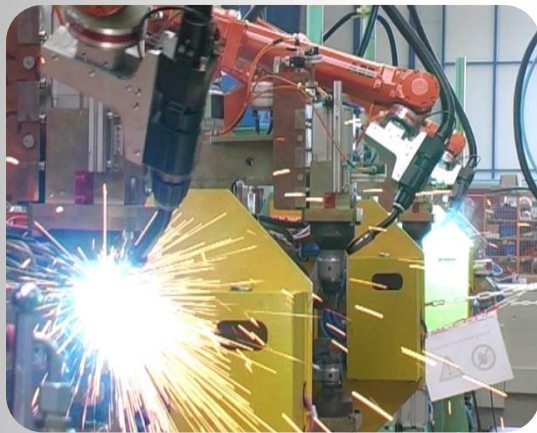




**we eye your
welding quality**

Automated monitoring of the welding process



Inline – during welding

Process monitoring during welding

Fulfills different tasks:

Measuring device

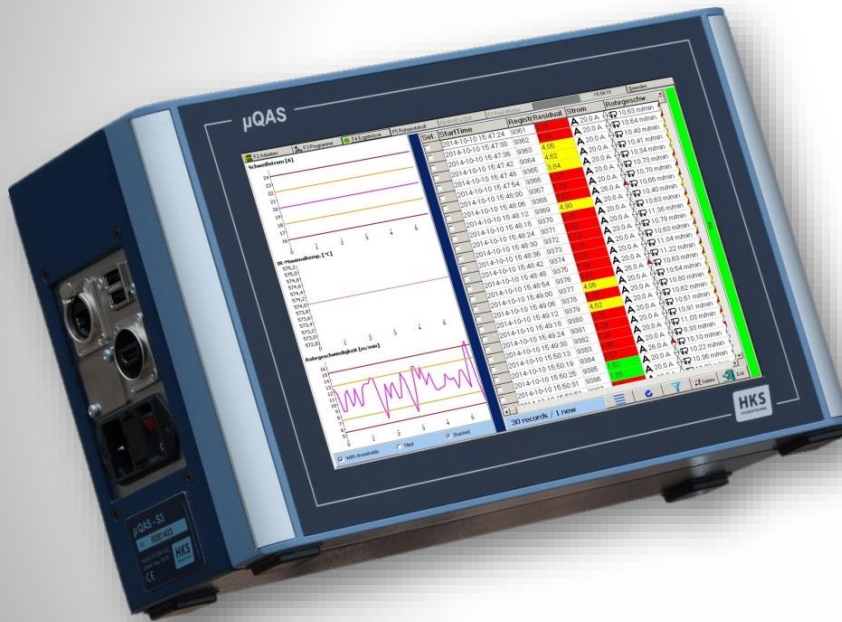
- Generates measuring and process instructions
- Controls parameters and detect tolerance exceedings
- Assists during setting up the process
- Accounting, calculation and review of welding tasks
- Documentation of welding parameters during product lifetime
- Verification of the compliance of parameter values limits
- Automation, monitoring and sorting faulty welded parts
- Analysis of the welding process
- Development of new process variants
- Calibration of sensors and welding machines

Specific requirements demand custom-tailored solutions

HKS-Products are:

- ✓ **independent** from the used welding equipment
- ✓ **easy** to operate
- ✓ **robust** for harsh industrial environments
- ✓ **optimal** tailored for different welding processes

WELDQAS – Quality Assurance System



Documentation

Monitoring

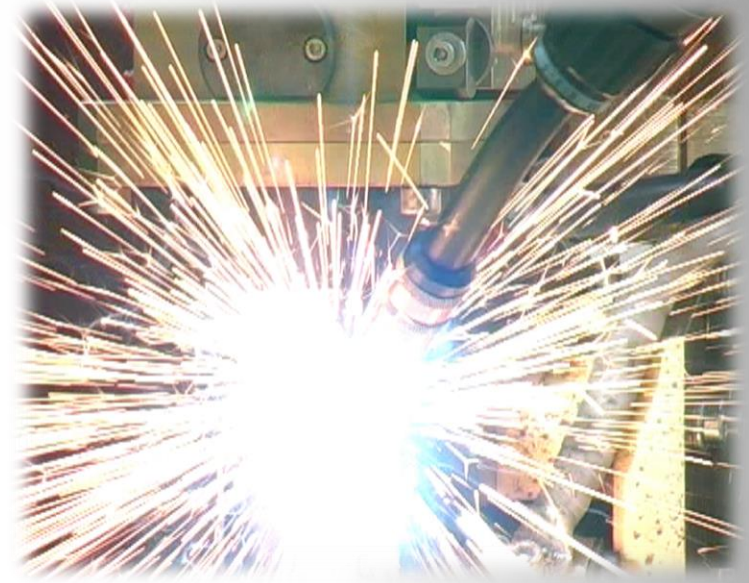
Fault detection

WELDQAS – What's that?

