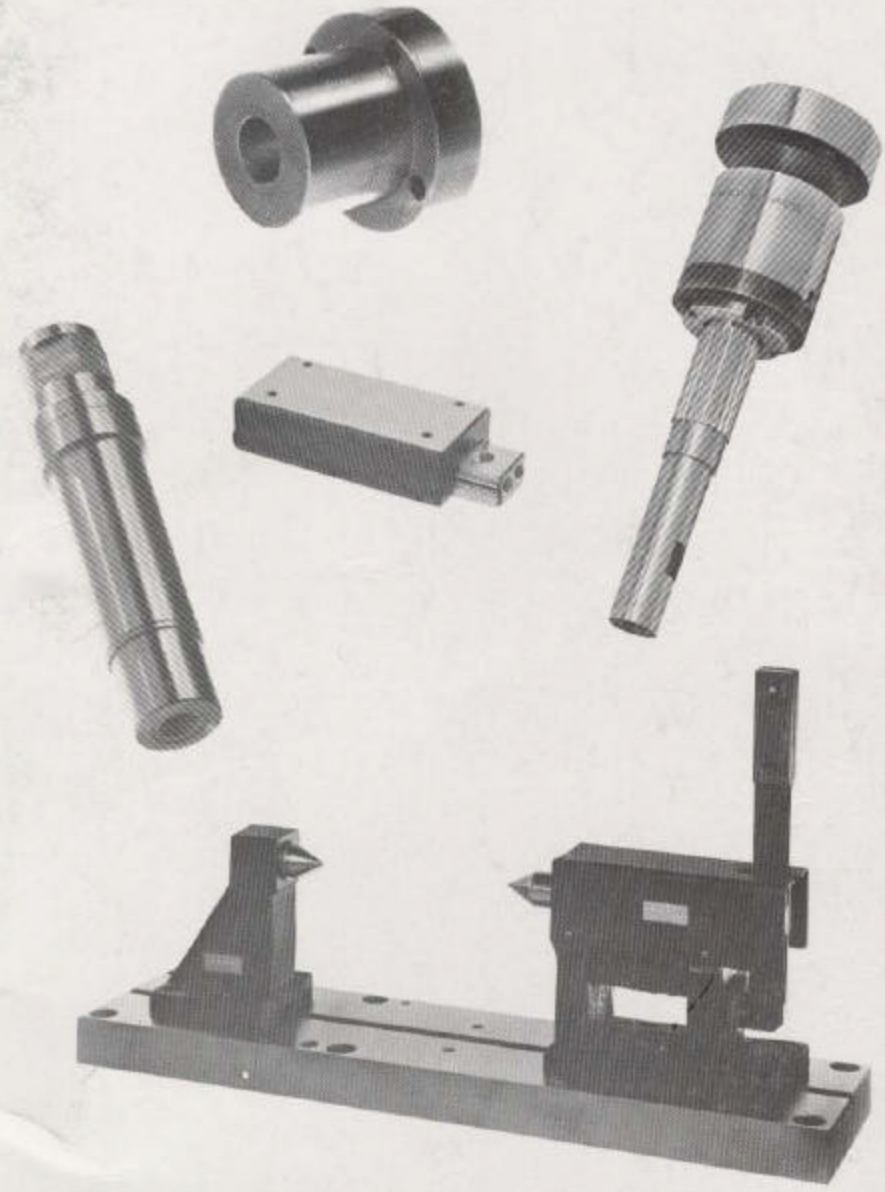
HANLO

FIXTURE GAGE
COMPONENTS

CATALOG 82D



HANLO GAGES

HANLO

GAGE & ENGINEERING CO.

TABLE OF CONTENTS

BALL SLIDES

FEATURES

- Off the Shelf

  Low Cost

  Delivery

  Ready for Mounting

- Precision Assemblies

  Accuracy of .0002 in their entire travel in either a horizontal or vertical mounted position

  Friction free movement

NOTE: Do not subject Ball Slide to any type of shock. Balls and ways may become brinelled.

- Travel

  1" to 6" of travel on standard models

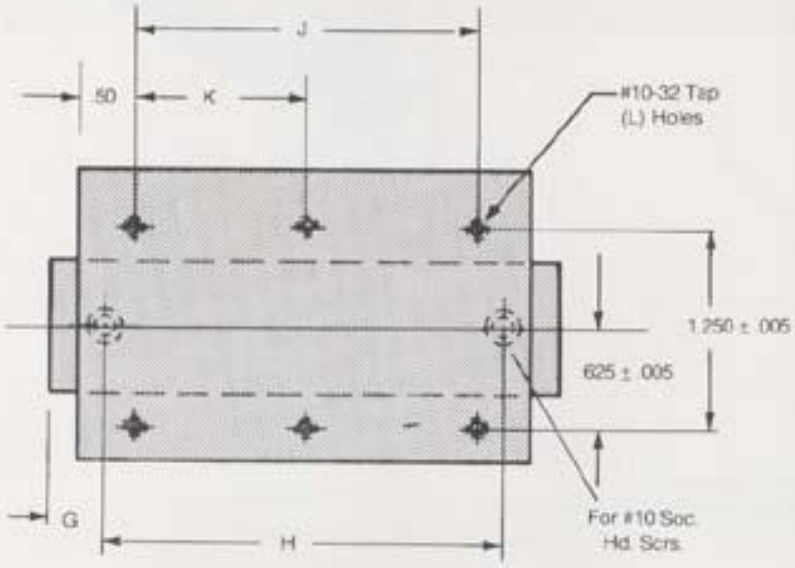
- 2 Models

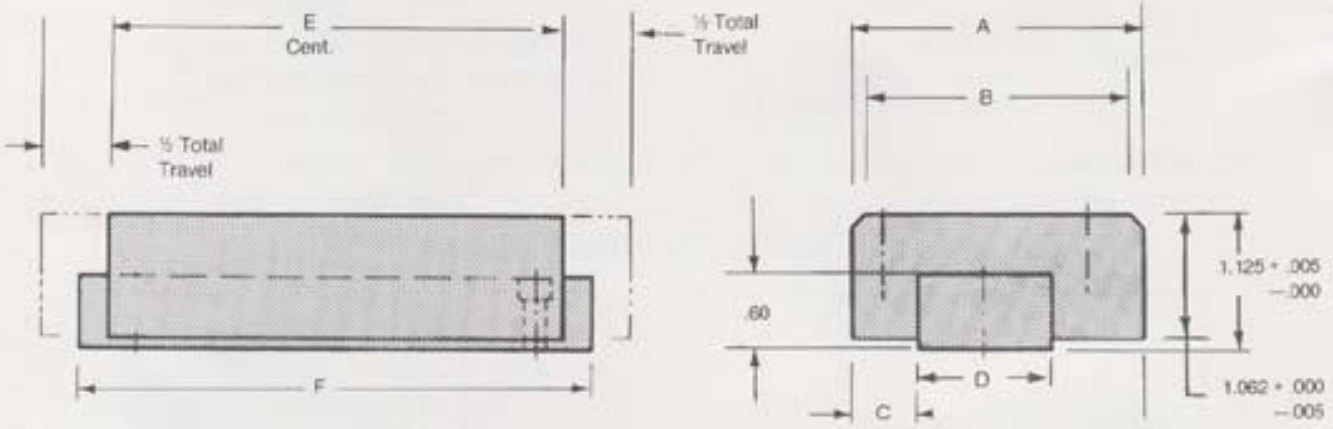
Light Duty

Model 23-1
24-2
25-3
26-4

Medium Duty

Model 34-3
37-6





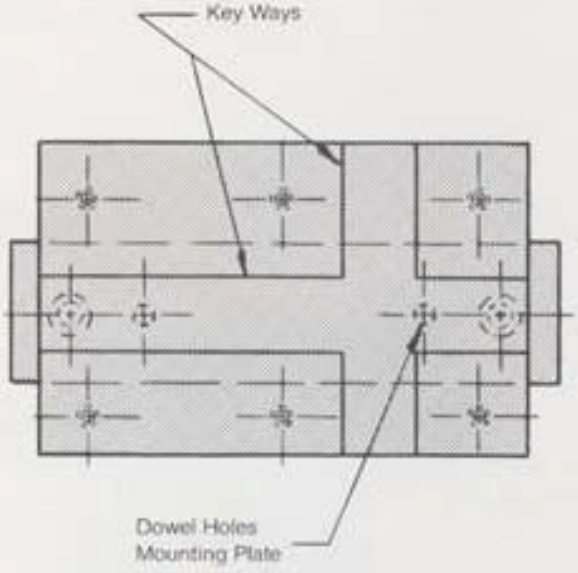
TYPE	MODEL NO.	A	B	C	D	E	F	G	H	J	K	L	TRAVEL
LIGHT DUTY	23-1	2.00	1.88	.405	.94	3.00	3.50	.50	2.50	2.00	0	4	1.0
	24-2	2.00	1.88	.405	.94	4.00	4.50	.50	3.50	3.00	0	4	2.0
	25-3	2.00	1.88	.405	.94	5.00	5.50	.50	4.50	4.00	0	4	3.0
	26-4	2.00	1.88	.405	.94	6.00	6.50	.50	5.50	5.00	2.50	6	4.0
MEDIUM DUTY	34-3	2.75	2.50	.554	1.49	4.00	4.50	.562	3.375	3.00	0	4	2.25
	37-6	2.75	2.50	.554	1.49	7.00	7.50	.562	6.375	6.00	3.00	6	6.0

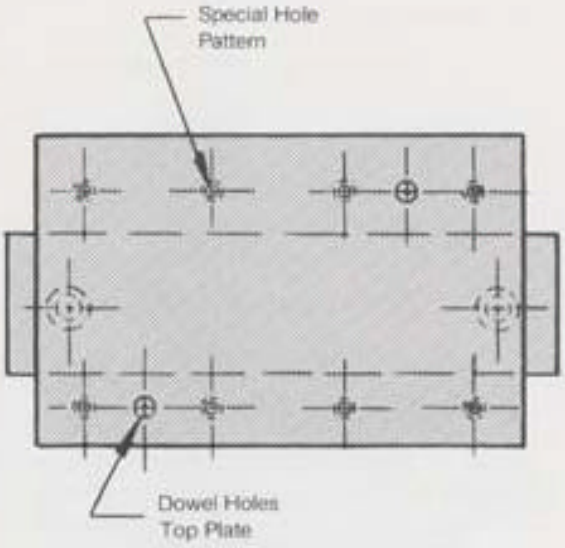
VARIATIONS

- Key Ways
- Dowel Holes — Top Plate
- Dowel Holes — Mounting Plate
- Hole Pattern — Other than Standard

Supply Hanlo with engineering drawing for quoting.

Hanlo's engineering staff can assist you with your variations and gaging problems. Your inquiry will receive prompt attention.





NOTE: Due to the precision of these units, all alterations must be made by Hanlo or our guarantee of accuracy is voided.

CENTER ASSEMBLIES

FEATURES

- Off the Shelf
  - Low cost
  - Delivery
  - Ready for mounting
- Accuracy
  - Center height held ± .0001 inch
- Reliability
  - Rugged construction
  - Centers available in tool steel or carbide, ground to precision ball type or production dimensions
  - Center assemblies covered to protect mechanism

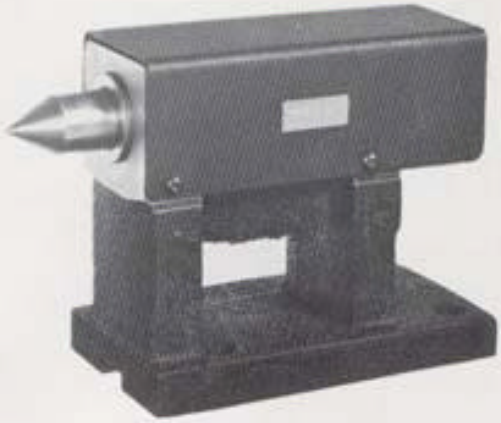
Standard Hanlo gage units must be incorporated in the special gage design to effect savings in both design and manufacturing costs.

