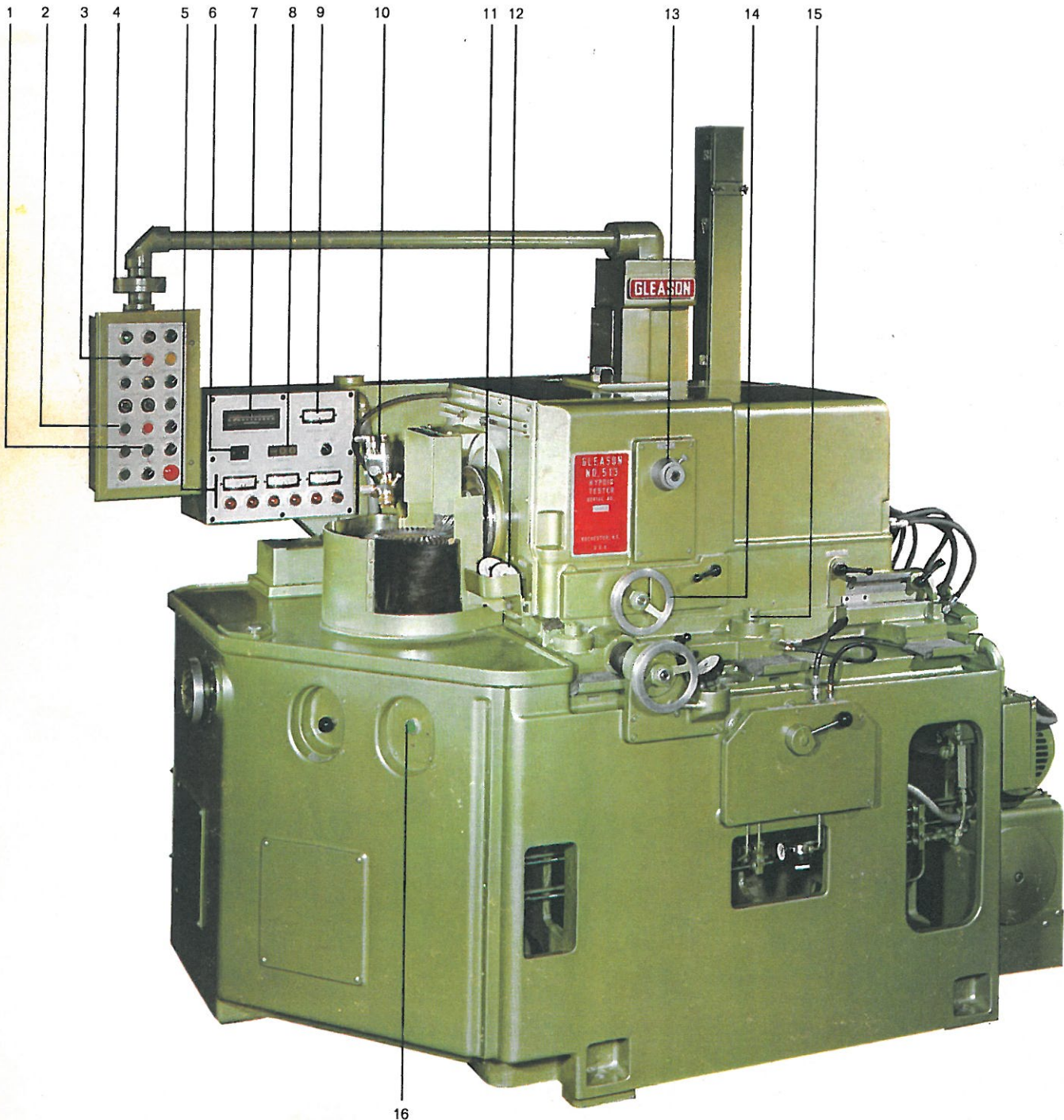
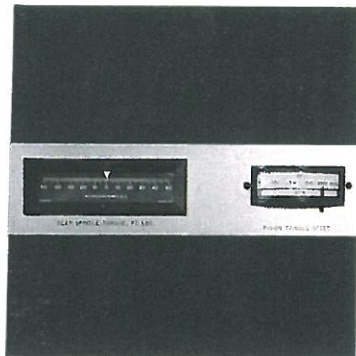


