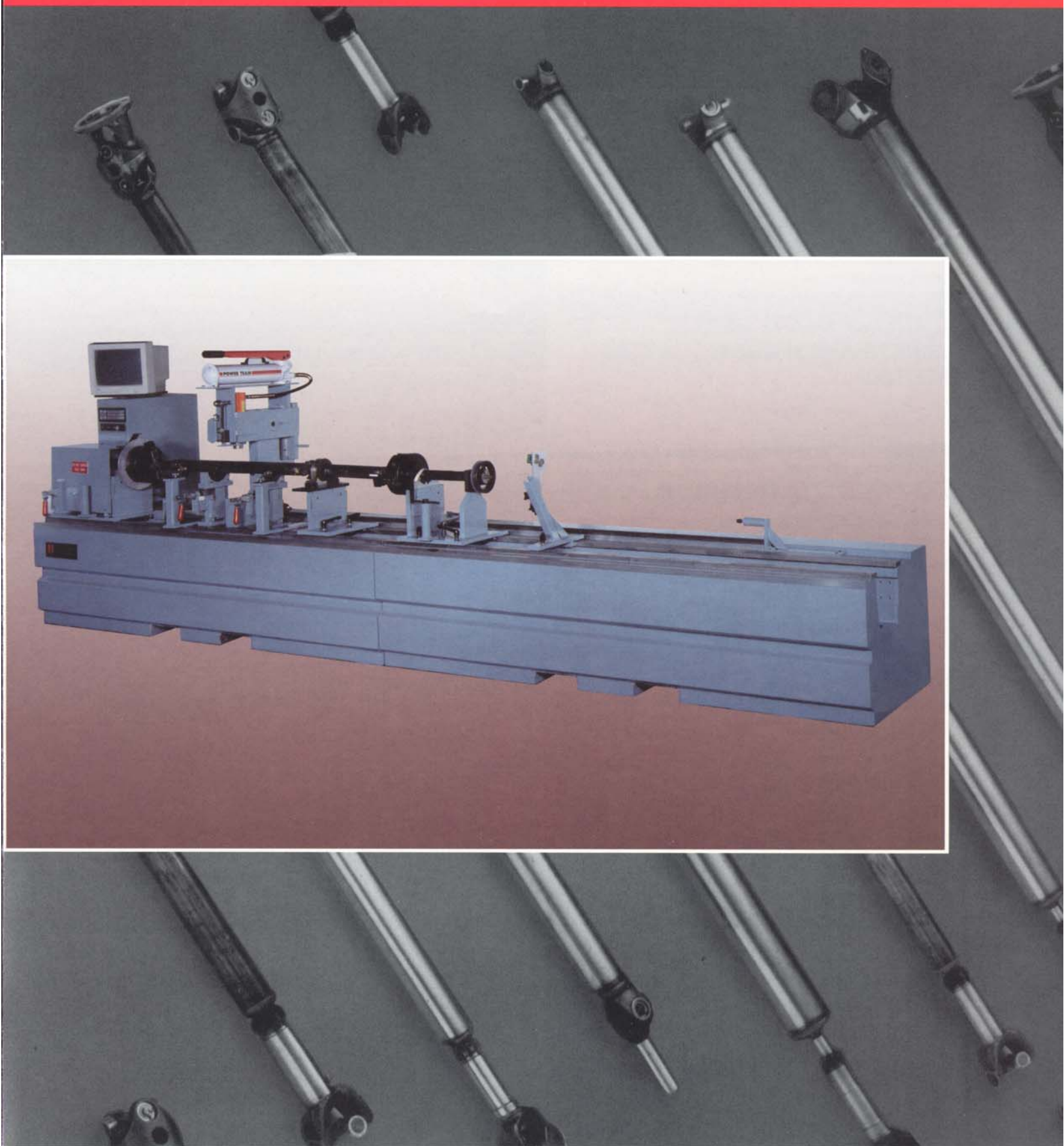
Hines Driveline Build and Rebuild Equipment

FABRICATION and BALANCE SYSTEMS



Hines Driveline Build

Why Should You Balance?

