

## Right Angle Heads and Live Tools

### X-line - the next generation

As a result of extensive research BENZ has developed a new generation of angle heads and Live Tools which further extend the possibilities to our customers to greatly improve their production output and precision machining.

### What is the X-line?

The X-line® from BENZ - an new dimension in cutting technology. The main part of the new X-line type is an angular drive based on a so-called "cylcro drive". There are cylindrical pinion changes with a cylcro gearwheel. Both rolling partners have an optimized roll-off behavior. The slogan of the teeth characteristics are crowning, tip relief, break of the heads edges and adjustment of the profile.

Such drives have only been used for applications with low importance for a long time because there had not been any mathematical models or production possibilities. Today we are able to use the whole potential of those angular drives. Nevertheless, the cylcro drives are more than a simple set of angular wheels. The advantages of this type lay in the detail and for some applications it allows further construction possibilities. This has been very important for BENZ when constructing special-application type heads.

The more BENZ checked the possibilities of the cylcro drive the more advantages our engineers have found. We tested extreme situations such as the building of integral parts in the aircraft industry, which demand extremely high cutting speeds and maximum speeds. Furthermore, BENZ tested milling operations in the automotive sector. In both cases nothing equaled our X-Line design!

### Advantages that convince:

- increase the output power of your machine with added functionality (c-axis)
- minimize tool-changes
- integration of our automatically adjustable working axis
- easy adaptation to existing machines
- exceptional running performance
- higher throughput capacity with reduced tool change weight
- extreme system rigidity by use of optimized application of bearings
- improved noise attenuation
- maximum coolant pressure 70 bar at 10,000 rpm
- high flexibility, suitable for use with coolants, lubricants and minimal-amount-lubrication
- higher maximum tool length through a shorter design
- available in all standard designs
- pre-balanced, rotation symmetrical parts
- available in all sizes
- available for all types of tool changers and machines

### X-line modular BMS (Benz-Modular-System)

The demands for a "modular disconnect" solution for the x-line generation were very high. With the BMS system we created a disconnect that even exceeded our goals in reference to rigidity, concentricity and clamping tolerance.

Advantages at a glance:

- short taper with surface plane
- extremely high rigidity by using additional tension on the surface area
- lateral clamping by use of two tapered, threaded pins
- no backlash (tolerance) between the coupled elements
- highest concentricity and accuracy in the repeatability of the tool change
- compatibility with all commonly used spindle systems
- all tapers have internal cooling system