

Instruction Manual for DODGE® TORQUE-ARM™ Speed Reducers Straight Bore & Taper Bushed

Sizes: **TXT105**
TXT205

These instructions must be read thoroughly before installing or operating this product.

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.

INSTALLATION:

1. Use eyebolt to lift reducer.
2. Determine the running position of the reducer. (See Fig. 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 running positions as follows:

Horizontal Installations-Install the magnetic drain plug in the hole closest to the bottom of the reducer. Throwaway 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.

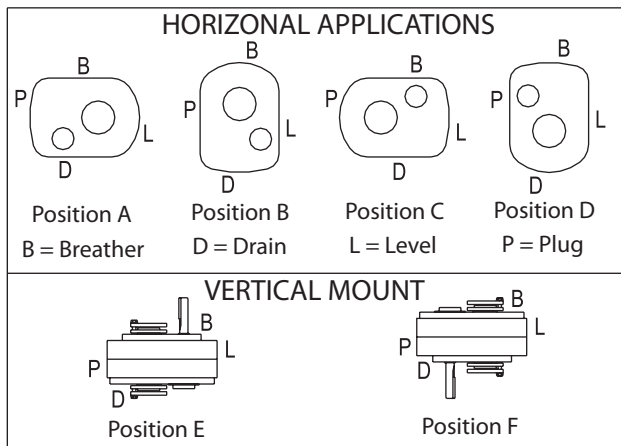


Figure 1 - Mounting Positions

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.

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.

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 from position "B" or "D" in Fig. 1 sketches, or 5' either way from 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°/5° 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. 3.

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 bushing 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 manual for tapered bushings.

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

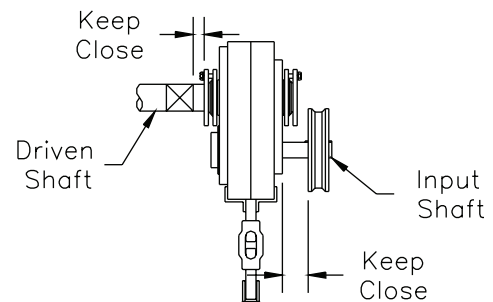


Figure 2 - Installation of Sheave

5. Install motor and V-belt drive so belt pull 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 drive with the torque arm.



LUBRICATION

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 reducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant. Check oil level regularly.

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 frequently. 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 disulphide in the reducer when backstop is used. These additives will destroy sprag action. Failure to observe these pre-cautions could result in damage to, or destruction of, the equipment.

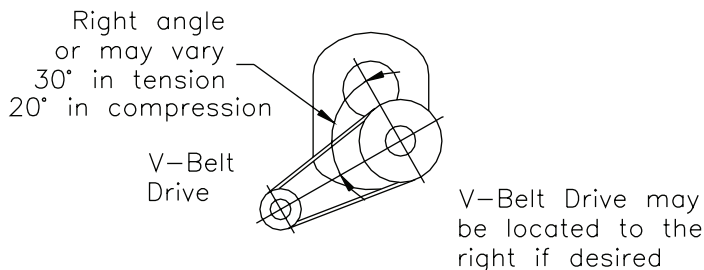


Figure 3 - Installation of Motor

- 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.
- 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. (See Fig. 4.) Make sure that there is sufficient take-up in the turnbuckle for belt tension adjustment when using V-belt drive.

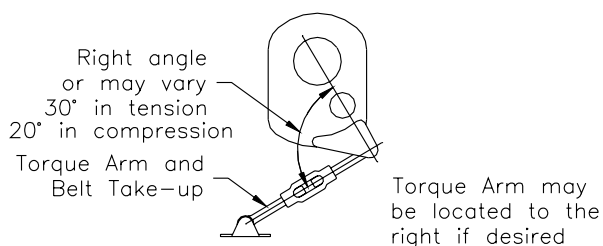


Figure 4 - Installation of Torque Arm Fulcrum

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

- Fill gear reducer with recommended lubricant.

