Plasma Cutting with Robots
Versatile • Efficient • Safe

Pioneers in Plasma Cutting since 1959
Plasma Cutting of Three Dimensional Structures

Industrial robots are excellently suited for economic large-scale production, for effective low-volume production and even for piece production.

Kjellberg plasma cutting systems can be adapted to all robots and robot controls in the market. Robot-assisted plasma cutting offers all features that are required for the use in industry and craft:

- Cost-efficient cutting
- Simple programming and operation
- High cutting speeds
- High cut quality, nearly no rework required
- High flexibility

It is possible to cut all electrically conductive materials and diverse types of work-pieces:

- Structural components for vehicles
- Pipes and containers
- Hollow profiles, open and closed profiles as well as bulb flat profiles
- Dished bottoms

Plasma cutting with robots offers a number of possible applications:

- Cutting on pre-selected paths or of work-pieces with greater tolerances on paths with automatic torch height control
- Vertical cutting (straight cuts and holes)
- Complex three-dimensional contours
- Precise and variable bevel cutting
- With some systems also marking
- Underwater plasma cutting
- Plasma cutting on hot work-pieces

At present, Contour Cut is the latest way of high-quality plasma cutting.

It is the further development of the HiFocus technology for cutting fine inner and outer contours in mild steel and convinces with:

- High cut quality and contour accuracy
- Low angular deviations and smooth cut surfaces
- Excellent repeatability and dimension accuracy
- High productivity at low costs
High Flexibility of the Production

Today, robot-assisted cutting technique is mainly used for the processing of three-dimensional workpieces. The most important users are the automotive industry and its suppliers as well as enterprises in container and pipe production, steel construction and shipbuilding. In these sectors, the plasma cutting technique has already many times proven its advantages with regard to flexibility and cost benefits compared to other technologies.

Examples from the Automotive Industry

End-cutting of hydro-formed axle components for a passenger car

Cutting of a passenger car B-pillar from high-strength material

Contour cut on a section of a vehicle exhaust system from CrNi-materials (method: Underwater plasma cutting for trim-free inner pipe surfaces and clean cut surfaces)

Kerf on a galvanised passenger car body, the corrosion protection layer next to the groove is preserved on the work-piece surface

End-cutting of a safety profile for a passenger car body

Gap bridging: hole cutting with high cut quality on spot-welded sheets
Plasma Cutting in Container and Pipeline Construction

For cutting on curved surfaces, the robot requires a good sensor system with respect to the data exchange with the plasma cutting system in order to achieve a constant torch height. So the conditions are fulfilled for achieving excellent bevel cuts especially in this industrial field and, thus, reducing weld preparation costs.

Cutting Tasks in the Shipbuilding Industry

One of the typical plasma cutting tasks in shipbuilding in connection with robots is the cutting of profiles. End cutting and hole cutting with and without bevels in diverse flat profiles, angle profiles and above all bulb flat profiles can be done easily and quickly. Also strongly varying material thicknesses on one work-piece are manageable without any problems.
For plasma cutting with robots, Kjellberg Finsterwalde has developed a wide variety of torches. Depending on the task, several models are on offer:

- As straight version or with 60° or 90° angled cutting heads – they make it possible to cut even highly structured work-pieces optimally
- With quick-change head

With Kjellberg plasma torches, bevel cuts up to 50° are possible. In connection with special torches, bevel cuts up to 60° are possible.

### Plasma Torches for Special Applications

#### HiFocus Plasma Torches up to 160 A

**PerCut 160-2 LS**
Robot plasma torch as straight version and with acute-angled consumables

**PerCut 160-2 60° LS**
Robot plasma torch with cutting head angled by 60°, particularly suited for the processing of structured parts

**PerCut 160-2 90° LS**
Robot plasma torch with cutting head angled by 90°, mainly for pipe end cutting

#### HiFocus Plasma Torch up to 440 A

**PerCut 450M Robo**
Robot plasma torch as straight version with quick-change head

#### FineFocus Plasma Torch up to 300 A

**PB-S80 W-2 Robo**
Robot plasma torch mainly for cutting on even surfaces, pipes and profiles, bevel cuts up to 45°
Overview of Plasma Cutting Systems Suited for Robots

<table>
<thead>
<tr>
<th>Power Source</th>
<th>HiFocus 80i</th>
<th>HiFocus 130</th>
<th>HiFocus 161i</th>
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<tr>
<td>Cutting current at 100 % d. c.</td>
<td>10 - 80 A</td>
<td>20 - 130 A</td>
<td>10 - 160 A</td>
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<tr>
<td>Marking current</td>
<td>-</td>
<td>16 A</td>
<td>5 - 25 A</td>
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<tr>
<td>Recommended cutting range 1)</td>
<td>0.5 - 15 mm</td>
<td>0.5 - 25 mm</td>
<td>0.5 - 25 mm</td>
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<tr>
<td>Max. cutting range</td>
<td>20 (25°) mm</td>
<td>25 (40°) mm</td>
<td>25 (60°) mm</td>
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<tr>
<td>Max. piercing</td>
<td>15 mm</td>
<td>25 mm</td>
<td>25 (30°) mm</td>
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<td>Bevel cutting up to</td>
<td>45°</td>
<td>45°</td>
<td>45°</td>
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<tr>
<td>Plasma torch</td>
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<td>PerCut 160-2 LS</td>
<td>PerCut 160-2 LS</td>
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<tr>
<td>Power Source</td>
<td>HiFocus 280i</td>
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<td>HiFocus 440i</td>
</tr>
<tr>
<td>Cutting current at 100 % d. c.</td>
<td>10 - 280 A</td>
<td>10 - 360 A</td>
<td>10 - 440 A</td>
</tr>
<tr>
<td>Marking current</td>
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<td>5 - 50 A</td>
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<tr>
<td>Recommended cutting range 1)</td>
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<td>0.5 - 60 mm</td>
<td>0.5 - 60 (80) mm</td>
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<tr>
<td>Max. cutting range</td>
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Example of a Connection Diagram

Connection diagram for HiFocus 360i with automatic gas console: from an external CNC control, stored cutting data can be activated, thus guaranteeing optimum cut quality and highest reproducibility.

Kjellberg plasma cutting units are CE-conform and correspond with the valid guidelines and instructions of the European Union. They are developed and fabricated on basis of the standard EN 60974. The plasma cutting units are labelled with the S-sign and therefore applicable to environments with increased hazard of electric shock. The fabrication takes place according to DIN EN ISO 9001. The factory-owned quality assurance comprises piece and cutting performance tests, documented by test certificate.

Our products represent a high level of quality and reliability. We reserve the rights to change design and/or technical specification during the series fabrication. Claims of any kind can not be derived from this brochure.

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