



ARNOLD GAUGE

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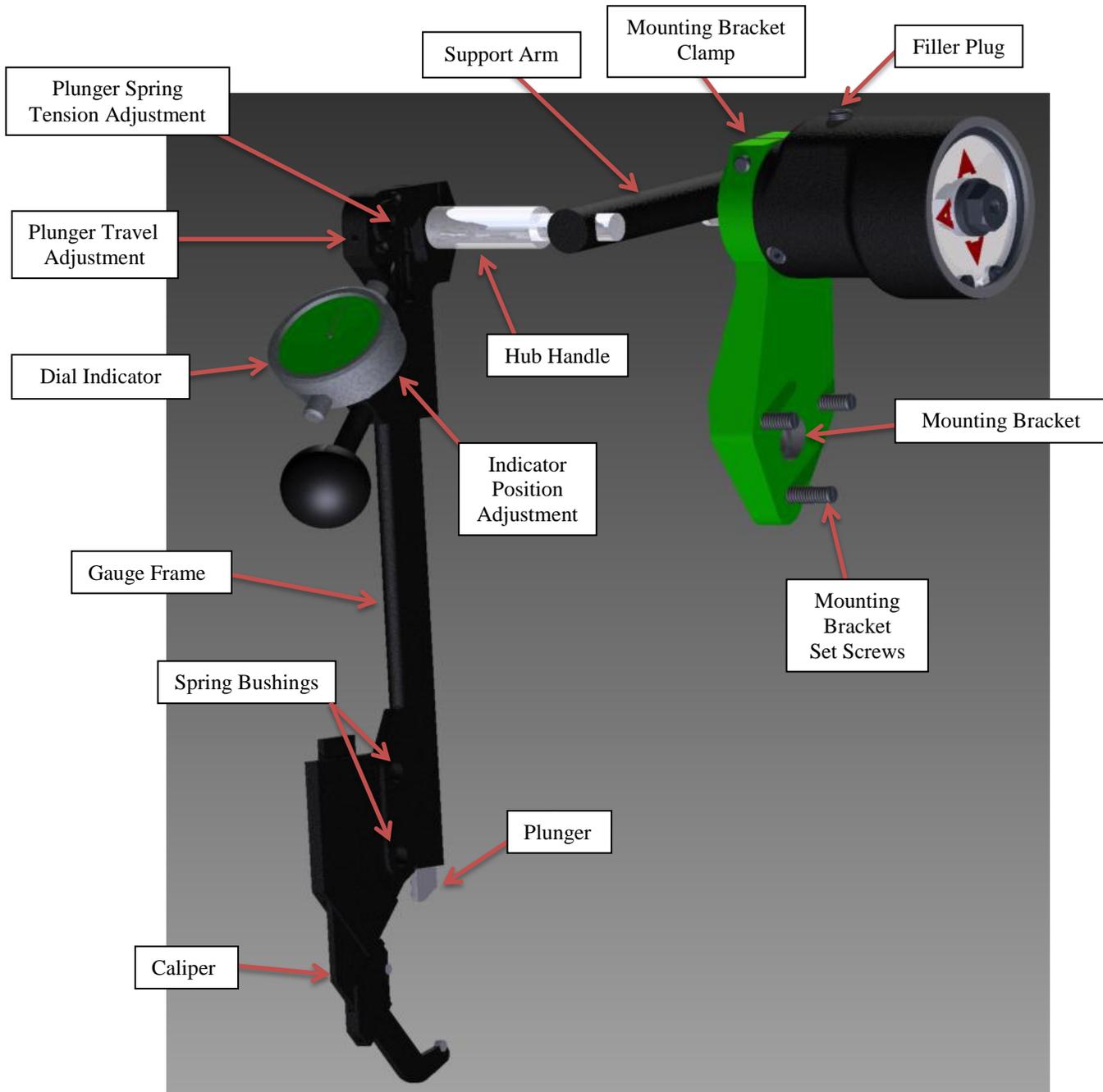
INSTRUCTIONS

