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KUKA.ServoGun

## Spot weld product family

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ServoGun-family function overview

- **ServoGunBasic:**
  - Force control through part detection using patented mechanism
  - After part detection: force control until target force is reached
  - Automated weld gun drive parameter determination
  - Almost temperature-, age- and orientation independent
  - Force accuracy: +/- 3-7% of target force within weld range

- **ServoGunAdvanced (A USP):**
  - Force regulation via servo motor with integrated force sensor
  - Automated weld gun drive parameter determination
  - Temperature-, age- and orientation independent
  - Force accuracy: +/- 1-3% of target force within weld range
 - Additional hardware required (SDC-module, ARO-servo motor with integrated force sensor, dress pack cabling)

ServoGun Advanced	FC
ServoGun Basic	
EQT	RS
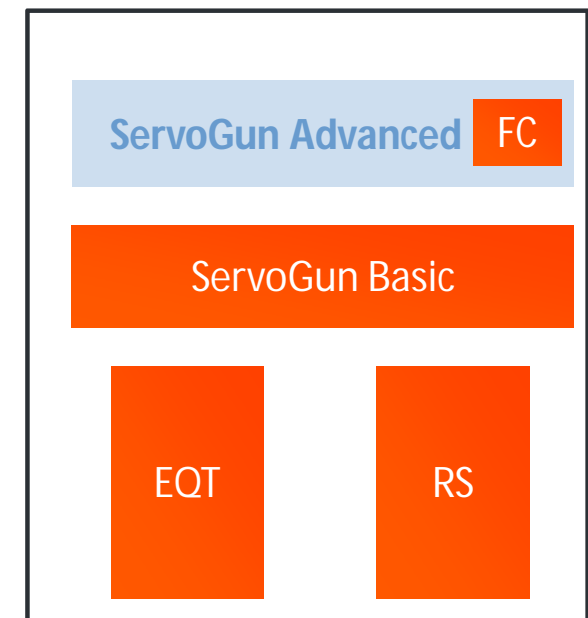
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Automatic Force Calibration of Servogun- A KUKA USP

KUKA ServoGun Basic provides automatic force calibration with an optional external force sensor attached to the gun and connected directly to the standard interface at the robot base for mastering. *(Conventional method of servo gun force calibration is default available)*

- using the calibration wizard software the gun will be automatically calibrated in five simple steps:
  - attach force sensor to one electrode tip of the servo gun
  - connect cable to standard interface at robot base plate
  - leave robot cell and close safety gate
  - select and start automatic force calibration routine
  - after calibration the force calibration curve is displayed on the teach pendant

- Proper Documentation- results of the calibration will be stored in a log-file and can be exported for further documentation

Video Link- https://youtu.be/NbsZE47_Fbc
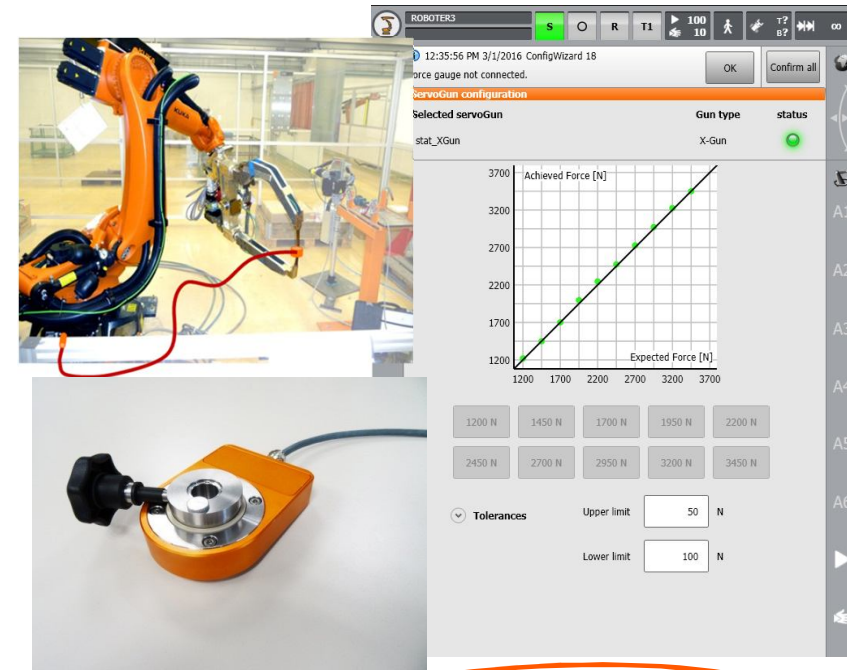
Servogun Commissioning in <10 mins Using optional KUKA Clamping Force Sensor (Standard Procedure currently takes 30 mins. Approx.)