Savings Originate in Design

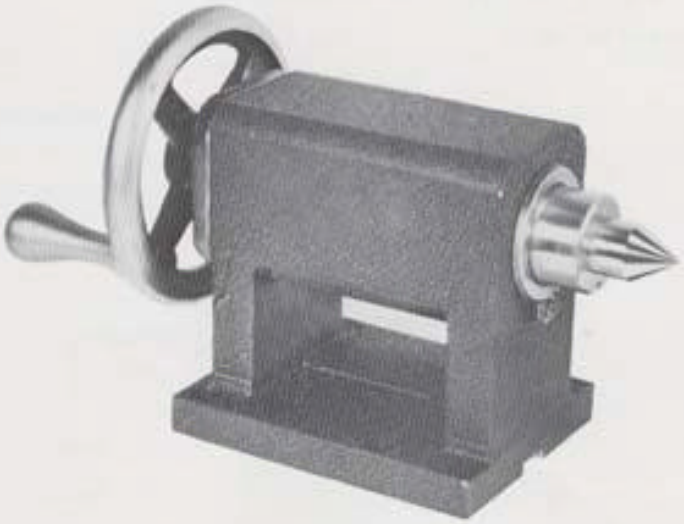
Retractable Center
Available with trigger to hold center in retracted position.

These Models Available
In Two Sizes

Fixed Centers



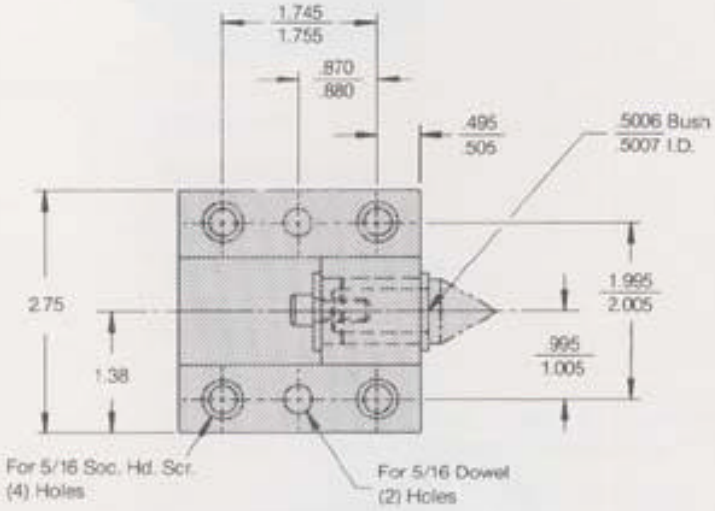
Spring Loaded Center



Variable Pressure Center Assembly

FIXED CENTER ASSEMBLY

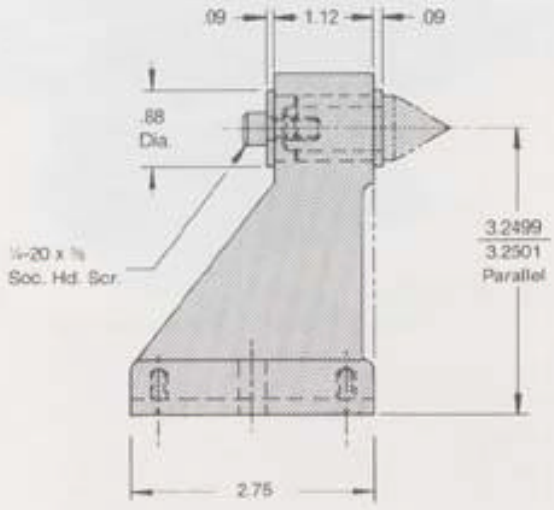
MODEL F-325

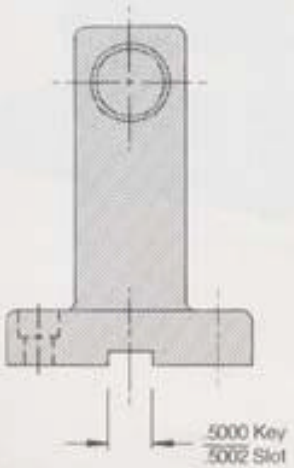


See Page 7
For Available Centers

Centers Are Not
Supplied With Unit

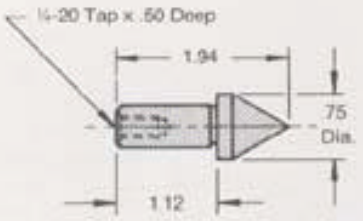
See Page 24 For
Ordering Instructions



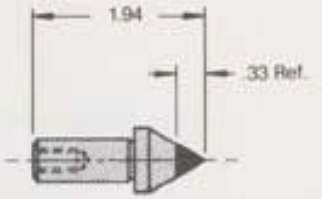


CENTERS FOR MODEL F-325

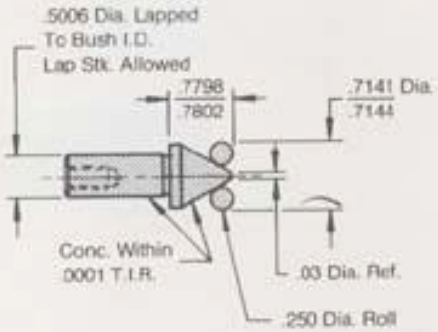
Model 325 FS
Tool Steel



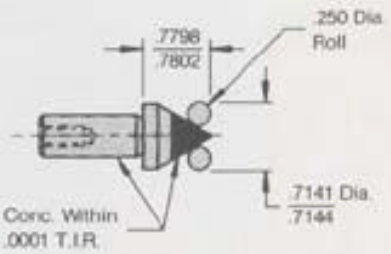
Model 325 FC
Carbide



Model 325 FSP
Tool Steel
Precision

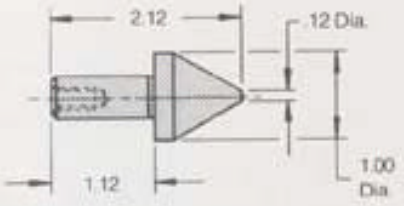


Model 325 FCP
Carbide
(Precision)

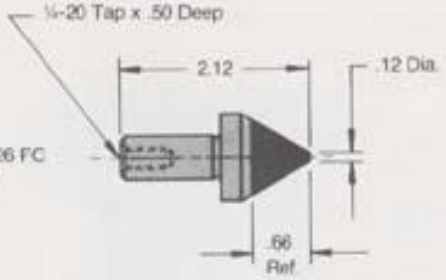


All Dimensions Typical

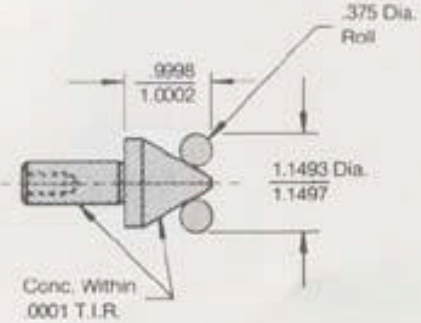
Model 326 FS
Tool Steel



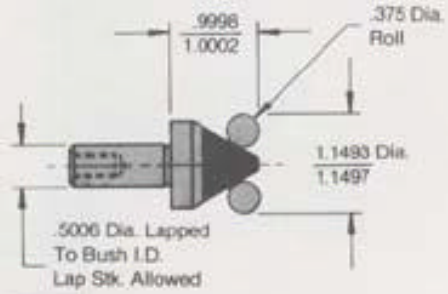
Model 326 FC
Carbide



Model 326 FSP
Tool Steel
(Precision)



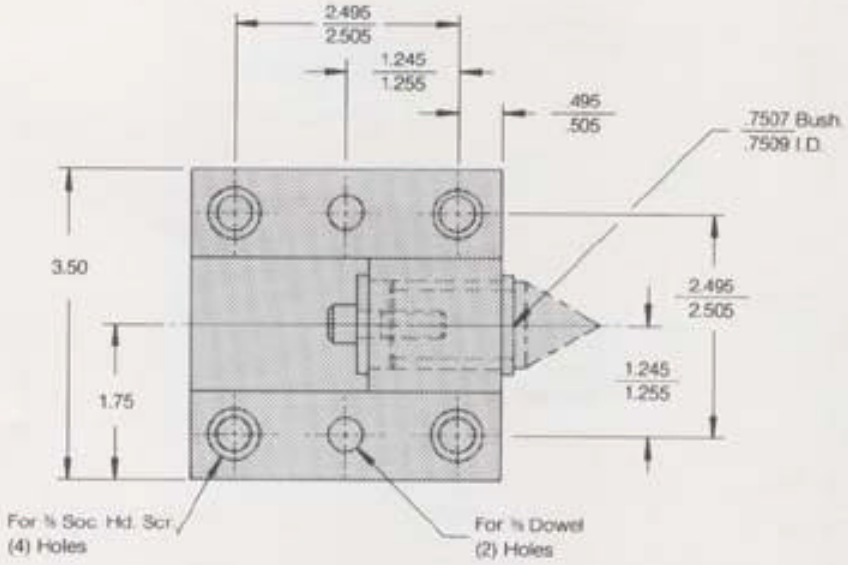
Model 326 FCP
Carbide
(Precision)



Special Models Quoted Upon Request

FIXED CENTER ASSEMBLY

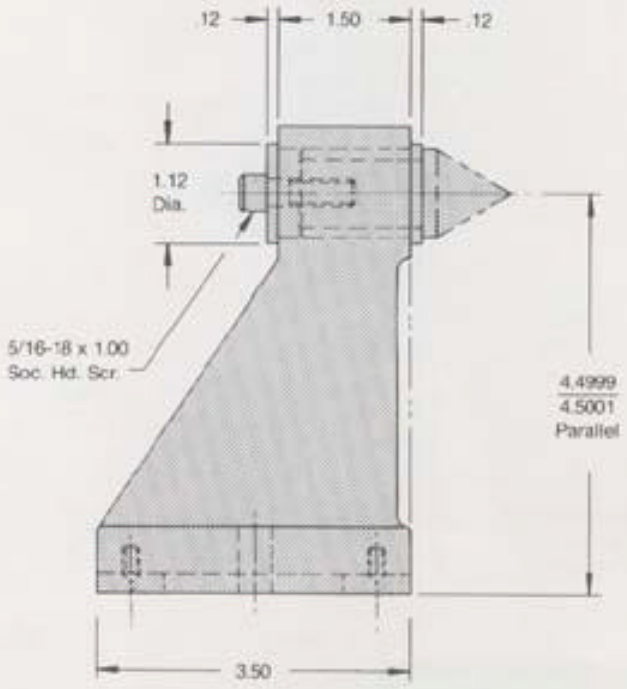
MODEL F-450

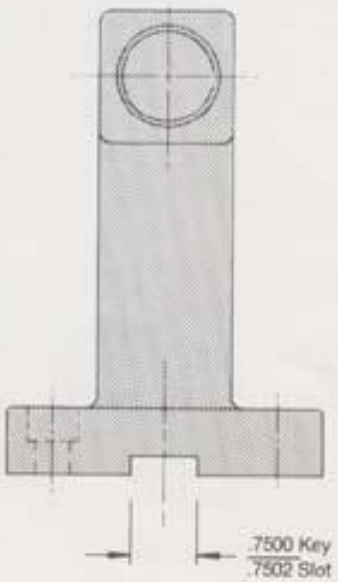


See Page 9
For Available Centers

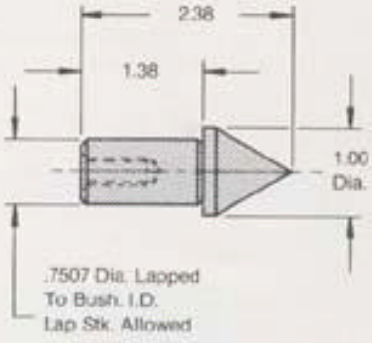
Centers Are Not
Supplied With Unit

See Page 24 For
Ordering Instructions

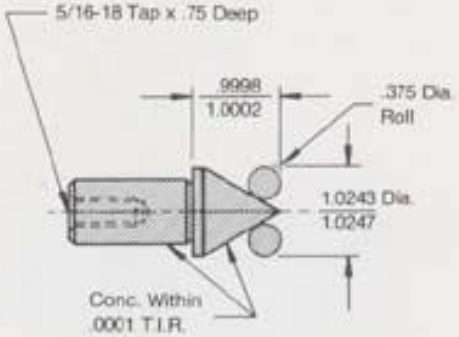




CENTERS FOR MODEL F-450

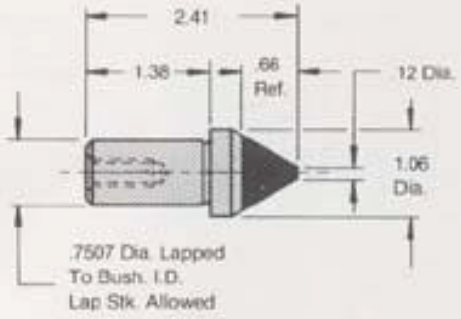


Model 450 FS
Tool Steel

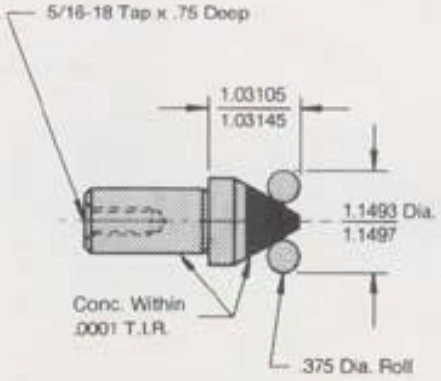


Model 450 FSP
Tool Steel
(Precision)