FOR INSTALLING AND USING MODEL LR CONTINUOUS GRINDING GAGES

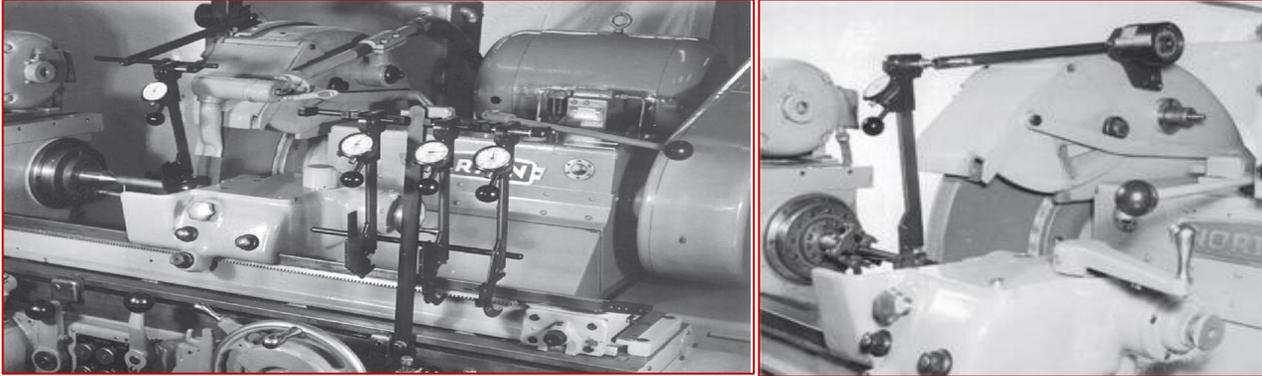




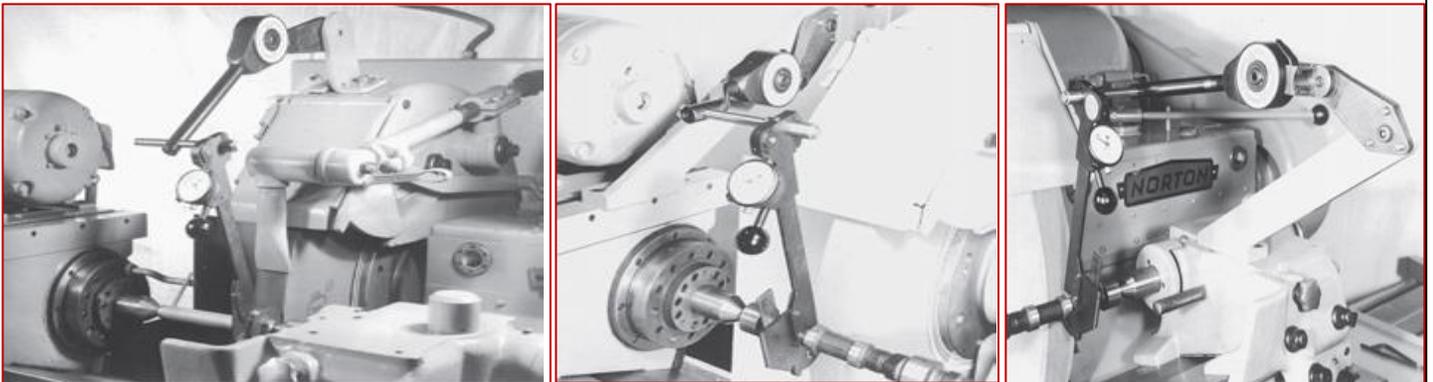
PARTS DIAGRAM



Satisfactory gage performance depends to a great extent upon proper attachment. A solid, rigid point should be selected on the machine at which the $\frac{1}{2}$ -13 socket head cap screw can be fastened. In those cases where the machine does not present a suitable surface for attachment, it is preferable to construct a simple bracket to facilitate installation. The bracket should be rugged, being made from $\frac{5}{8} \times 2 \frac{1}{2}$ " steel bar stock.

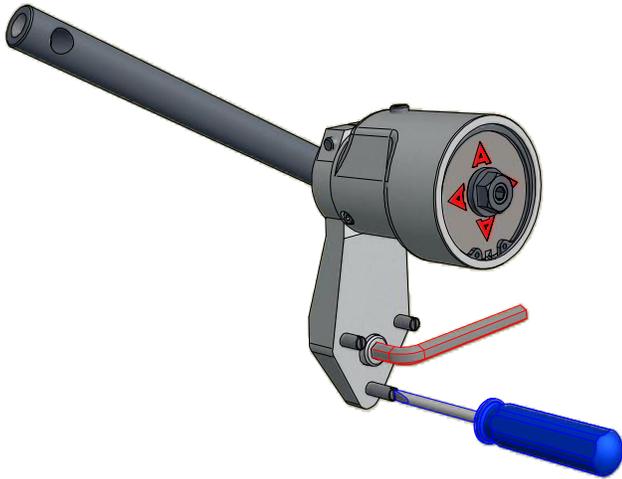


Gage set-ups should allow the work piece to traverse through the gaging contacts indicating not only diameter but taper. This is an advantage where interruptions or part configurations do not permit traverse grinding. All arrangements are suitable for plunge grinding.



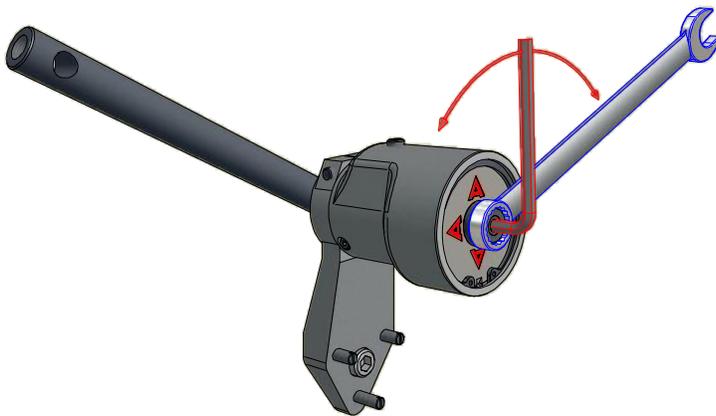
Arnold gages are shipped pre-assembled, allowance being made for shipping limitations. Attach with a $\frac{1}{2}$ -13 socket head cap screw. Where-ever possible the angles shown should be observed. It is particularly important to keep the gage frame square with the work piece. Adjustments of the mounting bracket set screws provide a means for perfect alignment of the gage.

