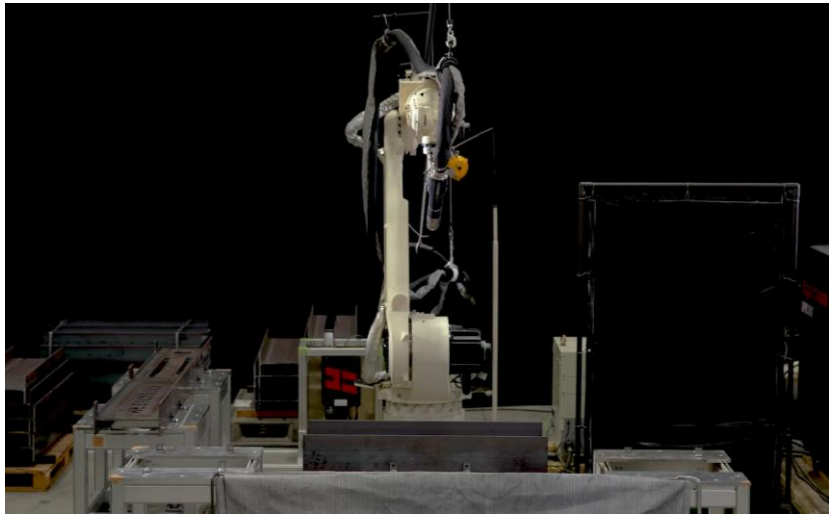
Automatic Cutting Path Tracking

Plasma-Cutting Robot System

International Robot Exhibition 2025

What is plasma cutting?

It involves instantly melting the workpiece using high-energy plasma, and then cutting it by blowing high-pressure gas.



6.5 mm thick H-beam: High-speed cutting

Reasons to choose plasma cutting

Thick plate cutting

"Operating Costs, Productivity, Quality"

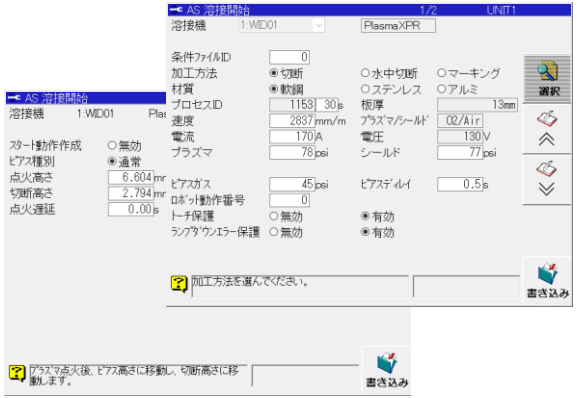
- Can be introduced with lower investment compared to lasers
- High productivity through high-speed cutting
- Smooth and straight cut surfaces

Challenges in Cutting Automation

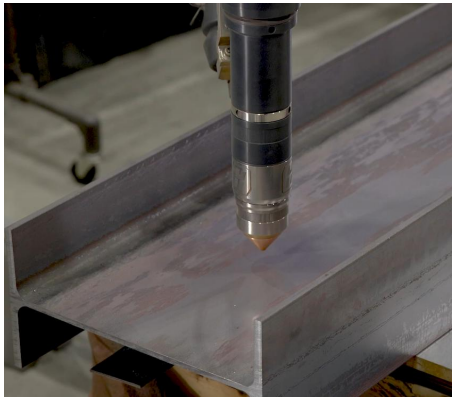
Want to automate plasma cutting to boost productivity...

