HYBRID FABRICATION

by Jimmy Myers, senior editor

Reducing the footprint and saving steps with a laser/punch machine with multi-tooling

Reducing the footprint, accomplishing more than just one task per machine, improving productivity – these are the goals that fit into just about any fabricator's strategy for success. However, these goals haven't always been easy to achieve given the fact that some fabricated parts require specialized tooling, which means a different machine is needed for each step.

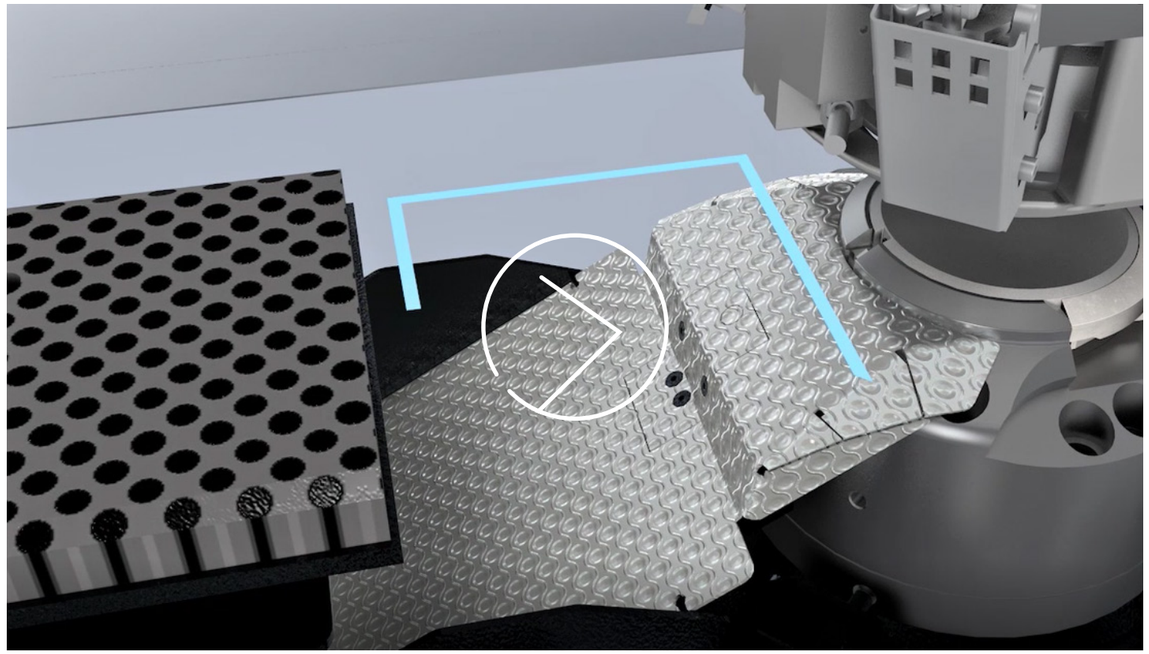
Take, for instance, a part formed from a piece of sheet metal that requires tooling for louvers, yet also requires tooling for elongated bends as well as a solution for precision laser cuts. A job shop might have to employ three different machines in an assembly line scenario to fabricate such a part from a single piece of sheet metal. That means a lot of real estate on the shop room floor, not to mention time and labor costs.

Granted, most parts are going to filter through a number of processes before they reach the end stage, but what if a few of those stops along the way could be performed on one machine? This would certainly help a fabricator improve the way it leverages usable space on the shop room floor and improve productivity.

This is what Trumpf Inc. has aimed for in its latest hybrid development, the TruMatic 1000 laser/punch combination machine.

A 40-year history

Trumpf has a four-decade history of manufacturing combination machines. Along the way, the company increased its laser power and brought in new generations of punch machines with added automation. This long history of designing new machines resulted in the recently released TruMatic series, including a CO_2 laser machine in the TruMatic 7000 and a fiber laser/punch combo machine featuring a SheetMaster material handling automation system in the TruMatic 6000.

