

**Parts Replacement Manual**

**For**

**Torque-Arm™**

**Speed Reducers**

**Straight Bore & Taper Bushed**

**TDT115 - TDT125**  
**TDT215 - TDT225**  
**SIZES: TDT315 - TDT325**  
**TDT415 - TDT425**  
**TDT515 - TDT525**

**WARNING:** Because of the possible danger to persons(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 risk 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.



## INSTALLATION

1. On sizes TDT3, TDT4 and TDT5, replace the plastic plug that protects the threaded hole in the reducer housing with the eyebolt supplied with the reducer.

2. Determine the running positions of the reducer. (See Fig. 1) Note that the reducer is supplied with 4 or 7 plugs; 4 around the sides for horizontal installations and 1 on each face for vertical installations. These plugs must be arranged relative to the running positions as follows:

**Horizontal Installations** — Install the magnetic drain plug in the hole closest to the bottom of the reducer. Throw away the tape that covers the filler/ventilation plug in shipment and install plug in topmost hole. Of the 3 remaining plugs on the sides of the reducer, the lowest one is the minimum oil level plug.

**Vertical Installations** — Install the filler/ventilation plug in the hole provided in the top face of the reducer housing. Use the hole in the bottom face for the magnetic drain plug. Of the 5 remaining holes on the sides of the reducer, use a plug in the upper housing half for the minimum oil level plug.

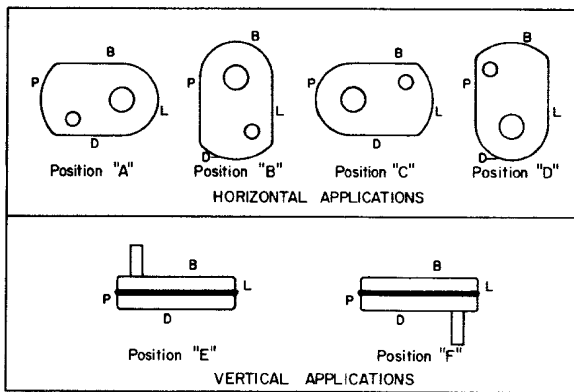


Fig. 1 — Mounting Positions

The running position of the reducer in a horizontal application is not limited to the four positions shown in Figure 1. However, if running position is over  $20^\circ$  either way from sketches, the oil level plug cannot be safely used to check the oil level, unless during the checking the torque arm is disconnected and the reducer is swung to within  $20^\circ$  of the positions shown in Figure 1. Because of the many possible positions of the reducer, it may be necessary or desirable to make special adaptations using the lubrication fitting holes furnished along with other standard pipe fittings, stand pipes and oil level gages as required.

**Important:** Because reducer is shipped without oil, it is necessary to add the proper amount of oil before running. Use a high grade petroleum base, rust and oxidation inhibited (R & O) gear oil — see tables. Follow instructions on reducer nameplate, warning tags, and in the installation manual.

Under average industrial operating conditions, the lubricant should be changed every 2500 hours of operation or every 6 months, whichever occurs first. Drain re-

3. Mount reducer on driven shaft as follows:

**For Straight Bore:** Mount reducer on driven shaft as close to bearing as practical. If bushings are used, assemble bushings in reducer first. A set of bushings for one reducer consists of one keyseated bushing and one plain bushing. Extra length setscrews are furnished with the reducer. Driven shaft should extend through full length of speed reducer. Tighten both setscrews in each collar.

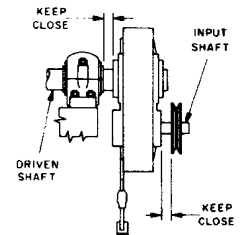


Fig. 2

**For Taper Bushed:** Mount reducer on driven shaft per instruction sheet No. 499629 packed with tapered bushings.

4. Install sheave on input shaft as close to reducer as practical. (See Fig. 2)

5. Install motor and V-belt drive so belt will approximately be at right angles to the center line between driven and input shaft. (See Fig. 3) This will permit tightening the V-belt with the torque arm.

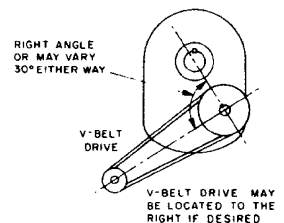


Fig. 3

6. Install torque arm and adaptor plates using the long reducer bolts. The bolts may be shifted to any of the holes on the input end of the reducer.