All Dimensions Typical



Model 450 FC
Carbide

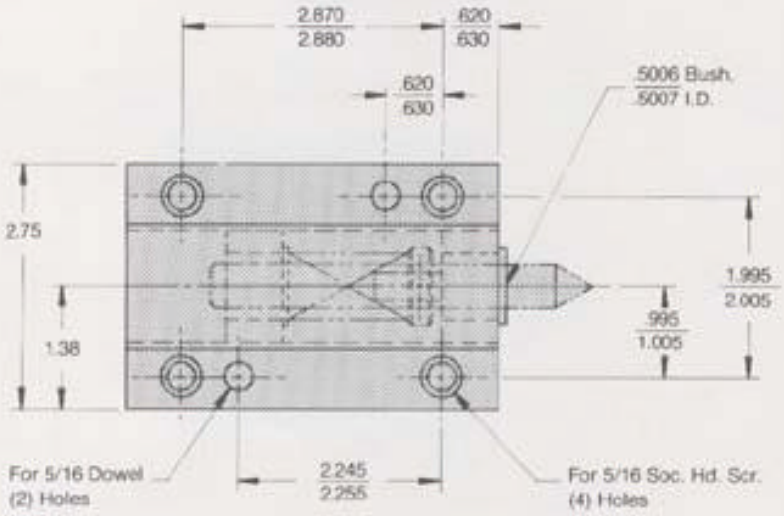


Model 450 FCP
Carbide
(Precision)

