

Torque-Arm™ Speed Reducers Straight Bore & Taper Bushed TXT805 TXT905 Instruction Manual

These instructions must be read thoroughly before installation or operation. This instruction manual was accurate at the time of printing. Please see dodgeindustrial.com for updated instruction manuals.

WARNING: To ensure the 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.

WARNING: All products over 25 kg (55 lbs) are noted on the shipping package. Proper lifting practices are required for these products.

INSTALLATION

This reducer is compatible with the Ability Smart Sensor, that can be installed in the adapter plug labelled “smart sensor”. The plug and sensor can be moved to different locations as required by mounting position.

1. Replace the plastic plugs that protect the threaded holes in the reducer housing with the eyebolt supplied with the reducer.
2. Determine the mounting position of the reducer (Figure 1). Note that the reducer is supplied with either 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 mounting 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 filter/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 filter/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.

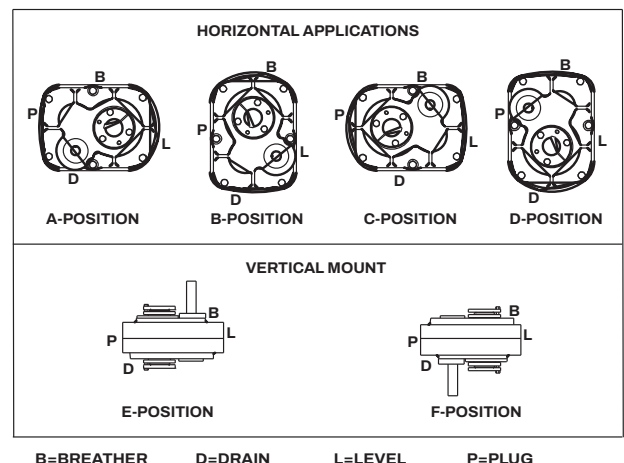


Figure 1 - Mounting Positions

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 Dodge® nor are the responsibility of Dodge. 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.

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° either way in position “B” and “D”, or 5° either way in position “A” or “C,” 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° for position “B” or “D” or 5° for position “A” or “C” 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 gauges as required.

If mounting the Torque-Arm reducer on an inclined angle, consult your local representative for proper oil level.
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.

For Taper Bushed: Mount reducer on driven shaft per instruction sheet packed with tapered bushings.

Install sheave on input shaft as close to reducer as practical (Figure 2).

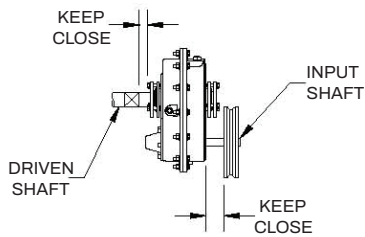


Figure 2 - Reducer and Sheave Installation

3. Install motor and V-belt drive so belt pull will approximately be at right angles to the center line between driven and input shaft (Figure 3). This will permit tightening the V-belt drive with the Torque-Arm.

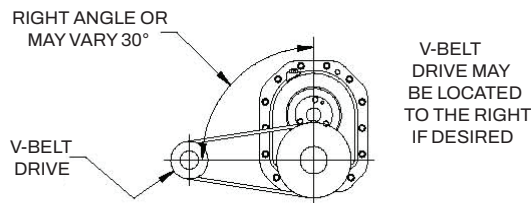


Figure 3 - Angle of V-Drive

4. Install Torque-Arm and adapter plates using the long reducer bolts. The bolts may be shifted to any of the holes on the input end of the reducer.
5. Install Torque-Arm fulcrum on a rigid support so that the Torque-Arm will be approximately at right angles ($\pm 30^\circ$) to the center line through the driven shaft and the Torque-Arm anchor screw (Figure 4). Make sure that there is sufficient take-up in the turnbuckle for belt tension adjustment when using V-belt drive

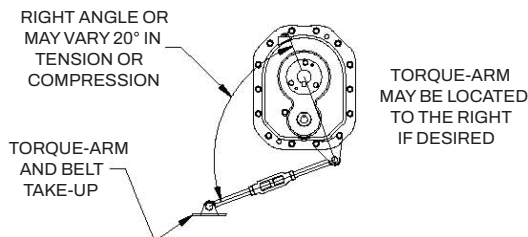


Figure 4 - Angle of Torque-Arm

LUBRICATION

CAUTION: Unit is shipped without oil. Add proper amount of recommended lubricant before operating. Failure to observe this precaution could result in damage to or destruction of the equipment.