## Feature Highlights

1. Slow-speed roll button
2. Cycle start button
3. Automatic cycle button
4. Movable control pendant
5. Quality measurement system
6. Automatic pinion cone search limit adjustment
7. Gear spindle torque meter
8. Digital read-out
9. Pinion spindle tachometer
10. Automatic marking compound and oil spray system.
11. Pinion cone dial indicator
12. Backlash dial indicator
13. Backlash setup dial
14. Pinion cone search handwheel
15. Pinion head slide clamp
16. Dual-control button



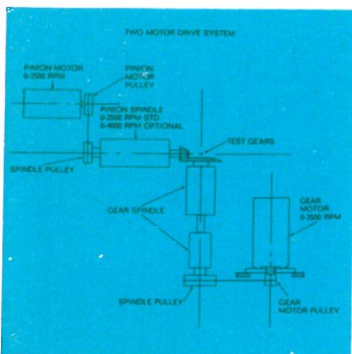
# Features



## TORQUE AND SPEED CONTROL SYSTEM

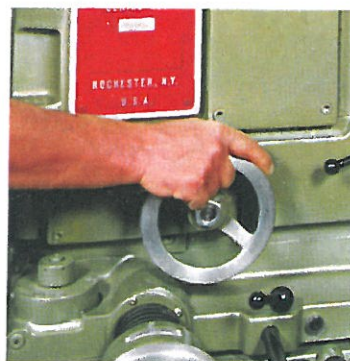
Gear spindle torque and pinion spindle speed are adjustable to any desired value by means of potentiometers. These permit varying torque while maintaining a constant speed . . . or varying speed while maintaining a constant torque. Once set, torque and speed are accurately controlled by feedback systems.

Operator can observe actual gear torque and pinion spindle speed on panel-mounted torque meter and tachometer.



## TWO-MOTOR DRIVE SYSTEM

Separate motors for pinion and gear spindles allow load to be shifted from coast to drive side of gears, or vice-versa, without reversing spindle rotation. This drive system makes the testing operation faster.



## MANUAL PINION CONE SEARCH

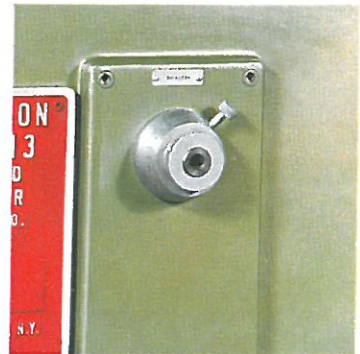
This is used to find the quietest cone position while the gears are running. The pinion cone position may be seen directly on the dial indicator or the digital read-out. Pinion cone stops are used to mechanically limit the amount of pinion movement within a desired range.



## 12 RPM PINION SLOW ROLL

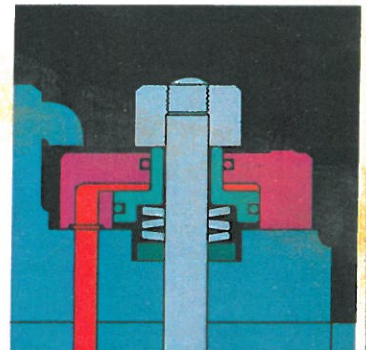
This is used to rotate the gear set for brushing on marking compound, and inspecting tooth bearing patterns.

It is also used to measure composite tooth error (kick-out) between pinion and gear teeth. Results are read on the backlash dial indicator when pinion and gear are in metal-to-metal contact. This feature can be used to assure that the gear set is within production tolerances for spacing and runout.



