- No start-stop points inside the bend
- TIG<sup>er</sup> high deposition rate/high productivity
- Automated cladding sequence
- Process: 



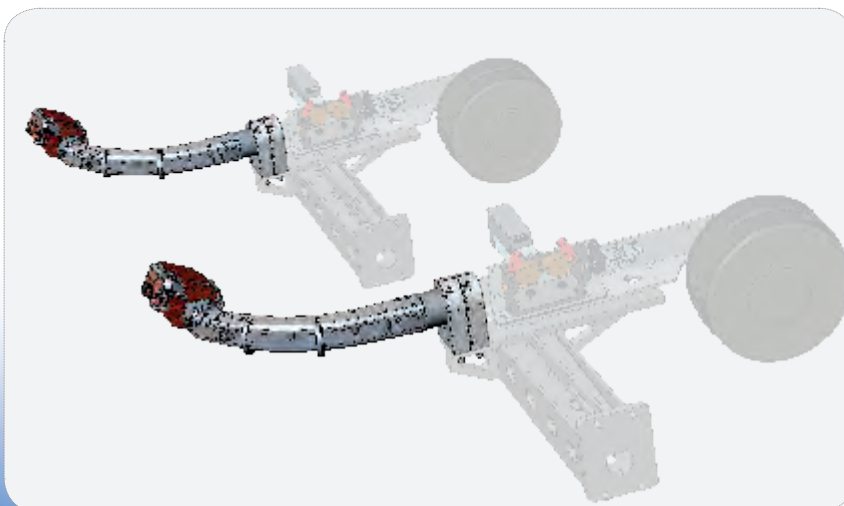
Set of PC 600-3 power sources  
- 1 master and 1 slave



Bend weld overlay installation with TIG<sup>er</sup> technology



Clamping unit



Weld overlay lances with wire feeder



Weld overlay head interface



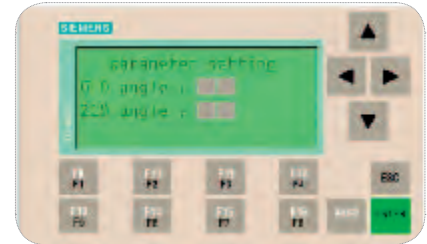
## ▶ Control cabinet

### ▶ Main items

- Tilting positioner for longitudinal weld overlay - 8" to 36"
- Welding head interface with cross slides & wire feeder
- Set of PC 600-3 power sources (1 master & 1 slave)
- CN control cabinet



Weld overlay programming software (weld overlay parameters)



Operator touchscreen

### ▶ Variants / options

- TIG<sup>er</sup> weld overlay lance with torch rotation and fixtures according to the bend size
- Bend clamping unit
- DAQbox - tool for productivity management and data acquisition