Use a high grade petroleum base, rust and oxidation inhibited (R & O) gear oil (Tables 1 and 2). Follow instructions on reducer nameplate, warning tags, and in this 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 reducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant.

CAUTION: Extreme pressure (EP) lubricants are not recommended for average operating conditions. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

CAUTION: Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

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

CAUTION: Do not use oils containing slippery additives such as graphite or molybdenum disulfide in the reducer when backstop is used. These additives will destroy sprag action. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

Table 2 – Lubrication Recommendations - ISO Grades *

Output RPM	ISO Grades For Ambient Temperatures of 50° F to 125° F *	
	Torque-Arm Reducer Size	
	TXT805	TXT905
301 – 400	220	220
201 – 300	220	220
151 – 200	220	220
126 – 150	220	220
101 – 125	220	220
81 – 100	320	220
41 – 80	320	220
11 – 40	320	320
1 – 10	320	320

Table 2 – Lubrication Recommendations - ISO Grades *

Output RPM	ISO Grades For Ambient Temperatures of 15° F to 60° F *	
	Torque-Arm Reducer Size	
	TXT805	TXT905
301 – 400	150	150
201 – 300	150	150
151 – 200	150	150
126 – 150	150	150
101 – 125	150	150
81 – 100	150	150
41 – 80	150	150
11 – 40	220	220
1 – 10	220	220

* For reducers operating in ambient temperatures between -22°F (-30°C) and 20°F (-6.6°C) use a synthetic hydrocarbon lubricant, 100 ISO grade or AGMA 3 grade (for example, Mobil SHC627). Above 125°F (51°C), consult Dodge Industrial, Inc., Dodge Gear Application Engineering, Greenville, SC for lubrication recommendation.

NOTES:

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

Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a lubrication manufacturer's representative for recommendations.

Mobil SHC630 Series oil is recommended for high ambient temperatures.

See Figure 7 for lubricants viscosity classification equivalents.

Table 1 – Oil Volumes

Reducer Size	Volume of Oil to Fill Reducer to Oil Level Plug ①④																	
	② Position A			② Position B			② Position C			② Position D			② Position E			② Position F		
	Fluid Ounces	③ Quarts	Liters	Fluid Ounces	③ Quarts	Liters	Fluid Ounces	③ Quarts	Liters	Fluid Ounces	③ Quarts	Liters	Fluid Ounces	③ Quarts	Liters	Fluid Ounces	③ Quarts	Liters
TXT805	192	6	5.7	480	15	14.2	320	10	9.5	272	8-1/2	8.0	704	22	20.8	600	18-3/4	17
TXT905	472	14-3/4	14.0	480	15	14.2	216	16-1/4	6.4	440	13-3/4	13.0	1020	31-7/8	30.2	1020	31-7/8	30

① Oil quantity is approximate. Service with lubricant until oil runs out of oil level hole.

② Refer to Figure 1 for mounting positions.

③ US measure: 1 quart = 32 fluid ounces = .94646 liters.

④ Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug (P). If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult Dodge Industrial Inc., Dodge Engineering, Greenville, SC.

MOTOR MOUNTS

The motor mount must be installed on output end of reducer as shown in Figure 5. Note: The TORQUE-ARM motor mount cannot be used in applications requiring the use of TRI-MATIC® overload release.

Remove two or three (as required) housing bolts on output end of reducer. Place the motor mount in position and install the longer housing bolts supplied with the motor mount. Tighten bolts to torque specified in Table 4.

Install motor, drive sheave and driven sheave so that driven sheave is as close to the reducer housing as practical. Install V-belt and tension with the four adjusting screws provided on TORQUE-ARM motor mount.

Check all bolts to see that they are securely tightened.