Reducer Size	Volume of Oil Required to Fill Reducer to Oil Level Plug																	
	① Position A			① Position B			① Position C			① Position D			① Position E			① Position F		
	Fluid Ounces (Approx)	Quarts ^② (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts ^② (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts ^② (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts ^② (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts ^② (Approx)	Liters (Approx)	Fluid Ounces (Approx)	Quarts ^② (Approx)	Liters (Approx)
TXT105	20	5/8	.59	24	3/4	.71	20	5/8	.59	24	3/4	.71	36	1-1/8	1.06	44	1-3/8	1.30
TXT205	24	3/4	.71	28	7/8	.83	28	7/8	.83	28	7/8	.83	56	1-3/4	1.66	72	2-1/4	2.13

^① Refer to Figure 1 on page 2 for mounting positions

^② U.S. Measure: 1 quart = 32 fluid ounces = .04646 liters

^③ Below 15 RPM output speed, oil level must be adjusted

NOTE: If reducer position is to vary from those shown in Figure 1 either more or less oil may be required. Consult Dodge Product Support.

Table 2 -Lubrication Recommendations -ISO Grades ①														
Output RPM	For Ambient Temperatures of 50° thru 125°													
	Reducer Size													
	1	2	3	4	5	6	7	8	9	10	12	13	14	15
301-400	320	320	220	220	220	220	220	220	220	220	220	220	220	220
201-300	320	320	220	220	220	220	220	220	220	220	220	220	220	220
151-200	320	320	220	220	220	220	220	220	220	220	220	220	220	220
126-150	320	320	320	220	220	220	220	220	220	220	220	220	220	220
101-125	320	320	320	320	220	220	220	220	220	220	220	220	220	220
81-100	320	320	320	320	320	220	220	220	220	220	220	220	220	220
41-80	320	320	320	320	320	220	220	220	220	220	220	220	220	220
11-40	320	320	320	320	320	320	320	320	320	320	220	220	220	220
1-10	320	320	320	320	320	320	320	320	320	320	320	320	320	320

Output RPM	For Ambient Temperatures of 15° thru 60°													
	Reducer Size													
	1	2	3	4	5	6	7	8	9	10	12	13	14	15
301-400	220	220	150	150	150	150	150	150	150	150	150	150	150	150
201-300	220	220	150	150	150	150	150	150	150	150	150	150	150	150
151-200	220	220	150	150	150	150	150	150	150	150	150	150	150	150
126-150	220	220	220	150	150	150	150	150	150	150	150	150	150	150
101-125	220	220	220	220	150	150	150	150	150	150	150	150	150	150
81-100	220	220	220	220	220	150	150	150	150	150	150	150	150	150
41-80	220	220	220	220	220	150	150	150	150	150	150	150	150	150
11-40	220	220	220	220	220	220	220	220	220	220	150	150	150	150
1-10	220	220	220	220	220	220	220	220	220	220	220	220	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 35 grade (for example - Mobil SHC627).

Above 125°F (51 .6°C), consult DODGE Gear Application Engineering (864) 288-9050 for lubrication recommendation.