automatic

- **Welding observer**
- **Inspector**
- **Recorder**

For arc welding processes MIG/MAG,
TIG, SAW, Plasma



„inline“ weld data registration during welding

- **without additional mountings to the welding torch**
- **excellent fault detection**

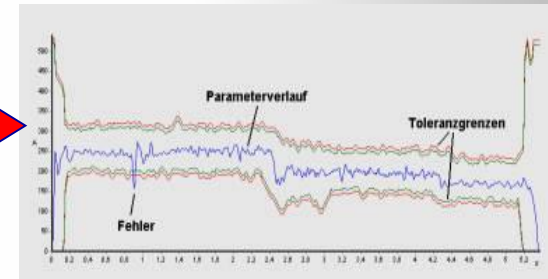
WELDQAS – Principle of Operation

Difference in arc

Seam fault



Resulting difference in welding parameters

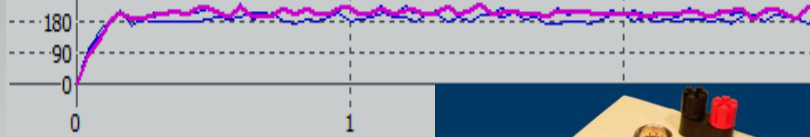


- Measuring welding parameters with 23 kHz (up to 234 kHz for stud welding)
- Signal processor based compression of measured values to welding parameters via intelligent algorithms
- Comparison with reference curves (time-sensitive reference values) during welding
- Calculating quality marks for each seam

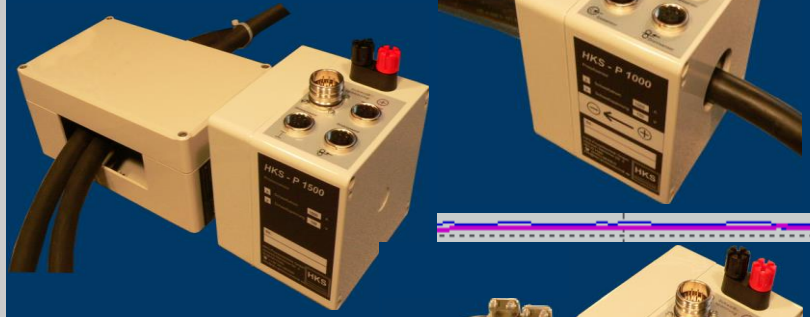
➤ **Instant notification when a bad welding occurs**

Data acquisition sensors

Schweißstrom [A]



Schweißspannung [V]



Gasfluß [l/min]



Welding current

Welding voltage

4 / 1955



Data acquisition sensors

Schweißstrom [A]

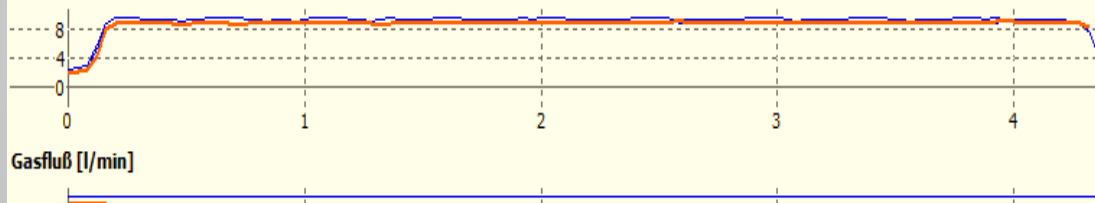


stationary



mobile

Drahtvorschub [m/min]



Gasfluß [l/min]



Gas flow



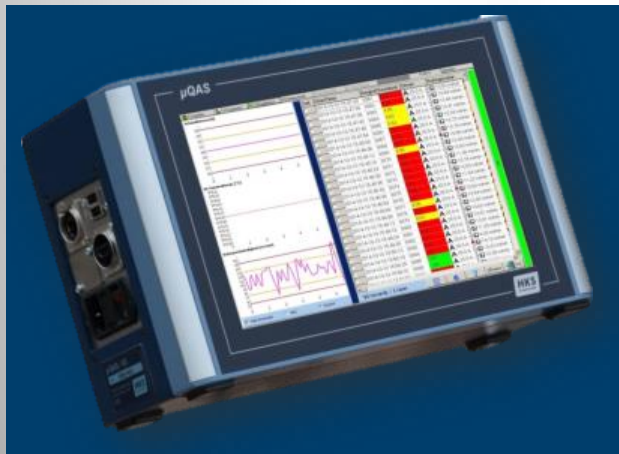
submerge



WELDQAS – Versions

1. Compact version

Standard device for monitoring up to two welding torches



2. Cabinet version

Systems for complex plants

- More than two welding torches
- Multiple submerge arc torches
- Endless profile mills