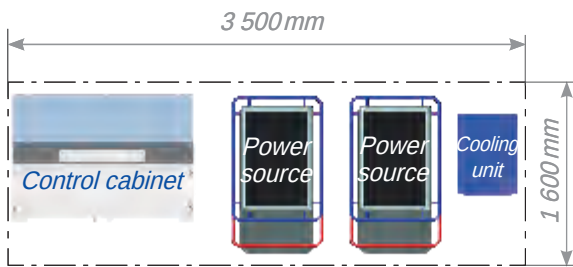


### ▶ Technical data

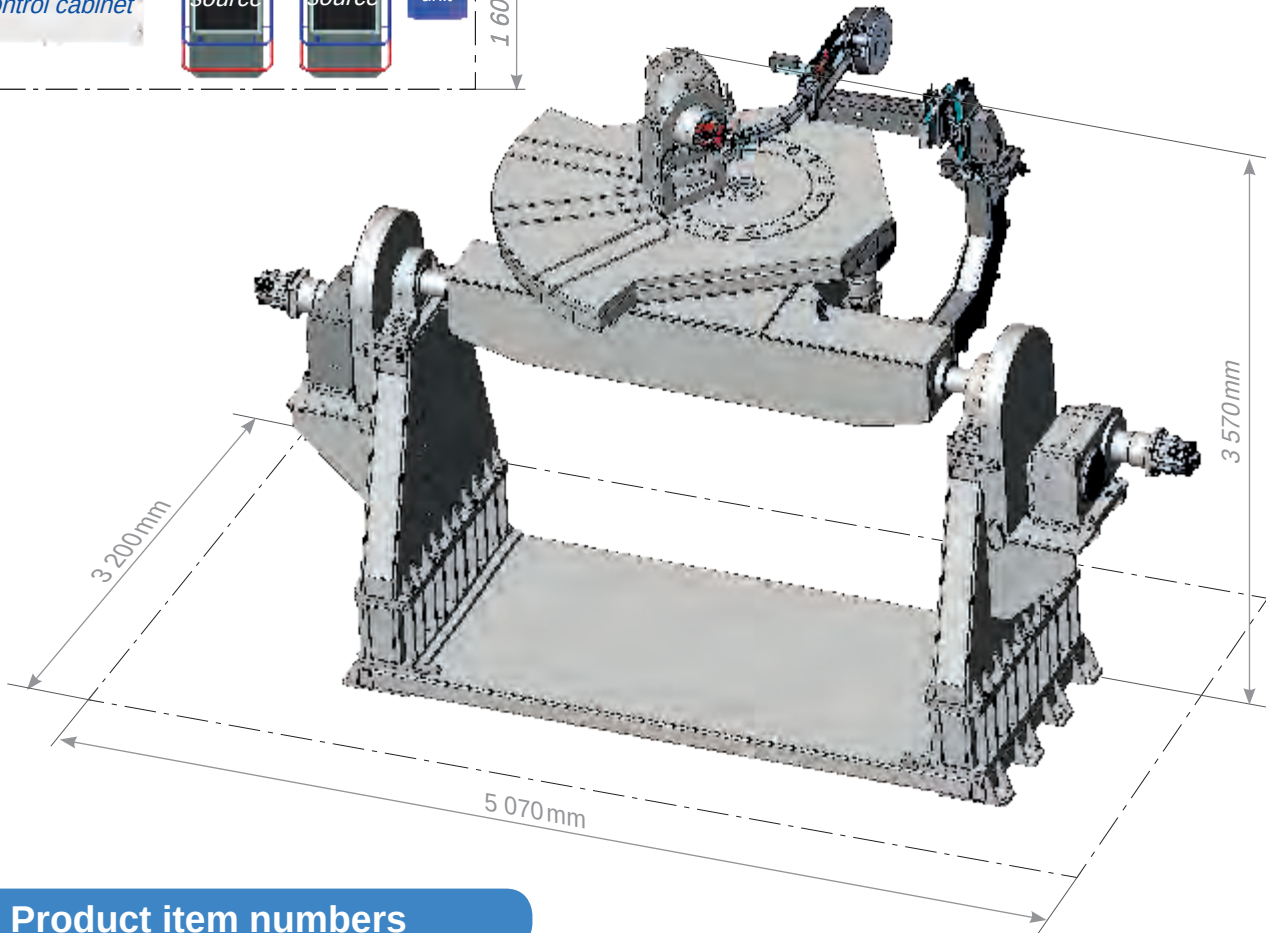
Bend	
O.D. max.	914 mm (36")
I.D. min.*	189 mm (7 7/16")
Bend radius	1.5 D
AVC stroke	25 mm
Wire feeder	0.5 to 14 m/min
Compatible with wire spool	Ø 300 - 15 kg

\* before weld overlay considering 2 layers

## ► Layout and utilities



Utilities	
Power sources - TIG <sup>er</sup>	400V - three-phase - 1x33kVA + 1x28kVA
Control cabinet	230V - single phase - 15kVA
Cooling unit	230V - single phase - 4kVA



