

PHI Tube and Pipe Bending Machines



Look to PHI, the Industry Leader in Tube and Pipe Bending Equipment.

PHI has been a leading manufacturer of tube and pipe bending equipment for over 40 years. First as Leonard Precision Products, then as Conrac Corp. - Machine Tool Division and now as PHI Machine Tool. The PHI tube and pipe benders are designed to meet a wide variety of customer requirements from the small production or prototype job shop to the high end user. PHI offers the right machine for the right application providing a full complement of machines from the manually operated machines, where precision bending and portability are required, to the more sophisticated higher production machines, that require hydraulic bending and programmability for precision forming, that provides accurate repeatability from part to part.

PHI is also known for quality products such as tube end finishing machines for flaring, squaring and deburring and bead forming the ends of tubes. Pipe flanging machines and automated multi-head welding systems are among the family of specialized products offered by PHI.

PHI has led the industry in terms of such refinements as drop-away clamps to allow the bending of more complicated shapes, and follower block assists and pusher assemblies that provide the operation with more precise control over wall thickness.

As manufacturers of production equipment, PHI has taken special care to design safety and reliability into each tube and pipe bender. All HR Series hydraulically powered machines, for example, are equipped with safety plates on the bender arm. Rack-and-pinions and worm gears are utilized rather than chains on all carrier drives.

Every PHI bending machine is warrantied for parts and labor, for one year from date of delivery. Expert service specialists are available for travel to all parts of the world for consultation and service.

PHI is the leader in bending equipment - for a reason.

Manual Bending Systems

410/411 Manual Bending Machines

The ideal bending machines for prototype departments, small machine shops and operations where cost is a factor and when only a few bends are needed per piece. The compact design permits a great deal of mobility, as well as flexibility of location. They're lightweight and require less than four square feet of bench space - including the bend arm sweep. With tube forming capabilities up to 1.0" diameter x .065 W.T. These machines offer a great return for the investment.

420 Precision Bending Machine

The model 420 is a totally flexible and precise manually operated "Draw" or "Rotary Die" type machine. It has a special gear-operated bend arm that will increase leverage 4 to 1 when bending heavier tubes. The model 420 is reversible and may be set up for either right or left hand bending. This machine can be purchased in a bend head only configuration or as a complete system for those jobs requiring multiple bends on a different axis. This is the ideal system for forming tube sizes up to 1.5 diameter x .065 W.T.

Hydraulically Operated Systems

PHI's family of synchronized bending machines, models 411HR, B210 Synchro, 210HR, 220HR and 233 Synchro offers three axis bending with one powered axis for degree of bend (DOB). Our modular design - a basic machine with many options, allow each machine to be custom fitted to meet your needs for forming tube sizes up to 3" diameter x .188 W.T.

PHI's user-friendly programmable digital controllers are specifically designed for bending and are logically laid out for proper bending sequencing. It has a capacity for 100 programs consisting of 1 to 10 degree of bends per program. The optional carriage system allows mechanical presetting of up to 10 planes of bend (POB) and distance between bends (DBB). When incorporated with the controller, the machine will synchronize and interlock all three functions to ensure correct tube alignment before bending can occur. This ensures easily repeatable bent tube shapes and scrap-free production.