Dynamic Balancing:

- Eliminates the premature failure of transmission seals.
- Eliminates the premature failure of differential seals.
- Eliminates premature failure of U-joints.
- Gives you smoother running, longer lasting drivetrains.
- Gives your customers higher quality products.
- Gives you the edge on your competition.

BALANCING MEANS REPEAT BUSINESS AND HIGHER PROFITS!!!

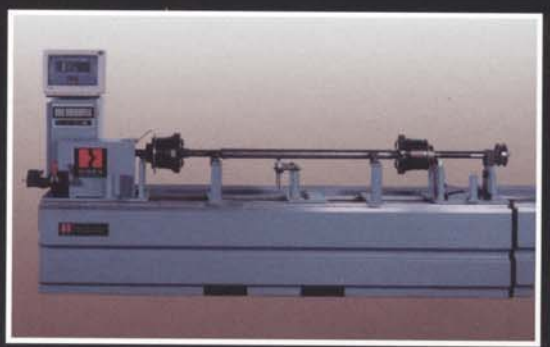
The Hines Difference

- Hard suspension gives permanent calibration.
- Hines' runout sensors read the true centerline, not the irregular tube surface.
- The Hines computer tells you the exact amount and location of unbalance.
- The Hines balancer takes all the driveshaft components into consideration.
- The Four-jaw chucks eliminate costly changeover time.
- Designed and built from the ground up in Ann Arbor, Michigan.
- Design your own system with our variety of options.

Advanced Digital Computer Technology:

- Unparalleled accuracy
- Easy Setup
- Quick Readout

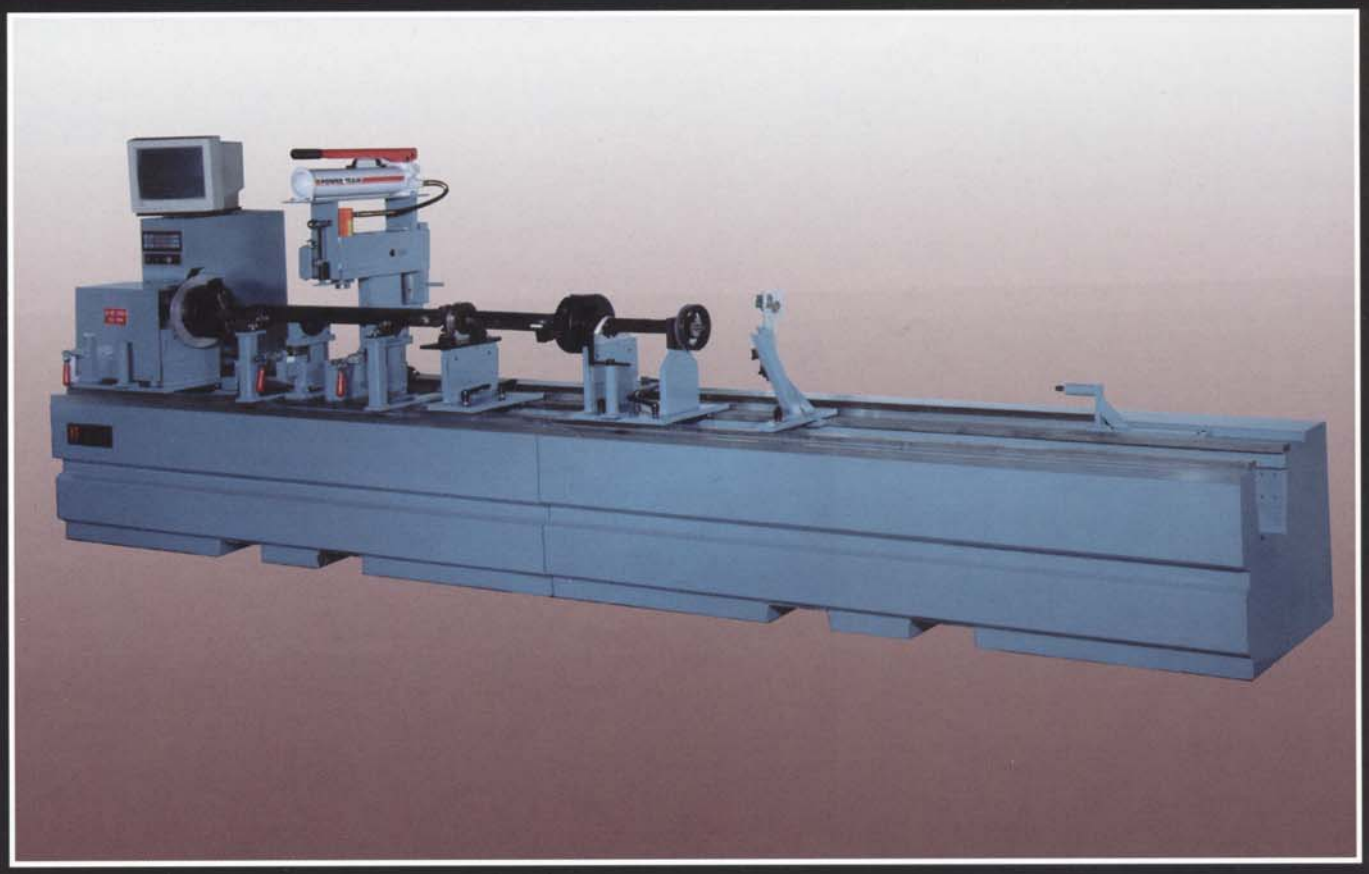
The Computer walks the operator through every step!