## AUTOMATIC BACKLASH CONTROL

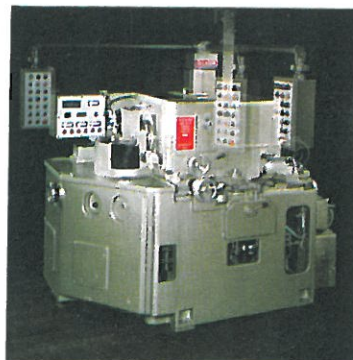
Provides a pre-selected amount of backlash. After pinion is advanced into metal-to-metal contact, size variation is shown on the dial indicator. The pinion is then withdrawn a pre-selected amount and the gears are ready to be tested.



## CROSS SECTION OF PINION SLIDE CLAMP HYDRAULIC CHUCKING AND CLAMPING

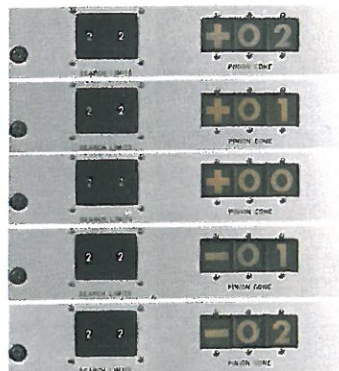
Gear and pinion are automatically chucked by spring force before parts are in mesh. Automatic dechucking is hydraulic, and occurs when the pinion is completely raised from mesh. A new type of double acting chuck assures that the dechuck force is not applied to the spindle bearings.

Clamps holding gear head, pinion head, offset slide and backlash mechanism securely positioned during machine operation, are also spring operated as shown. Application of hydraulic pressure (orange) compresses spring and unclamps slide.



## MOVEABLE CONTROL PENDANT

May be easily positioned for the convenience of the operator.



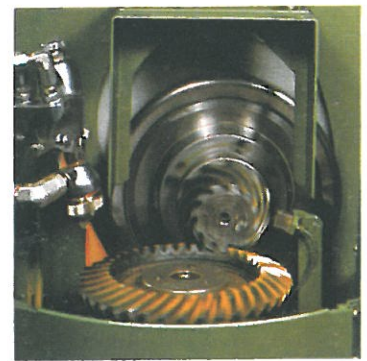
#### AUTOMATIC PINION CONE SEARCH

This moves the pinion along its axis and allows the quality measurement system to select the position where vibration amplitude is the lowest. This pinion cone setting appears on the digital read-out and remains after the test cycle stops.



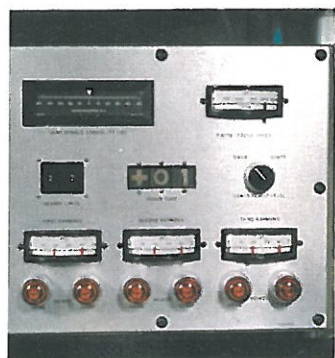
#### AUTOMATIC TEST CYCLE

Allows programming of the test operation. Torque and running time for both drive and coast sides can be preset independently.



#### AUTOMATIC MARKING COMPOUND AND OIL SPRAY SYSTEM

As gears begin to accelerate to test speed, marking compound or oil is automatically sprayed onto the gear, coating both sides of the teeth. A push of a button will apply an additional amount if desired. Fully adjustable for flow and direction, the spray is easily set to accommodate various size gears.



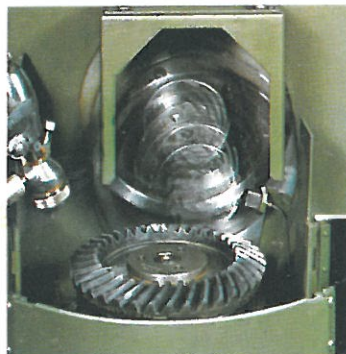
#### QUALITY MEASUREMENT (STEM)

This feature provides a visual indication of the gear set quality, measuring the vibration amplitudes and illuminating reject lights if the preset quality limits are exceeded on either drive or coast side.



#### DIGITAL READ-OUT

Provides a visual display of the difference (+ or -) between the actual and the theoretical pinion cone positions. This reading, in thousandths of an inch or hundredths of a millimeter, determines the size of the shim to be used for positioning the pinion in the best running position when the axle is assembled.