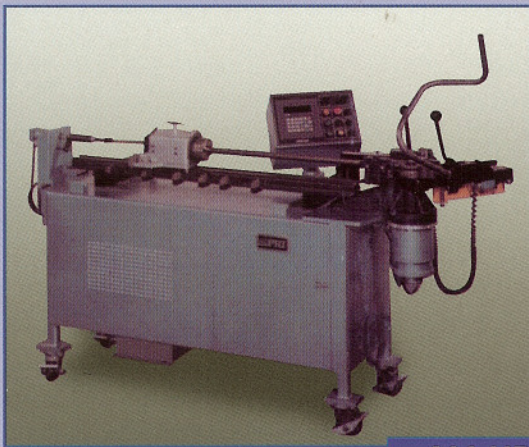
420 Precision Bending Machine



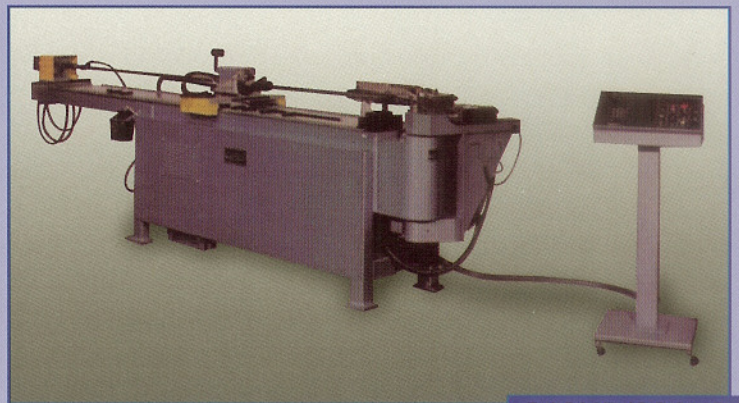
410 Manual Bending Machine



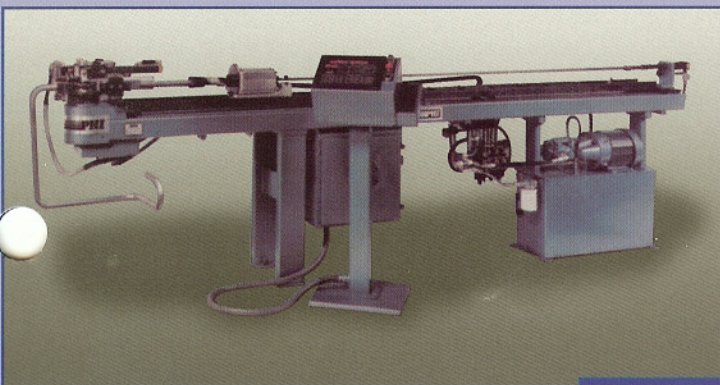
411 Manual Bending Machine



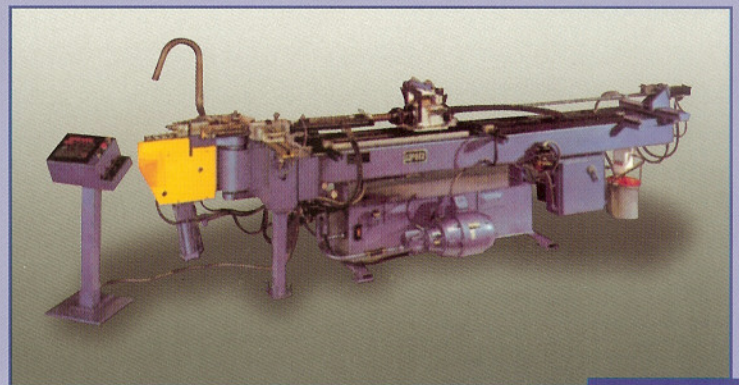
411 HR



210HR/220HR



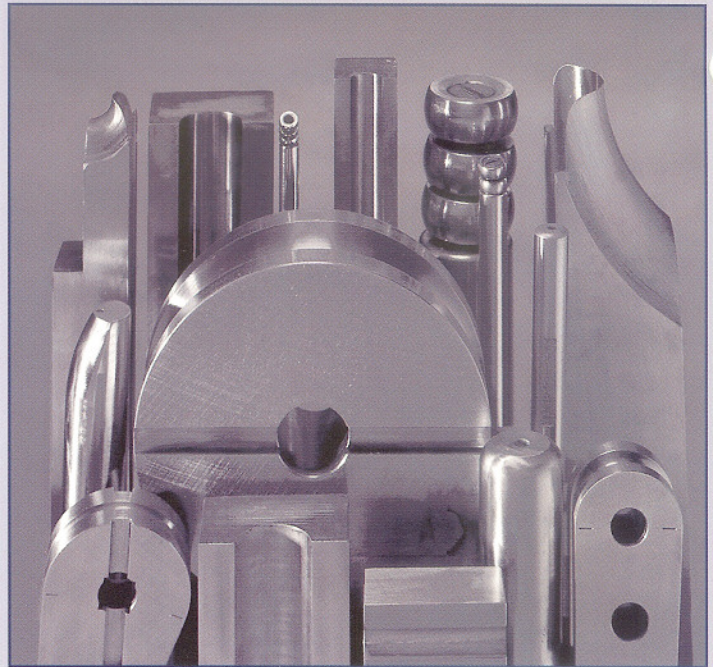
B210



233

Tooling Offers the User These Benefits:

- The PHI Adaptive Tooling System permits bending a wider range of material diameters on one machine. Conversely, it makes a single item of tooling usable on a number of different PHI bending machines.
- Wiper dies are machined to achieve best tangential fit with bend dies.
- Follower blocks are designed for precise alignment with the radius block.
- PHI tooling is manufactured in conformance with the requirements of military specifications MIL-I-45208A and MIL-C-45662A.
- Clamp blocks are designed for maximum grip of the tube and have a typical length of four times the Tube Outside Diameter; large sizes, three times Tube Outside Diameter.
- All stock tooling subject to prior sale.



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