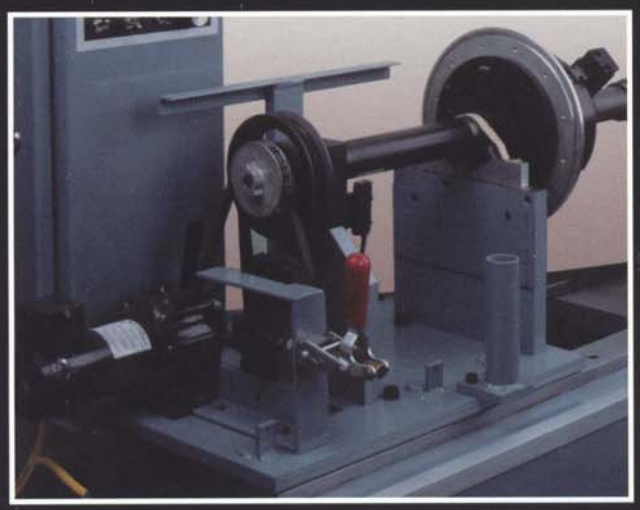
Hines Balancer:

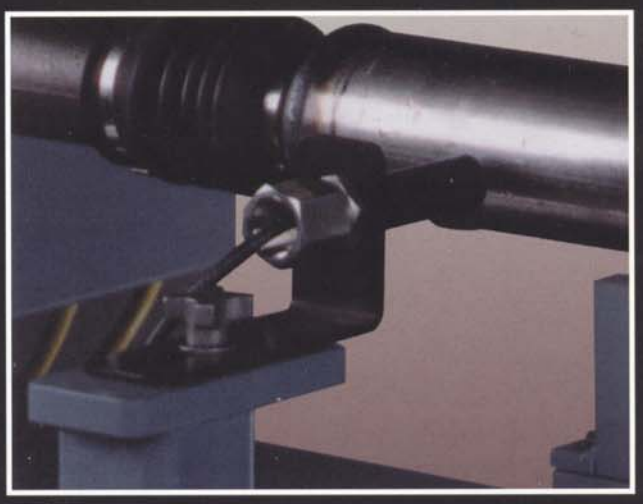
- Rugged hard bearing suspension
- Simplified setup, first spin readout
- Factory calibration
- High sensitivity for precision
- Steel and formulated concrete base for vibration dampening and stability
- Balancers are our business