## ► Product item numbers

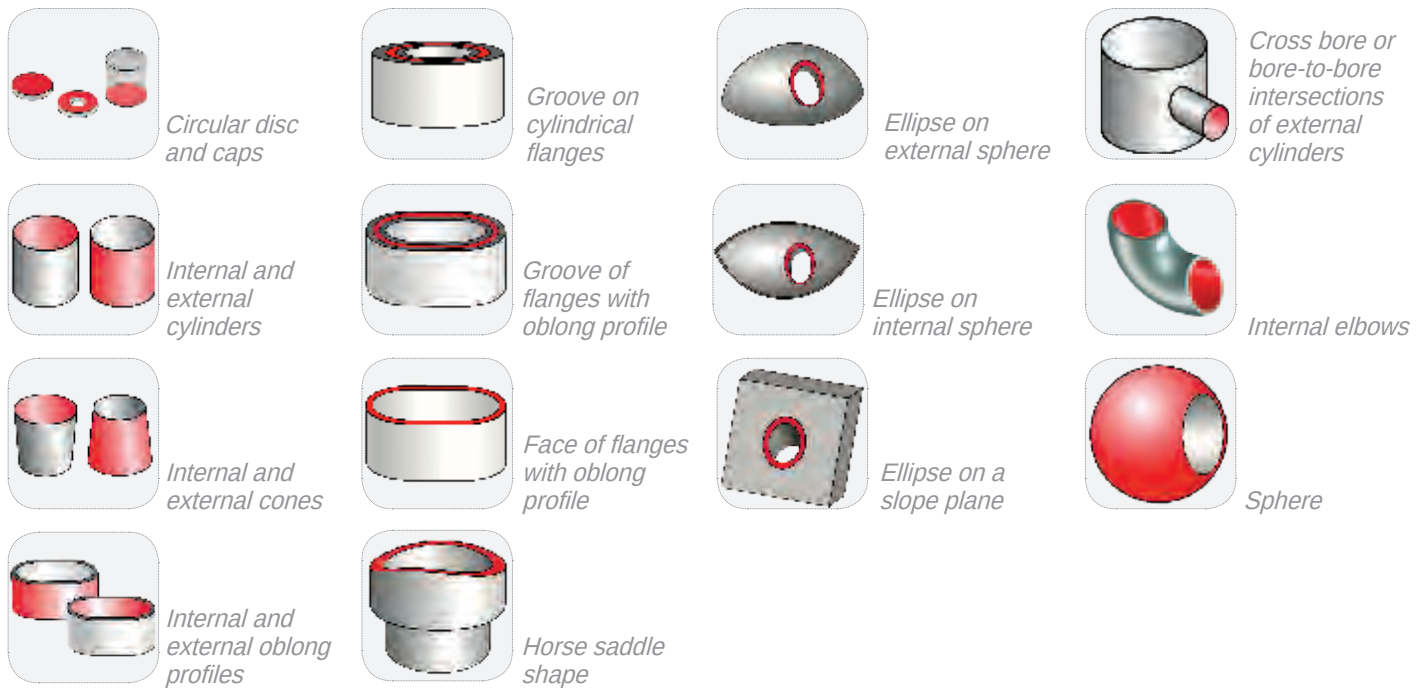
	8" ≤ I.D. ≤ 36"
Standard bend weld overlay installation (including positioner, cladding lance interface, set of power sources, cooling unit, control cabinet)	0033960001
Data acquisition system	0033269901
TIG <sup>er</sup> lance for bend 90° diameter 8"	0033960101
Fixture for bend 90° diameter 8"	0339630201
TIG <sup>er</sup> lance for bend 90° diameter 16"	0339630301
Fixture for bend 90° diameter 16"	0339630401
TIG <sup>er</sup> lance for bend 90° diameter 20"	0339630501
Fixture for bend 90° diameter 20"	0339630601
TIG <sup>er</sup> lance for bend 90° diameter 24"	0339630701
Fixture for bend 90° diameter 24"	0339630801
TIG <sup>er</sup> lance for bend 90° diameter 30"	0339630901
Fixture for bend 90° diameter 30"	0339631001
TIG <sup>er</sup> lance for bend 90° diameter 36"	0339631101
Fixture for bend 90° diameter 36"	0339631201



## Workpiece geometries

### Weld overlay machines with conventional or CN Controller?

The choice of equipment and software is related to the shape complexity of the workpieces. Therefore, each surface to be cladded must be identified such as cylinder, flat base, cap, truncated cones or intersection of cylinders.