1. Difficult to set cutting conditions
2. Difficult to operate robots and cutting processes
3. Difficulty adapting to workpiece misalignment

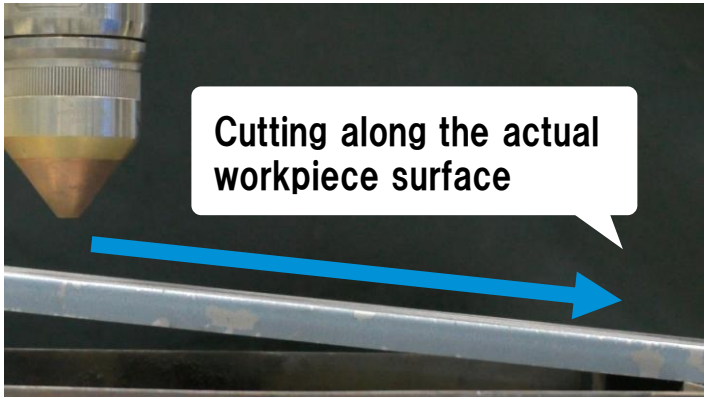
▶ Plasma cutting robots provide support



1. Automatic cutting condition setting

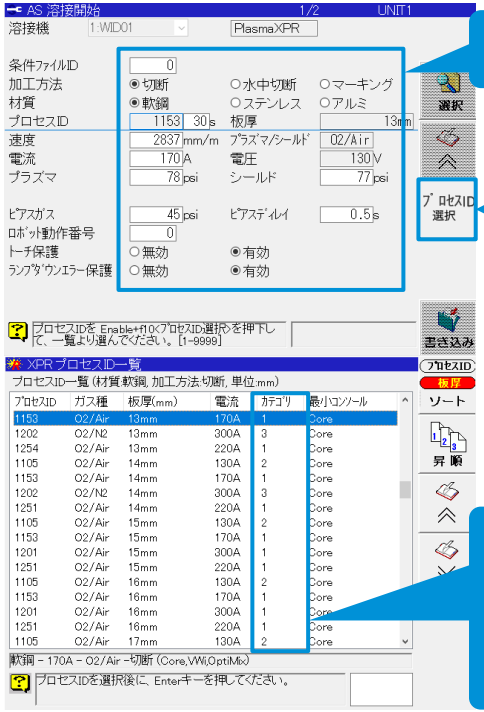


2. Automatically Execute Start Operation



3. Height control compensates for misalignment

1. Simple Condition Setting



Over a dozen types of processing conditions

Recommended conditions are displayed for each plate thickness, Automatically input complex processing conditions

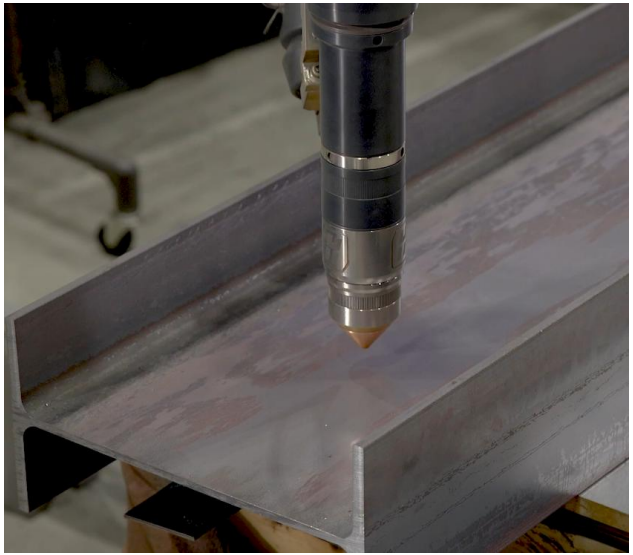
Select plate thickness and finish condition (category)

▶ Setting complete !

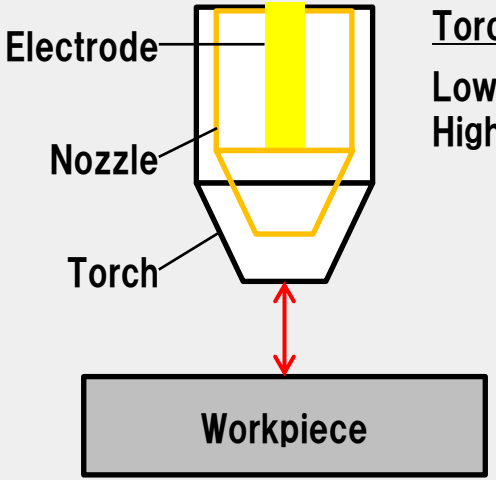
Category 1: Optimal balance of cost and performance
Category 2: High-quality finish
Category 3: Fast Cutting Speed