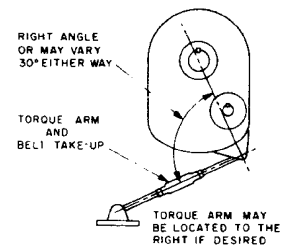


Fig. 4

7. Install torque arm fulcrum on a rigid support so that the torque arm will be approximately at right angles to the center line through the driven shaft and the torque arm anchor screw. (See Fig. 4) Make sure that there is sufficient take-up in the turnbuckle for belt tension adjustment when using V-belt drive.

## LUBRICATION

ducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant. Caution: Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly.

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperatures above  $200^\circ \text{F.}$ , the oil should be changed every 1 to 3 months depending on severity of conditions.

Reference	Name of Part	No. Req'd.	TDT1 Part No.	TDT2 Part No.	TDT3 Part No.	TDT4 Part No.	TDT5 Part No.
12	Backstop Assembly	1	241101	242101	243101	244092	245101
14	Right Housing Half	1	241258	242070	243070	244070	245188
15	Left Housing Half	1	241258	242071	243071	244071	245188
16	Air Vent	1	241237	241237	241237	241237	245237
18	Housing Bolt	1	411418	411418	411440	411442	411464
20	Adaptor — Housing Bolt	2	411420	411420	411442	411444	411466
22	Lockwasher	4	419011	419011	419012	419012	419013
24	Hex Nut	4	407087	407087	407089	407089	407091
26	Dowel Pin	2	420089	420089	420103	420103	420110
28	Pipe Plug	2	430031	430031	430031	430031	430033
30	Magnetic Plug	1	430060	430060	430060	430060	430062
32	Washer	2	419092	419092	419096	419096	419096
36*	Backstop Cover	1	241221	242221	243221	244221	245221
38	Backstop Cover Gasket	1	241220	242220	243220	244220	245220
40	Backstop Cover Screw	4	415022	415022	415022	415022	416532
42	Lockwasher	4	419007	419007	419007	419007	419007
44	C' Shaft Brg. Cover (Input)	1	262221	242224	243224	244223	355060
46	C' Shaft Brg. Cover (Backstop)	1	262221	242224	243224	244224	355060
48	C' Shaft Brg. Cover Gasket	1	.....	.....	.....	244222	.....
50	C' Shaft Brg. Cover Screw	4	.....	.....	.....	415022	.....
52*	Input Shaft { 15:1 Ratio with Pinion } 25:1 Ratio	1	241268	242174	243009	244009	245009
54*	Input Shaft Brg. (Input)	1	241269	242175	243004	244004	245004
56*	Input Shaft Brg. (Backstop)	1	390277	390282	390287	390293	390298
58	Input Shaft Key	1	390278	390277	390288	390288	390299
60	Input Shaft Key	1	443008	443014	443032	443082	443113
62*	COUNTER-SHAFT { 15:1 Ratio ASSEMBLY * / 25:1 Ratio	1	390180	390786	390729	390068	390080
64	Countershaft with Pinion	1	390231	390787	390730	390069	390090
66*	First Reduction { 15:1 Ratio Gear } 25:1 Ratio	1	241264	242173	243002	244002	245002
68*	First Reduction { 15:1 Ratio Gear } 25:1 Ratio	1	241262	242008	243214	244214	245214
70*	First Reduction { 15:1 Ratio Gear } 25:1 Ratio	1	241263	242005	243212	244212	245212
72*	First Reduction { 15:1 Ratio Gear } 25:1 Ratio	1	241309	242218	243215	244215	244215
74*	Countershaft Brg. (Input)	1	391755	391757	390288	391759	390302
76*	Countershaft Brg. (Backstop)	1	391755	391757	390288	390295	390302
78*	OUTPUT HUB ASSEMBLY *	1	390151	390152	390980	390154	390985
80*	Straight Bore	1	390878	390879	390897	390899	390925
82*	Taper Bushed	1	241208	242208	243338	244208	245338
84*	Output Hub (Str. Bore)	1	241265	242134	243307	244091	245113
86*	Output Hub (Taper Bush.)	1	241007	242007	243213	244007	245213
88*	Output Gear	1	241217	272157	243216	244217	245216
90*	Output Gear Key	1	421013	421017	421021	421025	421030
92*	Output Hub	2	443037	443068	443069	443102	443115
94*	Snap Ring	1	390279	390284	390289	390296	390300
96*	Output Hub Collar	2	241209	242209	243209	244209	245209
98*	Collar Screw	4	400062	400094	400098	400150	400154
100*	Bushing Back-up Plate	2	241266	242137	243308	244099	245114
102*	Retaining Ring	2	421111	421112	421109	421108	421107
104*	SEAL KIT *	1	241340	242340	243340	244340	245340
106*	Backstop Cover Gasket	1	241220	242220	243220	244220	245220
108*	Input Shaft Seal	1	241203	242203	243203	244203	245203
110*	Output Hub Seal	2	241202	242202	243202	244202	245202
112*	Housing Gasket	1	241219	242219	243219	244219	245219
114*	Gasket Eliminator Tube	1	465044	465044	465044	465044	465044
116*	3/4" Bore	1	241272	.....	.....	.....	.....
118*	3/4" Bore	1	241274	.....	.....	.....	.....
120*	1 1/4" Bore	1	241276	242140	.....	.....	.....
122*	1 1/4" Bore	1	241278	242142	.....	.....	.....
124*	1 1/4" Bore	1	241280	242144	.....	.....	.....
126*	1 1/4" Bore	1	241282	242146	.....	.....	.....
128*	1 1/4" Bore	1	241286	242148	243278	.....	.....
130*	1 1/4" Bore	1	241288	242150	243280	.....	.....
132*	1 1/4" Bore	1	241290	242152	243282	.....	.....
134*	1 1/4" Bore	1	241294	242154	243284	244077	.....
136*	1 1/4" Bore	1	241292	242156	243260	244079	245074
138*	1 1/4" Bore	1	.....	242158	243262	244081	245078
140*	1 1/4" Bore	1	.....	242162	243264	244083	.....