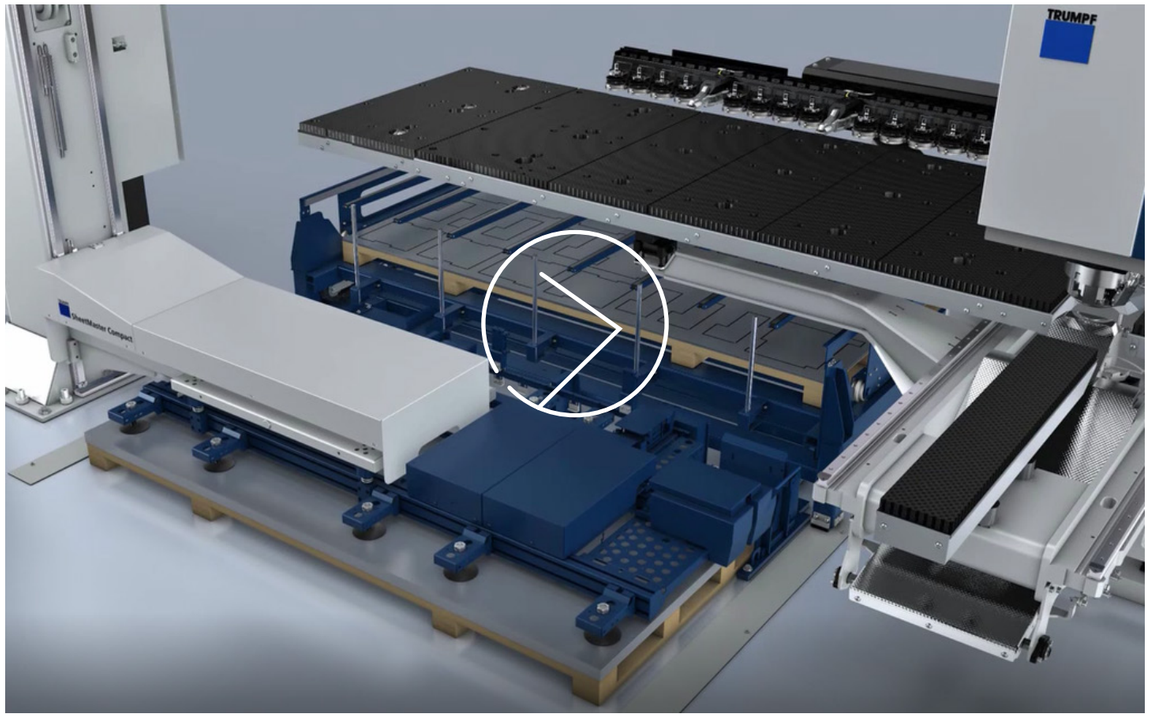


Watch how the TruMatic 1000 sorts parts and scrap into specific bins.

Most recently, Trumpf introduced the TruMatic 1000, which is marketed as an entry-level machine for fabricators, but also as the world's smallest laser/punch machine, which is 24 percent smaller than the previous model. Despite its entry-level moniker, it packs a big punch; it offers users the ability to laser cut, sort, form, tap and punch on a singular compact platform.

The newest addition

The focus with the TruMatic 1000 is on flexibility and delivering high-quality parts. One of the keys to the machine's flexibility lies in its frame. The "O" style frame brings a modular concept that fits well with the patented →



Trumpf's SheetMaster Compact offers an efficient automated way to load and offload material.

drive system, which accommodates automation capabilities.

"The 'O' style frame is there to ensure we have full support of the punch and laser head over its entire travel," says Brian Welz, product manager, punch and combination products for Trumpf. "Secondly, this design provides an extremely compact footprint."

For organizations that aren't quite ready for fiber laser cutting, the TruMatic 1000 is offered as a punch-only machine, the TruPunch version. When the time is right, the user can add a 3-kW laser, transitioning the machine to a laser/punch combo. The process is fairly straightforward, only requiring the addition of protective housing, a chiller and a dust collector. Running on nitrogen, the TruDisk laser can cut 18-gauge steel at 1,000 ipm.

"It's designed to grow with you," Welz says.

While the punching and laser cutting capabilities are the most highly touted by Trumpf, the TruMatic 1000 embosses and stamps and can also bend up to 3.5-in.-long flanges and 1-in.-high 14-gauge material.

For instance, a 4-in. louver can be created with a single hit. A wheel tool can be implemented to allow the operator to raise the material or lower it by two times the material thickness. Trumpf's multi-tool →

A cross section of the head shows how the punch works.

> "Because the sheet is only moved in one direction, we can move the punch or laser head at a higher rate. This improves the dynamics and processing of this machine."
>
> *Brian Welz, product manager punch and combination products, Trumpf Inc.*

includes up to five tools in one head for added performance.

The heart of the machine

What makes all this possible? Along with the "O" style frame, Trumpf points to the Delta Drive system, which Welz refers to as the "heart of the machine."

In most traditional punching applications, the sheet metal moves on the Y-axis. However, with the patented Delta Drive system, Trumpf has eliminated the need for the sheet and worktable to move on the Y-axis. Powered by two servomotors, the drive system allows the punch head to move back and forth on the Y-axis, which is considered somewhat revolutionary in punch head technology, while the material handling clamps move the sheet on the X-axis.