ServoGun-family function overview

- **EqualizingTech:**
  - Alternative to pneumatic gun equalization with remaining forces of approx. 200 N (position dependent)
  - Easier parameter utilization per weld point location
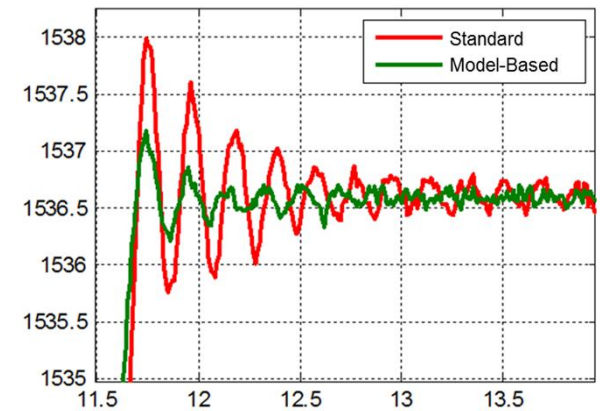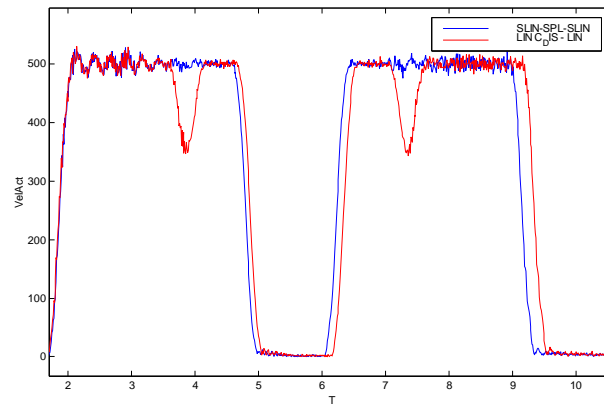 - Improved functional analysis

- **RoboSpin:**
  - With weld start: programmable circular motion around weld spot (5°-10° - depending on part) during or after weld spot
  - Improved weld quality with longer weld tip life
  - Optimized timing in conjunction with ServoGun
  - Especially useful for aluminum welding
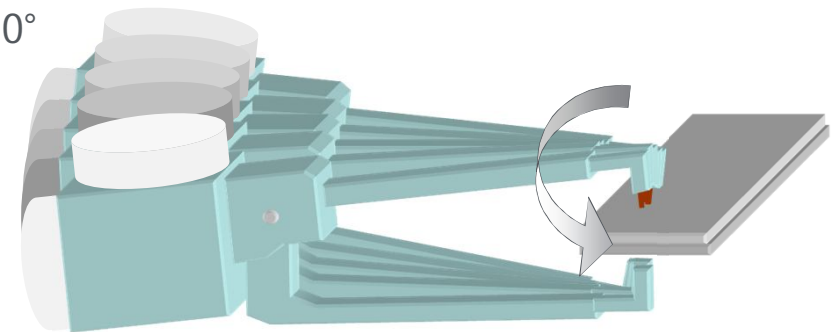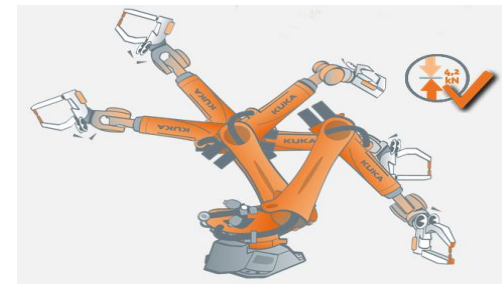
KUKA Robot- Enhanced Motion Features

