HYPERTHERM®
A Hypertherm Associates Brand

Cast trimming with Powermax® plasma

Significantly increase efficiency, lower costs, and deliver superior cut quality

Manufacturing overview

Manufacturers must lead the way in quality, efficiency, and cost reduction to stay competitive. To be profitable, they must identify then solve bottlenecks in the manufacturing process and keep secondary work to a minimum to maximize output. To complicate matters, skilled labor shortages are raising costs and wreaking havoc on production floors. In response, manufacturers are innovating via automation, robotics, and artificial intelligence. This is especially true for those that cut casted metal parts, many of which are introducing robots integrated with plasma cutting systems.

Customer pain points:

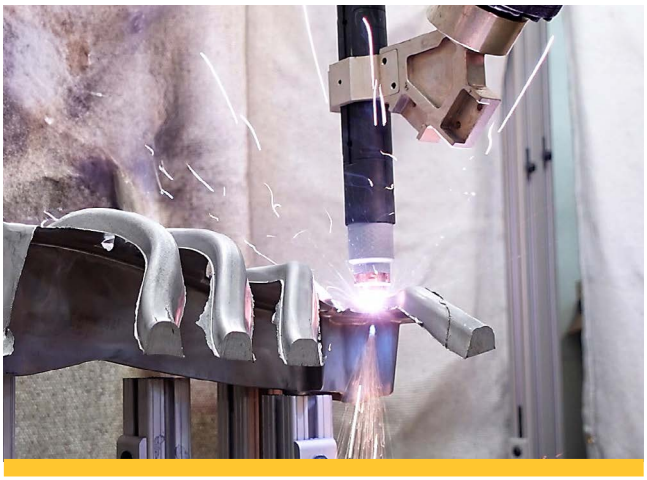
- Skilled labor shortage increase costs and curtail production
- High capital cost of trim presses for large castings
- Manual work contributes to higher workplace injuries
- Slow cycle times for the entire line created by trim press bottlenecks
- Lack of flexibility to change trim die when there are changes to the cast
- Safety concerns from flamable metal shavings

Some industries that rely on casting:

Agriculture	Defense
Automotive	Mining
Transportation	Construction
Paper	Alternative energy

Powermax SYNC solution

The Powermax SYNC® series plasma cutting systems, by Hypertherm Associates, are designed to easily integrate into robotic cells for cutting casted metal parts. This solution significantly reduces time, labor, and operating costs compared with alternative technologies.



A Powermax SYNC plasma systems in robotic applications reduce and/or eliminate the challenges of trimming casts. This includes issues such as variability in part geometry, fixturing, metal thickness, and cut path. This market-proven solution has resulted in greater uptime and higher productivity, while creating a trimming cell that is much more versatile.

Key business benefits:

Improves quality

Using plasma cutting and robotic offline programming allows operators to more accurately and quickly trim aluminum castings

Enhances versatility

Plasma on a robot improves the versatility of your trimming job through increased torch-to-work- distance (stand-off) and easy path programming. This reduces/ eliminates crashes and allows for quick changes that save time when part geometries are inconsistent.

Accelerates processing

Using plasma cutting systems in pilot arc control mode to remove the flash and an auto tool changer for cartridge significantly reduces cycle time.

Reduces skilled labor

Investing in robotic plasma-cut cells lessens the reliance on human labor and increases cutting speeds – often by more than double The cartridge eliminates the traditional 5-piece consumable stack-up, eliminating costly setup mistakes.

Application support

Hypertherm and robotic systems integrators provide expert application support for cutting parameter selection, operating cost / cycle time optimization, and cutting cell support / analysis.

Key Powermax SYNC features

Provides flexibility with industrial grade cutting of thicknesses from 2 mm to 24 mm – designed for gigacast trimming.

Choice of three robotic application torches with 45°, 90°, or 180° heads that are lightweight, narrow, and have flexible, robust leads

Integration adaptability with a variety of robots due to low electrical noise with the contact start torch technology (no high frequency) enabling multiple, non TIG-rated robots to cut in one cell

Provides application versatility with three cutting cartridge types for different cast cutting needs; standard mechanized cartridges, HyAccess™ cartridges for hard-to-reach locations, and FlushCut® cartridges for cutting as close to the surface as possible

Robot programming is made easier and arc transfer more repeatable due to a much higher stand-off (up to 6 mm) than competitive processes, preventing crashes on parts with inconsistent part geometries. The continuous pilot arc mode feature keeps the arc when moving between each cut.