★ Includes parts listed immediately below marked "▲". Series TDT1 and TDT5 housing assemblies also includes a two-piece housing. Bushing assembly includes 2 bushings.

▲ The parts marked "▲" make up the assemblies under which they are listed.

◆ Not shown on drawing.

† 4 req'd. on TDT1; 5 req'd. on TDT2; 6 req'd. on TDT3, TDT4 & TDT5.

‡ 6 req'd. on TDT1; 7 req'd. on TDT2; 8 req'd. on TDT3, TDT4 & TDT5.

● For reducers originally supplied with gaskets only.

◆ Straight Bore only.

◆ Taper Bushed only.

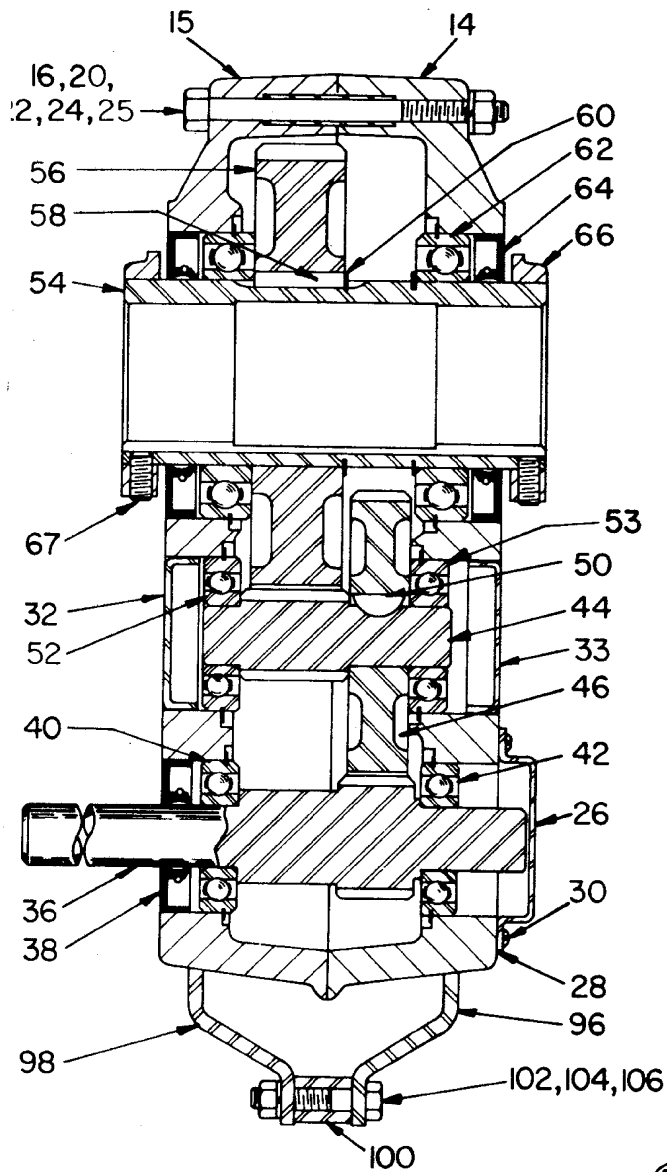
‡ On size TDT2 for 1 1/4" thru 1 1/2" bores; TDT3 for 1 1/4" thru 1 3/4" bores and TDT for 1 1/4" thru 2 1/4" bores.