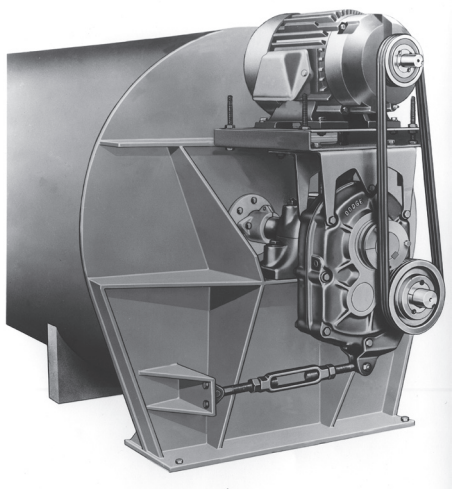


Figure 5 - Complete Drive

NOTE: Belt guard removed for photographic purposes.

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

GUIDELINES FOR TORQUE-ARM REDUCER LONG-TERM STORAGE

During periods of long storage, or when waiting for delivery or installation of other equipment, special care should be taken to protect a gear reducer to have it ready to be in the best condition when placed into service.

By taking special precautions, problems such as seal leakage and reducer failure due to lack of lubrication, improper lubrication quantity, or contamination can be avoided. The following precautions will protect gear reducers during periods of extended storage:

PREPARATION:

1. Drain oil from the unit. Add a vapor phase corrosion inhibiting oil (VCI-105 oil by Daubert Chemical Co.) in accordance with Table 3.
2. Seal the unit airtight. Replace the vent plug with a standard pipe plug and wire the vent to the unit.
3. Cover all unpainted exterior parts with a waxy rust preventative compound that will keep oxygen away from the bare metal. (Non-Rust X-110 by Daubert Chemical Co. or equivalent).
4. The instruction manuals and lubrication tags are paper and must be kept dry. Either remove these documents and store them inside, or cover the unit with a durable waterproof cover which can keep moisture away.
5. Protect reducer from dust, moisture, and other contaminants by storing the unit in a dry area.
6. In damp environments, the reducer should be packed inside a moisture-proof container or an envelope of polyethylene containing a desiccant material. If the reducer is to be stored outdoors, cover the entire exterior with a rust preventative.

WHEN PLACING THE REDUCER INTO SERVICE:

1. Assemble the vent plug into the proper hole.
2. Clean the shaft extensions with petroleum solvents.
3. Fill the unit to the proper oil level using a recommended lubricant. The VCI oil will not affect the new lubricant.

Follow the installation instructions provided in this manual.

Table 3 - Quantities of VCI #105 Oil

Reducer Size	Quarts or Liters
TXT805	.75
TXT905	1.0

VCI #105 and #10 are interchangeable.
VCI #105 is more readily available.