Dynamic Process analysis

Detecting porosities by current and voltage

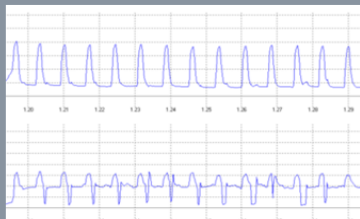


Monitoring by online-arc analysis

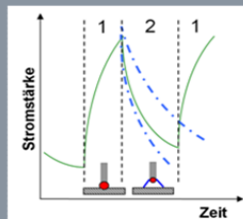
Dismantle in
mass transfer
phase

Phase accurate state
analysis based on
arc- welding model

Characteristic
parameter



Synchronised signals U, I



Current profile, short circuit



Porosities

Burn-through

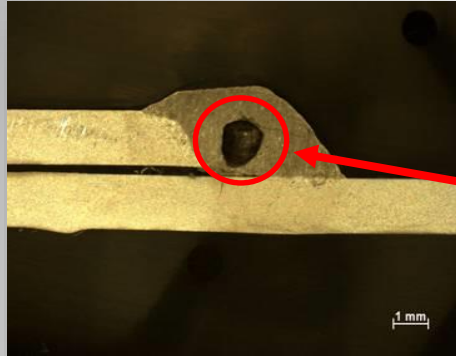