‡ Double row ball bearing on size TDT4.

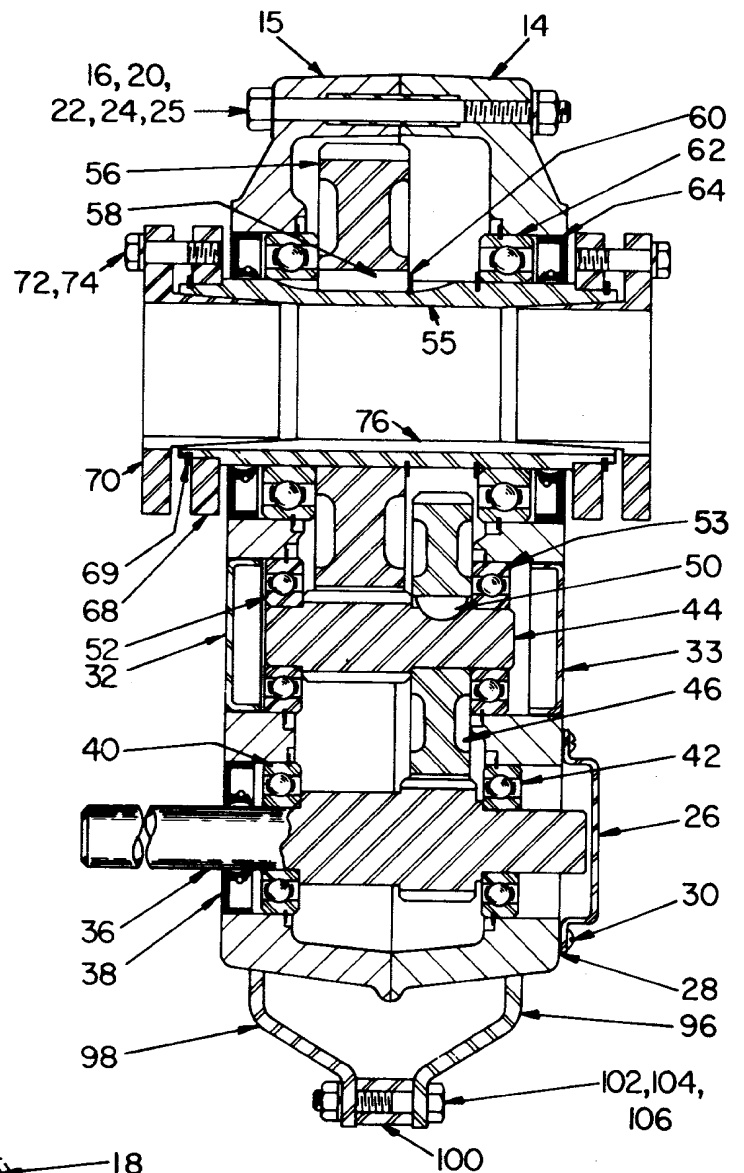
\* Recommended spare parts.

