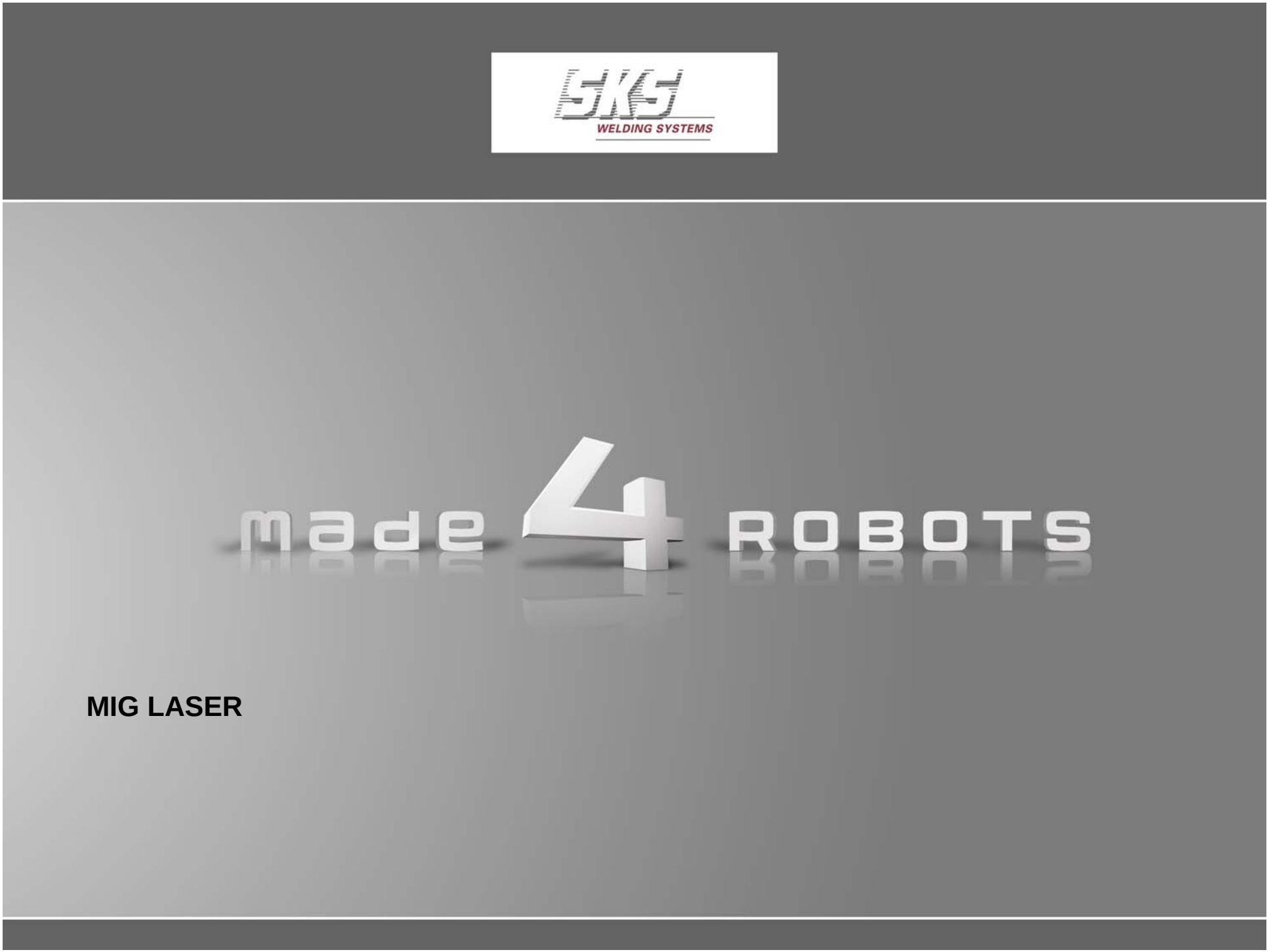
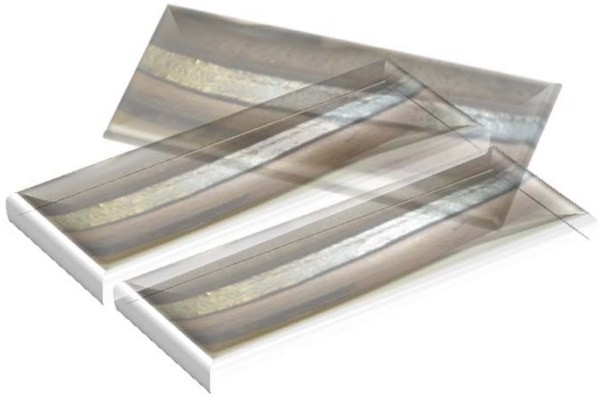