Allows three gas options and cut process parameters for different metal types and operating cost considerations: compressed air for all metal types, nitrogen for improved cut quality on thin aluminum, F5 for improved cut quality on stainless steel

Automatically sets the system process via single-piece cartridge design which eliminates errors, and allows for automated consumable changes for greater up-time and high volume production

Provides performance data for monitoring efficiency, diagnostics, and process improvements

MINI CASE STUDY

Overview

A North American auto manufacturer needed a new way to trim large aluminum casts, deeming traditional methods of cast trimming to be ineffective for their application.

Challenge

Traditionally, trim presses have very limited versatility trimming parts with variabilities in geometry. Parts may get stuck in the press, or the press may trim into the actual part. Fiber lasers require a very close stand-off height which can often result in torch crashes and significant downtime.

Solution

The company installed a robotic cell featuring Powermax105 SYNC systems and saw immediate positive results. They significantly increased throughput and reduced downtime.

In 2023, more than 750,000 vehicles were sold that were made using Powermax plasma.

The Hypertherm Associates corporate story

Hypertherm®. OMAX®. Centricut®. ProNest®. AccuStream®, Robotmaster®. These names and more represent Hypertherm Associates™ – the world's leading provider of industrial cutting technologies and solutions. With constancy of purpose, a drive to innovate, and a passion for customer success, Hypertherm Associates leads the industrial cutting and shaping industry.

Hundreds of thousands of businesses rely on Hypertherm Associates' technologies and solutions for performance and reliability that help increase their productivity and profitability. Companies worldwide turn to us to build ships, airplanes, and rail cars, to construct steel buildings and bridges, and fabricate heavy equipment and wind turbines.

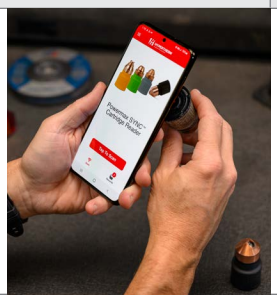
Shaping Possibility

Since the founding of Hypertherm in 1968, we have always believed in the value of surpassing expectations. It's why we make continued investments in people. It's why we invest aggressively in ongoing product development. And now, it's why we'll be known as Hypertherm Associates: a 100% Associate-owned company composed of the world-class industrial cutting technologies and solutions you know and trust – plasma, waterjet, CAD-CAM, robotic software, and more – to help our customers succeed in ways that have never been possible.

Powermax SYNC® series and SmartSYNC® cartridges, robotic torches, and accessories

	Powermax65 SYNC®	Powermax85 SYNC®	Powermax105 SYNC®
Mechanized cut capacity rating	1" (25 mm)	1-1/4" (30 mm)	1-1/2" (40 mm)
Mechanized pierce rating	5/8" (16 mm)	3/4" (20 mm)	7/8" (22 mm)
Amperage operating range	20–65 A	25–85 A	30–105 A
Cut speed example on ¼" (6 mm) mild steel	93 ipm (2570 mm/min)	130 ipm (3560 mm/min)	156 ipm (3960 mm/min)
Amperage output for 100% duty cycle	46 A	66 A	74 A

SmartSYNC cartridges		SmartSYNC robotic torches	
Standard mechanized		180°	
FlushCut®		45°	
HyAccess® mechanized		90°	

Related accessories			
Cartridge reader and app for performance analysis		Robotic teach tip for SmartSYNC torch	Torch mounting bracket
			
Part number	528083	429054	228806

Learn more at www.hypertherm.com/cast-trimming

As 100% Associate owners, we are all focused on delivering a superior customer experience. www.hyperthermassociates.com/ownership

Environmental stewardship is one of Hypertherm Associates' core values. www.hyperthermassociates.com/environment

100% Associate-owned Greener Cuts

HYPERTHERM ASSOCIATES™