Special Models Quoted Upon Request

SPRING LOADED CENTER ASSEMBLY

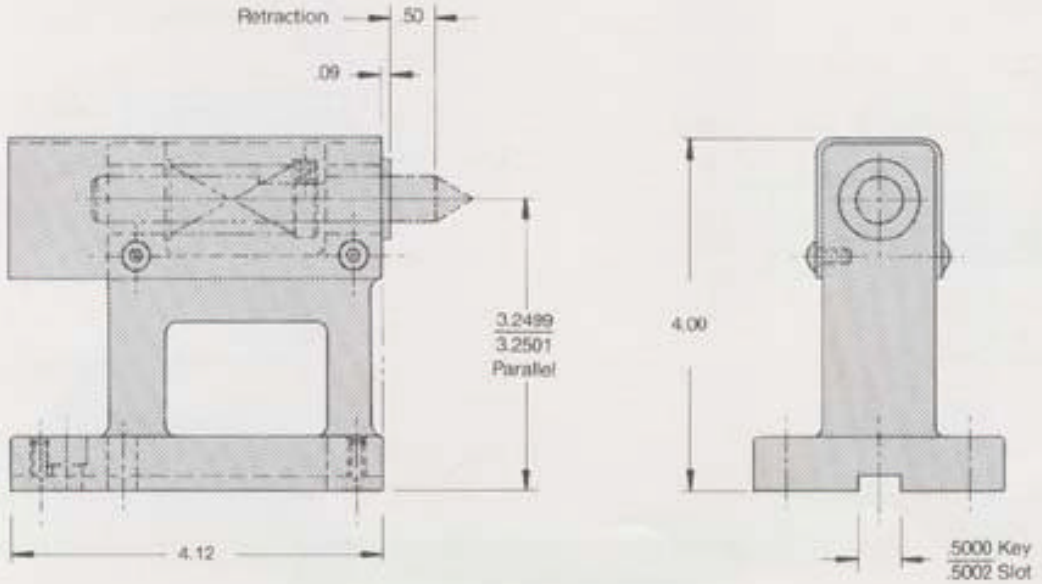
MODEL R-325



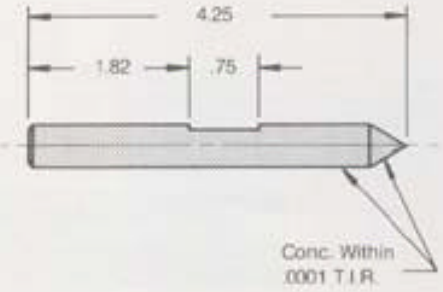
See Page 11
For Available Centers

Centers Are Not Supplied With Unit

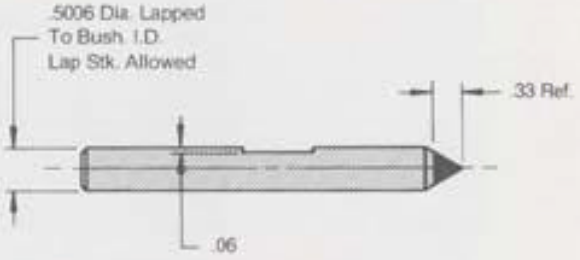
See Page 24 For Ordering Instructions



CENTERS FOR MODEL R-325

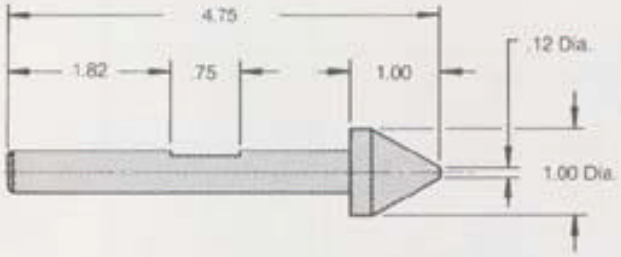


Model 325 S
Tool Steel

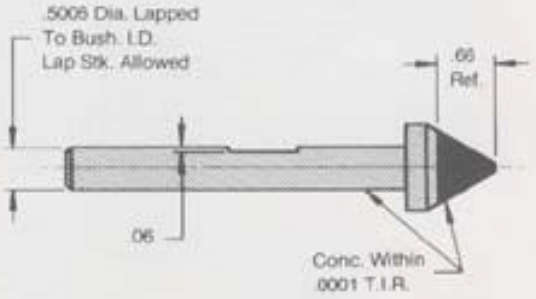


Model 325 C
Carbide

All Dimensions Typical



Model 326 S
Tool Steel

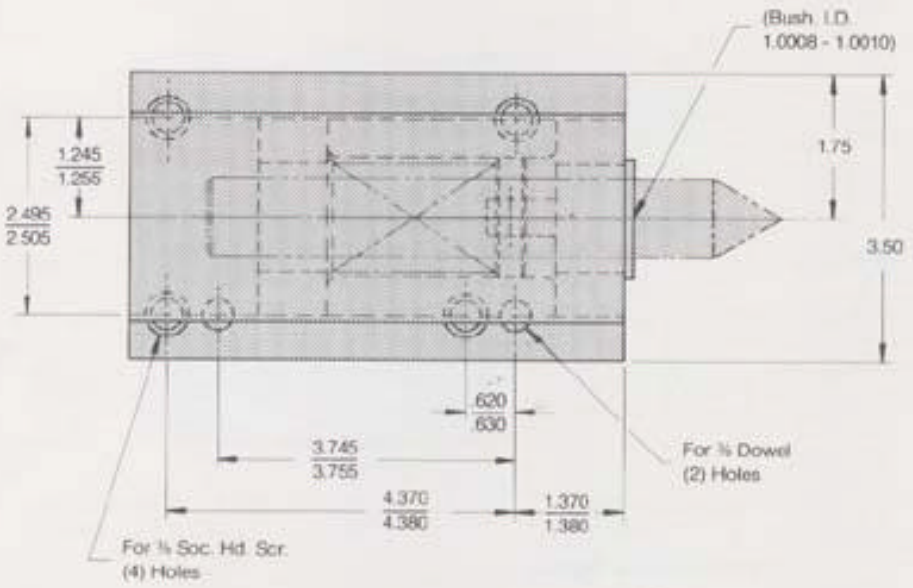


Model 326 C
Carbide

Special Models Quoted Upon Request

SPRING LOADED CENTER ASSEMBLY

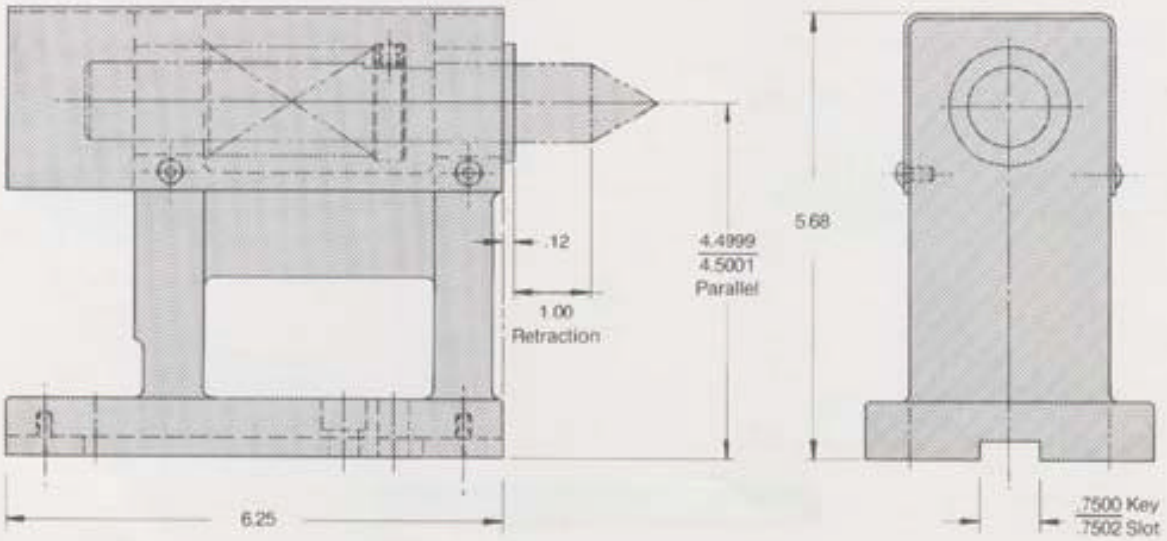
MODEL R-450



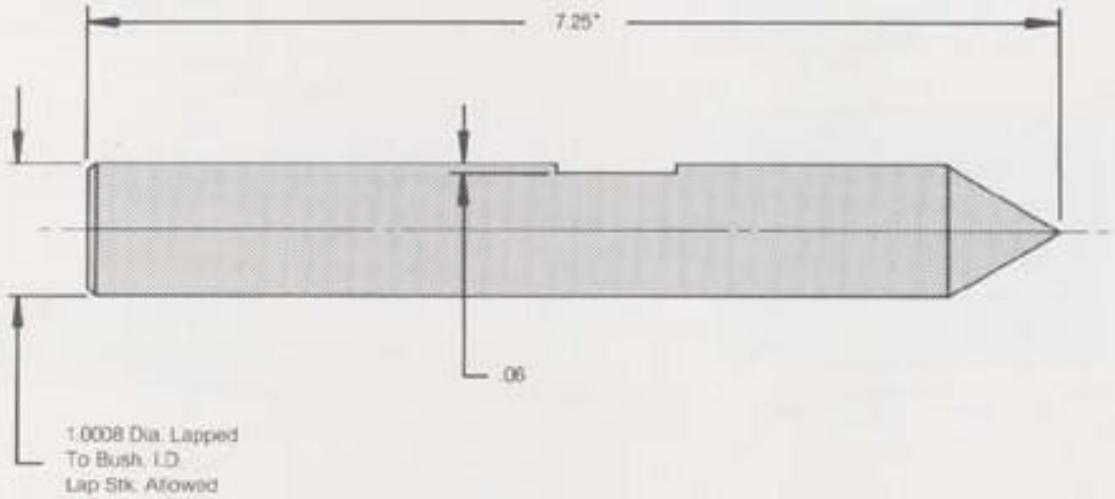
See Page 13 For Available Centers

Centers Are Not Supplied With Unit

See Page 24 For Ordering Instructions

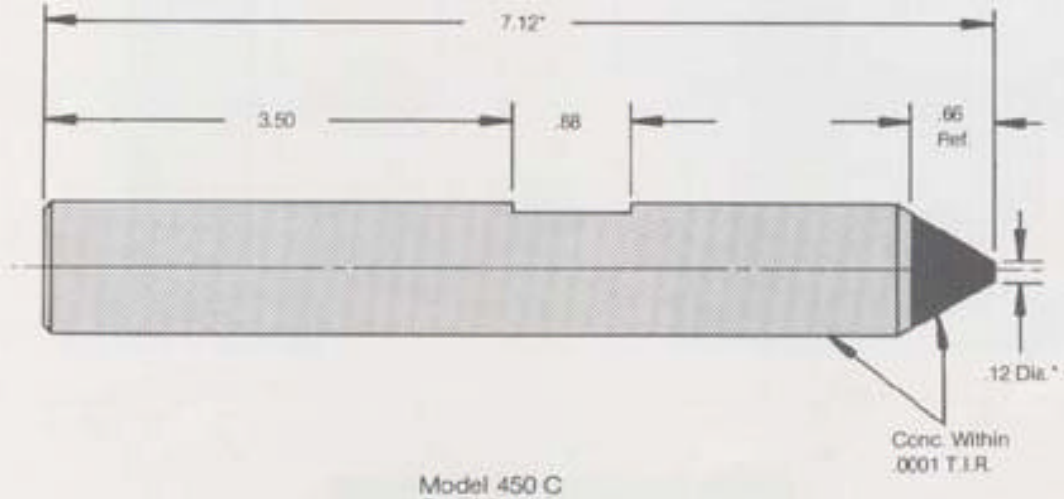


CENTERS FOR MODEL R-450



Model 450 S
Tool Steel

***All Dimensions Typical Except As Marked**

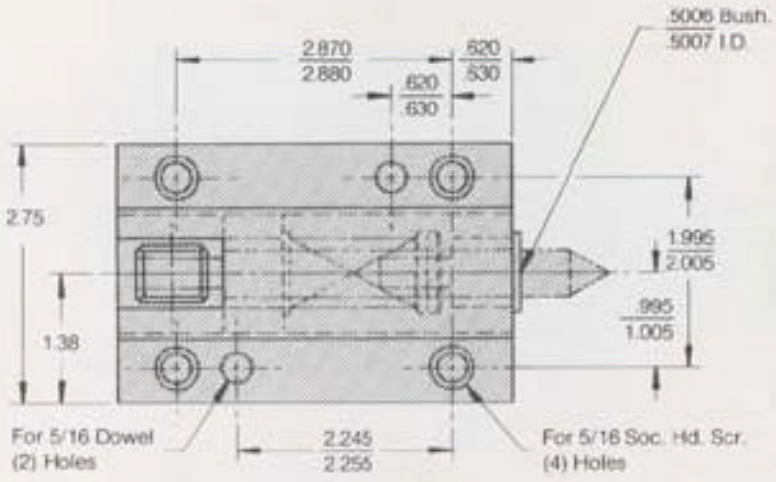


Model 450 C
Carbide

Special Models Quoted Upon Request

RETRACTABLE CENTER ASSEMBLY

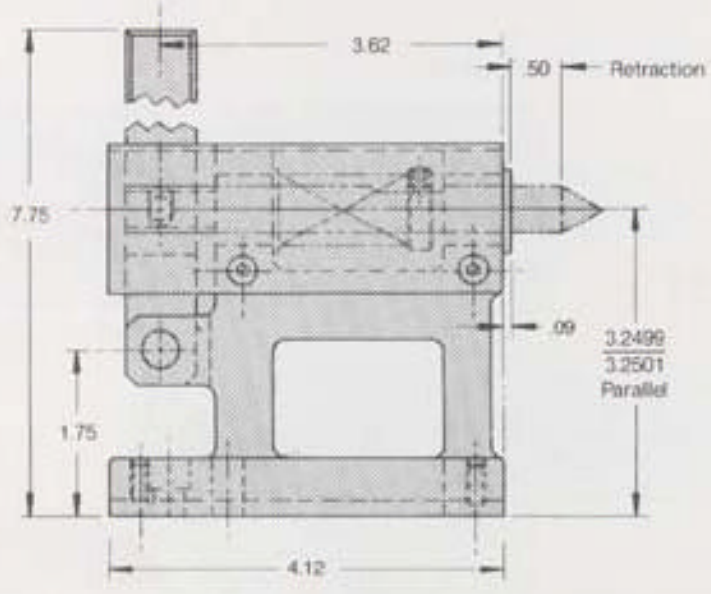
MODEL RH-325

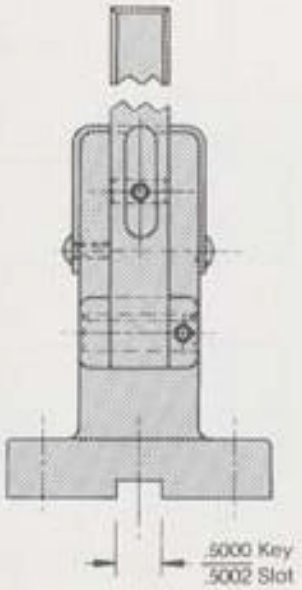


See Page 15
For Available Centers

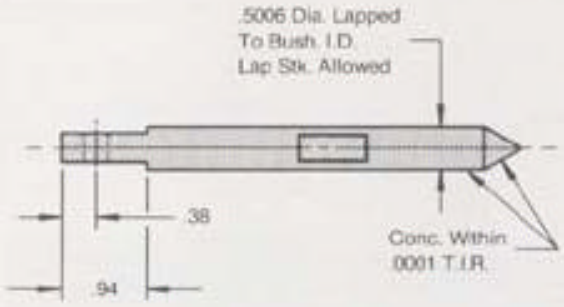
Centers Are Not Supplied With Unit

See Page 24 For Ordering Instructions

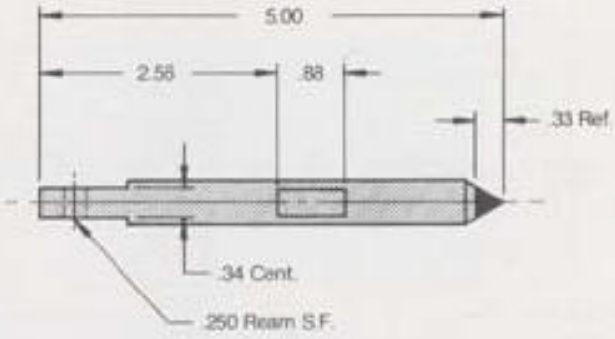




CENTERS FOR MODELS RH-325 & RHT-325

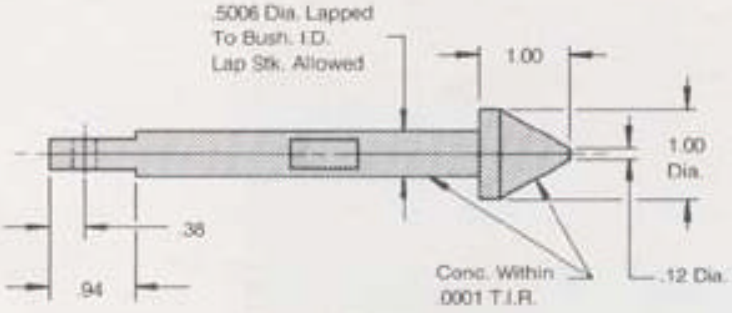


Model 325 HS
Tool Steel

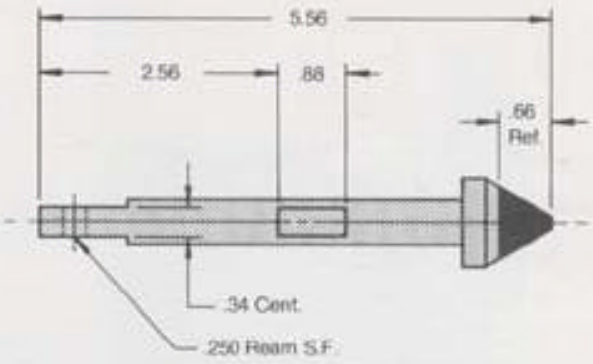


Model 325 HC
Carbide

All Dimensions Typical



Model 326 HS
Tool Steel

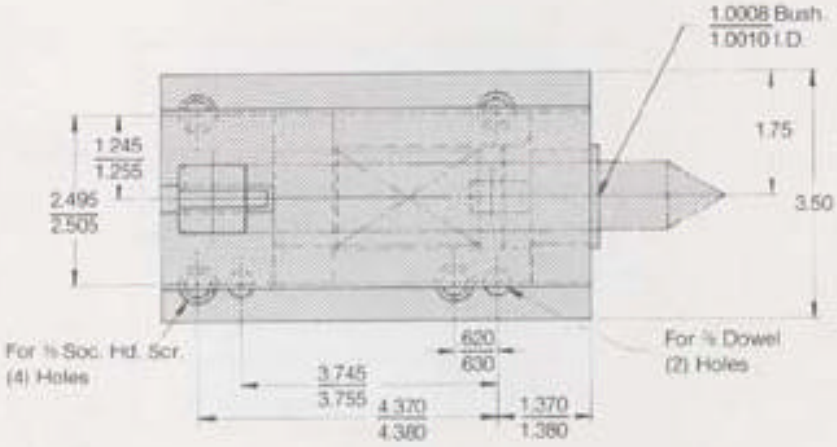


Model 326 HC
Carbide

Special Models Quoted Upon Request

RETRACTABLE CENTER ASSEMBLY

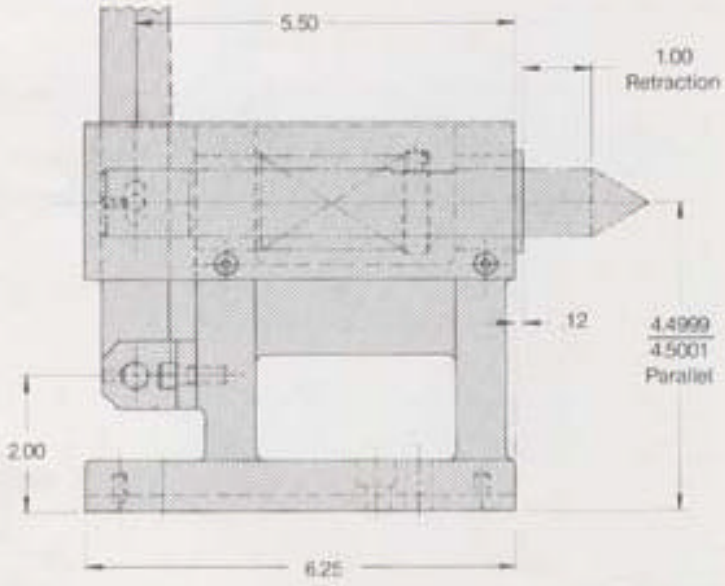
MODEL RH-450

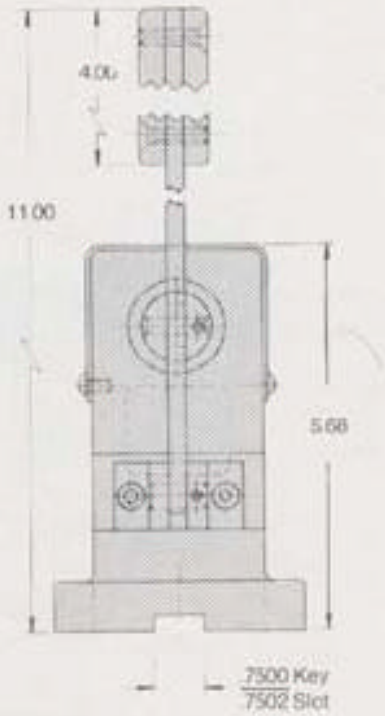