WELDING SYSTEMS
made 4 ROBOTS
MIG LASER

MIG Laser Process



MIG Laser Welding:

The highly dynamic MSG process is supported by the static laser process.

- **Better Penetration**
- **Acceleration of the process (more energy)**
- **Less heat input into the part**

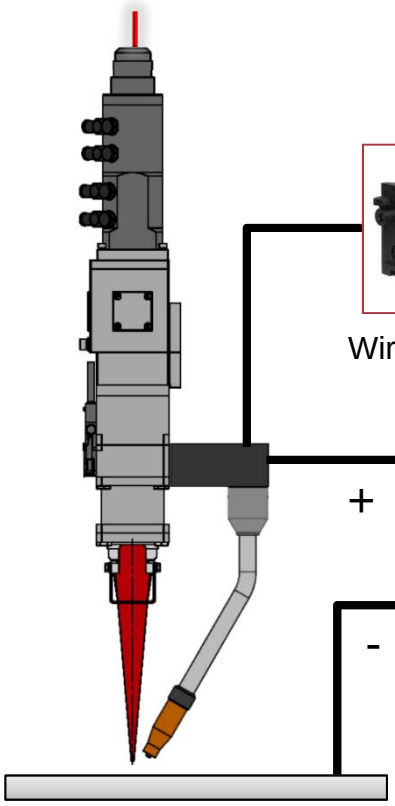
MIG LASER

MIG Laser

YLR 3000S

Fiberlaser

- **Synchronization of MIG Process, laser (P) and robot (v) with SKS welding system**
- **Welding system and laser as one unit**
- **Synchroweld functionality available soon**



Wire Feeder PF 5

Robot-interface UNI 5

Weld Process controller with characteristic material curves generated by SKS (Laser power output)

+

-

Power Source LSQ 5

Synchroweld
Implementation in progress

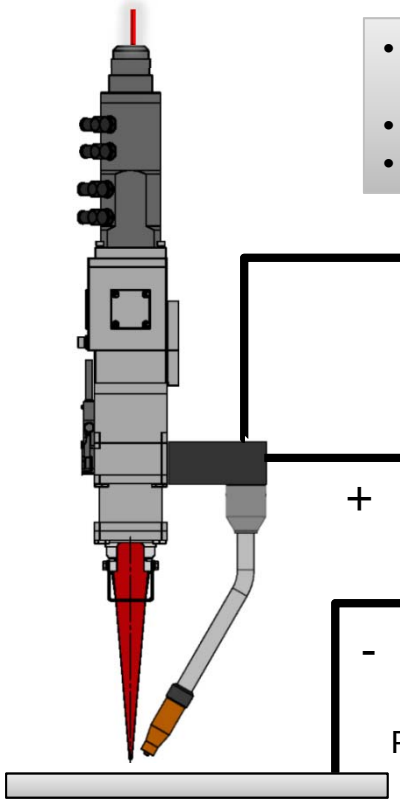
Robot-control

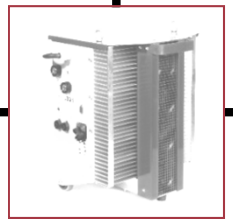
- **Given values of laser output power and welding speed are stored in the weldsystem**
- **Documentation of process factors**

MIG LASER

Cold-/Hotwire

- **Synchronization of wire feeding speed, laser (P) and robot (v) with SKS welding system**
- **Welding system and laser as one unit**
- **Synchroweld functionality available soon**





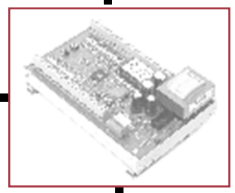
Power Source

Multifunction Feeder MFF
All-in-one solution: Wire Feeder and Weld Process Controller

