

# DODGE® All-Steel Cartridge Units

These instructions must be read thoroughly before installation or operation.

## Installation Instructions

### Assembly of Cartridge (Refer to Parts Drawing)

**CAUTION: Unit is shipped without grease. Add proper amount of recommended lubricant before operating. Failure to observe these precautions could result in damage to, or destruction of, the equipment.**

1. Remove bearing from box and pack full of NLGI #2 lithium-base grease, then mount bearing (35) on adapter sleeve (9).
2. Install knurled adapter nut (70) on small end of sleeve. Hand tighten until it contacts the large face of taper bearing cone.
3. Install other nut (65) on large end of sleeve. Hand tighten until it contacts the small face of taper bearing cone; then back off one full turn.
4. Line up hole in bearing outer race (35 or 40) with locking pin on key (99).
5. Slide inboard end plate (25), fitted with one .007" shim and half full of NLGI #2 lithium-base grease to frame (20). Line up drain plug at 6 o'clock. Tighten all end plate cap screws to 25 in.-lbs. with keyway in the frame.
6. Slide subassembly, made up of bearing (40), adapter sleeve (9), and the mounting nuts (70 & 65) through the mounted inboard end plate (25).
7. Slide outboard end plate (25) over knurled adapter nut (70). Tighten end plate cap screws to 25 in.-lbs. Loosen all cap screws on outboard side and retighten finger tight.
8. Using feeler gauges, measure distance between end plate (25) and frame (20) beside each cap screw. The average of all readings will be the shim pack thickness required between the frame (20) and end plate (25).
9. Remove outboard end plate (25).
10. Insert proper shim pack on pilot of outboard end plate (25). Pack outboard end plate 50% full of NLGI #2 lithium-base grease.
11. Slide outboard end plate (25) over knurled adapter nut (70) Line up drain plug at 6 o'clock.
12. Fasten outboard end plate (25) to frame (20). Hand tighten all end plate cap screws. Do not fully torque cap screws on either end plate until after the bearing has been tightened to shaft.
13. Back off large end adapter nut (65) until both piston ring grooves are fully exposed. Place piston ring seals (60) in the appropriate grooves of the large end adapter nut (65) so that the gaps are 180° apart. Pack seals with NLGI #2 lithium base grease.
14. Hand tighten large end adapter nut (65) while compressing the piston ring seals until it contacts the small face of the taper bearing core; then back off one full turn.

**WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures, as may be desirable, or as may be specified in safety codes should be provided, and are neither provided by Baldor Electric Company, nor are the responsibility of Baldor Electric Company. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risks to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.**

15. Back off knurled adapter nut (70) until both piston ring seal grooves are fully exposed. Place piston ring seals (60) in the appropriate grooves on the knurled adapter nut (70) so that the gaps are 180° apart. Pack seals with a NLGI #2 lithium-base grease.
16. Hand tighten knurled adapter nut (70) while compressing the piston ring seals until it contacts the large face of the taper bearing cone.
17. Install setscrews on adapter nuts (65 and 70). Do not, at this time, tighten setscrews against adapter (9).

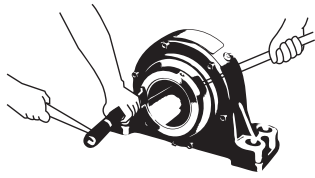
### To Locate Bearing on Shaft

**WARNING: To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.**

1. Shaft should be within commercial tolerances, straight, smooth, and clean. Apply a light coating of oil or other rust inhibitor to the shaft in the bearing area.
2. Loosen lockscrews (75) in adapter nuts (65) and (70) to prevent damage to adapter (9). (If necessary to expand adapter (9), loosen knurled adapter nut (70) approximately two turns and tap on end of this nut.)
3. Slide shaft through bearing bore and position where wanted.
4. **Do not fully torque cap screws of end plates (25) to frame until bearing is tightened on shaft.**
5. **Block up shaft or support shaft with slings to remove weight from bearing.** This is extremely important where the bearing and shaft are large; also, where heavy equipment is mounted on shaft.
6. **To tighten bearing on shaft,** tighten non-expansion bearing first.
7. Loosen (turn counterclockwise) nut (65) one full turn. **Make sure this nut does not touch end of bearing (35 or 40) during tightening operation.** (See Arrow "A" on Drawing.) Tighten (turn clock-wise) **knurled** nut (70). Repeat the loosening of smooth nut and the tightening of **knurled** nut one turn at a time until adapter (9) is snug on shaft and considerable effort is required to turn knurled nut (70). Then use sledge and brass bar as shown in illustration.
8. **Tighten (turn clockwise) Nut (65) until it is tight against end of bearing (35 or 40). Further tighten smooth nut with sledge and brass bar as show in Figures 1 through 4.**