### **POW<sub>in</sub>** Conventional controller

- Dedicated to less complex surfaces such as cylinders, bases and caps (circular trajectories of the torch)
- Sequential programme
- Each programming step controls the movement along one of the axes (X, Y or Z, no interpolation)
- Programming, archiving and transfer of on-line and off-line programmes

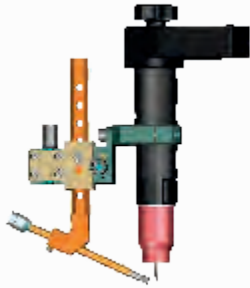
### **CNC axes** CN Controller

- Dedicated to circular and non-circular or interrupted surfaces such as sealing surfaces, intersection of cylinders and spheres (complex trajectories of the torch)
- Programmed to manage the movement of the torch along several axes, with interpolation
- A simulator allows the previewing of predefined trajectories and the evaluation of associated cycle times and deposition rates
- Unique user-friendly GUI (graphical user interface)
- Programming, archiving and transfer of on-line and off-line programs
- Data monitoring system with alarm functions



# Torches and lances

## Examples



Standard HW welding torch



Extended HW welding torch



HW lance fixed angle



HW lance fixed angle with cameras (2C)



HW lance adjustable angle



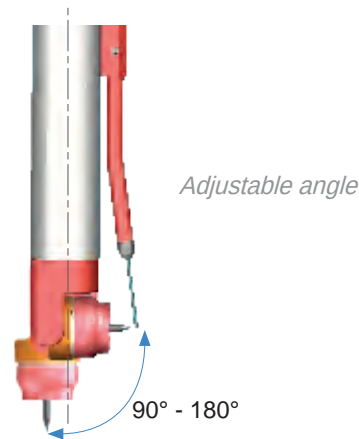
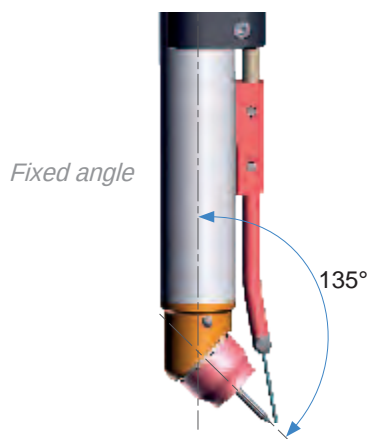
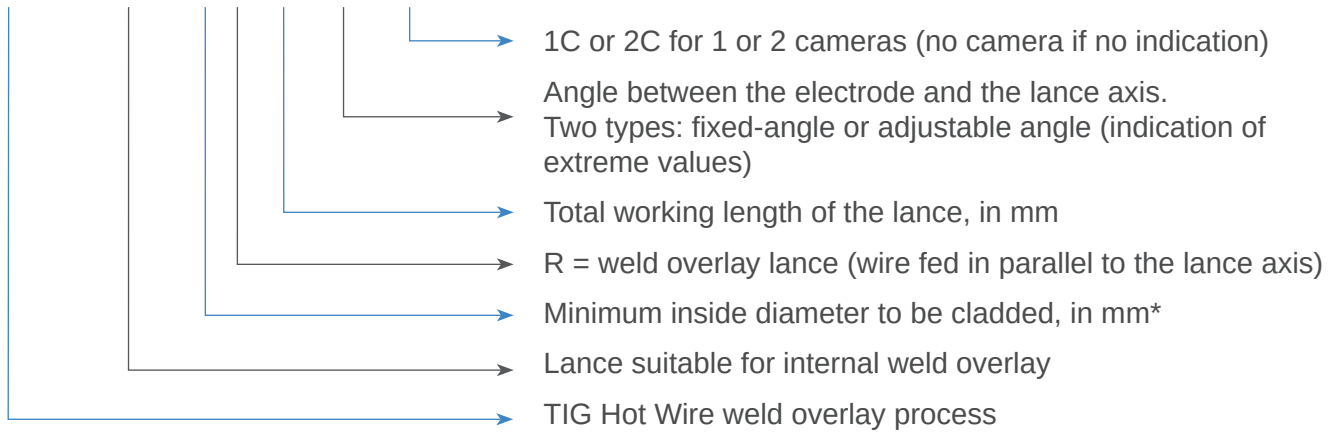
TIG<sup>er</sup> lance