Reversal of the mounting is effected by rotating the lift spring about its anchoring rivet 180 degrees. The gate must be turned end for end in order that the check valve there in will function to restrict the lifting motion. Re-assembly together with the addition of SAE-20 motor oil restores the unit to proper operation.



STEP 1: *Mounting and alignment*

Attach mounting bracket to grinder with 1/2-13 socket head cap screw.
Adjust the three set screws with a flat head screwdriver to properly align the gage with your workpiece.



STEP 2: *Set lifting force*

Loosen the flanged jam nut with a 3/4" wrench, and rotate the spring with a 1/4" hex wrench. The spring should exert 4-8 ounces (110-220 grams) more than necessary to exactly counterbalance the gage.

- Not enough force will cause unstable gaging contact
- Too much force will wear the gage and workpiece

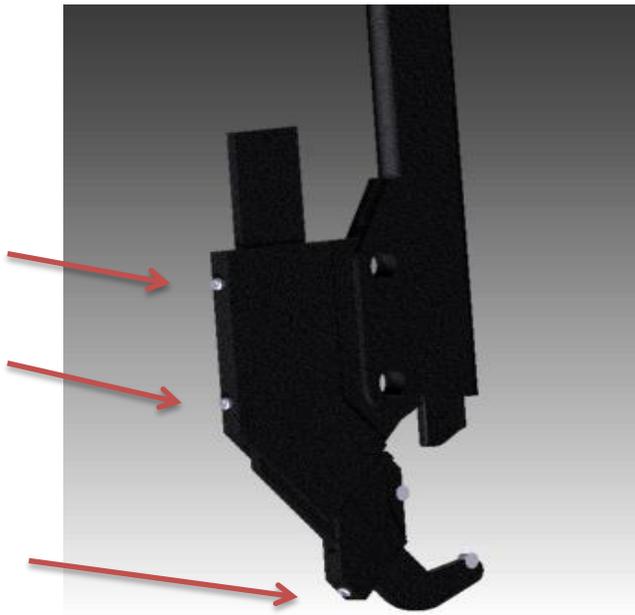


STEP 3: *Set lifting speed*

Adjust the lifting speed so the gage raises smoothly, coming to a soft cushioned stop. Use a 1/8 hex wrench to adjust the oil metering screw.

Clockwise = faster
Counterclockwise = slower

- Not enough force will cause longer cycle time
- Too much speed will shock the gage and cause measurement error.



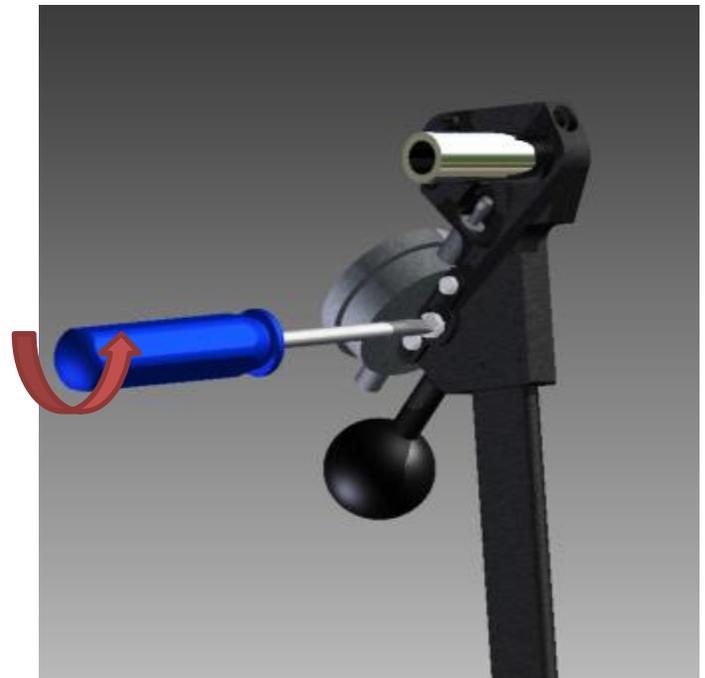
Step 4

The adjustable caliper is locked into a given setting by three socket head set screws. To change, loosen these screws and move to the new position, observing the graduated scale. Make certain the back contact engages the body before tightening its locking screw.

Single purpose calipers and spline type calipers do not require any adjustment and are ready to use as shipped. Should marking of the work piece occur, lapping slightly with diamond compound will eliminate this difficulty.

Step 5

While the gage is supported by the rotating work piece, the indicator is moved into its operating position by the associated cam provided for that purpose. It is generally set with the zero at the top of the dial face, although this is not absolutely necessary. The indicator should not revolve more than one revolution during the grinding cycle for two reasons: to avoid confusion with which "zero" is at finish size, and to avoid unnecessary wear and tear of the indicator mechanism.