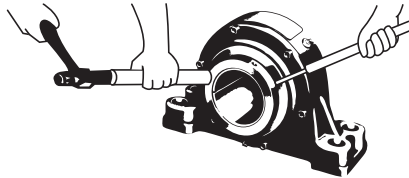
**NOTE: When installing the bearing, it is very important that the split tapered adapter (bearing sleeve) be drawn down on the shaft as tight as possible. Use one of the following illustrated methods to overcome friction between the tapered adapter and the taper-bored cone and between the threads of the adapter and the adapter nut. The sudden jar developed by the sledge and brass bar (while the tightening force is being applied to the adapter nut) helps to overcome the friction, allowing the nut to be tightened to a greater degree than otherwise possible.**

**NOTE: Pictures shown are for pillow blocks. The same procedure is used for cartridge units.**



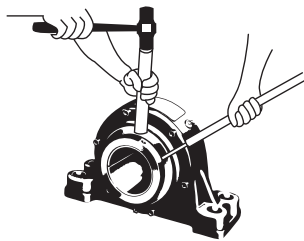
Hitting directly on face of adapter nut with brass bar parallel to shaft, while applying torque with barring rod to tighten nut. **This is the preferred method.** ① ②

**Figure 1 - Directly on face of adapter**



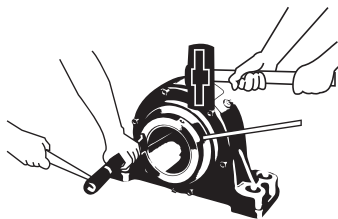
Hitting on nut at an angle where unable to hit at right angle to face. This method is not as effective as the method shown in Figure 1. ① ②

**Figure 2 - On nut at angle**



Hitting on O.D. of nut with brass bar held at right angle to shaft. This method is not as effective as the methods shown in Figures 1 or 2. ① ②

**Figure 3 - On O.D. of nut**



This is an alternate method to those shown in Figures 1, 2, and 3 in that a spanner wrench is used in place of the barring rod. ① ③

**Figure 4 - Spanner Wrench Method**

- ① For 3-1/2 and smaller shaft sizes the brass bar should not be less than 1" diameter, for 3-15/16" to 5" shaft sizes not less than 1-1/4" diameter; for 5-7/16" to 7" shaft sizes not less than 1-1/2" diameter, for 7-1/2" to 10" shaft sizes not less than 2" diameter.
  - ② A 12" length of drill rod which is 1/64" less in diameter than the barring pockets is recommended for use as barring rod. Pipe should be used as shown for additional leverage.
  - ③ Pin in spanner wrench should be 1/64" less in diameter than the barring pockets.
9. Loosen smooth nut (65) and retighten knurled nut as in Step 7.
  10. Retighten smooth nut as in Step 8.
  11. After tightening non-expansion bearing on shaft, fasten end plates (25) to frame (20) by tightening cap screws to recommended torque values shown on Table 4. Proceed to tighten Expansion bearing, repeating Steps 7 through 10.
  12. On expansion bearing locate to allow expansion in proper direction. When center groove on smooth nut is set flush with end of End Plate, equal expansion in either direction is provided. Where unusual expansion is likely, set to either side of center groove as required to allow expansion in proper direction. Outside grooves indicate extreme limits when unit is accurately aligned.
  13. After having tightened Expansion bearing to shaft, proceed to fasten End Plates (25) to Frame (20) by tightening cap screws to recommended torque values shown on Table 4.

14. Tighten setscrews (75) (two per adapter nut) per torque values shown on Table 6.
15. After a short run, make sure adapter (9) is tight as follows: loosen lockscrews (75); loosen end plate bolts; perform Steps 5 to 14 inclusive.

## Lubrication Instructions

**Storage or Special Shutdown** – if exposed to wet or dusty conditions or to corrosive vapors, extra protection is necessary: Add grease until it shows at the seals; rotate the bearing to distribute grease: cover the bearing. After storage or idle period, add a little fresh grease before running.

**High Speed Operation** – In the higher speed ranges too much grease will cause overheating. The amount of grease that the bearing will take for a particular high speed application can only be determined by experience – see "Operating Temperature" below. It will be necessary to remove grease fitting (also drain plug when finished) to permit excess grease to escape. When establishing a re-lubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

**Operation in Presence of Dust, Water or Corrosive Vapor** – Under these conditions the bearing should contain as much grease as speed will permit, since a full bearing with consequent slight leakage is the best protection against entrance of foreign material. In the higher speed ranges too much grease will cause overheating – see "High Speed Operation" above. In the lower speed ranges it is advisable to add extra grease to a new bearing before putting into operation. Bearings should be greased as often as necessary (daily if required) to maintain a slight leakage at the seals.