Synchroweld
Implementation in progress

Fiberlaser

YLR 3000S



Robot-interface I/O 5

Robot-control

All in one solution

Multi Function Feeder MFF

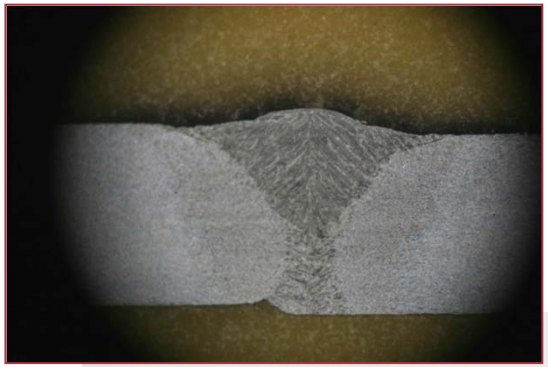
All-in-one solution

Wire feeder with integrated
weld process controller

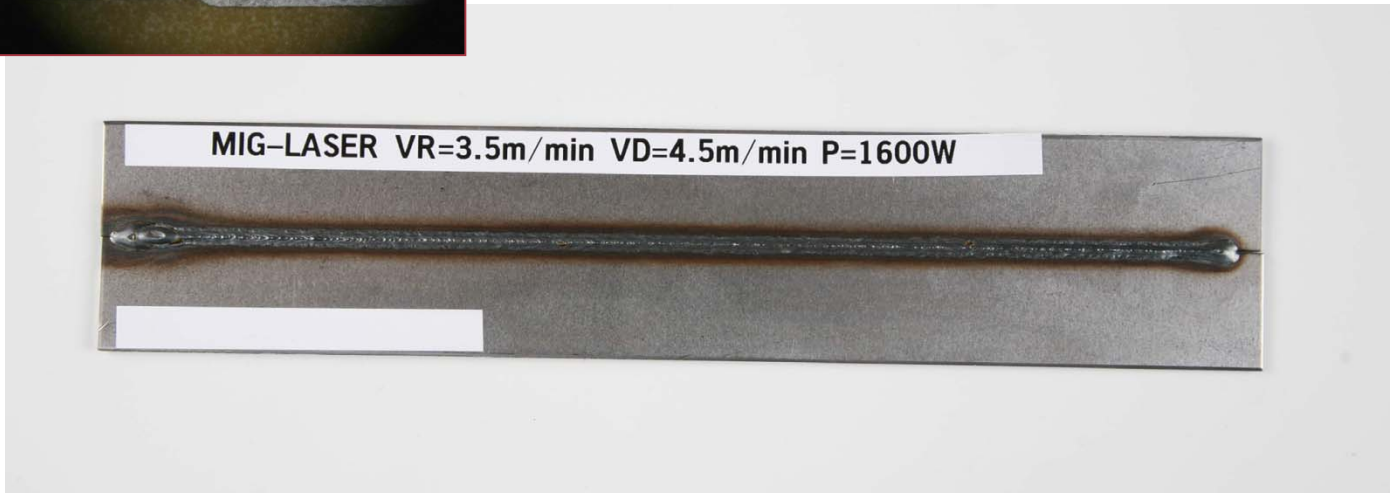
Applications: TIG coldwire
Laser coldwire
Laser hotwire

Connects robot, laser and power source.