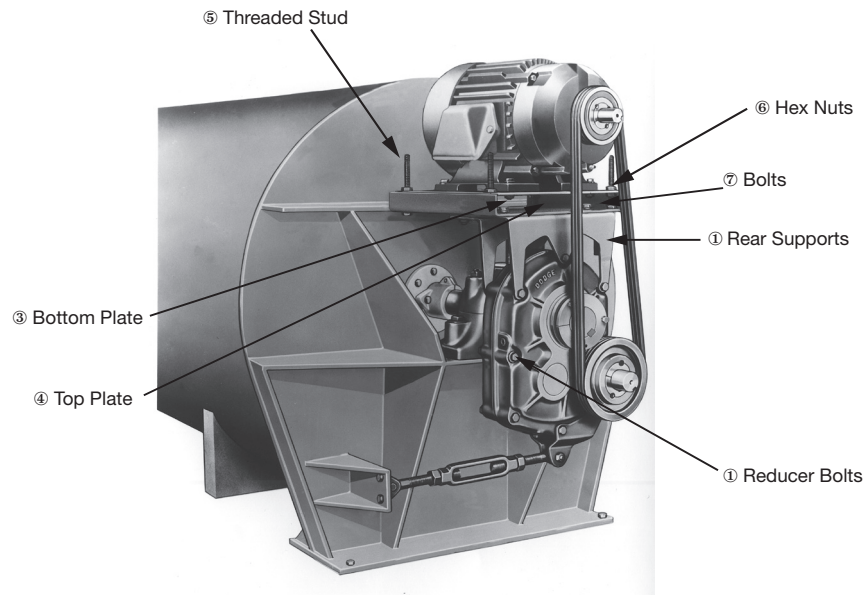
NOTE: Pour point of lubricant selected should be at least 10°F lower than expected minimum ambient starting temperature. Refer to Viscosity Equivalency chart for lubricants viscosity classification equivalents.

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.

MOTOR MOUNT INSTALLATION

Note: Refer to photo for position of all parts before installation.

1. Remove the two or three bolts required for mounting the TAM Motor Mount from the reducer housing. Install the front and rear supports (2) using the new reducer bolts (1) supplied with the motor mount. Make sure support flanges face output side of reducer. Tighten bolts securely.
2. Mount bottom plate (3) on supports with bolts supplied. Insert bolts (7) from top through slotted holes. Add flat washer, lockwasher, and nut. Hand tighten.
3. Thread two nuts (6) on each threaded stud (5) leaving approximately 1" of stud protruding at one end. Insert threaded stud with 1" of threads through corner holes of bottom plate, thread a hex nut (6) on the stud and tighten securely.
4. Slide top plate (4) over the threaded stud, making sure center handling hole is positioned opposite input side of reducer. Thread a hex nut (6) on the studs and tighten securely.



WARNING: If electrical connections to motor are installed at this time, disconnect and lock out power supply before proceeding. Failure to observe this precaution may result in bodily injury.

5. Locate the proper position for the motor and bolt to the top plate. Tighten bolts securely.
6. Install motor sheave and reducer sheave as close to motor and reducer housings as possible. Accurately align the motor and reducer sheave by sliding bottom plate in relation to supports. Tighten bolts (7) securely.
7. Install V-belts and tension belts by alternately adjusting nuts (6) on the threaded studs (jackscrews). Make certain that all bolts are securely tightened, the V-belt drive is properly aligned and the belt guard is installed before operating the drive.

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 the 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 the 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 air tight. Replace the vent plug with a standard pipe plug and wire the vent to the unit.
3. Cover the shaft extension with a waxy rust preventative compound that will keep oxygen away from the bare metal. (Non-Rust X-110 by Daubert Chemical Co.)
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 the 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 a suitable solvent.
3. Fill the unit to the proper oil level using a recommended lubricant. The VCI oil will not affect the new lubricant.
4. Follow the installation instructions provided in this manual.