Rebuild System is FAST, ACCURATE, EASY TO USE



Hines DL-500 Balancer with optional Straightening Press





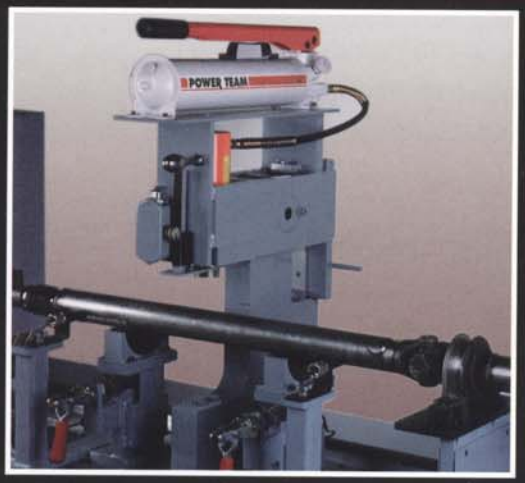
Welding Equipment:

- An adjustable-speed motor control drives the spindle for the welding operation.
- Copper ground strap (not shown)
- Gun holder (not shown)

Runout Sensors:

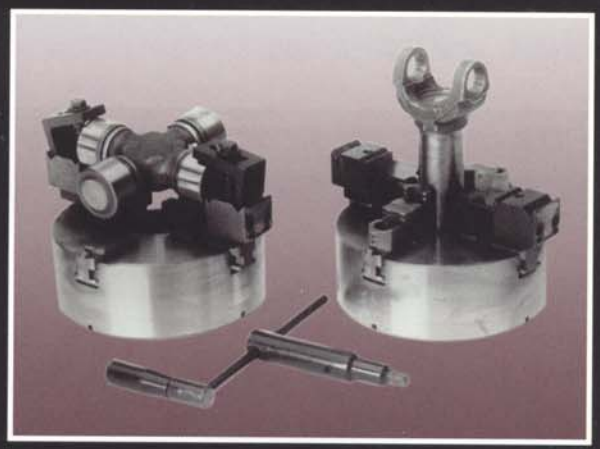
- Two non-contact runout sensors transfer runout signals to the computer.
- The computer filters out all tube irregularities to measure the actual amount and angle of tube runout -- all in a matter of seconds!

and PROFITABLE



Straightening Press System:

- The Press is a heavy-duty C-frame press with a two stage hydraulic pump.
- The Electronic Depth Sensor measures the amount of correction made by the press. This amount is displayed on the computer.
- Two Lift-Off Jacks with tooling correct runout before and after welding.



The Hines Tooling System:

The Four-Jaw Chuck s are manufactured and balanced to precision tolerances. They hold the driveshaft on its true centerline providing outstanding accuracy.

These chucks hold either couplings or tubing so the operator can balance through series 1810 driveshafts without changing tooling.

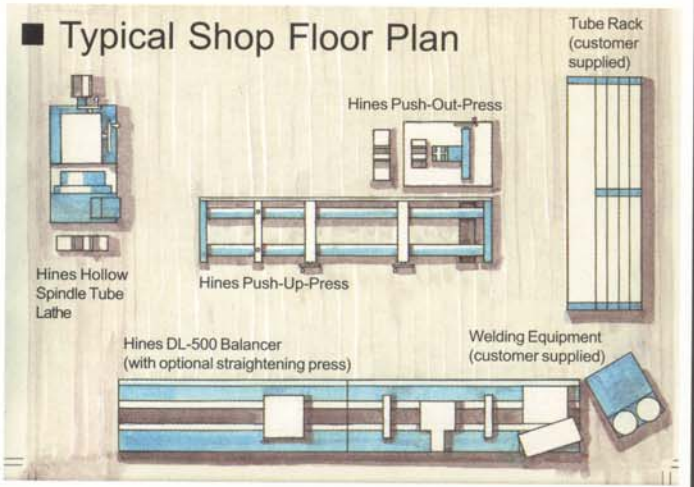
■ *Balancer Options:*

- Standard and Heavy Duty Versions
- Wing Bearing Style and Other Tooling
- Special Wiring
- Adjustable Tolerance
- Second Center Stanchion
- Additional Bed Length
- Straightening Press