# Torches and lances

## ▶ Lance designations

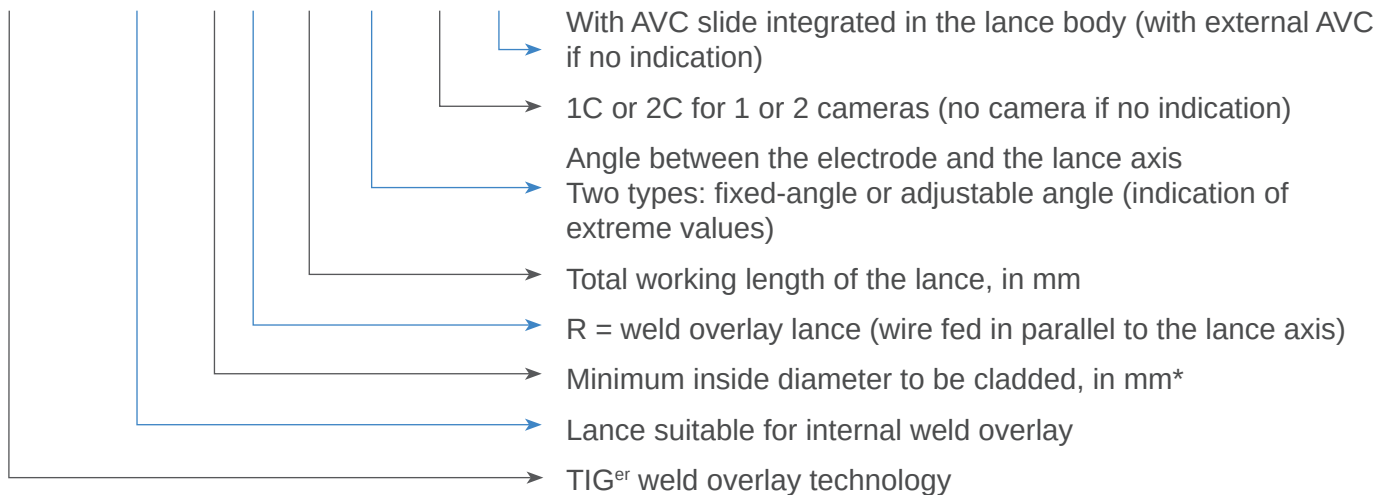
- TIG HW Lance designations

*TIG HW lance ID 35-R-700-135°-XC*



- TIG<sup>er</sup> lance designations

*TIG<sup>er</sup> Lance ID 100-R-1000-135°-XC-AVC*



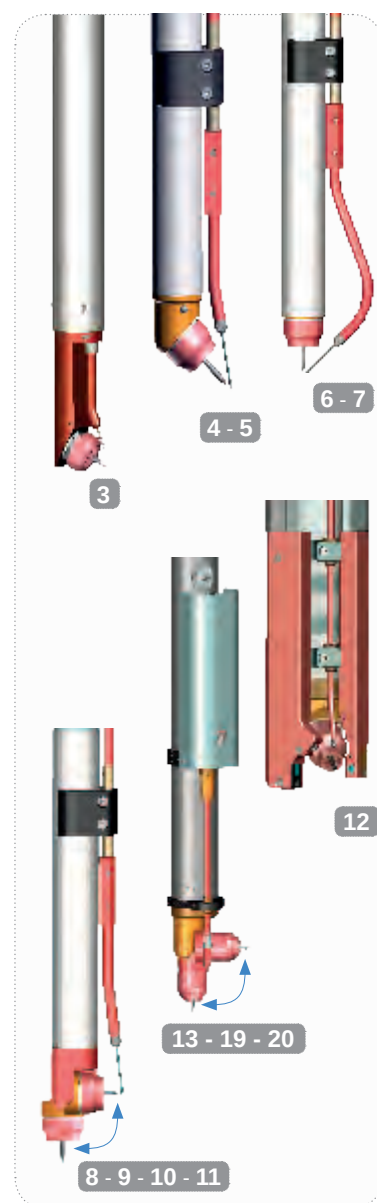
\* before weld overlay considering 2 layers

## ► Lances for column & boom and flatbed turntable

N°	TIG Torches		Duty cycle	
			Average current - 100%	Max peak current - 60%
1	WP 27 A	0033263310	500A	500A
2	WP 27 B	0033263410	500A	500A