Wire jam



Arc jam

Dynamic Process analysis //

Detecting irregularities by current and voltage



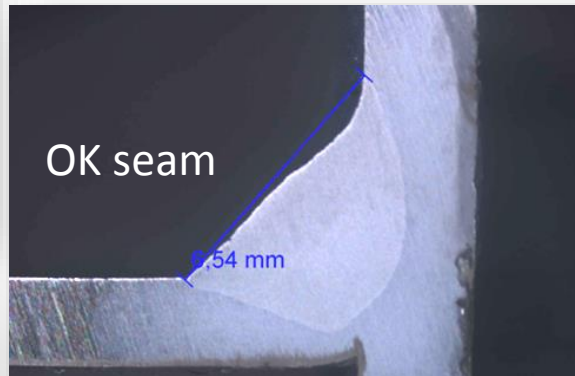
detectable irregularities

Porosities

Seam length

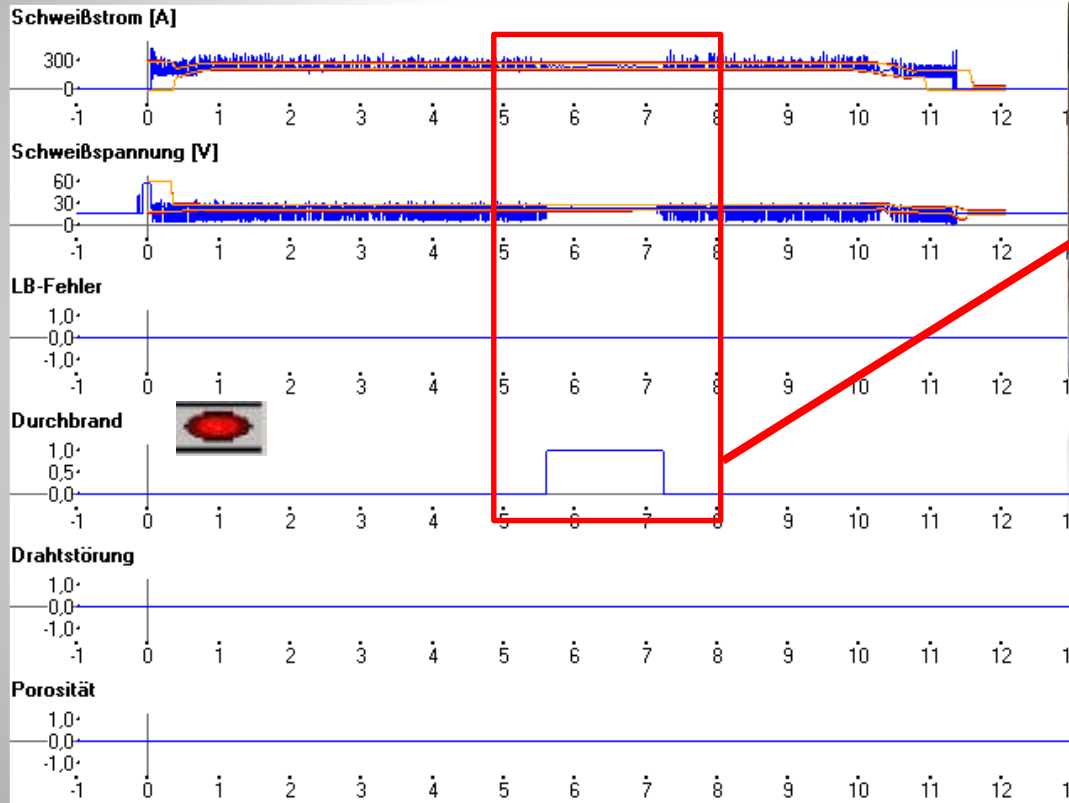
Seam interruption

Burn-through



Dynamic Process analysis

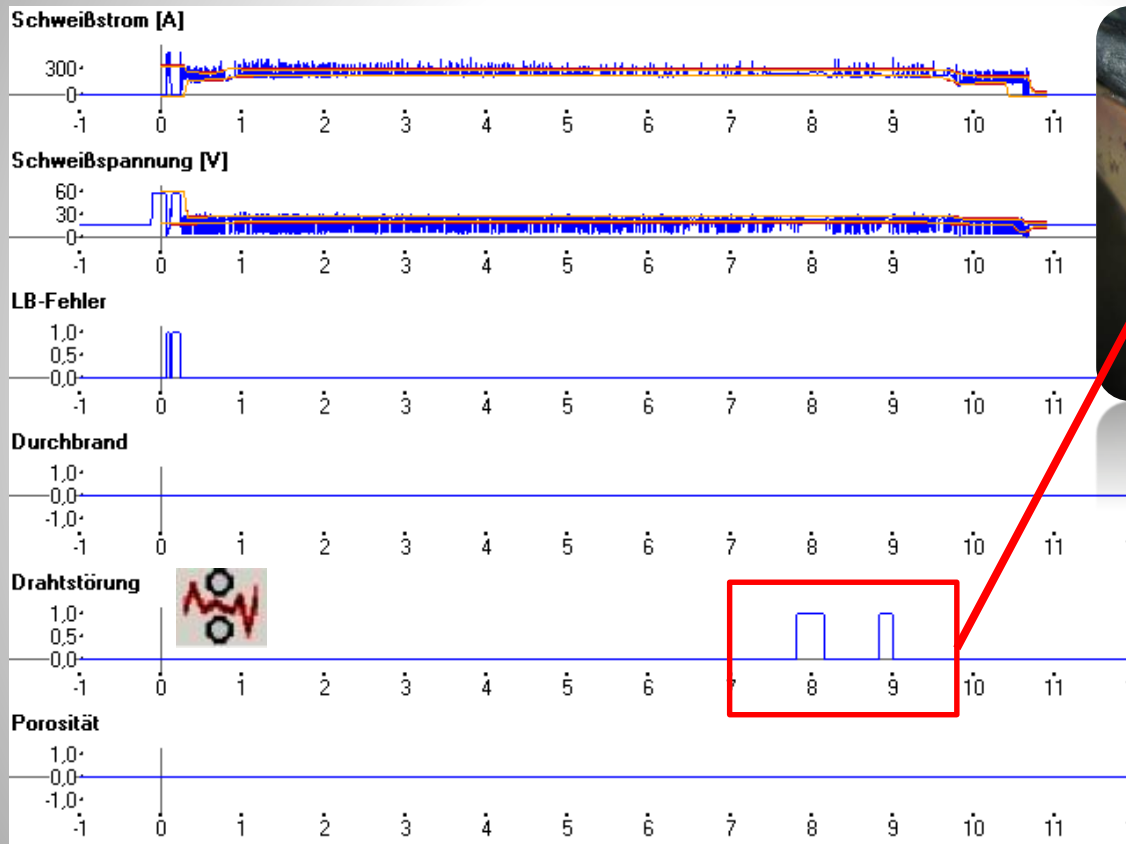
Detecting irregularities // Burn-trough



Process parameters over the time