#### AUTOMATIC MESHING

After loading the machine, the operator simultaneously presses the "cycle-start" and "dual-control" buttons. Parts are chucked. Then the pinion rolls slowly and advances into mesh. When the gears are in metal-to-metal contact, backlash is introduced and the machine is ready to run.



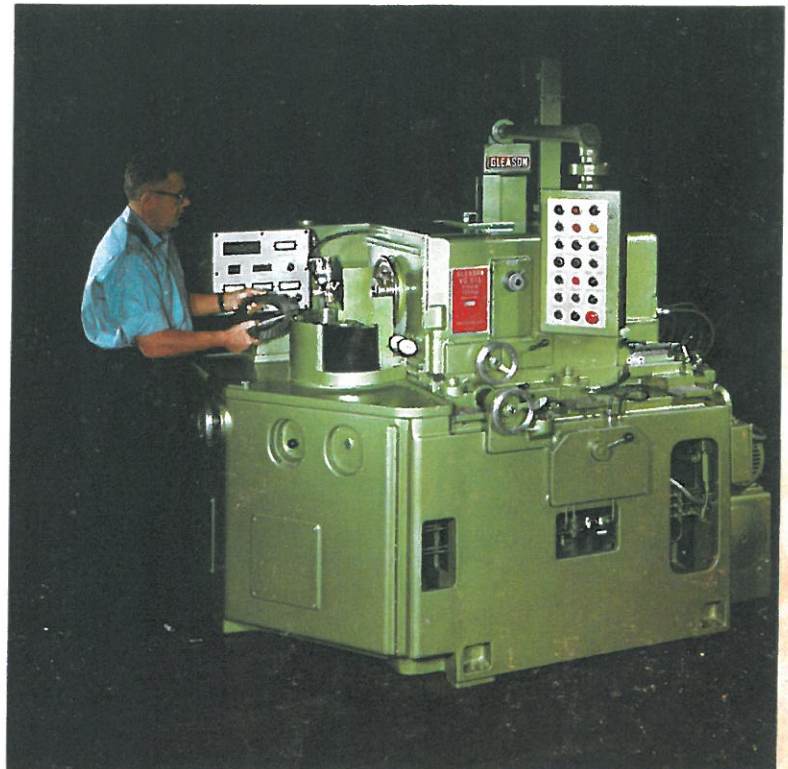
#### AUTOMATIC PINION CONE AND QUALITY STAMPING DEVICE

Operates at the end of the automatic test cycle and stamps the following information on the pinion face:

- Pinion cone digital readout value.
- Quality rating:
  - "A" if the gear set is acceptable.
  - "R" if rejected on both drive and coast sides.
  - "D" if rejected on drive side only.
  - "C" if rejected on coast side only.

## Manual operation

(513 basic machine)



The operator manually performs all of the following operations:

1. Places gear and pinion in the workholding equipment.
2. Simultaneously depresses the "advance" and "dual-control" buttons.
  - a. The parts are chucked.
  - b. The pinion lowers to the proximity of mesh.
3. Jogs the "advance" button, and manually meshes the gears.
4. Pushes the slow roll button and brushes marking compound on the slowly rolling gears.
5. Simultaneously depresses the "cycle-start" and "dual-control" buttons. The gears accelerate to test speed.
6. Varies the pinion cone to obtain the quietest running position on the drive side.
7. Turns a switch to apply load to the coast side of the gear teeth.
8. Listens to the coast side to check the noise level.
9. Releases the "cycle-start" button and the gears stop.
10. Observes the tooth contact on both sides of the gear teeth.
11. Reads variation from the theoretical pinion mounting distance, shown on the dial indicator. Then marks this value on the pinion.
12. Pushes the "withdraw" button. The pinion withdraws, and the gears dechuck.
13. Unloads the parts.