◆ NOTE: When replacing housing gasket or sealant clean housing flange surfaces on both halves, making sure not to nick or scratch flange surfaces. If reducer was originally supplied with a gasket do not use gasket replacer (Dow Corning RTV732) use gasket replacer (Dow Corning RTV732) only when the reducer was supplied without a housing gasket.

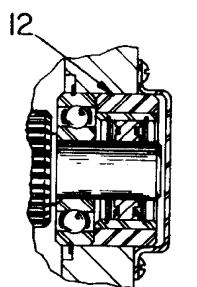
# **PARTS FOR TDT1 thru TDT5 STRAIGHT BORE & TAPER BUSHED SPEED REDUCERS**



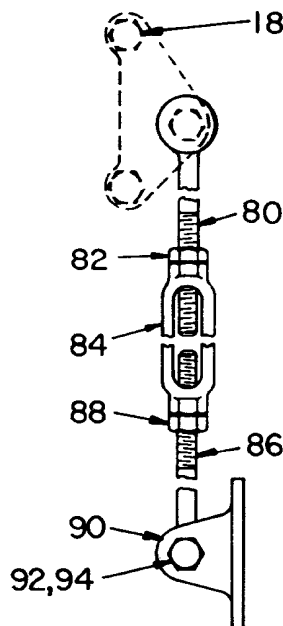
Straight Bore



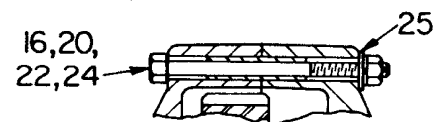
Taper - Bushed



Backstop Assembly



Torque-Arm Assembly



TDT1 and TDT5 Housing  
Assemblies Only

Note: The two digit numbers are for reference only. Order parts by the six digit numbers in the Parts List. Each six digit number is a complete identification of the part or assembly.

**Table 1 — Oil Volumes**

REDUCER SIZE	Volume of Oil Required to Fill Reducer to Oil Level Plug																	
	† Position A			† Position B			† Position C			† Position D			† Position E			† Position F		
	Fluid Ounces (Approx)	Quarts <sup>▲</sup> (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts <sup>▲</sup> (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts <sup>▲</sup> (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts <sup>▲</sup> (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts <sup>▲</sup> (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts <sup>▲</sup> (Approx)	Liters (Approx)
TDT115 TDT125	16	½	.47	16	½	.47	20	⅝	.59	24	¾	.71	32	1	.95	40	1¼	1.19
TDT215 TDT225	28	⅞	.83	32	1	.95	20	⅝	.59	32	1	.95	52	1⅝	1.54	56	1¾	1.66
TDT315 TDT325	48	1½	1.42	48	1½	1.42	24	¾	.71	44	1⅜	1.30	84	2⅝	2.48	96	3	2.84
TDT415 TDT425	60	1⅞	1.77	72	2¼	2.13	40	1¼	1.18	56	1¾	1.66	108	3⅜	3.19	136	4¼	4.02
TDT515 TDT525	104	3¼	3.08	128	4	3.79	104	3¼	3.08	128	4	3.79	224	7	6.62	272	8½	8.04

† Refer to Fig. 1 on page 2 for mounting positions.

▲ U. S. Measure: 1 quart = 32 fluid ounces = .94646 liters.

Note: If reducer position is to vary from those shown in Figure 1 either more or less oil may be required. Consult factory.

**Table 2 — Oil Recommendations for Average Operating Conditions**

Ratio and Output RPM	Room Temp. Fahr.	OIL		VISCOSITY	
		S. A. E. No.	AGMA Lub. No.	ASTM SUS @ 100° F.	Metric Equiv. c St @ 37.8° C.
25:1 — Up to 45 rpm 15:1 — Up to 75 rpm	— 25° thru 60°	10W40	—	—	—
	0° thru 100°	40	4	626 to 765	135 to 165
	101° thru 180°	50	5	918 to 1122	198 to 242
25:1 — 46 rpm and Up 15:1 — 76 rpm and Up	— 25° thru 60°	10W30	—	—	—
	0° thru 100°	30	3	417 to 510	90 to 110
	101° thru 180°	40	4	626 to 765	135 to 165

**NOTE:**

Pour point of lubricant selected should be at least 10° F. lower than expected minimum ambient starting temperature.