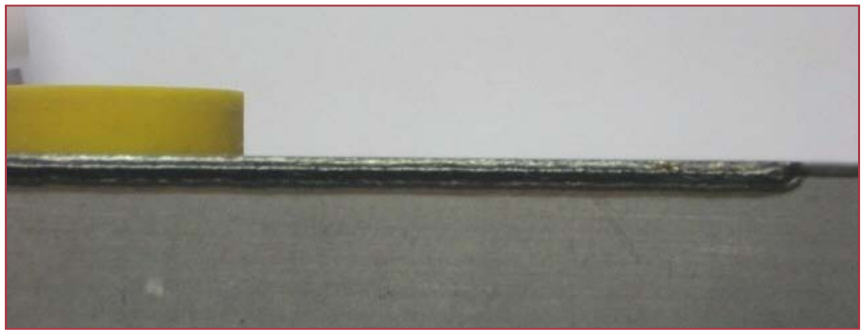
Example: square butt joint

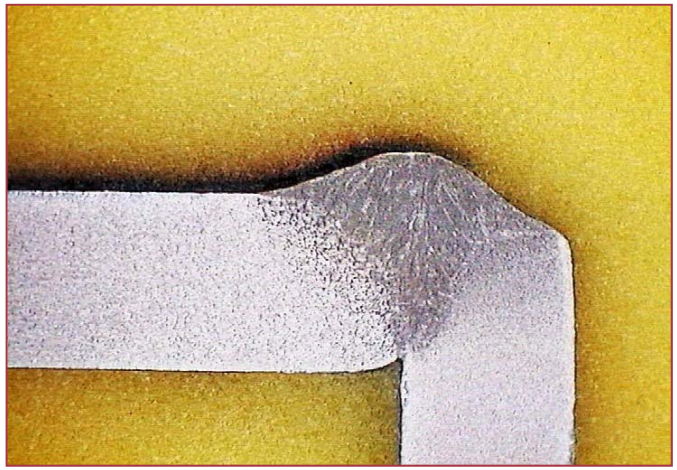


Material: steel S355, thickness: 2 mm
Filling material steel
G4SI1 1,0 mm (ER70-S)
Form: sqare butt weld
Orientation: horizontal



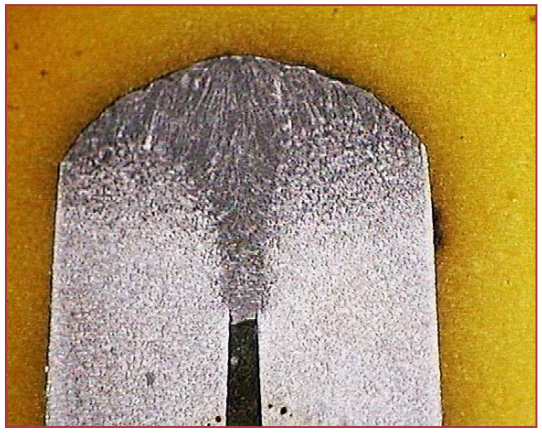
Example (1): corner joint (zinc coated)





Material: steel zinc coated
Thickness: 2 mm
Filling material: steel
G4SI1 1,0 mm (ER70-S)
Form: corner joint
Orientation: horizontal
MIG wire feeding speed: 5 m/min
Welding speed: 3,5 m/min
Laser (P): 1800 W

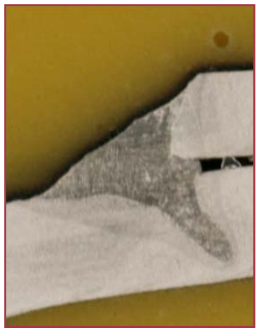
Example (2): edge joint (zinc coated)

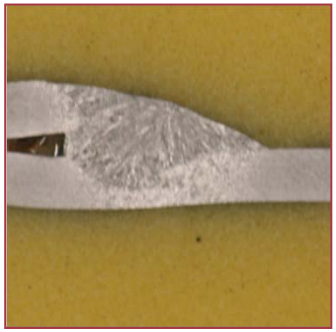


Material: steel zinc coated
Thickness: 2 mm
Filling material: steel
G4SI1 1.0 mm (ER70-S)
Form: edge joint
Orientation: horizontal
MIG wire feeding speed: 5 m/min
Weld speed: 3.5 m/min
Laser (P): 1800 W

Example (3)

Material: steel
Thickness: 2.0 mm
Filling material: steel
G4SI1 1.0 mm
I-Pulse, v=250 cm/min
Wire feeding speed: 11.5 m/min
Laser (P): 2500 W





left: diameter focus 0.4 mm
right: diameter focus 0.8 mm

Made for Robots.

Result: lap weld 2 mm steel sheet

MIG-Laser	
Wire feeding speed	11.5 m/min
P_{MIG}	6100 W
P_{Laser}	2500 W
Welding speed	2.5 m/min
Heat input per unit l.	207 J/mm

MIG	
Wire feeding speed	12.5 m/min
P_{MIG}	8700 W
P_{Laser}	---
Welding speed	1.0 m/min
Heat input per unit l.	522 J/mm

- **2.5 times faster welding**
- **about 60% less heat input**
- **about 60% less filling material**

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