Dynamic Process analysis

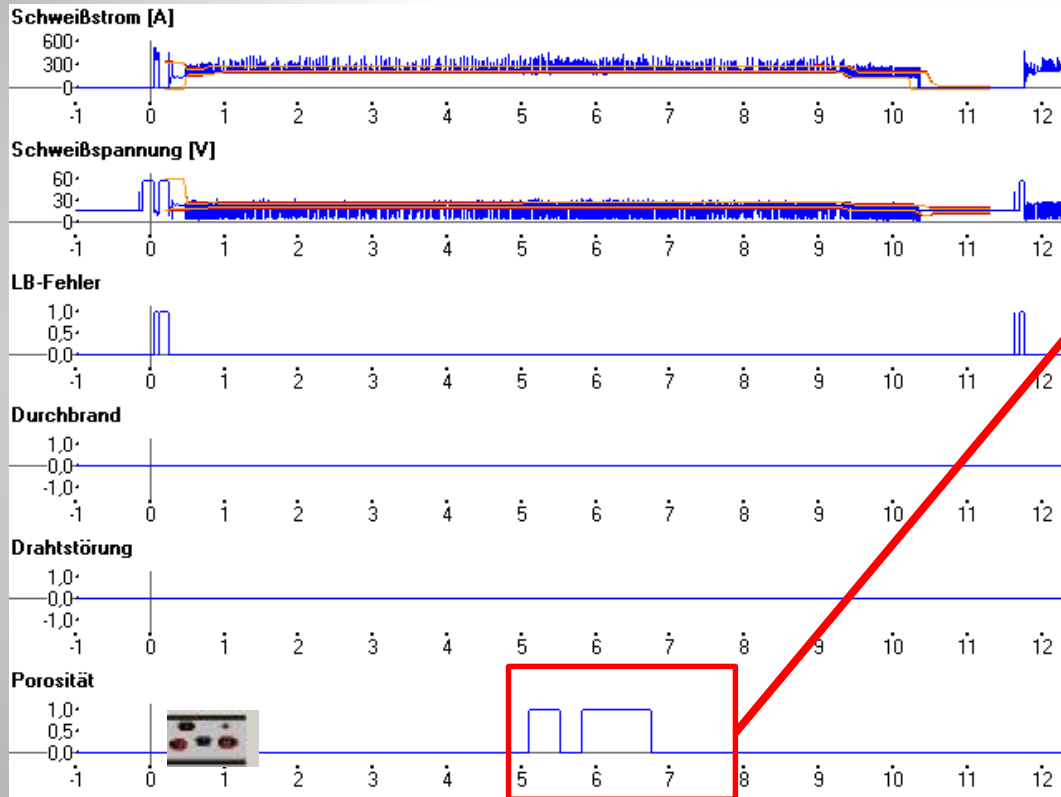
Detecting irregularities // Wire jam



Process parameters over the time

Dynamic Process analysis

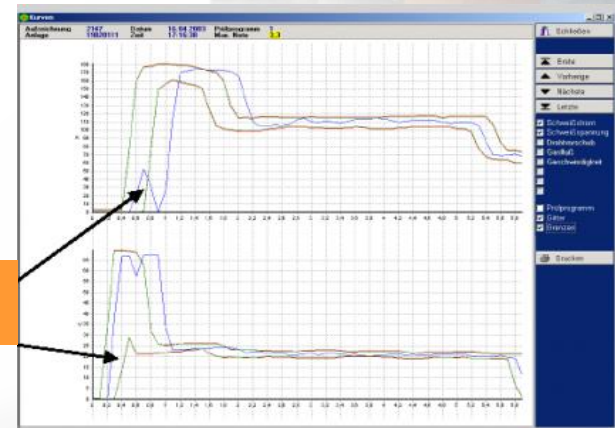
Detecting irregularities // Porosities



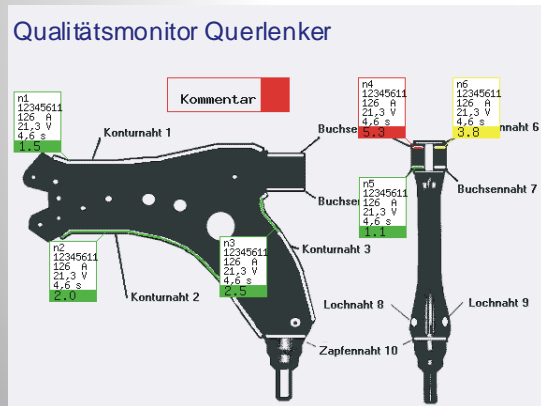
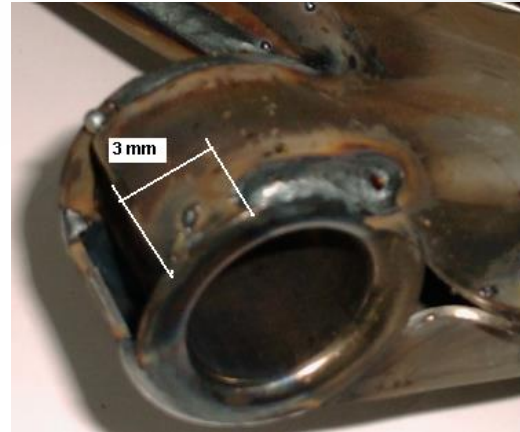
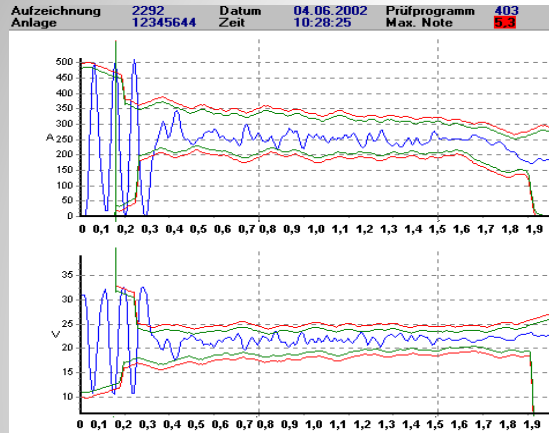
Process parameters over the time