**Average Operations** – The following table is a general guide for re-lubrication. However, certain conditions may require a change of lubricating periods as directed by experience. See "High Speed Operation" and "Operation in Presence of Dust, Water, or Corrosive Vapors" above.

**Operating Temperature** – Abnormal bearing temperature may indicate faulty lubrication. Normal temperature may range from "cool to warm to the touch" up to a point "too hot to the touch for more than a few seconds," depending on bearing size and speed, and surrounding conditions. Unusually high temperature accompanied by excessive leakage of grease indicates too much grease. High temperature with no grease showing at the seals, usually indicates too little grease, particularly if bearing is noisy. Normal temperature and a slight showing of grease at the seals indicates proper lubrication.

## Lubrication Guide

Read preceding paragraph before establishing lubrication schedule.

Table 1 - Suggested Lubrication Period In Weeks				
Hours Run Per day	1-250 RPM	251-500 RPM	501-750 RPM	751- RPM
8	12	12	10	7
16	12	7	5	4
24	10	5	3	2

**Kind of Grease** – Many ordinary cup greases will disintegrate at speeds far below those at which DODGE bearings will operate successfully if proper grease is used. Re-lubricate with Lithium Base Grease or a grease which is compatible with original lubricant and suitable for roller bearing service. In unusual or doubtful cases the recommendation of a reputable grease manufacturer should be secured.

**Special Operating Conditions** – Refer acid, chemical, extreme or other special operating conditions to Dodge Product Support, Baldor Electric Company, Greenville, South Carolina.

**Table 2 - Parts for ALL-STEEL Cartridge Units**

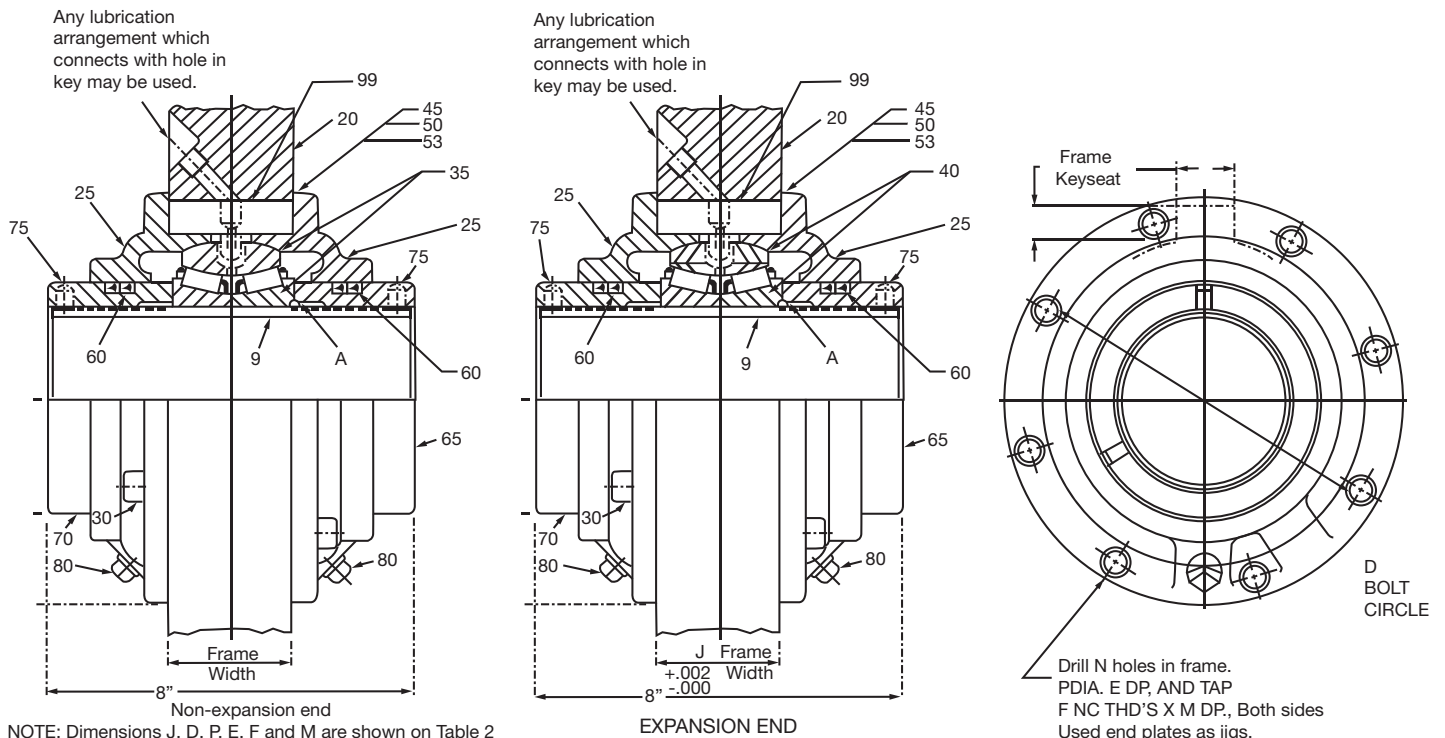
Reference	Name of Part	Number Required	Part Number for Various Shaft Sizes				
			2-11/16 2-15/16 3	3-1/4 3-7/16 3-1/2	3-15/16 4	4-1/4 4-7/16 4-1/2	4-15/16 5
99	Key Assembly	1	063113	063133	063153	063173	063193
25	End Plate	2	063102	063122	063142	063162	063182
30	End Plate Cap Screw	①	417102	417141	417141	417168	417168
35	Non-Expansion Bearing Complete	1	390721	390723	390725	390727	425024
40	Expansion Bearing Complete	1	390722	390724	390726	390728	425005
45	.010" End Plate Shim	②	427010	427011	427012	427013	427014
50	.007" End Plate Shim	②	427025	427026	427027	427028	427029
53	.015" End Plate Shim	②	427040	427041	427042	427043	427044
55	Locking Pin	1	063109	063129	063149	063169	063189
60	Piston Ring Seal	4	410070	410072	410074	410076	410042
65	Large End Adapter Nut	1	063111	063131	063151	063171	063191
70	Knurled Adapter Nut	1	063110	063130	063150	063170	063190
9	Adapter	1	See table below for part number.				
75	Adapter Nut Lock Screw	4	400050	40086	400118	400142	400146
80	Drain Plug	2	430008	430010	430010	430012	430012
...	Lubrication Fitting	1	405015	405015	405015	405015	405015