N°	TIG HW Lances		Duty cycle	
			Average current - 100%	Max peak current - 60%
3	ID 34-R-1000-120°	0030740013	300A	350A
4	ID 35-R-700-135°	0030740007	170A	200A
5	ID 35-R-1000-135°	0030740006	170A	200A
6	ID 35-R-700-180°	0030740009	170A	200A
7	ID 35-R-1000-180°	0030740008	170A	200A
8	ID 38-R-700-90/180°	0030740005	170A	200A
9	ID 38-R-1000-90/180°	0030740004	170A	200A
10	ID 45-R-700-90/180°	0030740003	200A	250A
11	ID 45-R-1000-90/180°	0030740001	200A	250A
12	ID 85-R-1000-120°-1C	0032010201	350A	400A
13	ID 100-R-1000-90/180°	0030740020	300A	350A

N°	TIG <sup>er</sup> Lances		Duty cycle	
			Average current - 100%	Max peak current - 60%
14	ID 100-R-1000-105°	0032281001	2x250A	2x350A
15	ID 100-R-1000-105°-1C	0032281002	2x250A	2x350A
16	ID 150-R-800-105°	0031260101	2x300A	2x300A
17	ID 150-R-800-105°-1C	0031030220	2x300A	2x300A
18	ID 200-R-1000-165°	0032281003	2x250A	2x350A



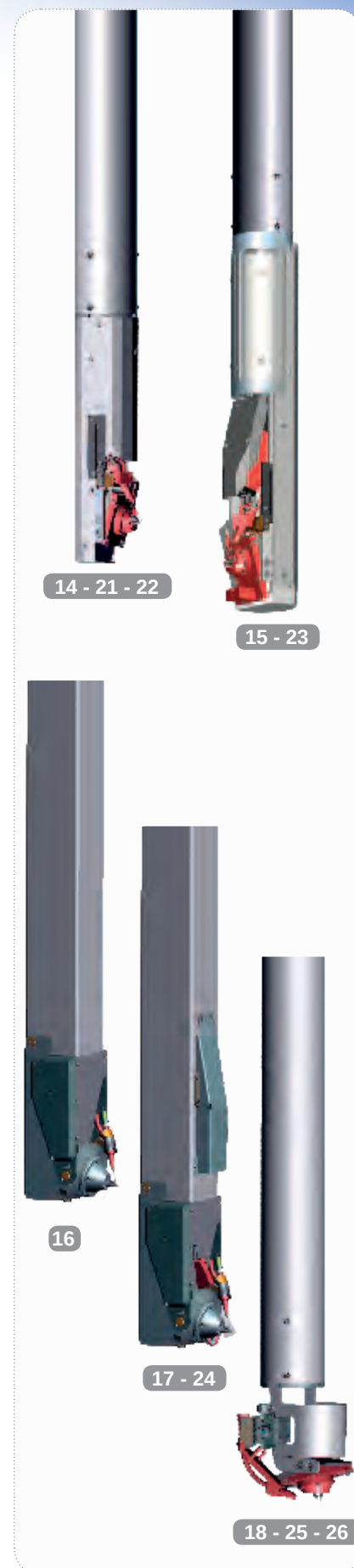


## ► Lances for SPX collector head

N°	TIG Torches		Duty cycle	
			Average current - 100%	Max peak current - 60%
1	WP 27 A	0033263310	350A	350A
2	WP 27 B	0033263410	350A	350A

N°	TIG HW Lances		Duty cycle	
			Average current - 100%	Max peak current - 60%
3	ID 34-R-1000-120°	0030740013	300A	350A
4	ID 35-R-700-135°	0030740007	170A	200A
5	ID 35-R-1000-135°	0030740006	170A	200A
6	ID 35-R-700-180°	0030740009	170A	200A
7	ID 35-R-1000-180°	0030740008	170A	200A
8	ID 38-R-700-90/180°	0030740005	170A	200A
9	ID 38-R-1000-90/180°	0030740004	170A	200A
10	ID 45-R-700-90/180°	0030740003	200A	250A
11	ID 45-R-1000-90/180°	0030740001	200A	250A
12	ID 85-R-1000-120°-1C	0032010201	350A	400A
13	ID 100-R-1000-90/180°	0030740020	300A	350A
19	ID 100-R-1500-90/180°	0030740021	300A	350A
20	ID 100-R-2000-90/180°	0030740022	300A	350A