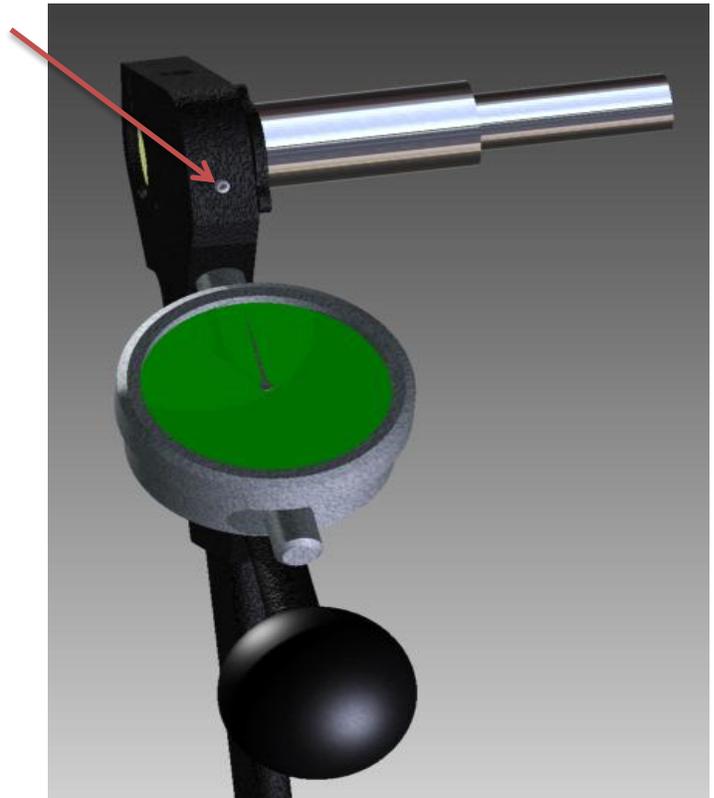


Step 6

Plunger force is established by turning the spring adjustment clockwise for increased pressure and counter-clockwise for decreased pressure. Use of the locking screws will hold the final setting. The plunger should have about 12 to 16 ounces force with which to grip the work piece. Softer material will generally require lighter pressures to avoid burnishing. Excessive pressure will diminish sensitivity and score the work piece. The factory has adjusted for average grinding conditions.

Step 7

Turning the plunger travel adjustment screw will determine the amount the plunger can move undersize after the gage has been removed from the work piece. Generally, it is desirable to confine this travel to approximately .010", thus eliminating unnecessary wear and tear on the indicator. Limited travel will minimize carrying grinder sludge into the gage frame. Test the adjustment by pushing the gage on and off the work piece repeatedly.



HOW TO USE THE GAGE:

Arnold gages are essentially in-process comparators used on external grinders and supported directly by the work pieces. For this reason these continuous grinding gages are set-up to masters or to work pieces ground within tolerance. They must be checked occasionally, the frequency dependent upon the closeness of tolerance. Unlike most comparators, these gages are capable of monitoring continuously not only the diameter, but roundness, surface condition and often times chatter.

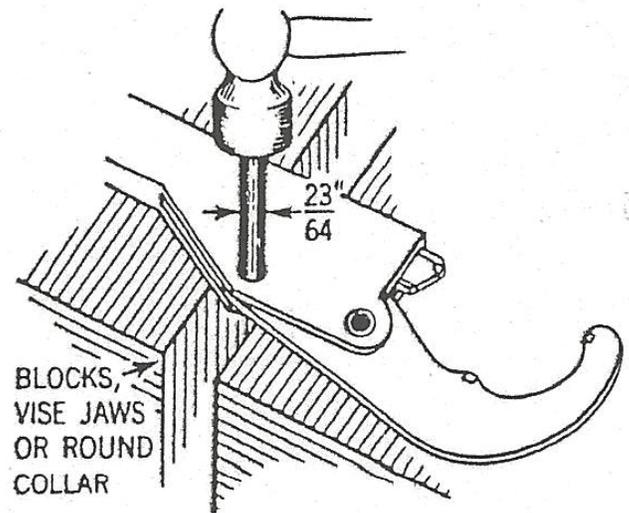
Operation of the gage involves its placement followed by observation of the dial indicator. The indicator hand will approach size in a clockwise direction coming to zero at its completion. Every effort should be made to handle the gage with care.

With the gage riding the work piece, the grinder feed rate can be crowded for fast stock removal. Near finish size, the feed should be slowed down or stopped entirely, allowing the "spring" within the set-up to carry the operation on down to final size. Temperature build-up within the part must be considered at all times. The work piece must be allowed to cool sufficiently when approaching finish size in order that the diameter will round up and a good finish will result. Generally speaking, longer grinding cycles with a generous spark-out period will produce better results. Out-of-round work pieces will appear as wobble on the dial indicator. Small flats, chatter, and rough surfaces will reflect as a high frequency flutter. What appears to be erratic gage behavior is often times only a manifestation of what is actually taking place at the work piece.