Table 4 - Parts for TXT805 and TXT905 Straight Bore and Taper Bushed Reducers

Ref.	Description	Number Required	TXT805	TXT905
12	Backstop Assembly	1	250260	272259
14	Housing	1	248174	249174
①	Air Vent with Bushing	1	390061	390061
15	Housing Bolt	9	411499	411499
16	Adapter Housing Bolt	2	411502	411502
17	Lockwasher	11	419016	419016
18	Plain Washer	2	419082	419082
19	Hex Nut	8	407095	407095
20	Dowel Pin	2	420128	420128
①	Pipe Plug	⑧	430035	430035
①	Magnetic Plug	1	430064	430064
①	Smart Sensor Adapter	1	966907	966907
23	Input Shaft Seal Carrier	1	258034	249211
24④	Input Shaft Shim Pack	③ ⑤	390038	390168
	.002" Thick	**	427579	427580
	.005" Thick	**	427595	427591
	.010" Thick	**	427602	427601
	.025" Thick	**	427621	427619
25	Backstop Carrier	1	258036	259035
27	Carrier Screw	32	411408	411408
28	Lockwasher	32	419011	419011
29	Backstop Cover	1	248221	259037
31	Backstop Cover Screw	6	411402	411402
32	Lockwasher	6	419009	419009
33⑩	Input Shaft with Pinion	1	258033	259034
① ④	Input Shaft Key	1	443133	443133
Input Shaft Bearing - Input Side				
36⑩	Cup	1	403051	403080
37⑩	Cone	1	402199	402114
Input Shaft Bearing - Backstop Side				
38⑩	Cup	1	403051	402231
39⑩	Cone	1	402198	402232
OUTPUT HUB ASSEMBLY ②				
Taper Bushed		1	390944	390949
Straight Bore		1	390993	390159
48⑩	Output Hub -Taper Bushed	1	272036	249140
49⑩	Output Hub -Straight Bore	1	248332	250090
50⑩	Output Gear	1	248215	021764
52*	Output Key & Roll Pin	2	390112	390112
55	Output Hub Seal Carrier			
	Input Side	1	258021	249221
	Backstop Side	1	258020	249220
Output Hub Bearing				
57⑩	Cup	2	402147	402160
58⑩	Cone	2	403105	403110
61③	Output Hub Bearing Shim Pack	④ Set	390048	390171
	.002" Thick	**	—	—
	.005" Thick	**	—	—
	.010" Thick	**	—	—
	.025" Thick	**	—	—
62	Output Hub Collar ⑥	2	248209	249209
63	Collar Screw ⑥	4	400190	400194

Ref.	Description	Number Required	TXT805	TXT905
64	Bushing Backup Plate ⑦	2	272037	272082
65	Retaining Ring ⑦	⑧	421098	421097
66	Bushing Assembly ②	1	272048	—
	2-15/16" Bore	1	272045	—
	3-3/16" Bore	1	272032	272056
	3-7/16" Bore	1	272033	272077
	3-15/16" Bore	1	272034	272078
	4-3/16" Bore	1	272035	272079
	4-7/16" Bore	1	—	272080
68 ①	Lockwasher	6	419013	419014
	Key Bushing to Shaft			
	2-15/16" Bore	1	443247	—
	3-3/16" Bore	1	443247	—
	3-7/16" Bore	1	443171	443249
	3-15/16" Bore	1	443173	272119
	4-3/16" Bore	1	443174	272108
①	4-7/16" Bore	1	443196	272086
	4-15/16" Bore	1	—	443161
	Key Bushing to Output Hub ⑨	1	443162	443121
Torque Arm Assembly ②		1	390129	390129
70	Rod End	1	271050	271050
72	Hex Nut	1	407104	407104
74	Turnbuckle	1	271051	271051
76	Extension	1	271052	271052
78	Left Hand Hex Nut	1	407250	407250
80	Fulcrum	1	271054	271054
82	Fulcrum Bolt	1	411516	411516
84	Lockwasher	1	419020	419020
86	Hex Nut	1	407099	407099
Adapter Assembly ②		1	—	—
88	Adapter Plate	2	272053	249241
92	Adapter Bushing	1	271046	271046
94	Adapter Bolt	1	411510	411510
96	Lockwasher	1	419020	419020
98	Hex Nut	1	407099	407099
Seal Kit ②		1	24S340	272708
30	Backstop Cover Gasket	1	248220	259038
34	Input Shaft Seal	1	248211	248211
54	Output Hub Seal	2	258019	249210
21	① RTV Sealant, Tube	1	465044	465044

Notes:

① Not shown on drawing.

② Includes parts listed immediately below. Housing assembly also includes a two-piece housing. Bushing assembly includes 2 bushings.

③ 1 set required for TXT805; 2 sets required for TXT905.

④ 2 sets required for TXT805; 1 set required for TXT905.

⑤ One set consists of one each of the shims listed immediately below

⑥ Straight bore only.

⑦ Taper bushed only.

⑧ 1 required on size TXT805; 3 required on size TXT905.