See Page 17
For Available Centers

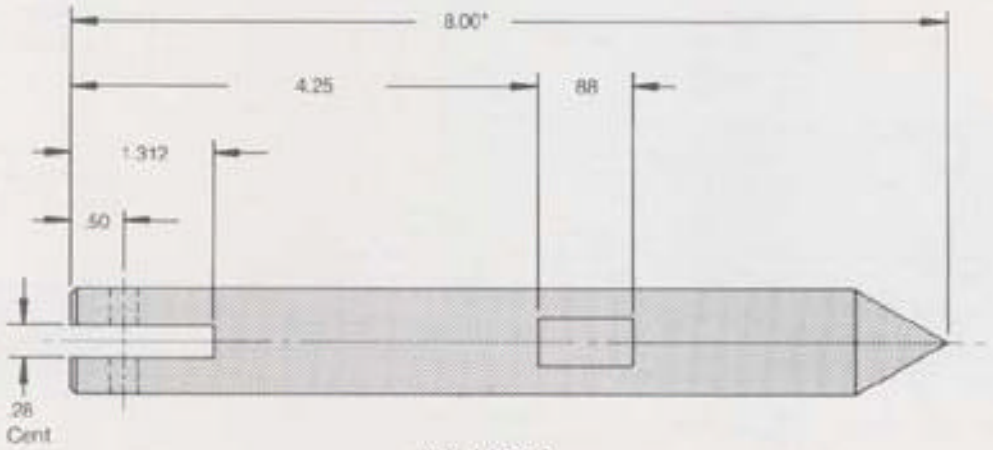
Centers Are Not Supplied With Unit

See Page 24 For Ordering Instructions



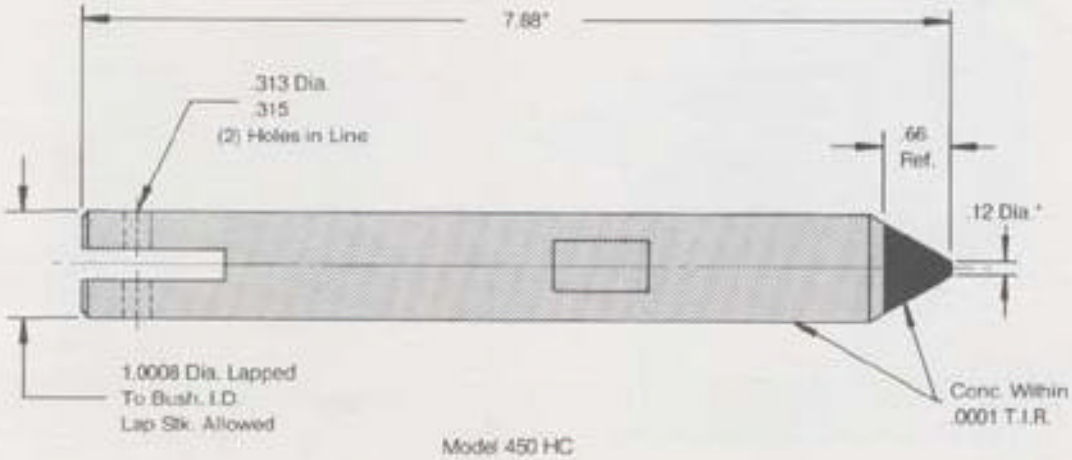


CENTERS FOR MODELS RH-450 & RHT-450



Model 450 HS
Tool Steel

***All Dimensions Typical Except As Marked**

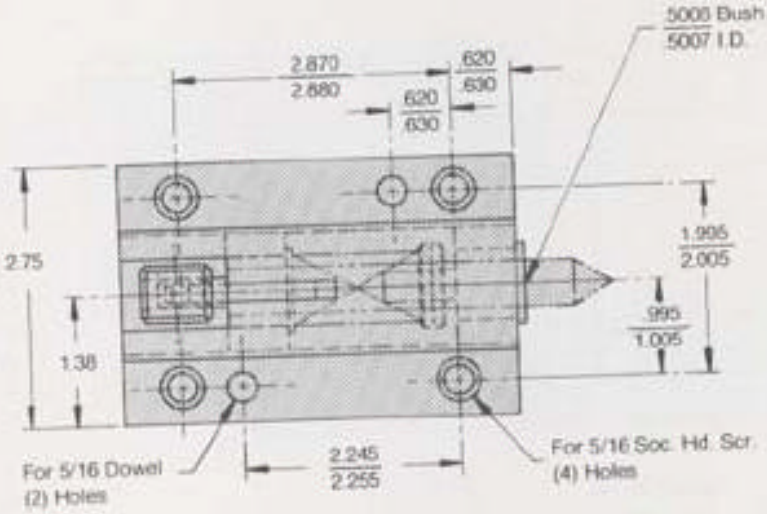


Model 450 HC
Carbide

Special Models Quoted Upon Request

RETRACTABLE CENTER ASSEMBLY

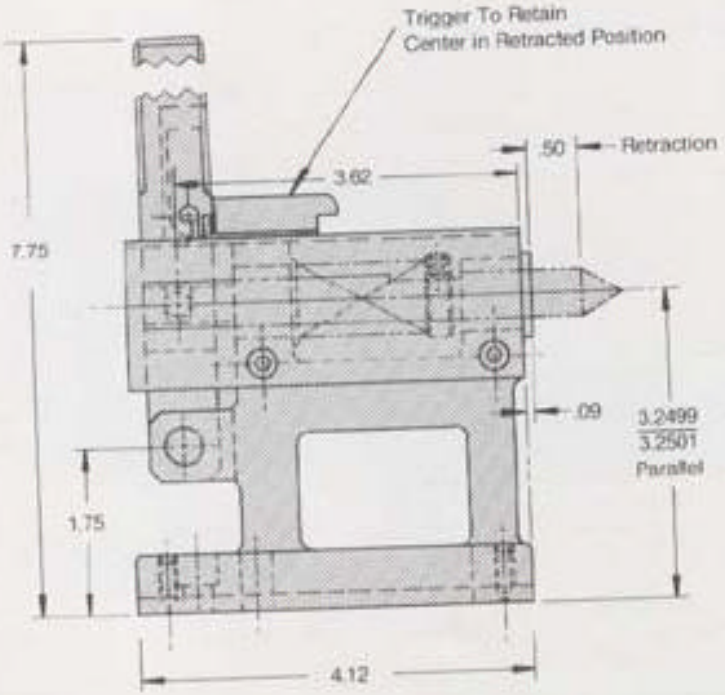
MODEL RHT-325

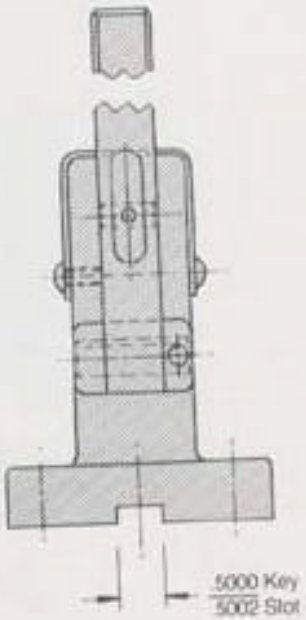


See Page 15
For Available Centers

Centers Are Not Supplied With Unit

See Page 24 For Ordering Instructions





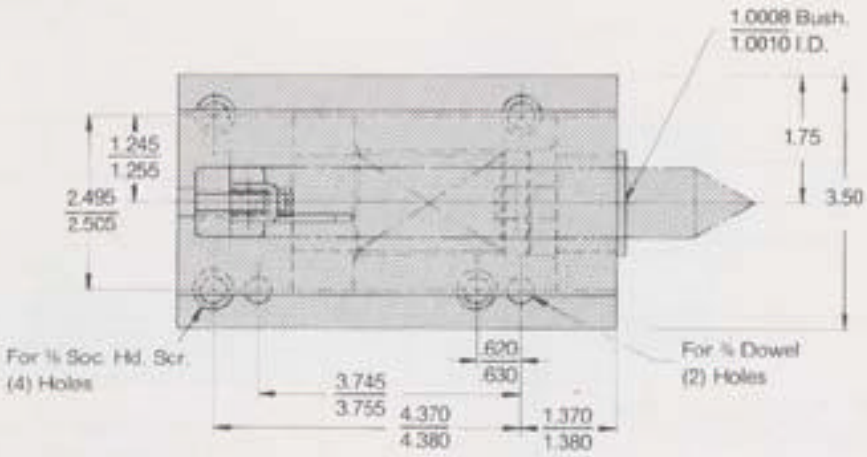
RETRACTABLE CENTER ASSEMBLY

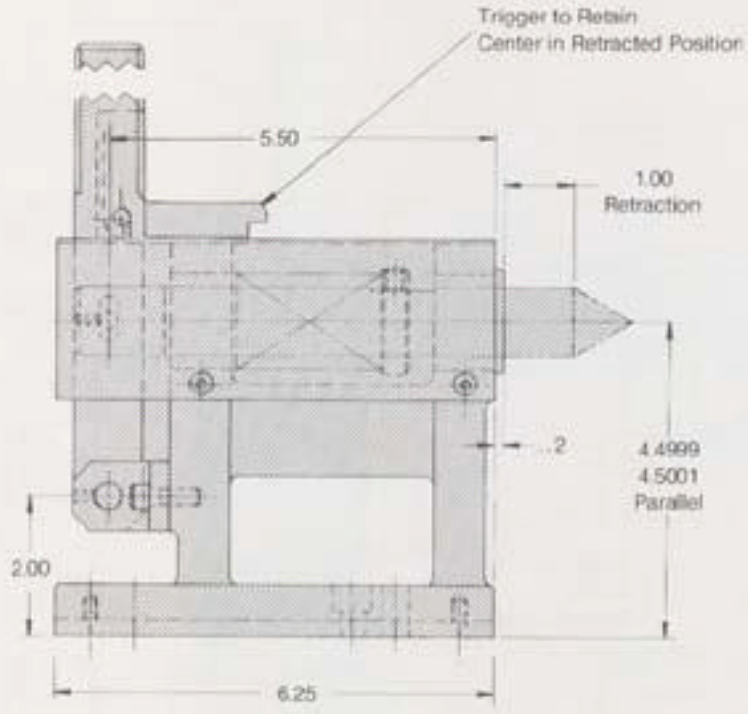
MODEL RHT-450

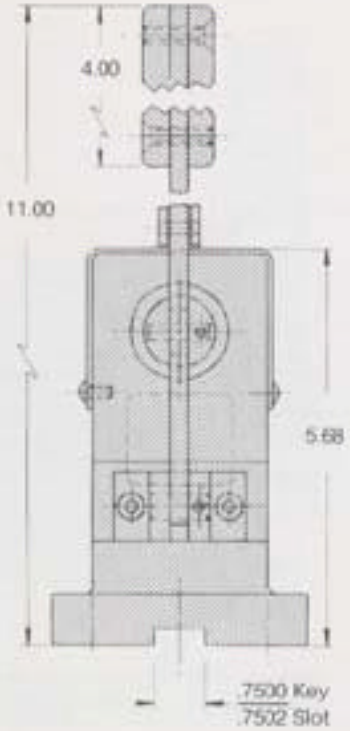
See Page 17
For Available Centers

Centers Are Not
Supplied With Unit

See Page 24 For
Ordering Instructions

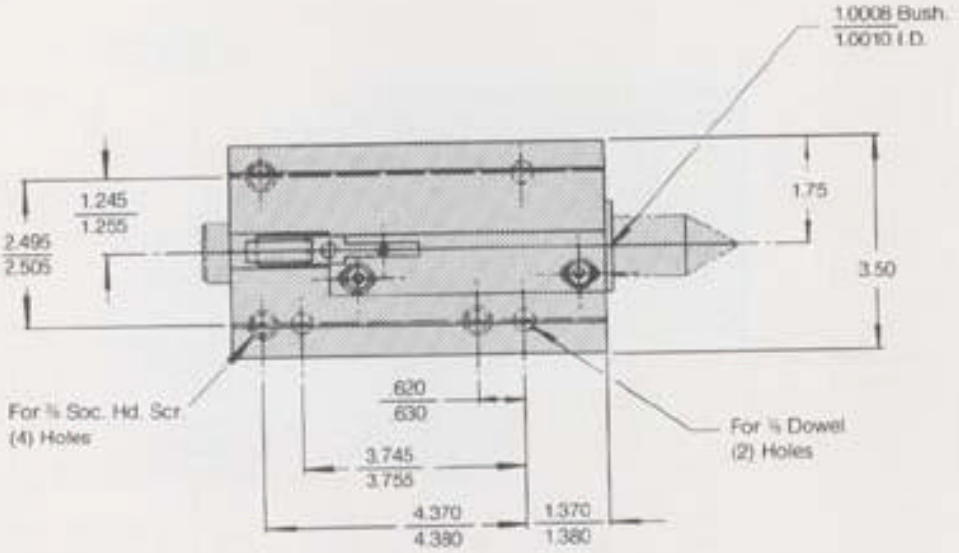






EXTENDED TRAVEL CENTER ASSEMBLY

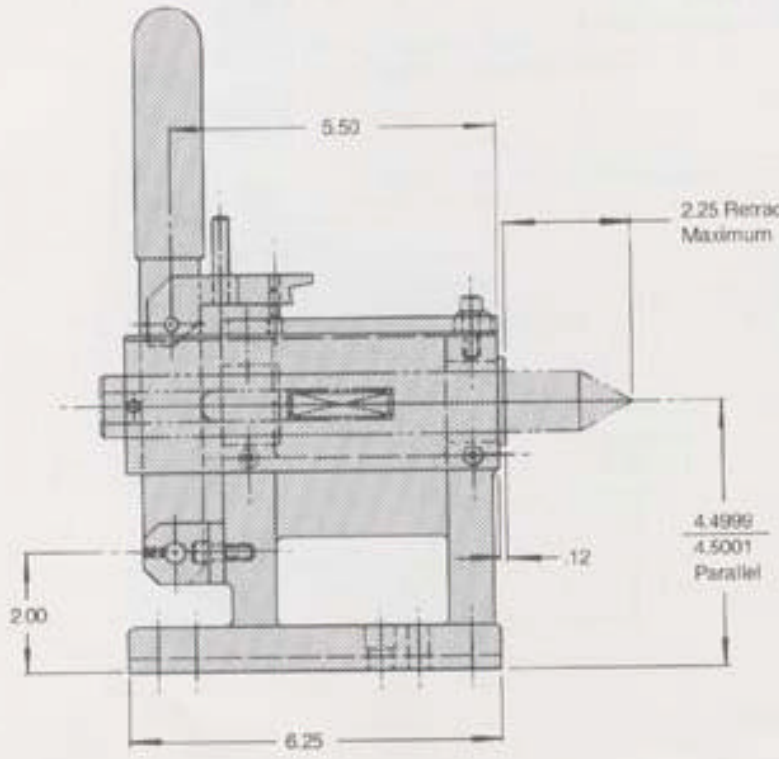
MODEL RHTIS-450

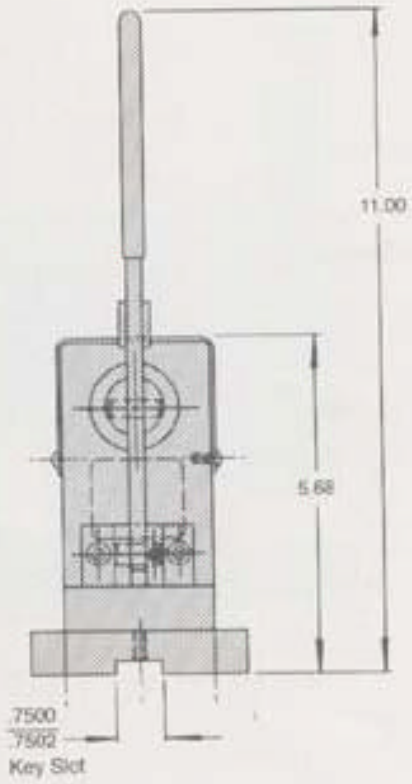


See Page 21
For Available Centers

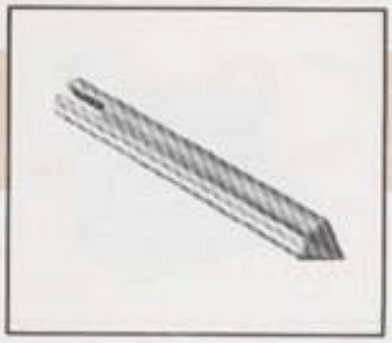
Centers Are Not
Supplied With Unit

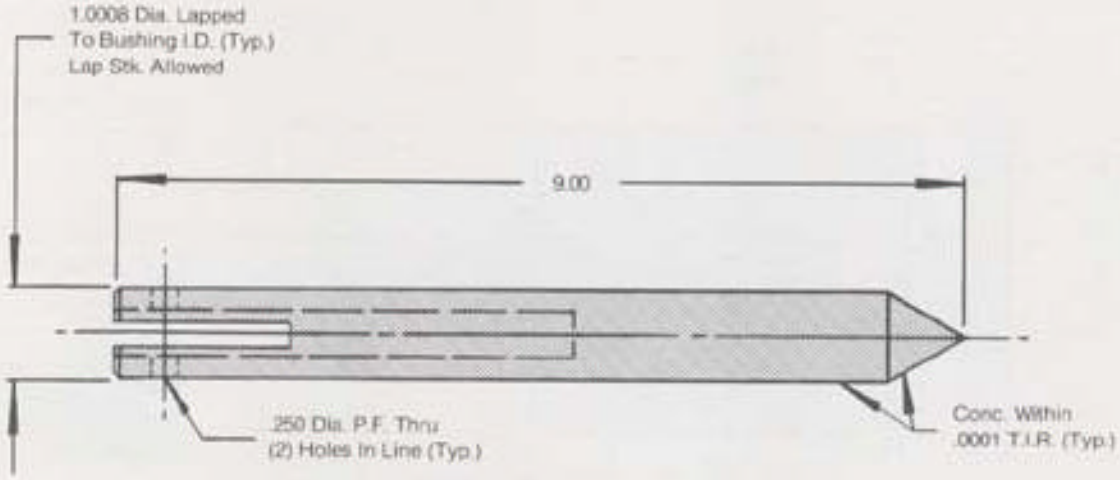
See Page 24 For
Ordering Instructions



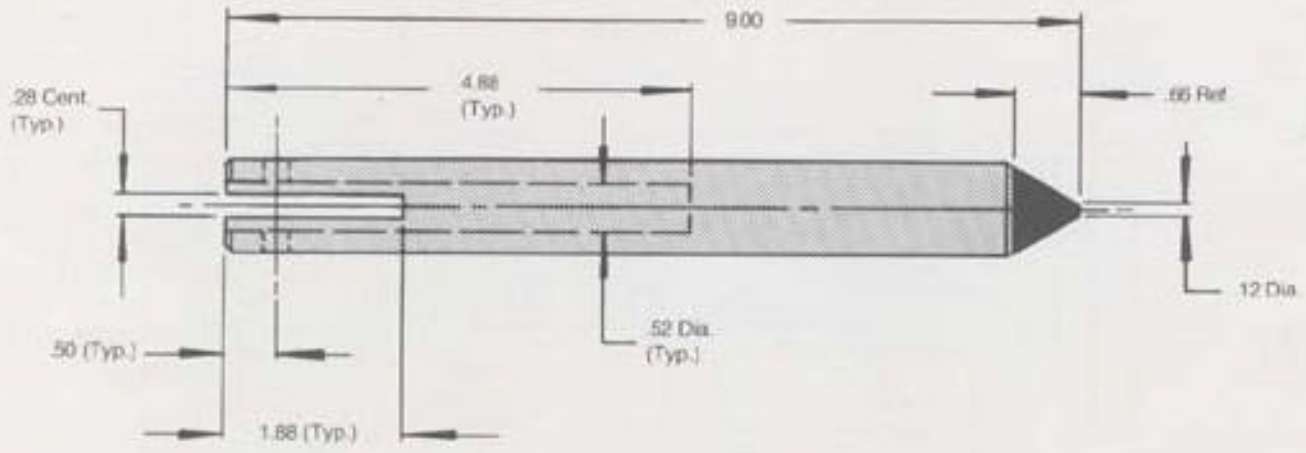


CENTERS FOR MODEL RHTIS-450

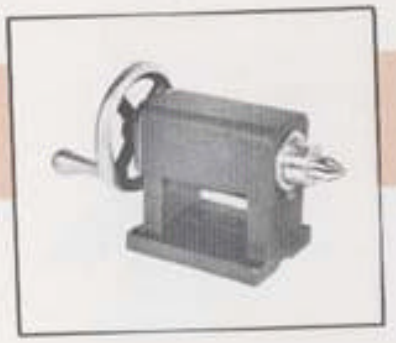




Model 450 ISS
Tool Steel

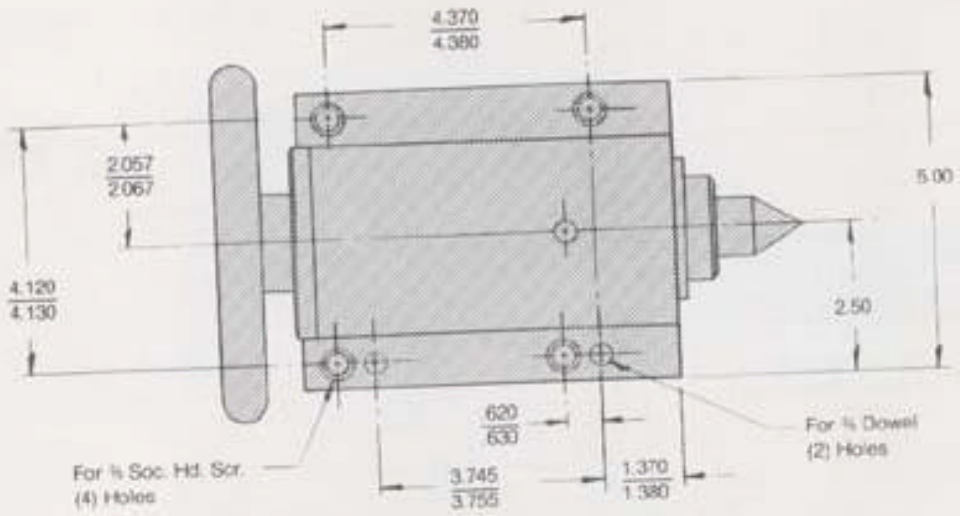


Model 450 ISC
Carbide



VARIABLE PRESSURE CENTER ASSEMBLY

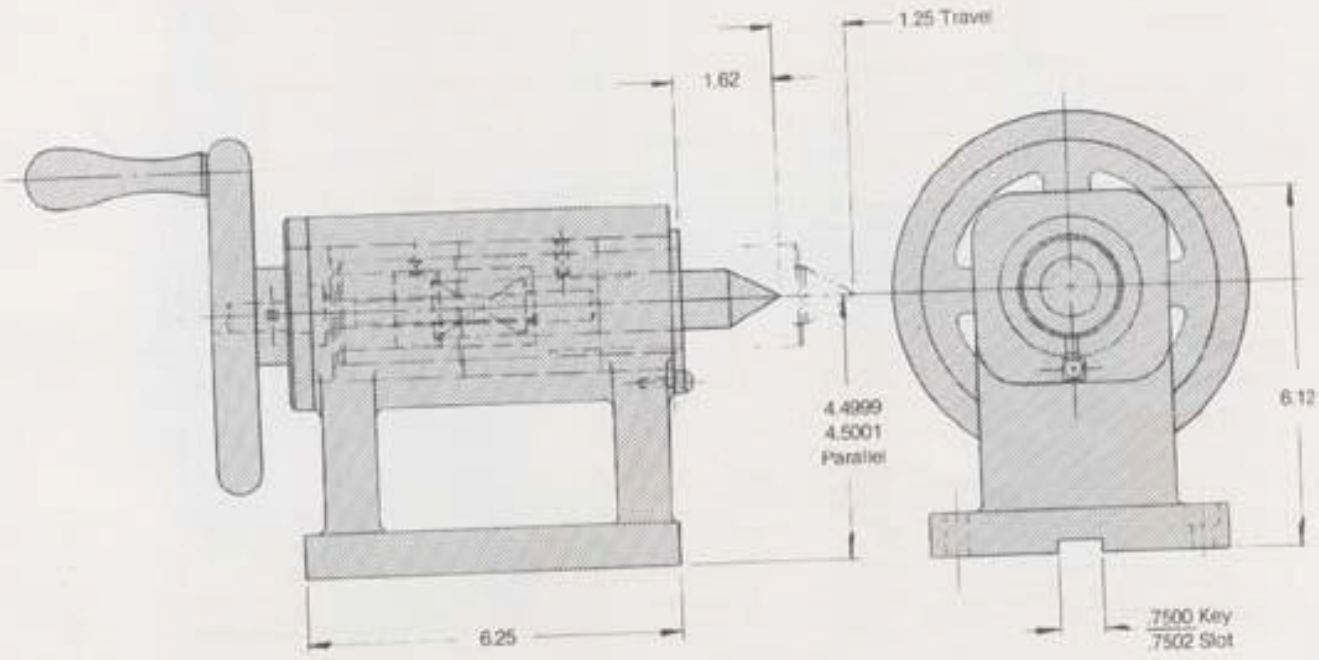
MODEL WTCA-450



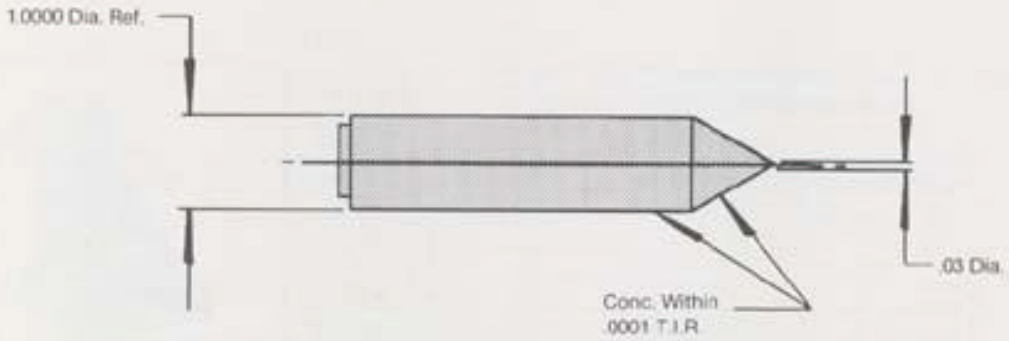
See Page 23
For Available Centers

Centers Are Not Supplied With Unit

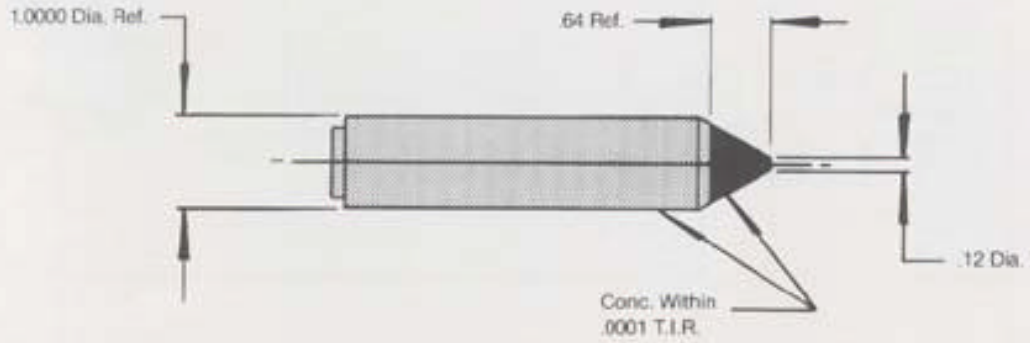
See Page 24 For Ordering Instructions



CENTERS FOR MODEL WTCA-450



Model 450 WTS