Extreme pressure (EP) lubricants are not recommended for average operating conditions.

Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a lubrication manufacturers representative for his recommendation.

Do not use oils containing slippery additives such as graphite or molybdenum disulphide in the reducer when backstop is used. These additives will destroy sprag action.

**MOTOR MOUNTS**

The motor mount must be installed on output end of reducer as shown in Figure 5. Note: The T-A motor mount is not recommended for applications requiring the use of a TRI-MATIC® Overload Release.

Remove two or three (as required) housing bolts on output end of reducer. Install back support 1 and front support 2 with new housing bolts 8. Install mounting bolts 3.

Install mounting plate 5 with adjusting studs 4 as shown in Figure 5.

Assemble one motor rail 6 by loosely bolting through the two front holes on each side of mounting plate (See Figure 5) with mounting rail bolts 7.

Measure the distance between front and rear mounting holes of motor. Position the rear motor rail to this distance and loosely bolt to the mounting plate.

Center the motor on the motor rails. Use a plain washer under each slot in the motor rails when the motor mounting bolts are less than ⅝" diameter. Bolt motor snugly to motor rails.

Install motor sheave and reducer sheave on their shafts as close as possible to the motor and reducer housings. **Note:** The motor rails may be moved forward or backward from the position shown in Figure 5 to permit alignment of the V-belt sheaves. It is permissible for the front motor rail to extend beyond the mounting plate 5. Align the V-belt sheaves carefully and tighten all bolts securely.

Install V-belts and adjust belt tension. Figure 5 shows the mount near the minimum belt center position. To increase the center distance, loosen the four nuts "A" on the adjusting studs and tighten the four nuts "B" alternately and evenly until the belts are properly tensioned.

Check all bolts to see that they are securely tightened.

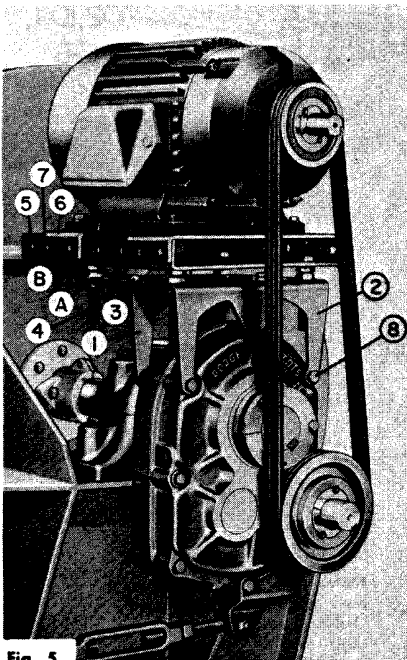


Fig. 5  
Note: Belt guard removed for photographic purposes.

Warning: Do not operate if belt guard is not in place.

## REPLACEMENT OF PARTS

### IMPORTANT:

Using tools normally found in a maintenance department, a Dodge Torque-Arm Speed Reducer can be disassembled and reassembled by careful attention to the instructions following.

Cleanliness is very important to prevent the introduction of dirt into the bearings and other parts of the reducer. A tank of clean solvent, an arbor press, and equipment for heating bearings and gears, should be available for shrinking these parts on shafts.

Our factory is prepared to repair reducers for customers who do not have proper facilities or who for any reason desire factory service.

The oil seals are of the rubbing type and considerable care should be used during disassembly and reassembly to avoid damage to the surface which the seals rub on.

The keyseat in the input shaft as well as any sharp edges on the output hub should be covered with scotch tape or paper before disassembly or reassembly. Also be careful to remove any burrs or nicks on surfaces of the input shaft or output hub before disassembly or reassembly.

### ORDERING PARTS:

When ordering parts for reducer specify Reducer Size No., Reducer Serial No., part name, part number and quantity.

It is strongly recommended that when a pinion or gear is replaced, the mating gear or pinion be replaced also.

