

# Newsletter

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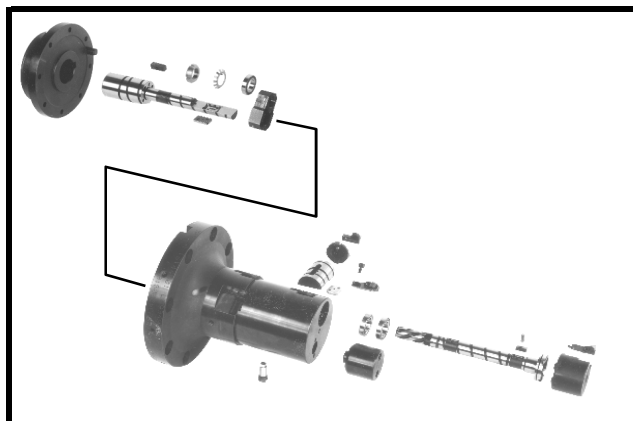
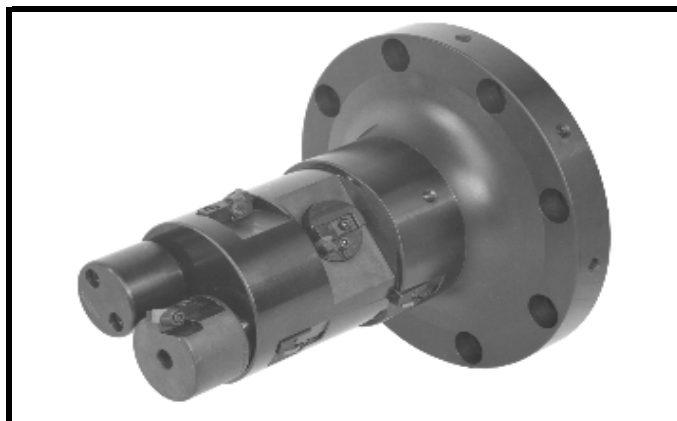
## **Master Tool**

**Innovators of Special Design & Build Tooling Systems**

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Cummins Engine Co. in Columbus, Indiana has recently introduced their new Signature 600 diesel engine. This new 600 horsepower engine has taken the diesel engine industry by storm. In development for over four years, Cummins' marketing introduction and manufacturing processes have been unprecedented.

At the early stages of the program, Master Tool was invited to review the processes on the machining of the six cylinder block. The finish cylinder boring was a main concern because the process called for a double transfer of the block to permit the cylinder bore tool to be advanced into the bore in a non-rotating condition. This was necessary because the finish diameters above and below the liner shelf were the same diameter. However, this also required the spindle to be stopped and started on each cycle. Not only was this time consuming but it added additional stress and wear on the spindle bearings - reducing the projected spindle life dramatically.

Master Tool proposed a cylinder bore tool that did not have to be started and stopped on each cycle. Based on previously designed feed-out heads using helical spline,

Master Tool was able to design a cylinder bore tool that could enter the bore in a rotating condition. Once inside the bore, a push on the single drawbar rotated the bottom bore diameter cutting head into position for finish machining of both the top and bottom diameters. Then a push on the drawbar feeds the cross slide out to machine the liner shelf (see illustration above). The system is then reversed to remove the cylinder bore tool from the finished bore.

The cross slide used to machine the liner shelf is round, rather than the conventional square slides used by competitors. This permits the slide to be sealed with an O-Ring to eliminate outside contaminants from entering the head.

This innovative design reduced the cycle time by not shutting the spindles off, reduced the machine cost by eliminating the double transfer and provides longer spindle life by reducing the wear on the spindle bearings.