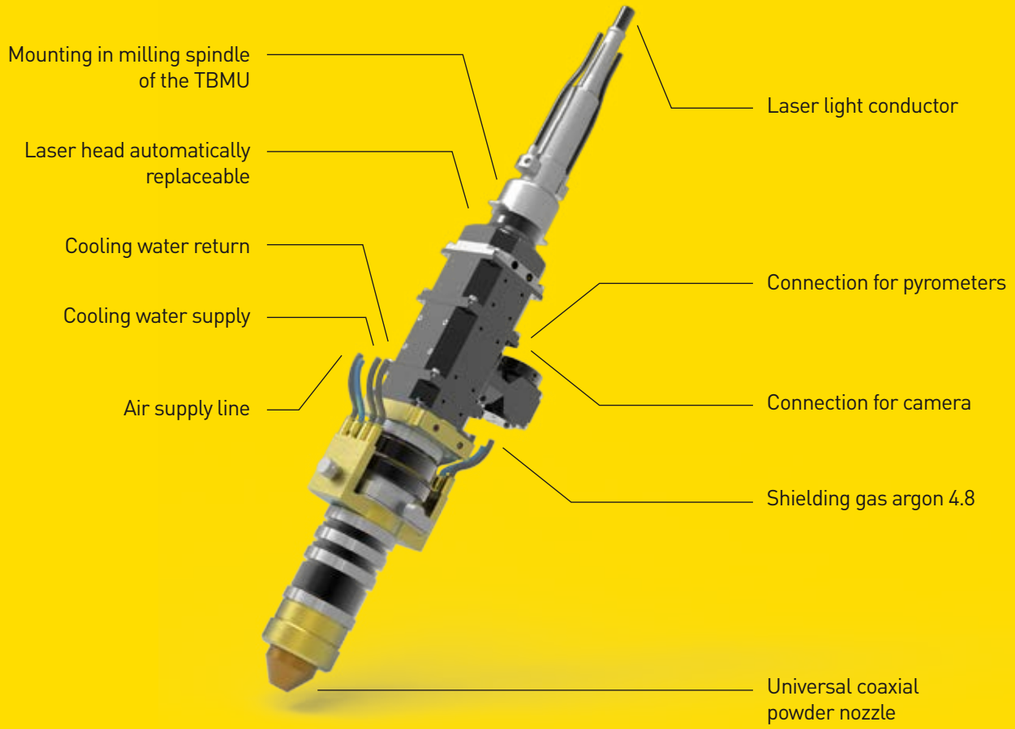
All eyes on

LAMIX - WFL Laser Solutions

by WFL Millturn Technologies

The benefits of additive manufacturing in a MILLTURN are particularly evident in the production of complex geometries, which cannot be produced or are at least very difficult to produce using conventional manufacturing processes. Thanks to the five interpolating axes of the MILLTURN machines, the 10 kW diode laser can be pivoted over a large area and also be used to process free-form surfaces. The application head consists of a nozzle, through which the metal powder particles are transported in a focussed manner to the application site. An inert gas is used to prevent oxidation processes and also serves as a carrier and transport medium. Depending on the application nozzle being used, material cladding can even be carried out horizontally.
In addition, it is possible to achieve a range of effects by using different nozzle geometries and powder combinations. With structures that protrude out of the workpiece, there is no need for oversized blanks, which means that cutting rates can be reduced. This saves machining time, reduces tool costs and means that machining can be completed without the need for reclamping. The key to productive operations is understanding the entire process, which is something which WFL expedites and further develops with continuous research.

LAMIX
LASER SOLUTIONS



Laser welding

For laser welding, a particular head with a different lens is required. During gap welding and deep gap welding, a substantially narrower focal point is required for the laser beam in order to achieve increased welding depth on the one hand and to keep the heat-affected zone as small as possible on the other. The aim is to develop an alternative to thin deep hole drilling.

Facts:
- Impressive welding depths can be achieved
- Simplified processes
- Concentric welding possible

Laser cladding

For cladding, the powdered metal is focused on a point of impact through a ring nozzle with the help of an inert gas. The laser beam is also focussed on this area, which results in the creation of a melt pool. The molten powdered metal settles in this pool and then solidifies. The width and height of the resulting material cladding is determined by precisely balancing the energy input and traversing speed of the laser beam with the amount of powder being fed through. The diode laser used consists of a high-performance lens and a coaxial powder nozzle.

Facts:
- Set-up of wear, heat and corrosion resistant coatings
- Repair of wear areas
- Broad range of materials possible

Laser hardening

The cladding laser head for the welding can also be directly used for laser hardening, and optionally a lens, which has been optimised for the hardening process, can also be switched. In this way, tooth flanks can be immediately hardened after milling for example during the manufacturing of gear teeth.

Facts:
- Scope of application: gear wheel flanks, bearing positions, contact surfaces
- Size of laser spot adjustable
- Hardening process directly in the machine
- High processing speed