Exchange calipers by driving spring bushings into place.

Set gage frame on protected surface to avoid marring.

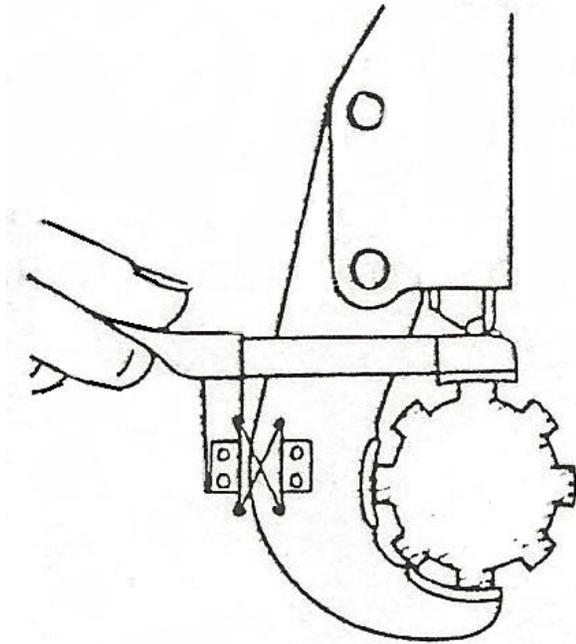
NOTE: Holes are deliberately offset to insure proper assembly.



MAINTENANCE:

Conditions around the grinder are usually wet and dirty owing to the nature of the operation. Arnold gages must work satisfactorily under these conditions. Successful gaging will therefore depend largely upon how clean the gages are kept, how they are kept in repair, and what effort is made to prevent breakdowns beforehand. Gages that are permitted to become dirty will eventually “stick” with grinder sludge. Abused gages will “stick” from bent and deformed parts. Excessive oiling will only serve to clog the gage and lock up the indicator. It is THEREFORE ONLY REASONABLE TO – KEEP ARNOLD GAGES CLEAN, PROPERLY ADJUSTED, AND IN GOOD REPAIR if you expect continuing success with them.

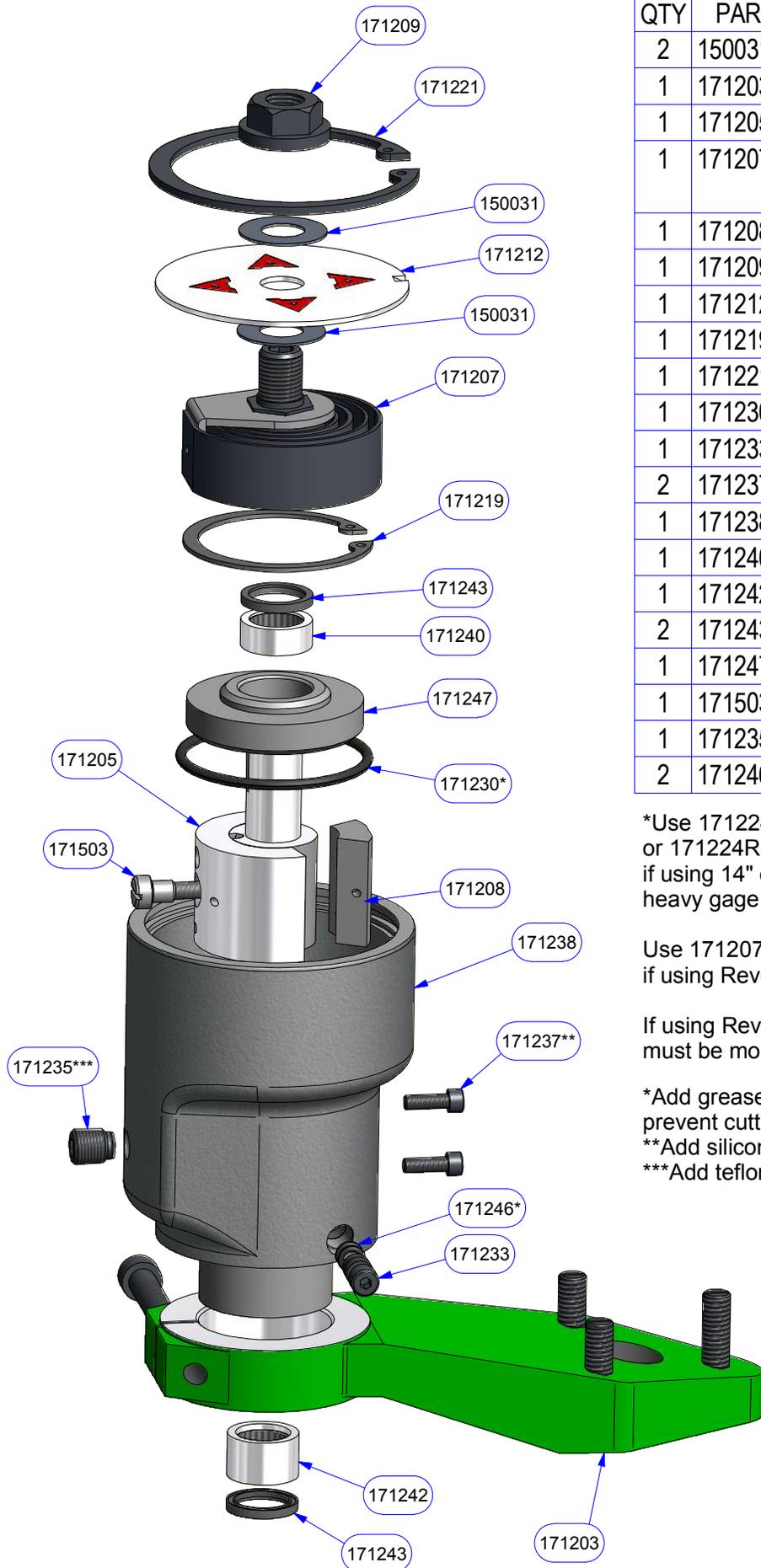
Constantly maintain a good working installation. Keep the gage free of encumbrances such as hoses, splash guards, and other unnecessary additions. Beware of modifications calculated to improve gage performance which often produce the opposite result. Consult the factory – let us pass along our recommendations on gage practice and usage.