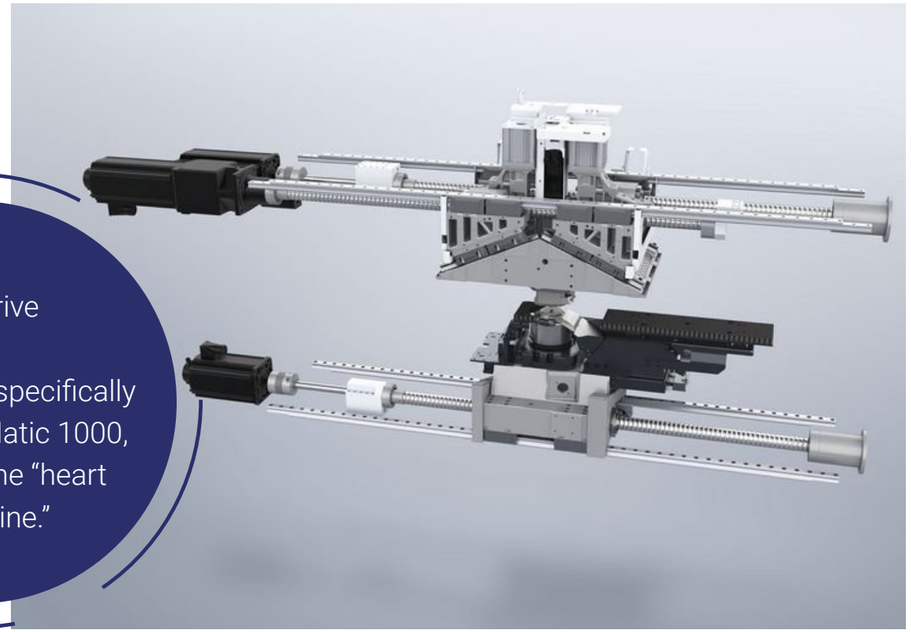
"Because the sheet is only moved in one direction," Welz says, "we can move the punch and laser head at a higher rate. This improves the dynamics and processing of the machine."

According to the company, the Delta Drive system "opens up new and innovative methods. For example, it lets small laser cut parts be reliably removed. Previously, most of them fell through the die into the scrap container and had to be removed by hand. Now the punch can operate in a slightly offset position."

To further improve the efficiency of moving parts, the Delta Drive has a triangular shape. The wedge part of the drive is a 3-ft. platform with integrated linear rails, which ensure that the movement is exact. And it's powerful too, exerting 18 tons of electrical punching force and 600 hits per min.

Tooling and automation

Ejecting parts in an efficient manner is also something the drive system in the TruMatic 1000 is uniquely suited to handle. Trumpf has included a new ejector tool to punch out parts through a chute into specific sorting boxes. A total of four boxes can be used. The machine is engineered so →



The Delta Drive system was engineered specifically for the TruMatic 1000, serving as the "heart of the machine."

The TruMatic 1000 is the smallest hybrid machine that utilizes a punch and laser to fabricate metal.

scrap punched out via the ejector tool falls through the die, which means operators don't have to go through a separate step of sorting waste material from actual parts. Furthermore, the ejector tool is delicate enough as to minimize scratches on the parts.

On the left side of the machine is a 48-in.-by-16-in. part flap. Processed parts can be sent down the chute onto a pallet or conveyor if it's going off to another application.

"A second 7-by-7-in. part chute is available," Welz says, "and is located in front of the punch head. Smaller parts can be sent down this chute into a container or into the optional integrated sorting unit."

The TruMatic 1000 has 20 stations, 17 of which are dedicated to tools. The TruPunch punch-only machine also has 20 stations, 18 of which are dedicated to tools. The maximum tool size for punching is a 3-in. round.

During the punching process, any housing associated with the laser is in the down position, allowing the operator to monitor the parts being punched and to get into the machine, if necessary. However, during the laser cutting process, the protective housing automatically goes into the up position. A secondary housing area moves down around the immediate cutting area, adding extra protection.

Another automatic feature involves a height sensor around the laser cutting head, which allows it to move effectively around flanges, bends and louvers.

Finally, there is an automation option for loading and offloading material called the SheetMaster Compact shared automation kit. It can be used on the TruPunch and TruMatic models. The kit loads raw sheets from 20 in. by 12 in. and up to 96-in.-by-48-in. material. It has a 3-ton loading and unloading capacity and an optimized footprint. Suction cups lift the sheets onto the table, and a detector alerts the operator if more than one sheet has been picked up. ●

Trumpf Inc. ⟶