Smart Motion Technology

Enhanced Motion Features – KUKA Smart Motion

"KUKA Smart Motion" stands for the new control algorithms that improve the already excellent accuracy and speed of the KUKA robot system even more:

- up to 25% higher speed for positioning motions or linear/circular motions compared to the current technology

- accurate and high speed positioning without overshooting or oscillation at the process point

- best of class in path accuracy for all applications independent of speed and acceleration

- reduced energy consumption due to energy-efficient planning of all motion types
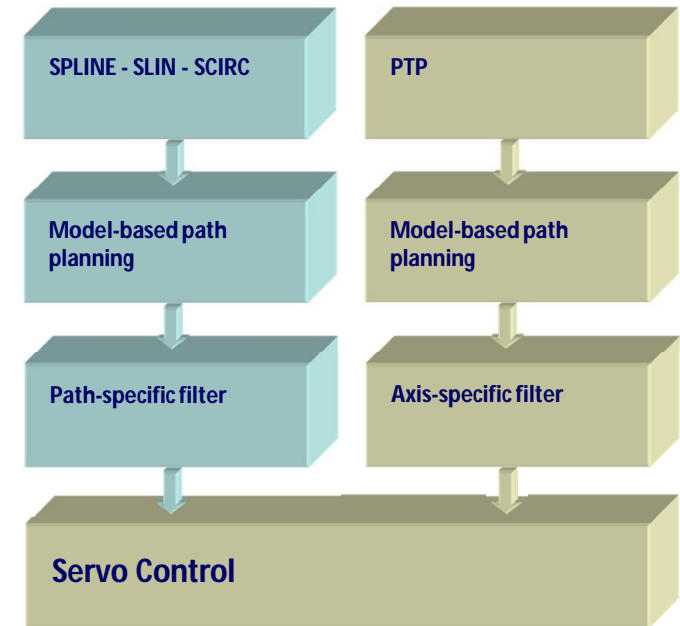
Cycle Time: **- 25%**

Energy Consumption: **- 30%**

Enhanced Motion Features – KUKA Spline Motion

"KUKA-SPLINE" is a Cartesian motion type that is suitable for complex and curved paths – fast and uncomplicated programming of even the most complex trajectories:

Disadvantages of approximated LIN and CIRC motions:

- path is defined by means of approximated points not located on the path
- generating the path is complicated, time-consuming and difficult to predict
- path might differ with override setting, velocity or acceleration

Advantages of using SPLINE, SLIN and SCIRC:

- path is defined by points on the path
- desired path can be generated easily and very fast
- path always remains the same, irrespective of the override setting, velocity or acceleration
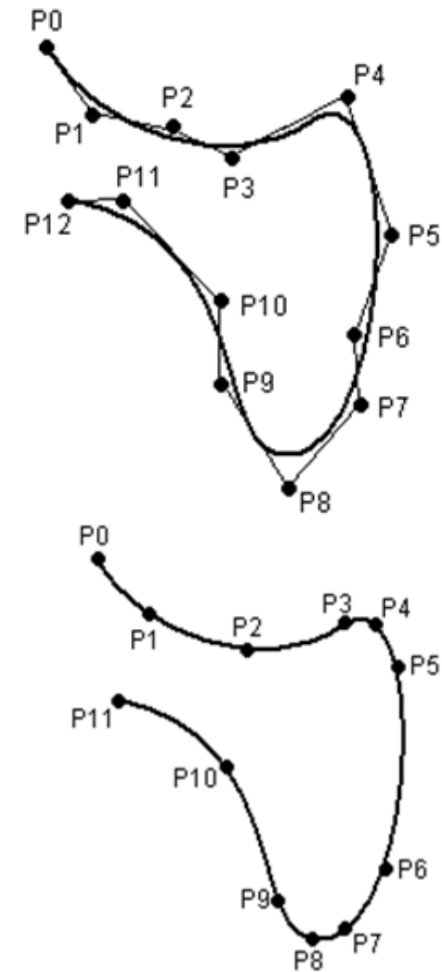
Enhanced Motion Features – KUKA Spline Motion