2. Start Operation Generation Function

Automatic generation from ignition to pilot hole and main cut initiation

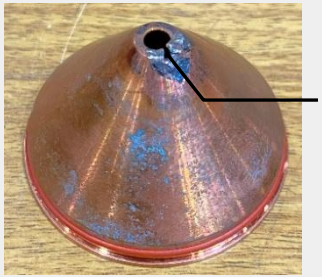


Start Operation Generation Function



Torch Height at Start

Low → Electrode/Nozzle Damage
High → Poor arc start causing intermittent stoppage



Extended service life of consumables・Reduction of short-circuit stops

3. Height Control Function

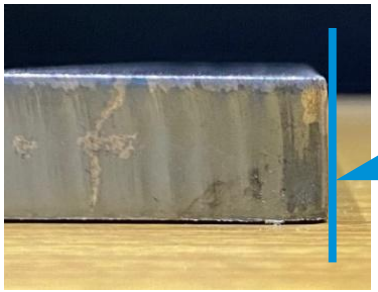
Automatically adjusts torch height in real time based on workpiece position

Plasma cutting

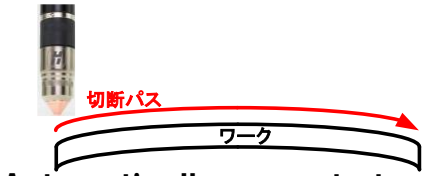
The shape (angle) of the cut surface changes with torch height

Maintain a constant torch height

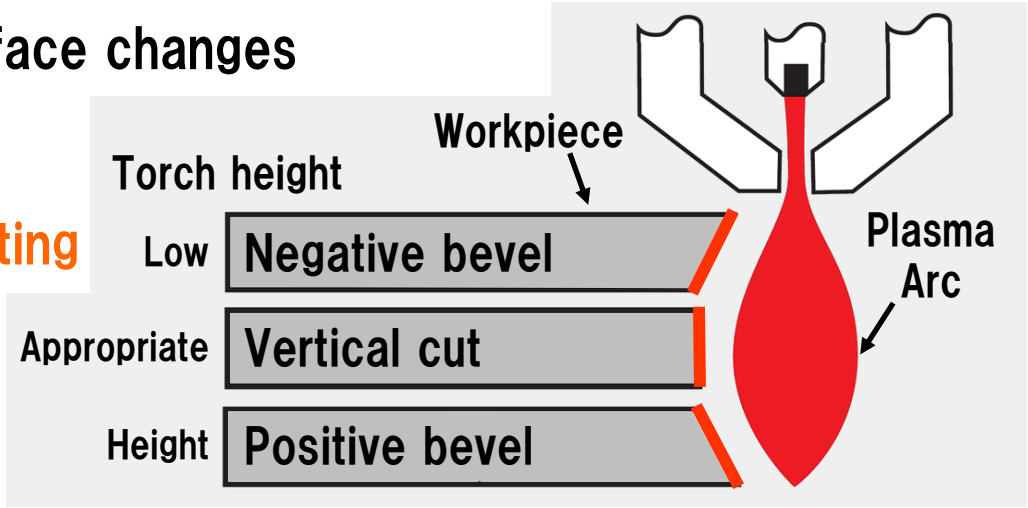
▶ Essential for high-quality cutting



Achieves a clean cut surface



Automatically corrects torch height at all times



Cutting surface when torch height changes

Demonstration: Plasma Cutting of Thick Plates

Bevel Cutting

Marking

Workpiece

Material: Mild Steel
(SS400, Black Skin)
Plate Thickness: 12 mm

Daihen's plasma cutting robot system achieves improved cutting productivity.


DAIHEN