SPLINE CALIPERS

For best results re-lap spline calipers on the job. Use Norbide 220 or 320 grit with oil. Diamond compound is satisfactory. This will assure alignment on your machine

1. Substitute indicator contact points, if necessary, to extend gage adjustment. Use points with ball end.
2. The various screws and nuts on the gage should not be tightened excessively. No benefit accrues, and often times threads are stripped and adjustments made difficult or impossible.
3. Fine adjustment of "zero" can be made by rotating bezel of indicator.
4. Do not permit gage to rest upside down. Sludge and coolant will drain into gage resulting in maintenance problems.
5. Taper can be detected by traversing work piece through the gage.
6. Occasionally check adjustments to make certain they are locked firmly into place.
7. Keep set-ups compact and close coupled to minimize deflection and keep arrangement rigid.
8. Dirty Gages are insensitive gages.



JR MOUNTING

QTY	PART NUMBER	TITLE
2	150031	Fiber Washer
1	171203	Levelling Bracket Assy
1	171205	Rotor Assy
1	171207	Lift Spring Assy (Standard)*
1	171208	Gate Assy
1	171209	Spring Adj. Lock Nut
1	171212	Spring Cover
1	171219	Inner Snap Ring
1	171221	Outer Snap Ring
1	171230*	Bearing Support Seal
1	171233	Rate Adj. Screw
2	171237**	Gate Attach. Screw
1	171238	JR Housing
1	171240	Inner Bearing
1	171242	Outer Bearing
2	171243	Bearing Seal
1	171247	Bearing Support
1	171503	Sector Attachment Screw
1	171235***	Oil Filler Assy
2	171246*	Screw Seal

*Use 171224 (Heavy-Duty Lift Spring Assy) or 171224R (Reverse Heavy-Duty Lift Spring Assy) if using 14" or 16" long support arms or if using a heavy gage assembly