"KUKA-SPLINE" stands for higher path accuracy, higher speed, shorter cycle time and easier programming:

Path contours do not depend on:

- override, velocity and acceleration

Shorter cycle times due to:

- no reduction of speed in approximation path segments

- No reduction of speed at short distances between points

Shorter start-up times and easier programming:

- accurate programming of points directly on the path without approximation

- faster testing as the robot runs the same path in single step as well as in standard execution
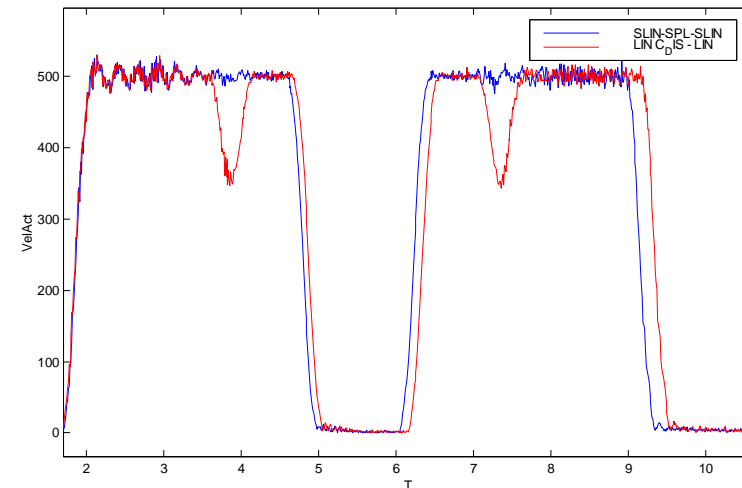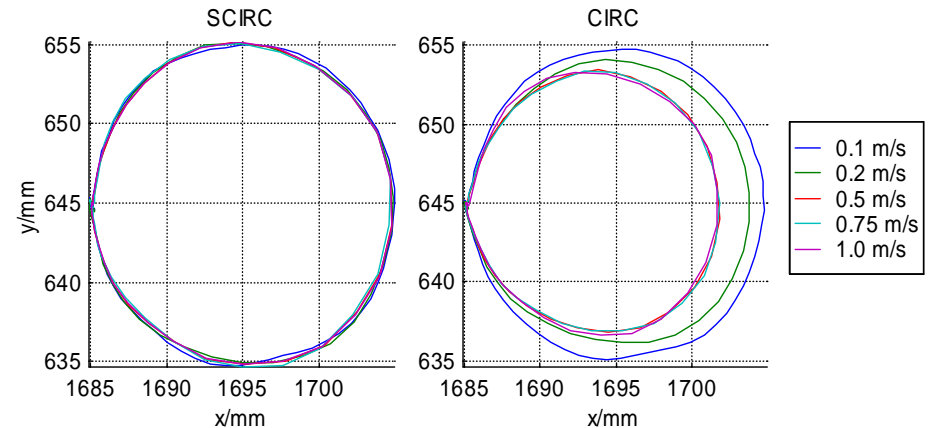
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Enhanced Motion Features – Shorter Cycle Time

"KUKA Model-based Closed loop Control" stands for faster positioning of the tool at the process point:

If the robot moves with a very high speed and decelerates at the process point it will oscillate before coming to a full stop:

- start of process will be delayed
- cycle time will be increased

The combination of a stiff robot arm with the new model-based close loop control will decrease the oscillation to a minimum:

- start of process almost immediately
- shorter cycle time