If the large gear on the output hub must be replaced it is recommended that an output hub assembly of a gear assembled on a hub be ordered to secure undamaged surfaces on the output hub where the oil seals rub. However, if it is desired to use the old output hub, press the gear and bearing off and examine the rubbing surface under the oil seal carefully for possible scratching or other damage resulting from the pressing operation. To prevent oil leakage at the shaft oil seals the smooth surface of the output hub must not be damaged.

If any parts must be pressed from a shaft or from the output hub, this should be done before ordering parts to make sure that none of the bearings or other parts are damaged in removal. Do not press against outer race of any bearing.

Because old shaft oil seals may be damaged in disassembly it is advisable to order replacements for these parts.

### REMOVING REDUCER FROM SHAFT:

#### STRAIGHT BORE —

Loosen screws in both output hub collars. Remove the collar next to end of shaft. This exposes three puller holes in output hub to permit use of wheel puller. In removing reducer from shaft be careful not to damage ends of hub.

#### TAPER BUSHED —

1. Remove bushing screws.
2. Place the screws in the threaded holes provided in the bushing flanges. Tighten the screws alternately and evenly until the bushings are free on the shaft. For ease of tightening screws make sure screw threads and threaded holes in bushing flanges are clean.

3. Remove the outside bushing, the reducer and then the inboard bushing.

### DISASSEMBLY:

1. Position reducer on its side and remove all bolts. Gently tap the output hub and input shaft with a soft hammer (rawhide not a lead hammer) to separate the housing halves. Open housing evenly to prevent damage to the parts inside.
2. Lift shaft, gear, and bearing assemblies from housing.
3. Remove seals from housing.

### REASSEMBLY:

1. **Output Hub Assembly:** Heat gear to 325 to 350°F. to shrink onto hub. Heat bearings to 270 to 290°F. to shrink onto hub. Any injury to the hub surfaces where the oil seals rub will cause leakage making it necessary to use a new hub.
2. **Countershaft Assembly:** Shaft and pinion are integral. Press gear and bearings on shaft. Press against inner (not outer) race of bearings.
3. **Input Shaft Assembly:** Shaft and pinion are integral. Press bearings on shaft. Press against inner (not outer) race of bearings.
4. Drive the two dowel pins into place in the right hand housing half. Position right half of housing (as shown in drawing) on blocks to allow clearance for protruding end of output hub.
5. Mesh output hub assembly and countershaft assembly together and place in housing half. Place input shaft assembly in housing half. Tap lightly with a soft hammer (rawhide not a lead hammer, until bearings are properly seated in the housing. Make sure that the snap rings on the O.D. of the bearings come into contact with the housing.
6. Clean housing flange surfaces on both halves, making sure not to nick or scratch flange face. Place a new bead of gasket eliminator on flange face and spread evenly over entire flange leaving no bare spots. **Note: If reducer was originally supplied with a housing gasket do not use gasket eliminator. Reorder gasket per part number given in parts list.** Place other housing half into position and tap with a soft hammer until housing bolts can be used or draw housing halves together. Torque housing bolts per torque values listed below:

#### Housing Bolt Torque Values

Reducer Size	Recommended Torque	Reducer Size	Recommended Torque
TD1 & TD2	360 lb.-ins.	TD4	600 lb.-ins.
TD3	600 lb.-ins.	TD5	900 lb.-ins.

7. Extreme care should be used in installing seals on input shaft and output hub to avoid damage to seals due to contact with sharp edges of the keyseat in the input shaft or the retaining ring groove in the output hub. This danger of damage and consequent oil leakage can be decreased by covering the keyseat and groove with scotch tape or paper which can be removed subsequently. Chamfer or burr housing bore if end of bore is sharp or rough. Fill cavity between lips of seal with grease. Seals should be pressed or tapped with a soft hammer evenly into place in the housing, applying force only on outer corner of seals. A slight oil leakage at the seals may be evident during initial running in, but will disappear unless the seals have been damaged.



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World Headquarters  
P.O. Box 2400, Fort Smith, AR 72902-2400 U.S.A., Ph: (1) 479.646.4711, Fax (1) 479.648.5792, International Fax (1) 479.648.5895  
Dodge Product Support  
6040 Ponders Court, Greenville, SC 29615-4617 U.S.A., Ph: (1) 864.297.4800, Fax: (1) 864.281.2433  
[www.baldor.com](http://www.baldor.com)

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