Use 171207R (Reverse Lift Spring Assy) if using Reverse JR mounting

If using Reverse JR mounting, 171208 (Gate Assy) must be mounted 180 degrees

*Add grease on parts 171246 and 171230 to prevent cutting

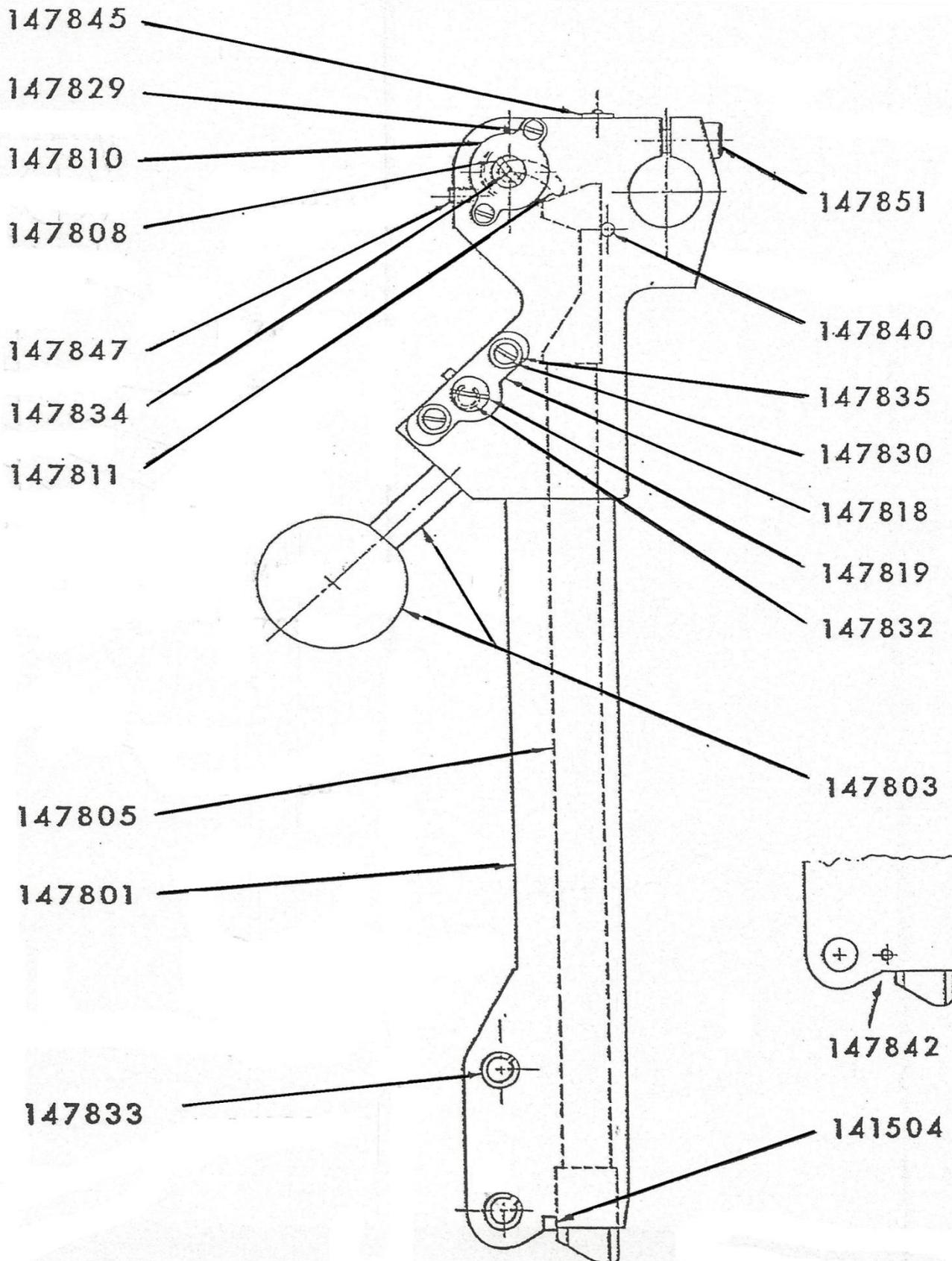
**Add silicone on 171237 to prevent leaking

***Add teflon tape on 171235 to prevent leaking



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Model LR Part Diagram



Model LR Grinding Gage

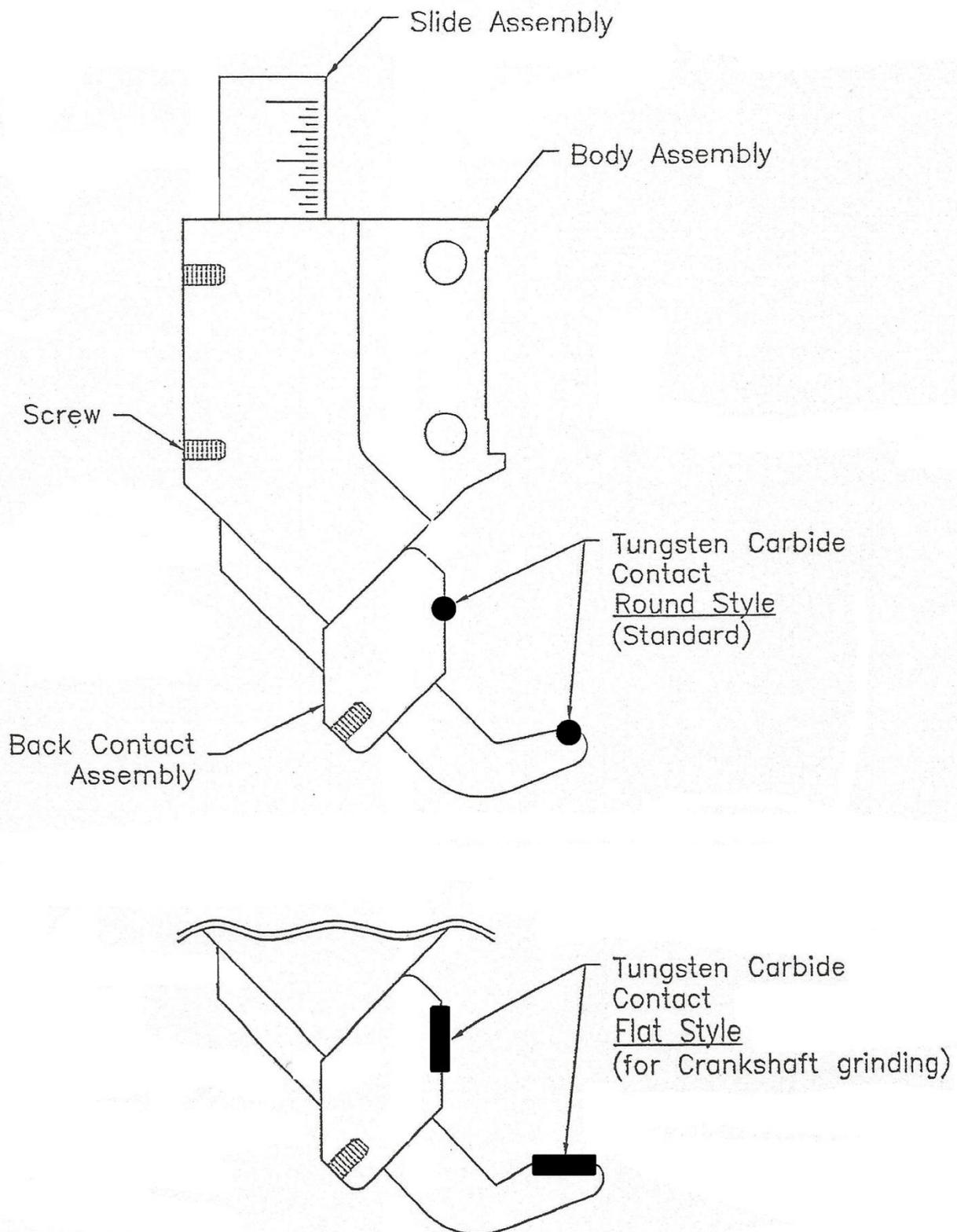
Part Number	Description
147801	Main Frame Assembly
147819	Indicator Adjusting Cam and Lock ring Group
147832	Indicator Adjustment Cam locking ring
147840	Plunger Upper Guide Insert
147847	Spring Top Screw (8-32 x3/2 lg. Special)
147851	Hub Clamp Screw (1/4-28 x 5/8 lg.)
147803	Handle Assembly
111401	Handle Ball
111402	Handle Stud
147805	Plunger
148001	Upper Molded Carbide End
148002	Lower Molded carbine End
148003	Plunger Center Section
147808	Plunger Spring and Housing Assembly
147810	Spring Lock Plate and Screw Group
147848	Spring Lock Plate
147829	Spring lock Plate Screw (4-40 x ¼ lg.) (2)
147811	Spring Lever Assembly
147818	Indicator Slide, Screw and Washer Group
147849	Indicator Adjustment Slide
147830	Indicator Clamp Screw (8-32 x 5/8 lg.)(2)
147835	Indicator Clamp Screw Washers (#8s Brass)(2)
147833	Caliper Bushing (2)
147834	Spring Level Pin
147842	Lower Bearing Carbide (1/8 Dia. X 5/16 lg.)
147845	Oiler (Drive Type)

