

## 10HH-D Series

### Crankshaft Bore Ream Machine

#### Standard Features

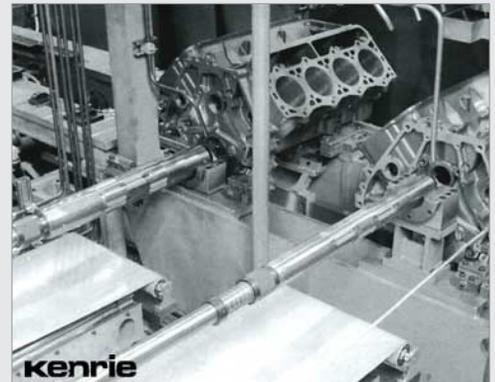
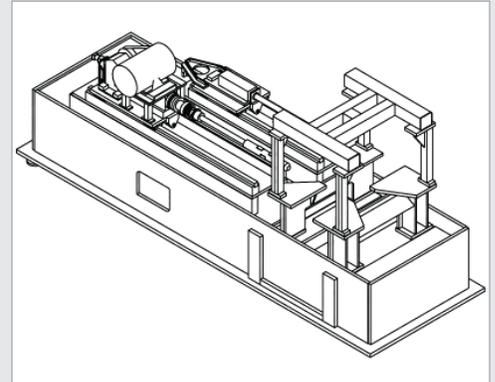
- Modular design with industry proven components
- Electronic motion control system
- Electronic stroke control
- PLC controlled machine functions
- User-friendly operator interface
- Spindle motor / tool load monitor and protection system
- Adjustable stroke and feed parameters
- Machine Fault diagnostic software

#### Description

The 10HH-D Series diamond ream machines have established the benchmark for excellence in finishing crankshaft, camshaft and balance shaft bores of various engine blocks. These machines are working in engine plants around the world and achieving the ever more demanding tolerances required by the industry.

Diamond ream tools are well suited for generating accurate size, surface finish and cylindrical form of engine blocks having cast iron, bi-metal or aluminum bores. The inherent characteristics and performance of ream tools make them a natural choice for machining these difficult configurations. The tools are designed to allow a set of diamond abrasive inserts to quickly pass through a cylindrical form in a single pass process. The abrasive inserts remain at a fixed diameter throughout the process, while only removing material that is diametrically smaller than the setting of the tool inserts. This technique provides advantages over conventional honing since less machining stock is required to achieve an equivalent result. In addition, ream tools can be used with water-based coolants which provide ergonomic and environmental advantages.

Ream tools used for crank and cam bores are typically arranged with (6) or more diamond abrasive inserts. The use of abrasive inserts, in lieu of diamond plated tool technology, permits optimization of the process by fitting the abrasive to the application.



Production cost for this arrangement is typically very low, with abrasives commonly lasting in excess of 500,000 cycles when machining cast iron or bi-metal bores.

All 10HH-D Series ream machines include as standard equipment, a PLC based programmable controller for monitoring and controlling various machine motions and process parameters throughout the machining operation.

Options include a coolant filtration and refrigeration system, post process gauging system used for bore size and geometry results, SPC process control software and modifications to encompass any customer specified components. KENRIE can also further enhance your 10HH-D Series ream machine by integrating a variety of production automation like marking systems or load/unload automation as part of the basic machine transfer design.

Diamond ream tooling and abrasives are designed and optimized for use with each 10HH-D Series machine. As the manufacturer of all critical items used in each machine sold, KENRIE ensures undivided responsibility for the performance of the entire process, including ream tools and abrasives.

All 10HH-D Series ream machines can be adapted to process different engine block configurations by changing the part contact details, and if necessary, the ream tools.

## Guide Specifications

### Efficiency Standards for a Typical 10HH-D Series Ream Process

Characteristic	CPK	Rbar	St Dev	Tolerance
* Crankbore size Ø	3.78	1.55µm	0.08µm	± 10.0µm
* Crankbore roundness O	27.0	0.07µm	0.02µm	25.0µm max
* Crankbore taper //	1.88	3.30µm	0.01µm	10.0µm max
* Cambore size Ø	6.75	4.90µm	0.06µm	± 18.0µm
* Cambore roundness O	3.30	3.04µm	0.05µm	6.5µm max
* Cambore taper //	1.76	1.70µm	0.01µm	10.0µm max

Machine type	Production rate	Total cycle time	Transfer type	# of spindles
10HH-D1	30 - 150 PPH	24 - 120 seconds	Single pitch	(1) total