■ *Balancer Specifications:*

Weight Capapcity	500 lbs.
Length	16 feet
Diameter (max inboard)	24 inches
Max. Sensitivity	+/- 0.02 oz.in.
Workpiece Height (above floor)	36 inches
Base Size (2 beds)	16 ft. x 3 ft.
Floor Space Required	20 ft. x 7 ft.
Shipping Weight	8000 lbs.
Machine Color	Blue-gray
Motor	1 hp, DC
Balancing Speed	500 rpm
Runout Speed	340 rpm

■ Typical Shop Floor Plan

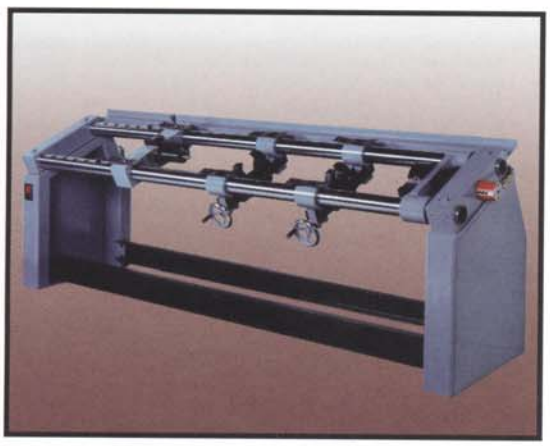


The Hollow Spindle Tube Lathe

The Hines Hollow Spindle Tube Lathe allows you to cut and chamfer tubing with ease and efficiency. You can also use it to remove welds from existing shafts for replacement of tube shaft and yoke.

The lathe is made with a three-jaw chuck which expands to an inner diameter of 7-1/4 inches. This allows you to cut a variety of tubing sizes.

Variable speed control on the Hollow Spindle Tube Lathe makes machining end yokes and stub yokes easy!



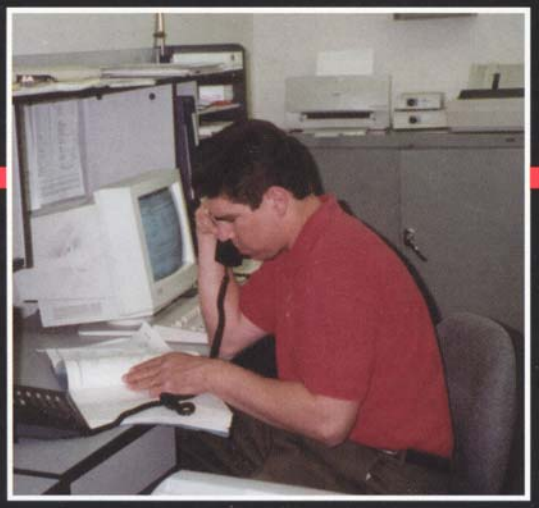
The Push-Up-Press

On the Hines Push-Up-Press, a 25 ton hydraulic ram simultaneously pushes a tight joint sub-assembly and a splined tube shaft into the tubing. This saves considerable labor time.

Stretched, heavy-duty, and high production models are available.

The Push-Out-Press

With the Push-Out-Press you can remove end fittings from old or damaged driveshafts in one simple step. This machine can be used just as easily to remove center bearings.



Hines Service and Technical Support

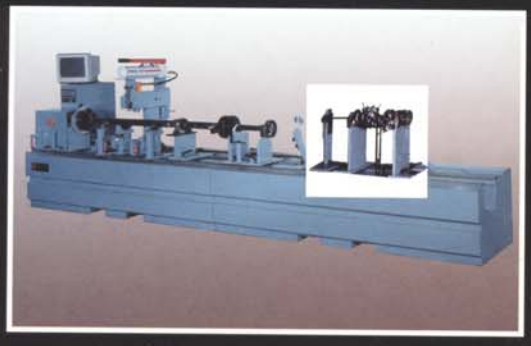
The Hines Service Department is here to answer your questions. Whether you need general help with your balancing concerns, or specific answers to technical questions, we're here to help. Also, since we build your balancing machines right here in Ann Arbor, we can supply you with any parts that you may need to enhance your Driveline Build/Rebuild System.