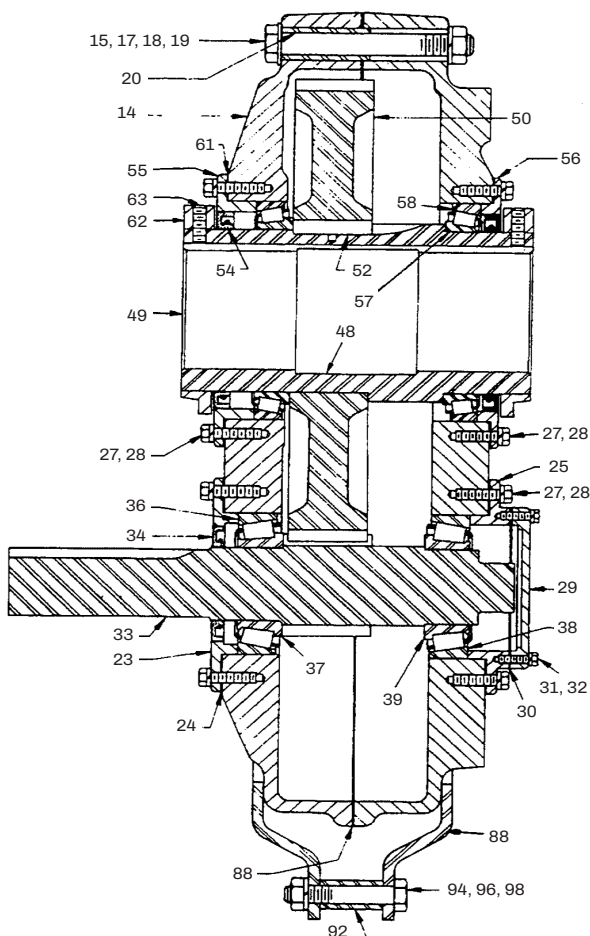
⑨ For 2-15/16" & 3-7/16" bores on TXT805; and 3-7/16" & 4-3/16" on TXT905.

⑩ Recommended spare parts.

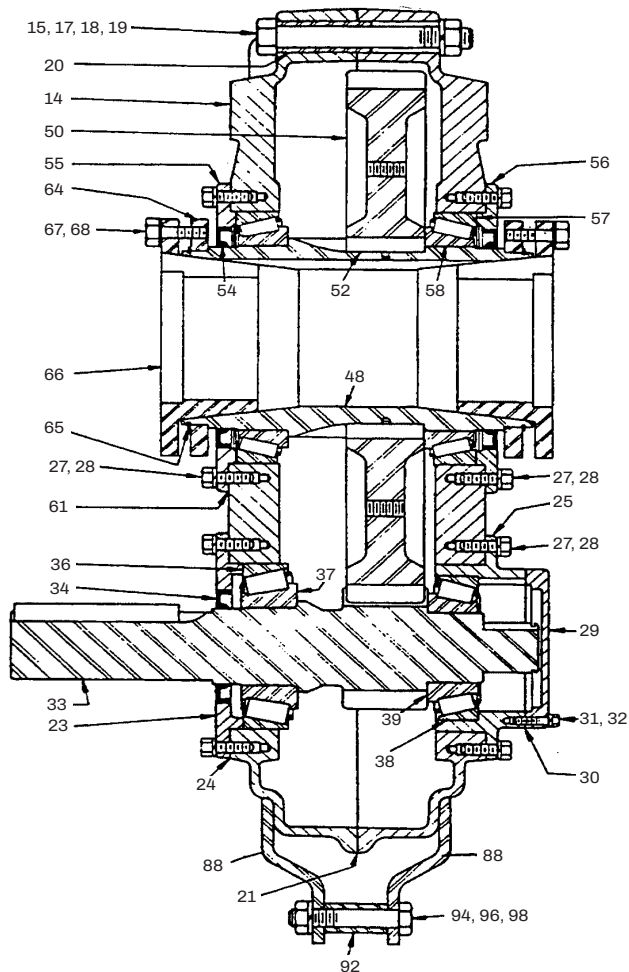
** If replacing a bearing or a shaft, it is advisable to order a set of shims for adjustment of bearings on the shaft assembly because the adjustment of the bearings on each shaft assembly is affected.