Tool Steel



Model 450 WTC
Carbide

ORDERING INSTRUCTIONS FOR CENTER ASSEMBLIES

For Ordering Centers With Unit Specify Center No.
After Model No. of Center Assembly

Example: Fixed Center Assembly F-325 With Precision Carbide Center 326 FCP

Hanlo Model F-325 - 326 FCP

- Basic Assembly Model No.
- Center Model No.

Example: Retractable Center Assembly RH-450 With Tool Steel Center 450 HS

Hanlo Model RH-450 - 450 HS

- Basic Assembly Model No.
- Center Model No.

STANDARD BASE PLATES

ORDERING

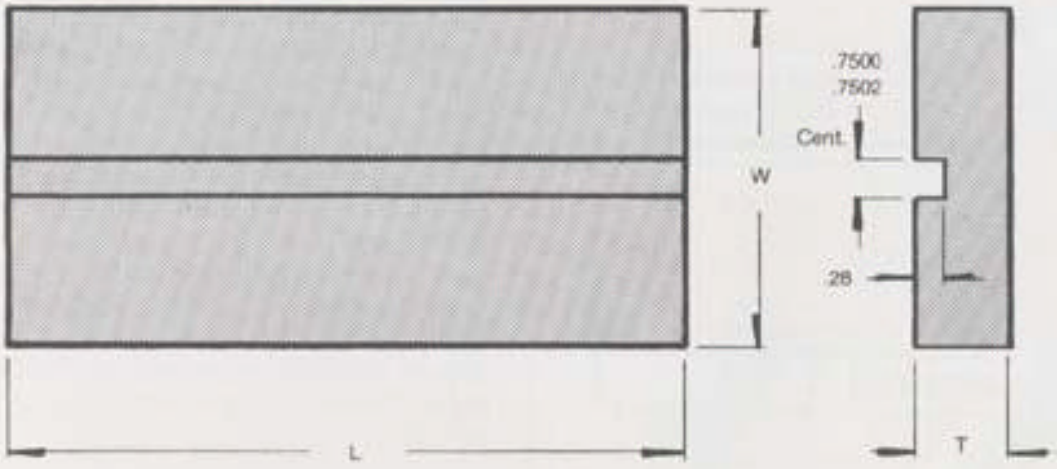
Example: Standard Base Plate—Hanlo

Model #H-564 — B — P

Plate — Blanchard — Precision

T x W x L	HANLO MODEL NO.
1- 7/16 x 8 x 12	H — 782
1- 7/16 x 6 x 18	H — 768
1- 7/16 x 8 x 18	H — 788
1- 7/16 x 10 x 18	H — 7108
1- 7/16 x 12 x 18	H — 7128
1-15/16 x 6 x 24	H — 564
1-15/16 x 8 x 24	H — 584
1-15/16 x 10 x 24	H — 5104
1-15/16 x 12 x 24	H — 5124
1-15/16 x 6 x 30	H — 560
1-15/16 x 8 x 30	H — 580
1-15/16 x 10 x 30	H — 5100
1-15/16 x 12 x 30	H — 5120

Blanchard Ground Flat Within .001
Precision Ground Flat Within .0002



Steel — Normalize

Special Models Quoted Upon Request

HYDRAULIC ARBORS & CHUCKS

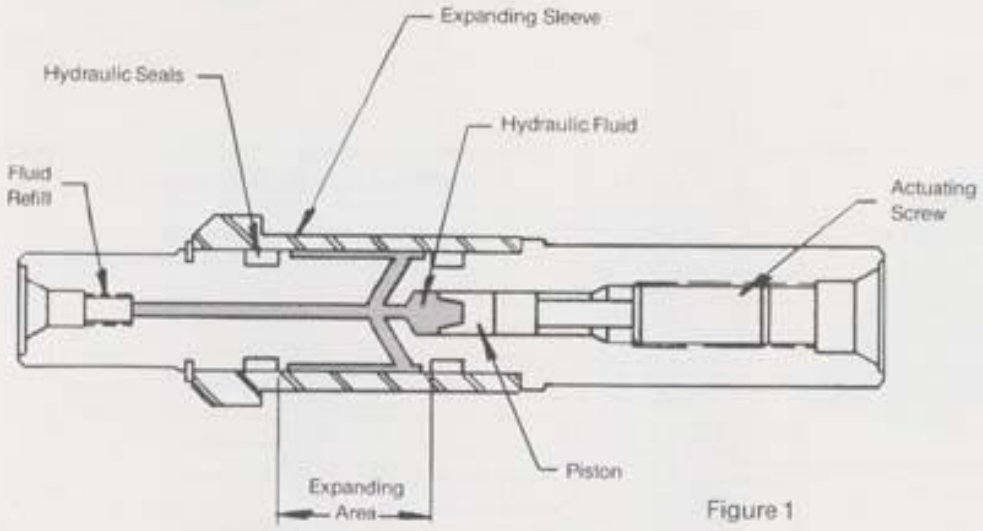


Figure 1

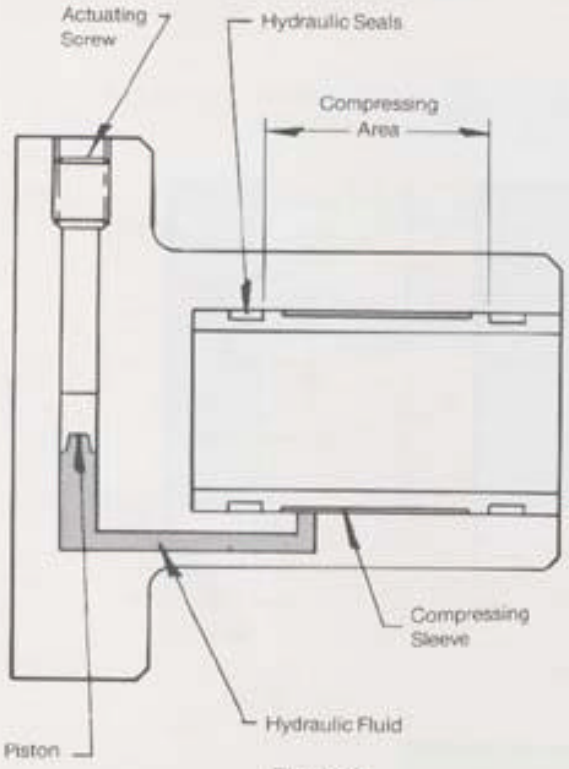


Figure 2

Hanlo-Grip arbors and chucks utilize a self contained hydraulic system to expand or compress the sleeve within the gripping area to a point within the elastic limits of the metal. The pressure is supplied through an internal piston assembly which can be actuated either manually or power assisted. The illustrations demonstrate a manual actuation to expand the arbor, or compress the chuck. Clockwise rotation of the actuator screw advances the piston which places the hydraulic system under great pressure. The arbor, Figure (1)—the expansion area is limited by the position of the hydraulic