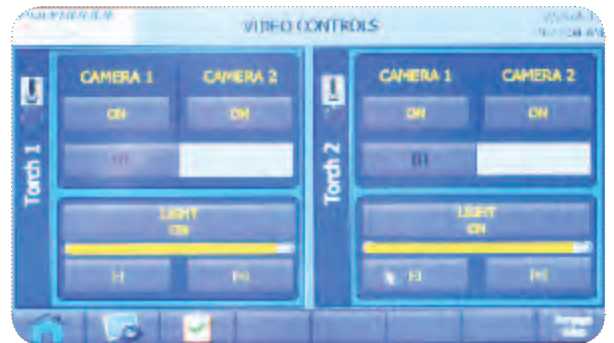
N°	TIG <sup>er</sup> Lances		Duty cycle	
			Average current - 100%	Max peak current - 60%
14	ID 100-R-1000-105°	0032281001	2x250A	2x350A
21	ID 100-R-1500-105°	0032281501	2x250A	2x350A
22	ID 100-R-2000-105°	0032282001	2x250A	2x350A
15	ID 100-R-1000-105°-1C	0032281002	2x250A	2x350A
23	ID 100-R-1500-105°-1C	0032281502	2x250A	2x350A
16	ID 150-R-800-105°	0031260101	2x300A	2x300A
17	ID 150-R-800-105°-1C	0031030220	2x300A	2x300A
24	ID 150-R-1200-105°-1C	0031440301	2x300A	2x300A
18	ID 200-R-1000-165°	0032281003	2x250A	2x350A
25	ID 200-R-1500-165°	0032281503	2x250A	2x350A
26	ID 200-R-2000-165°	0032282002	2x250A	2x350A



# Video monitoring

## ▶ Advantages

- Operator can easily monitor and follow the process remotely
- High temperature resistant
- Proven reliability
- Repositioning and/or inspection
- Outstanding image quality
- Viewing/recording in real time
- Perfect picture with and without arc



*Touchscreen for video controls*



*Real time monitoring*



## ▶ Complementary information

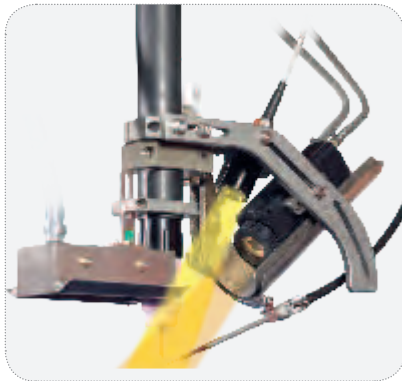
To monitor the weld overlay process, the operator can be assisted by a video system.

This supplementary feature consists of cameras mounted near the torches (or integrated in more complex cases), umbilicals and a rack or container with the instrumentation and control functions (lighting and filter control, focal distance adjustment and viewing monitors).

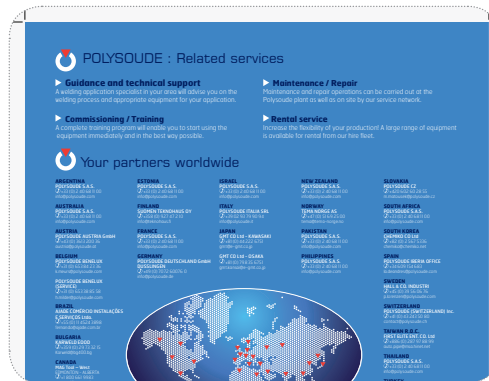
A single camera per torch viewing the melting of the wire is usually sufficient for weld overlay or buttering.

Depending on the level of integration, the camera may be external with their own cooling circuit or replaced by a micro-camera installed in the body of the torch adapted to the application.

For cameras, it is usual to be faced with severe heat conditions combined with space constraints. That is why the equipment is water-cooled.



*TIG WP 27 torch with external camera and light*



*TIG lance with integrated camera and light*



*TIG<sup>er</sup> lance with integrated camera*



## NOTES

## NOTES

# POLYSOUDE : Related services

## ► Guidance and technical support

A welding application specialist in your area will advise you on the welding process and appropriate equipment for your application.

## ► Commissioning / Training

A complete training program will enable you to start using the equipment immediately and in the best way possible.

## ► Maintenance / Repair

Maintenance and repair operations can be carried out at the Polysoude plant as well as on site by our service network.

## ► Rental service

Increase the flexibility of your production! A large range of equipment is available for rental from our hire fleet.

## Your partners worldwide

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