Application - MIG soldering - Underbody

- Arc ignition fault leads to timing differences. This differences exceed the respective tolerance band.
- Arc ignition fault leads mostly to rework (approximately once per shift)
- Arc ignition faults were always detected by the WeldQAS



Application – Monitoring MAG Welding – Track control arm



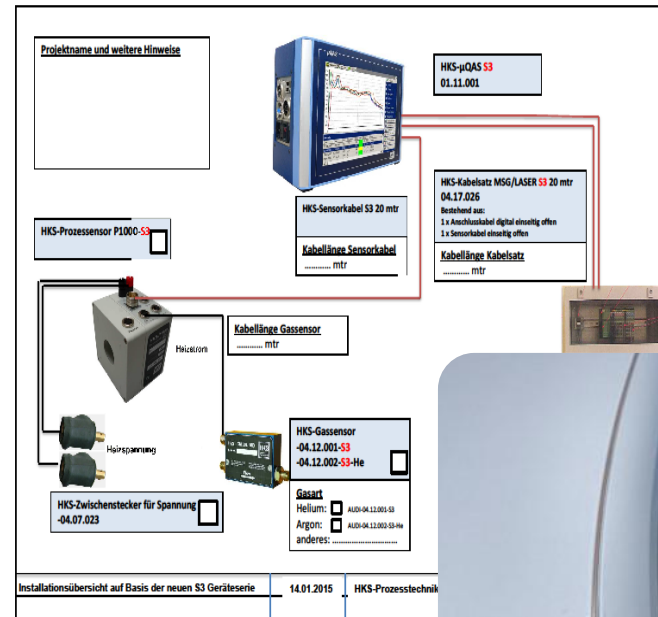
MAG Welding
 Welding current: 270 A
 Welding speed: 100 cm/min
3 mm in 0,18 sec.

180 ms to detect irregularities,
 a high dynamic resolution is
 mandatory

Application laser soldering / Plasma welding

Monitored parameters

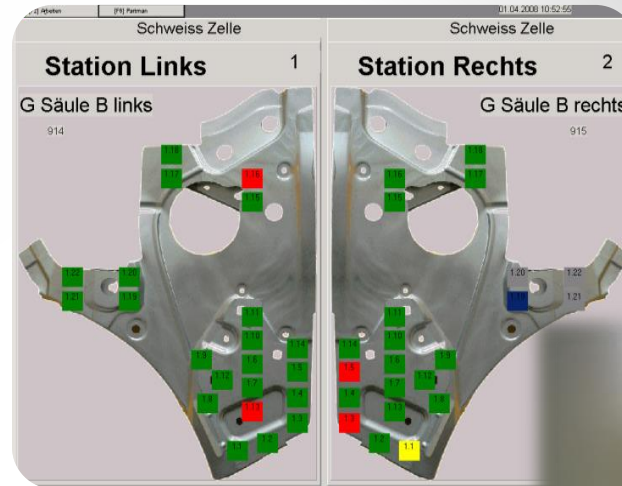
- Laser power
- Wire feed
- Heating current (hot wire)
- Heating voltage (hot wire)
- Joint position
- Focus position
- Welding current (Plasmatron)
- Welding voltage (Plasmatron)
- Gas flow (Plasmatron)



Application – Resistance welding

Monitored parameters:

- Current
- Voltage
- Force
- Energy
- Resistance
- Power
- Distance



Machine1		
A	0,0 kA	V 0mV
	42,6	1216
Ω	0 μ Ohm	F 1,7 kN
	29	1,4
Record No.	24	
Program	1.01.016	
Job No.	1.16	
Character	Messe 2013	
Quality	6,9	