seals. The chuck, Figure (2)—the compression area is limited by the position of the hydraulic seals. There is no expansion of the gripping area beyond the hydraulic seal area. The gripping area of the arbor or chuck is under equalized pressure, with uniform expansion or compression about the geometric center, thus providing extreme accuracy in part positioning.

ACCURACY

Hanlo hydraulically operated arbors and chucks are normally manufactured to operate within .0002 T.I.R. More precise units are available with tolerances down to .00002 T.I.R. The part variables determine this accuracy.

GRIPPING — SIZE RANGE

Arbors—minimum bore size 1/4"
Chucks — minimum body size 1/16"
Maximum gripping diameter of chucks and arbors is limited by part configuration and tolerance.

EXPANSION LIMITS

Hanlo hydraulic arbors and chucks have been engineered and tested to determine maximum material elasticity and provide the following limits:

.003 — first full inch diameter
.001 — each full inch additional diameter

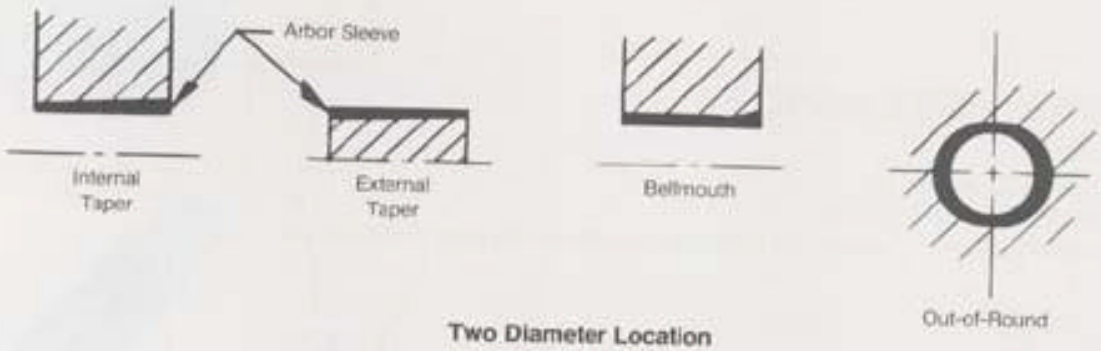
This applies to plain round arbors and chucks. Splined units will accommodate approximately 60% of these limits. Hanlo also offers specially constructed units with an expansion range up to three times these amounts where holding or accuracy requirements are not as severe as normally needed. Special part configuration of applications may necessitate changes in these values.

TESTING

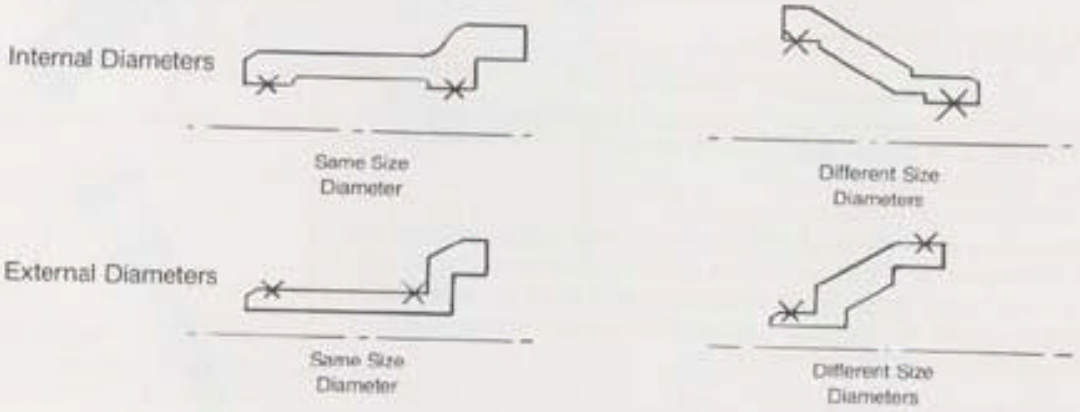
All manufacturing, testing, and inspection is done under atmospheric temperature controlled conditions prior to shipment. All units are cycled on Hanlo designed and manufactured test equipment. Hand or power actuated cycles are duplicated during testing. The test equipment insures each unit meets engineering specifications and tests all components involved in manufacture.