PARTS FOR TXT805 AND TXT905 STRAIGHT BORE AND TAPER BUSHED SPEED REDUCERS

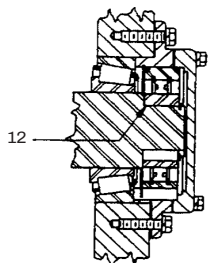
NOTE: The two-digit numbers are for reference only. Order parts by the six-digit numbers in the Parts List. Each six-digit number is a complete identification of the part or assembly.



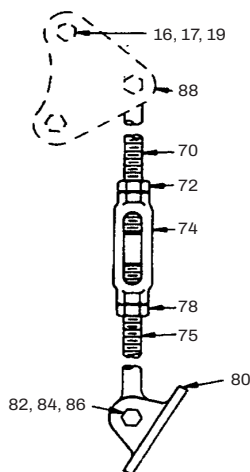
**TXT805
Straight Bore**



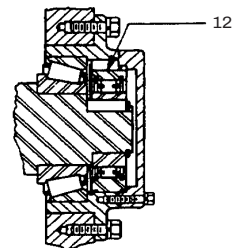
**TXT905
Taper Brushed**



**TXT805
Backstop Assembly**



**Torque-Arm
Assembly**



**TXT905
Backstop Assembly**

REPLACEMENT OF PARTS

NOTE: Using tools normally found in a maintenance department, a 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 (for shrinking these parts on shafts) should be available.

The oil seals are contact lip seals. Considerable care should be used during disassembly and reassembly to avoid damage to the surface on which the seals rub.

The keyseat in the input shaft, as well as any sharp edges on the output hub should be covered with 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 number, reducer model number, part name, part number, and quantity.

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

If the large gear on the output hub must be replaced, it is recommended that an output hub assembly consisting of a gear assembled on a hub be ordered to ensure undamaged surfaces on the output hub where the output 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 rollers or cage 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:

WARNING: To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Remove all external loads from drive before removing or servicing drive or accessories. Support reducer by external means before removing from shaft. Failure to observe these precautions could result in bodily injury.

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. Disconnect and remove belt guard, v-drive, and motor mount as required. Disconnect torque arm rod from reducer adapter.
2. Remove bushing screws.

3. 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. A tap can be used to clean out the threads. Use caution to use the proper size tap to prevent damage to the threads.
4. Remove the outside bushing, the reducer, and then the inboard bushing.

DISASSEMBLY:

1. Drain all oil from the reducer.
2. Position reducer on its side and remove all housing 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.
3. Lift input shaft, all gear assemblies, and bearing assemblies from housing.
4. Remove seals from housing.

REASSEMBLY:

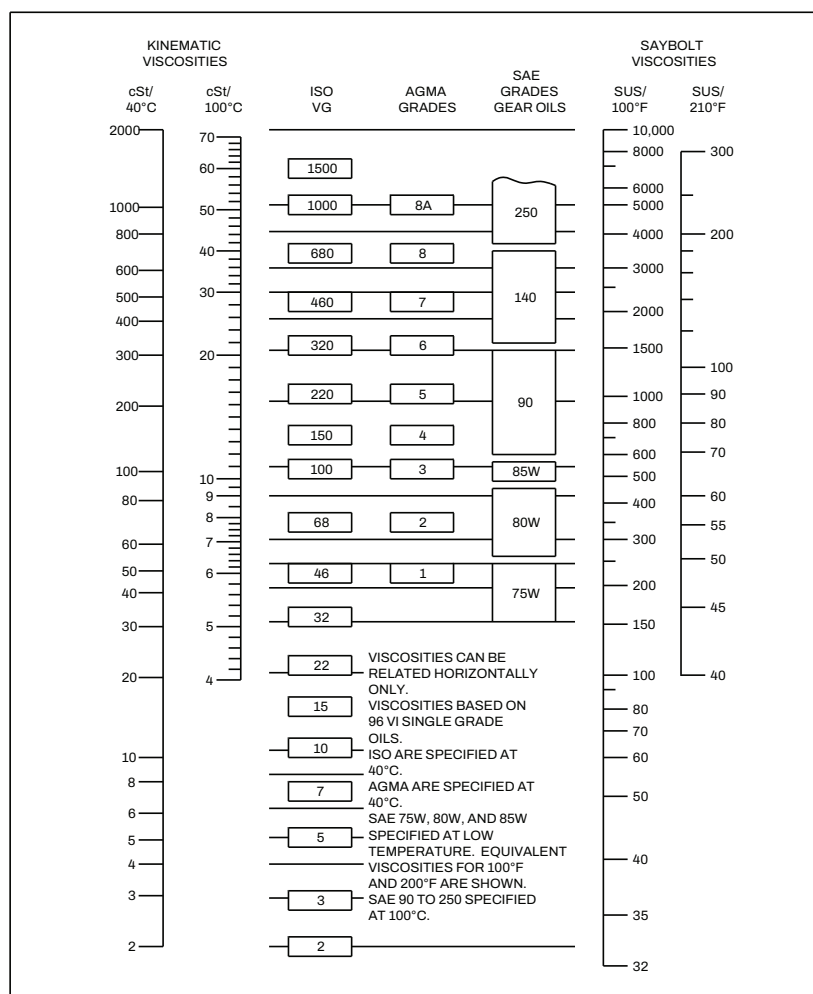
1. **Output Hub Assembly:** Heat gear to 325°F to 350°F to shrink onto hub. Heat bearings to 270°F to 290°F to shrink onto hub. Any injury to the hub surfaces where the oil seals rub will cause leakage, making it necessary to use a new hub.
2. **Input Shaft Assembly:** Heat bearing cones to 270°F to 290°F to shrink on shaft.
3. Place a .010" shim on output hub seal carrier, countershaft cover and backstop carrier for right-hand half of housing (as viewed in drawing). Place a 1/8" diameter bead of Dow Corning RTV732 sealant on the face around the I.D. of the shim (seal is to be between reducer housing and shim). Caution: If too much sealant is used it will run into bearing, and too little sealant will result in an ineffective seal. Install right-hand carriers and cover in housing half and torque screws to torque values in Table 5. Place bearing cups in right-hand housing half. Make certain the cups are properly seated in housing and are pressed against carriers and cover. Place housing half on blocks to allow for protruding end of output hub.
4. Mesh output hub assembly and input assembly together and place in housing half. Tap lightly with a soft hammer (rawhide not a lead hammer) until bearings are properly seated in the housing.
5. Place a 1/8" diagonal bead of Dow Corning RTV732 sealant on the flange of the housing half. Place other half of housing (without covers or carriers installed), insert dowel pins, and draw together evenly to prevent damage to parts. The final torque should be per Table 5.
6. Place output bearing cup in housing and tap in place. Install output seal carrier and draw down with two (2) bolts 180° apart to 50 inch-pounds of torque. Loosen bolts and retighten finger tight. Measure clearance between housing and carrier flange at each bolt and average. Add .010 to average and make up shim pack. Install shim pack and torque down all seal carrier bolts to 360 in-lb. Use dial indicator to check end play. Add or remove shims until indicator reads .001" to .003".
7. Again using the same procedure as in step 6, adjust the input shaft bearings to an end play of .002" to .003".
8. Total shim thickness per carrier or cover should not include more than .009" plastic shims. All other shims should be metal, and each plastic shim should be inserted between two metal shims. Place a 1/8" diagonal bead of Dow Corning RTV732 sealant on the face around the I.D. of the last shim and install the carriers or covers in the reducer housings. Torque carrier bolts to torque values in Table 5.

Table 5 - Recommended Torque Values (lb.-in.)			
Reducer Size	Housing Bolts	Output Hub Seal Carrier Screws	Input Bearing Cover Screws
TXT805	1620	360	120
TXT905	1620	360	120

Table 7 - Replacement Input Shaft Bearings		
Reducer Size	Input Side Part No.	Adapter Side Part No.
TXT805	402199 403051	402198 403051
TXT905	402114 403080	402232 403231

Table 6 - Replacement Output Hub Bearings	
Reducer Size	Part No.
TXT805	402147 403105
TXT905	402160 403110

OIL VISCOSITY EQUIVALENCY CHART



Dodge Industrial, Inc.
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