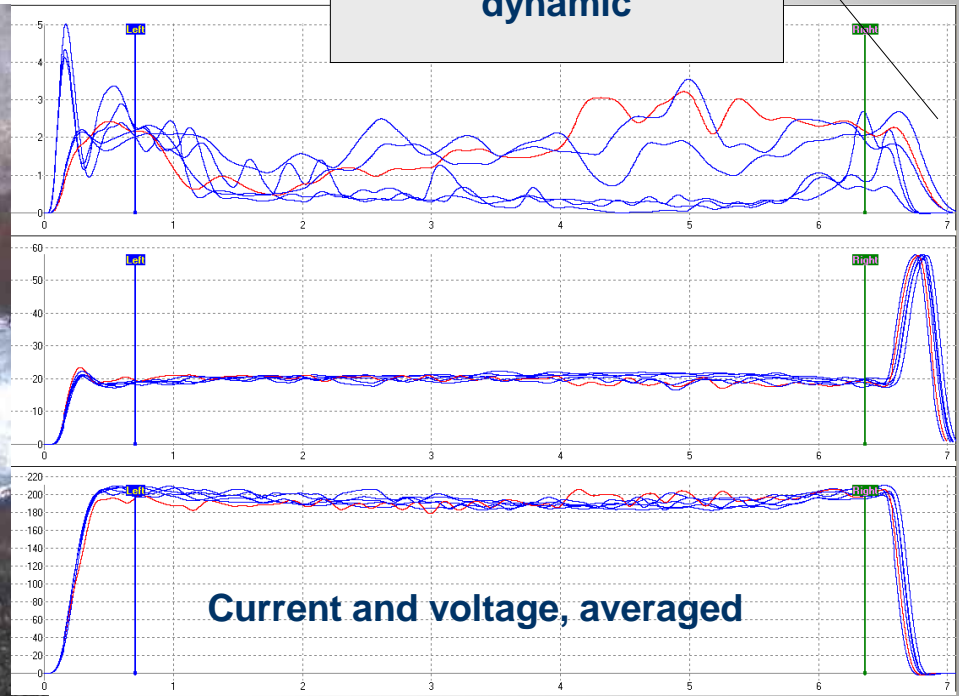


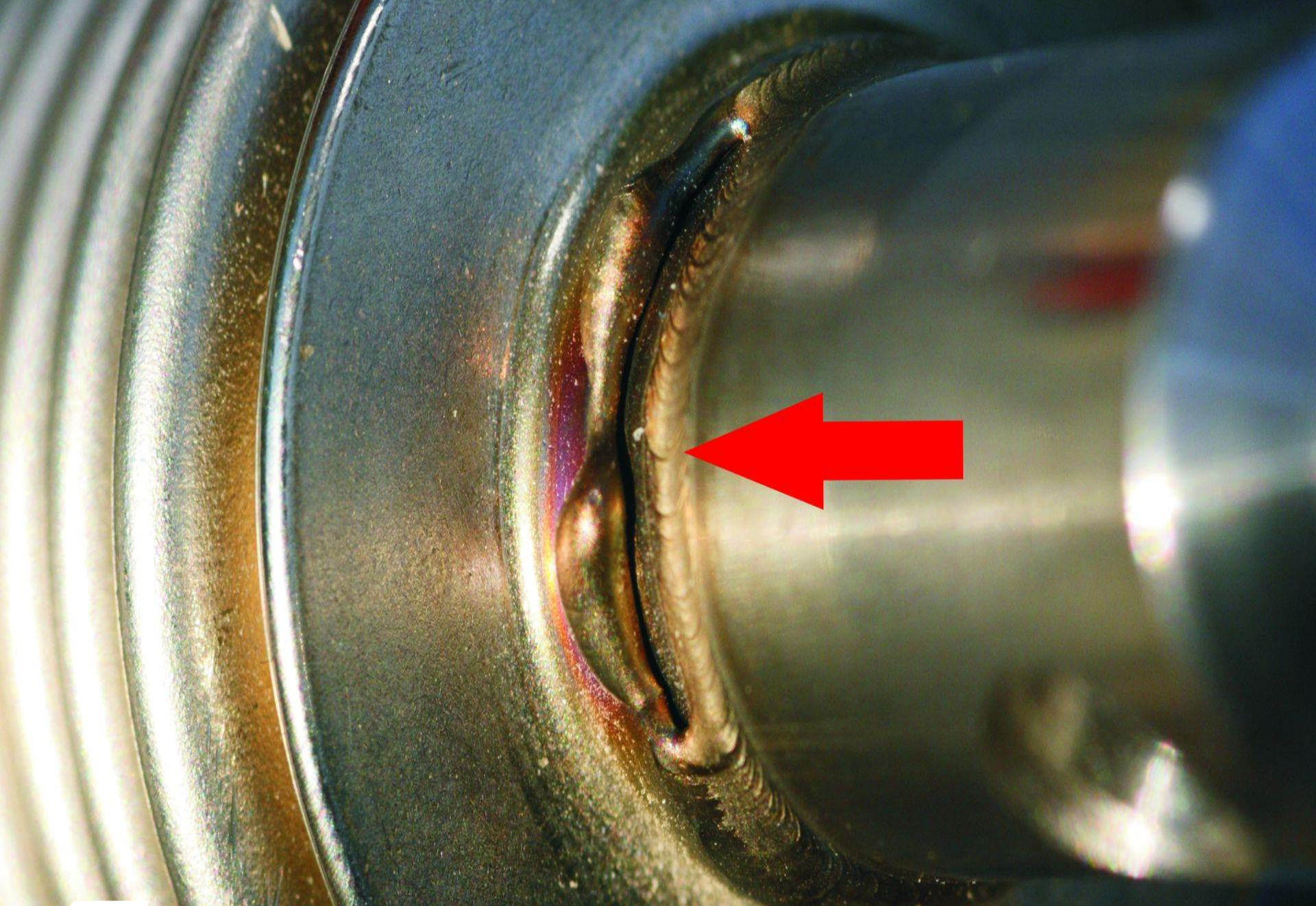
Application – MAG welding - Torque converter