POSITIVE CENTERING

Equalized holding force provides absolute centering accuracy that will conform to the part locating periphery. The arbor or chuck will assure positive holding in parts that may have in-tolerance inaccuracies such as taper, out of round, or bellmouth.



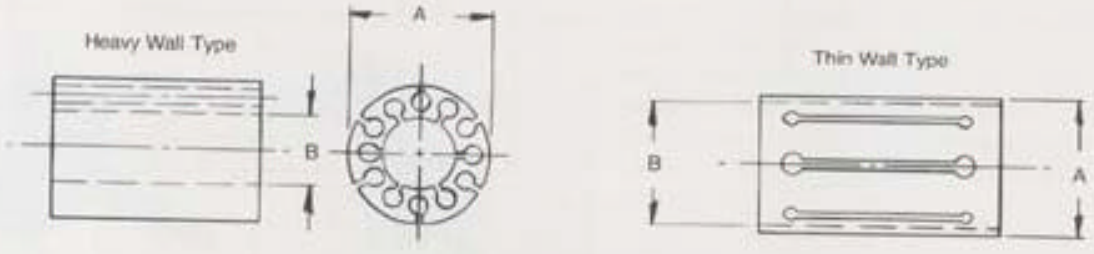
Two Diameter Location



Multiple Parts

Hold Similar Parts

With split-sleeve adaptors, similar parts with various locating sizes can be held with one basic arbor or chuck.



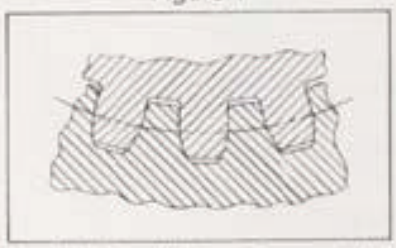
When "A" is basic chuck size, "B" is made to suit part.
When "B" is basic arbor size, "A" is made to suit part.

NOTE: Basic diameter determines amount of expansion.

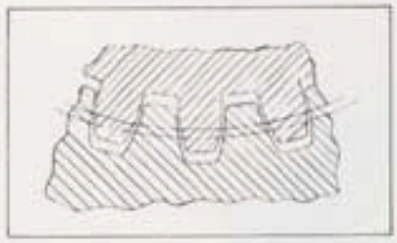
GEARS — SPLINES

- Internal
- External
  - Spur Gears
  - Helical Gears
  - Splines
  - Serrations

Figure 1



Involute Tooth Form Expanded



Involute Tooth Form Retracted

The use of Hanlo hydraulic arbors and chucks to establish the geometric centerline of a diameter is proven. Applied to splines and gears, the same principal is achieved by using an arbor or chuck with a gripping sleeve manufactured to a "GO" spline or gear condition. In this condition, equal expansion or compression in each tooth space will establish the part position. This is illustrated in Figure 1. The part can also be positioned by either the minor diameter or major diameter as shown in Figure 2. This same principal can also be applied to threads. To quote these applications, all spline, gear, serration, or thread information must be supplied to determine tolerances involved for the application.

Figure 2

Spline Retracted

Spline Expanded Locating
On Major Diameter

QUOTATIONS

To Obtain a Quotation, Please Submit the Following Information

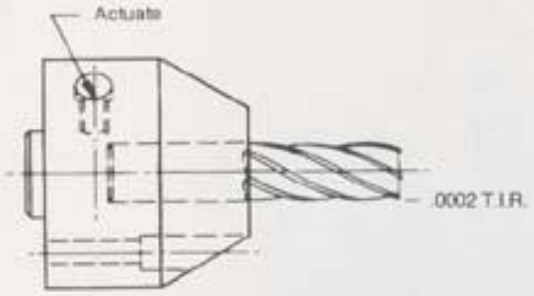
1. Print of part or tool and/or process sheets.
2. Locating diameter size, tolerance, and length.
3. Stop surface.
4. Operation to be performed (turn, hob, grind, balance, etc.).
5. Machine spindle dimensions, or type (if fixture mounted supply print of fixture).
6. Specify manual or power actuated.
7. Specify accuracy required of arbor or chuck.
8. If splined part, include all spline dimensions (and prints of "Go" and "Not Go" spline gages if available).

SERVICE

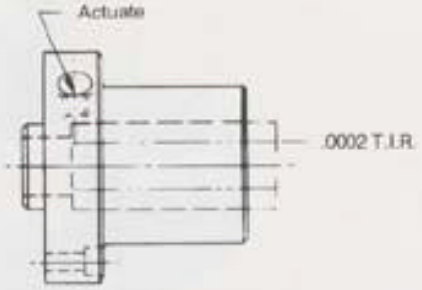
Hanlo Gage and Engineering Co. will be pleased to work with you to help solve any work or tool holding/locating problem you have.

Hanlo Gage also offers expert capability in repair, modification, or rebuilding of existing hydraulic arbors or chucks you may now have in your plant. All repairs or modifications are handled on a fast as possible delivery.

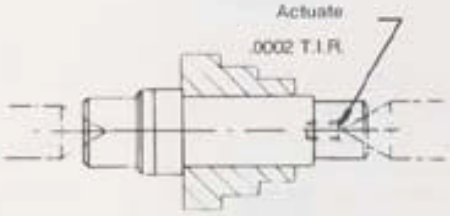
APPLICATIONS



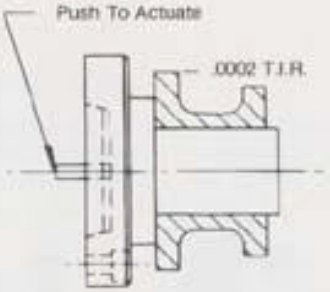
Chuck holding end mill or boring bar. Die Machining, boring, milling, cutter sharpening, etc. Manually actuated. Spindle mounted.



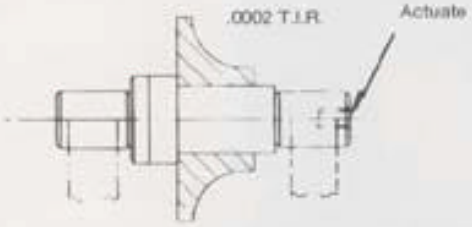
Chuck holding part I.D. grind, boring, inspection, etc. Manually actuated. Face plate or spindle mounted.



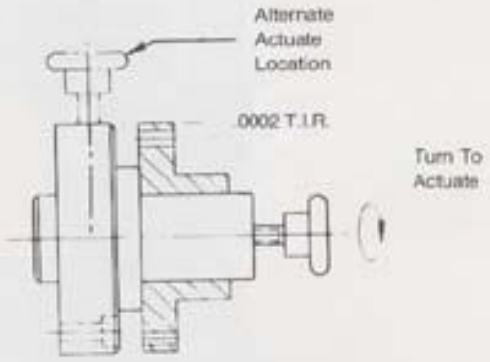
Arbor holding part or tool. Turning, grinding, inspection, hobbing, shaving, etc. Manually actuated. Between centers.



Arbor holding part or tool. Turning, grinding, inspection, hobbing, etc. Power actuated. Face plate or spindle mounted.



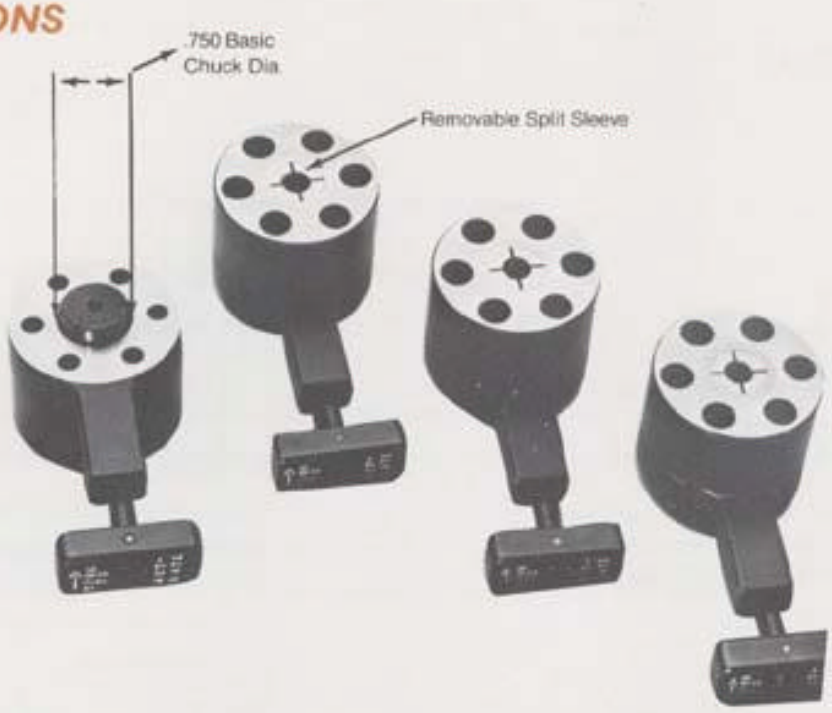
Arbor holding part. Inspection, balancing, etc. Manually actuated. Journal, vee block or roller mounted.



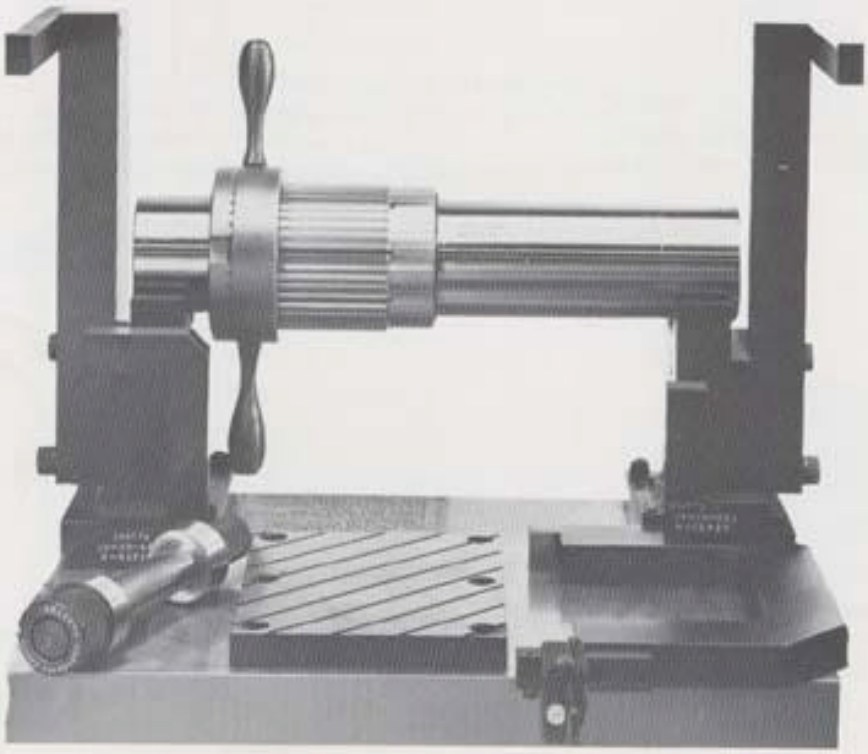
Arbor holding part. Inspection, drilling, milling, boring, balancing, hobbing, turning, grinding, etc. Manually actuated. Fixture or face plate mounted.

The applications shown above reflect but a few of the many possible mountings and machining operations. Hanlo-Grip units are adaptable to all operations and machines where outdated or inaccurate holding devices are normally used.

APPLICATIONS



Hanlo-Grip hydraulic chuck with removable split sleeves to grip parts from 3/4 to 5/16 diameters.



Inspection fixture utilizing Hanlo-Grip hydraulic splined arbor locating on the part pitch diameter.

APPLICATIONS

Squareness gage to check pinion face to pinion bores. Hanlo-Grip arbor and various split sleeves are inserted into the pinion bores to establish the true center line. Adjustable indicator arm assembly is piloted over a shaft on the arbor and rotated for the squareness check.

Combination Hanlo-Grip arbor and sweep gage to check concentricity of one bore to another.

ENGINEERING & MANUFACTURING

- FIXED LIMIT GAGES
- INDICATOR GAGE COMPONENTS
- INDICATOR GAGE ASSEMBLIES
- FIXTURE GAGE COMPONENTS
- ELECTRONIC GAGES
- AIR GAGES
- FIXTURE GAGE SYSTEMS
- AUTOMATIC GAGE SYSTEMS
- MASTERS

COMPLETE FACILITIES FOR REWORK & REPAIR

HANLO GAGES

HANLO

GAGE & ENGINEERING CO.