Engineering & Design

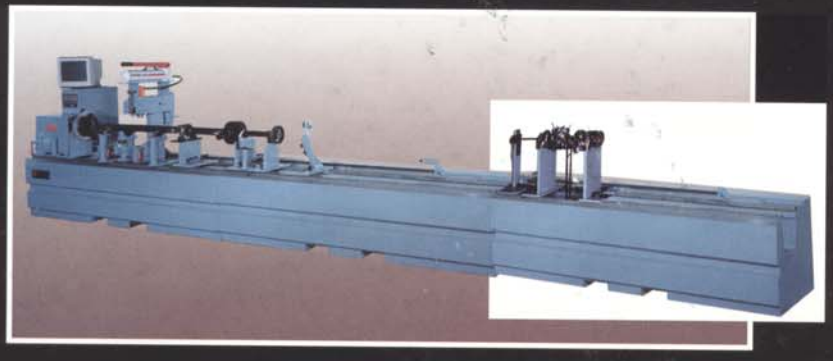
The Hines Mechanical, Electrical, and Software staff design your system to best fit your driveshaft balancing and build/rebuild needs. Their dedication to creating and perfecting state-of-the-art equipment has produced a whole line of balancing equipment that includes manual, semi-automatic, and automatic systems for a wide variety of product lines. In the field of Driveline Build/Rebuild, Hines offers a fast, efficient system that can turn your shop into a profit center.

Hines Driveline Build/Rebuild Equipment

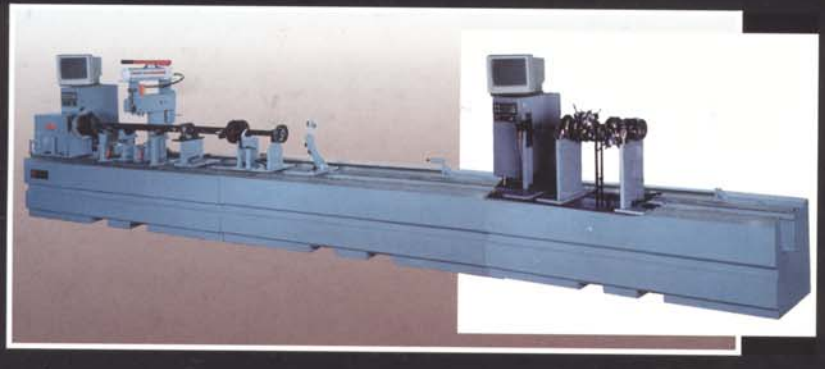
Enhance the flexibility of the Hines Driveline Balancer with Crankshaft Balancing Capability.



Option #A:
The package includes an additional drive motor, encoder, stanchion assemblies, restraint bars and remote on/off switch. These items are mounted to the right 8 ft. base while sharing the advanced DL500 computer. This configuration allows an operator to balance one part at a time. Stanchion assemblies are portable allowing the right base to accommodate longer driveshafts. *(See crankshaft brochure for balancing accessories).*



Option #B: The package includes an additional 8 ft. base, drive motor, encoder, stanchion assemblies, restraint bars and remote on/off switch. These items are mounted to the third 8ft. base while sharing the advanced DL500 computer This configuration reduces changeover time and increases shop efficiency. The operator is able to balance one part at a time. Stanchion assemblies are portable allowing the right base to accommodate longer shafts. *(See crankshaft brochure for balancing accessories)*



Option #C:
This option allows balancing crankshafts and driveshafts simultaneously. The package includes an additional 8 ft. base, advanced computer with video display, drive motor, encoder, stanchion assemblies, restraint bars. The additional 8 ft. base reduces changeover time. Stanchion assemblies are portable allowing the third base to accommodate longer driveshafts. *(See crankshaft brochure for balancer accessories.)*

Specifications for above options:

Hard Bearing Suspension
500 lb. Capacity
Length bearing to bearing - 5" to 80 "

Balance Sensitivity +/-0.01 oz.in
Balancing Range - 400 to 700 rpm
Swing Diameter - 36"