# Gleason 513 specifications

## CAPACITY

	English	Metric
Gear outside diameter (maximum) . . . . .	20"	508 mm
Pinion outside diameter (maximum) . . . . .	10"	254 mm
Offset of pinion spindle center in either direction from center of gear spindle (max.) . . . . .	4"	101.6 mm

## PINION SPINDLE

Diameter of taper hole at large end . . . . .	3 <sup>29</sup> / <sub>32</sub> "
Taper per foot . . . . .	3 <sup>9</sup> / <sub>64</sub> "
Depth of taper . . . . .	3"
Diameter of hole at small end . . . . .	3.740"
Depth of hole at small end from face of spindle . . . . .	15.5"

## GEAR SPINDLE

	Standard	Large Bore
Diameter of taper hole at large end . . . . .	2 <sup>1</sup> / <sub>4</sub> "	3 <sup>29</sup> / <sub>32</sub> "
Taper per foot . . . . .	1/2"	3 <sup>9</sup> / <sub>64</sub> "
Depth of taper . . . . .	3"	3"
Diameter of hole at small end . . . . .	2.168"	3.740"
Depth of hole at small end from face of spindle . . . . .	8"	7"

## ELECTRICAL EQUIPMENT

	60 Cycle	50 Cycle
Main motor—pinion sp.	7 1/2 H.P., D.C. 0-2500 rpm	same
gear sp.	10 H.P., D.C., 0-2500 rpm	same
Hydraulic motor	2 H.P., 1200 rpm	1000 rpm

## MISCELLANEOUS

	Machine		Electrical Enclosure*	
	Std.	Metric	Std.	Metric
Floor space . . . . .	65" x 88"	165.1cm x 223.5cm	26" x 72"	66cm x 183cm
Height . . . . .	75"	190cm	93"	236.2cm
Net wt. (est) . . . . .	10,745 lbs.	4,874 Kg.	2,800 lbs.	1,275 Kg.
Shipping wt. (est) . . . . .				
(boxed for export) . . . . .	12,500 lbs.	5,670 Kg.	3,400 lbs.	1,542 Kg.
Size of case (est) . . . . .	102" x 77" x 82"	259cm x 196cm x 208cm	81" x 34" x 96"	206 cm x 86cm x 244cm

60 psi minimum air pressure required for operation of machine.

\*free standing separate enclosure which can be located up to 30 ft. from machine.

## STANDARD EQUIPMENT

Two motor variable speed D.C. drive with controlled torque  
 Hydraulic power supply unit with accumulator  
 Hydraulic chucking both heads  
 Automatic preset backlash  
 Torque meter for measuring brake load  
 Manual pinion cone search  
 Pinion spindle tachometer  
 12 RPM pinion slow roll  
 Precision dial type indicators  
 Offset setting bar for zero offset  
 Pinion head spindle bore 3<sup>29</sup>/<sub>32</sub>" x 3<sup>9</sup>/<sub>64</sub>" taper x 3" long  
 Gear head spindle bore 2<sup>1</sup>/<sub>4</sub>" x 1/2" taper x 3" long  
 Complete electrical equipment including installation for 3 phase, 50 or 60 cycle, alternating current