Model LR Service Parts

141504	Lower Bearing Carbide (1/8 sq x 5/16 lg.)
145501	Collet, 3/8" Diameter Hole, for attachments
147861	Main Frame Assembly (Collet)

NOTE: UNLESS SPECIFIED, REQUIRED QUANTITY IS ONE EACH.

Adjustable Caliper Parts Diagram



Adjustable Calipers

Part Number	Description
152201	Set Screw (10-32 x 1/2 lg. Flat point)
142102	Disc Contact , Tungsten Carbide
3/16" to 1-1/2" Adjustable Caliper	
152210	Body Assembly
152211	Slide Assembly
152213	Back Contact Assembly
1" to 3" Adjustable Caliper	
152230	Body Assembly
152231 (152278)	Slide Assembly <i>(Flat carbide for crankshaft Grinding)</i>
152233 (152279)	Back Contact Assembly <i>(Flat carbide for crankshaft Grinding)</i>
3" to 5" Adjustable Caliper	
152250	Body Assembly
152251 (152281)	Slide Assembly <i>(Flat carbide for crankshaft Grinding)</i>
152253 (152282)	Back Contact Assembly <i>(Flat carbide for Crankshaft Grinding)</i>
5" to 8" Adjustable Caliper	
152260	Body Assembly
152261	Slide Assembly
152263	Back Contact Assembly
8" to 12" Adjustable Caliper	
152270	Body Assembly
152271 (152287)	Slide Assembly <i>(Flat carbide for crankshaft Grinding)</i>
152273 (152288)	Back Contact Assembly <i>(Flat carbide for Crankshaft Grinding)</i>
Metric Graduated Slide Assemblies (Disk Carbide)	
152212	Slide Assembly (6mm-40mm)
152232	Slide Assembly (25mm-75mm)
152252	Slide Assembly (75mm-125mm)
152262	Slide Assembly (125mm-200mm)
152272	Slide Assembly (200mm-300mm)

NOTE: Adjustable calipers and parts are interchangeable on models; L, WF, R, AND LR Gages.



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Parts and Service Policy

The Arnold Gauge Company will make every effort to cooperate and assist those responsible for the maintenance of our products. We shall deliver either and/or components with utmost speed and consideration for your needs. All shipments are made F.O.B. Fairfield, Ohio.

To promote rapid service, we suggest that whenever possible the model and serial numbers be included in your request. For our part, we will ship stock items within 24 hours of receipt of the order here in Fairfield. Repairs will be shipped within two weeks. Special gages and parts ship as soon as possible.

The Arnold Gauge Company Is prepared to repair and service all of our gages using genuine factory parts.