① 6 Required for 2 - 15/16 to 5" sizes

② Normally shims having a total thickness of about 1/16" will be required to give the proper fit of bearing in the housing.

**Table 3 - Adapter Part Numbers**

Shaft Size	2-11/16	2-15/16	3	3-1/4	3-7/16	3-1/2	3-15/16	4	4-7/16	4-1/2	4-15/16	5
Adapter Part No.	063105	063106	063108	063125	063126	063127	063144	063146	063164	063165	063183	063184



NOTE: Dimensions J, D, P, E, F and M are shown on Table 2

Drill N holes in frame.  
PDIA. E DP, AND TAP  
F NC THD'S X M DP, Both sides  
Used end plates as jigs.

**Figure 5 - Replacement Parts/Assembly Diagram for ALL-STEEL Cartridge Units**

## To Remove Bearing from Shaft

**WARNING: To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.**

1. Loosen setscrews (75) in both adapter nuts (65) and (70). Block up shaft to remove weight from bearing.
2. Loosen (turn counterclockwise) KNURLED adapter nut (70) at outboard of cartridge approximately two turns.
3. Tighten (turn clockwise) nut (65) at inboard of housings. Use sledge and brass bar as in Step 7 to break the cones loose on the adapter, thus allowing the adapter to loosen on shaft.

Bolt Size	Tightening Torque Pound-Inches
3/8-16	240
7/16-14	384
1/2-13	600
5/8-11	1,200
7/8-9	2,040

Shaft Size	Frame Width J = ± .005	Bolt Circle D	Frame Mounting Holes (Both Sides)				
			No. of Holes, N	Drill Size, P	Depth, E	Tap Size, F	Depth, M
2-1/16 2-15/16 3	2-3/16	6-3/8	6	.323	15/16	3/8-16	11/16
3-1/4 3-7/16 3-1/2	2-3/4	7-7/8	6	3/8	1-3/8	7/16-14	7/8
3-15/16 4	3-1/8	8-5/8	6	3/8	1-3/8	7/16-14	7/8
4-1/4 4-7/16 4-1/2	3-1/2	9-7/8	6	7/16	1-3/8	1/2-13	7/8
4-15/16 5	3-3/4	10-13/16	6	7/16	1-3/8	1/2-13	7/8

Setscrew Size	Tightening Torque Pound-Inches
5/16 - 18 × 3/8	156
3/8 - 16 × 1/2	273
7/16 - 14 × 1/2	428
1/2 - 13 × 5/8	615
1/2 - 13 × 3/4	615
5/8 - 11 × 3/4	1,315
3/4 - 10 × 1	2,150
1 - 8×1	7,010

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