## EXTRA EQUIPMENT

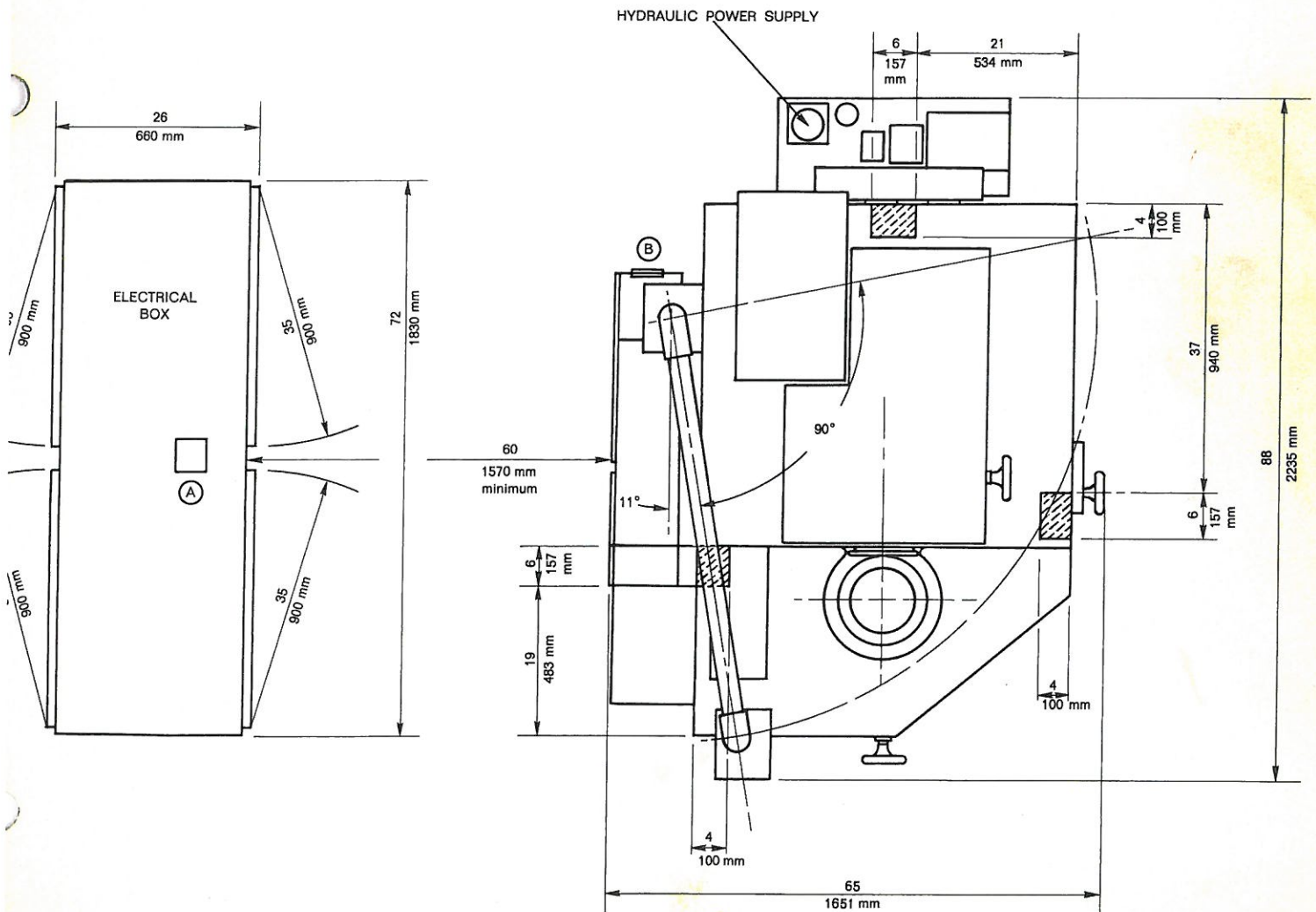
Additional offset setting bars  
 Gear quality measurement system  
 Automatic test cycle arrangement  
 Automatic meshing system  
 Dual spray system for automatic application of gear marking compound or oil mist  
 Digital read-out for pinion cone position  
 Automatic pinion cone search arrangement  
 Pinion cone and quality stamping arrangement  
 Production counter  
 Pinion cone stops for setting allowable search limits  
 Guarding arrangement for the following gear diameters:  
 • up to 10" outside diameter  
 • up to 20" outside diameter  
 High-speed drive arrangement for variable drive spindle speeds 0-4000 RPM  
 Setup bar assembly  
 Special gear head spindle bore 3<sup>29</sup>/<sub>32</sub>" x 3<sup>9</sup>/<sub>64</sub>" taper x 3" long in place of standard  
 Fixture for measuring mounting distance at front of pinion  
 Accumulator charging assembly  
 Graduated dial arrangement for pinion cone slide adjustment  
 Isolation mounts

**Machine layout**  
(dimensions in inches)

Stand up electrical box may be located not less than 5 feet or more than 30 feet from connection points A & B. Connections to be made with oil tight lay-in wireway & supplied by Gleason Works.

Note: for simplification all dimensions are accurate to approximately  $\pm 1''$  or  $\pm 25.4$  mm and may change. Do not scale drawing.

This machine should be placed on a solid floor or foundation and may rest on the three support pads.





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