Porosity caused by oxygen containment

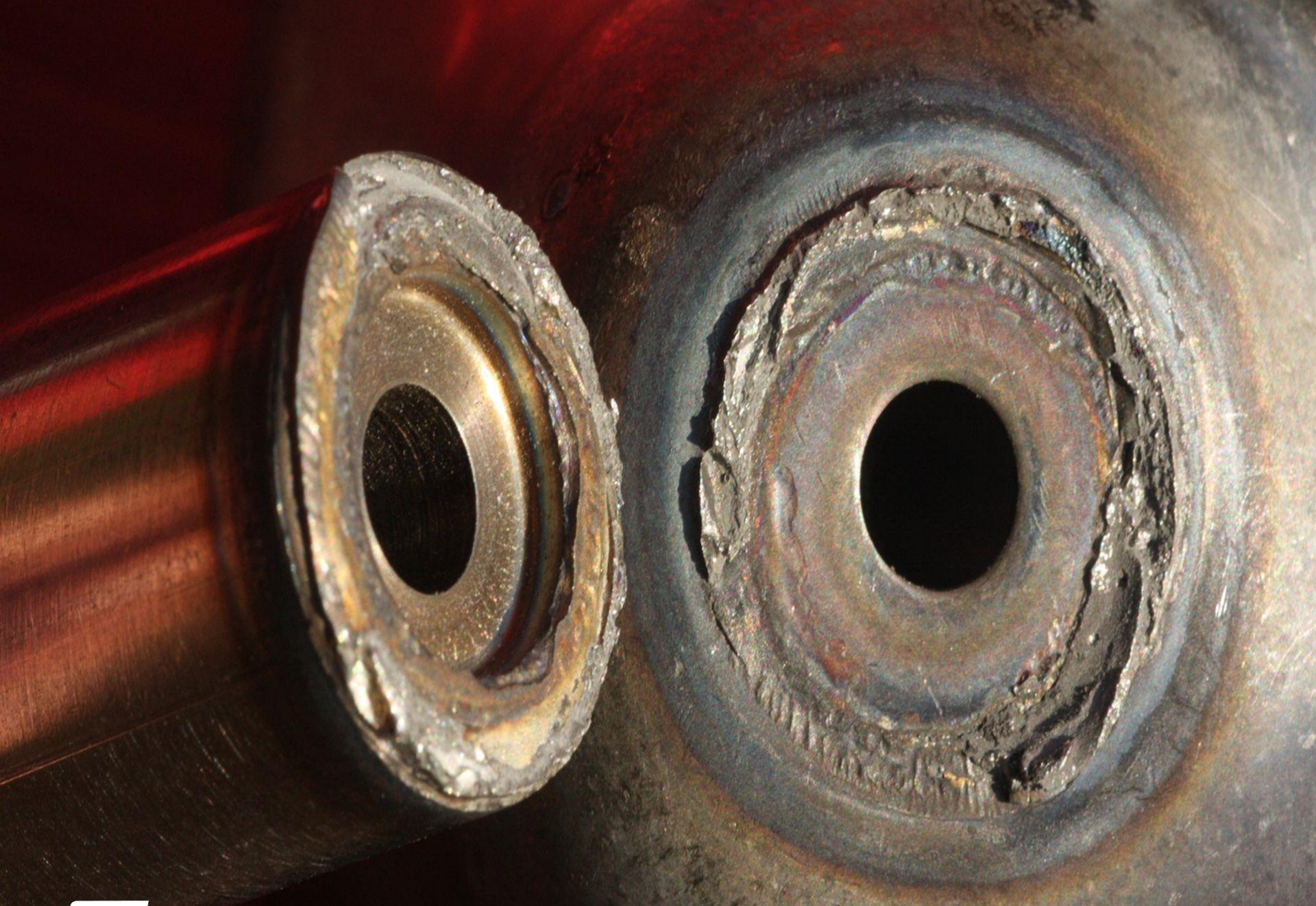


Change in short circuit
dynamic











some references

All logos are property of the respective company





we eye your
welding quality

Thank you for your
attention