Case Size	Quarts or Liters
TXT105,TXT205	.1

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

Reference	Name of Part	No. Req'd	TXT105 Part No.	TXT205 Part No.	
12	Backstop Assembly	1	242101	252101	
15	HOUSING	1	241186	242194	
①	Air Vent	1	241237	241237	
16	Housing Bolt	②	411418	411418	
18	Adapter - Housing Bolt	2	411420	411420	
20	Lockwasher	③	419011	419011	
22	Hex Nut	③	407087	407087	
24	Dowel Pin	2	420091	420091	
①	Pipe Plug	2	430031	430031	
①	Magnetic Plug	1	430060	430060	
25	Washer	4	419092	419204	
26	Backstop Cover	1	242221	243221	
30	Backstop Cover Screw	4	415022	415022	
36	Input Shaft Pinion	1	251020	242214	
54	OUTPUT HUB ASSEMBLY ④	1	390151	392110	
55	Straight Bore	1	390878	392111	
56	Taper Bushed	1	241208	242208	
58	⑤ Output Hub (Straight Bore)	1	241265	242134	
60	⑤ Output Hub (Taper Bushed)	1	241007	242181	
	⑤ Output Gear	1	241217	433399	
	⑤ Output Gear Key	2	421013	421017	
66	Output Hub Collar ⑥	2	241209	242209	
67	Collar Screw ⑥	4	400062	400094	
68	Bushing Back-up Plate ⑦	2	241266	242137	
69	Retaining Ring ⑦	2	421111	421112	
70	BUSHING ASSEMBLY ④ ⑦	1" Bore	1	241278
		1-1/16" Bore	1	241280
		1-1/8" Bore	1	241282	242146
		1-3/16" Bore	1	241286	242148
		1-1/4" Bore	1	241288	242150
		1-5/16" Bore	1	241290	242152
		1/3" Bore	1	242154
		1-7/16" Bore	1	241292	242156
		1-1/2" Bore	1	242158
		1-5/8" Bore	1	242162
		1-11/16" Bore	1	242164
		1-3/4" Bore	1	242166
		1-7/8" Bore	1
1-15/16" Bore	1	242168		
28	SEAL KIT ④ ⑤	1	272700	272701	
38	⑤ Backstop Cover Gasket	1	242220	243220	
64	⑤ Input Seal	1	242211	244211	
	⑤ Output Seal	2	242210	242210	

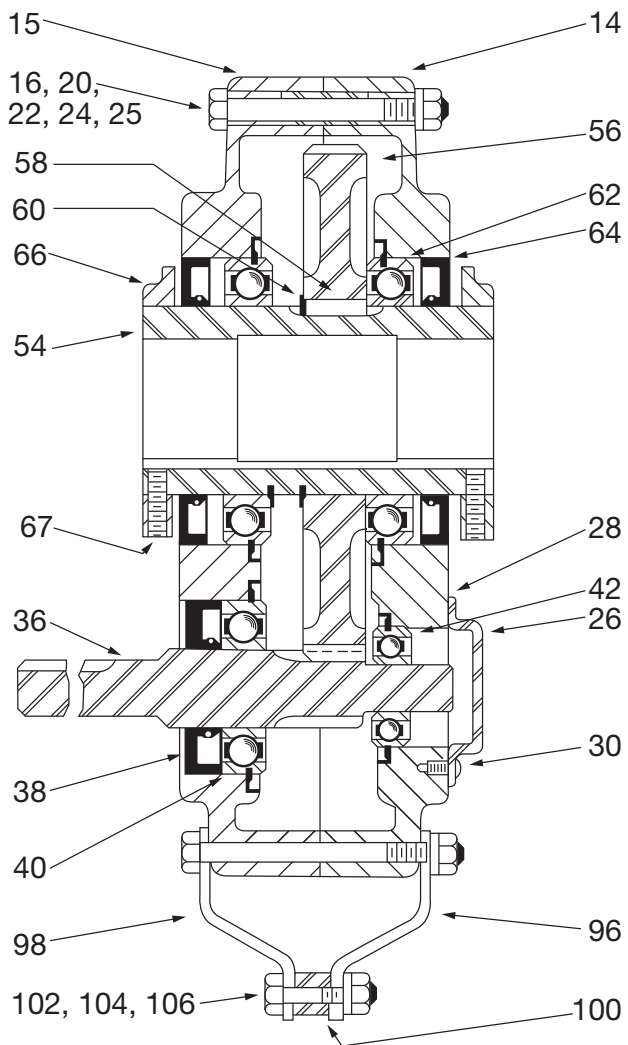
① Not shown on drawing.
② 4 required on TXT105; 5 required on TXT205.
③ 6 required on TXT105; 7 required on TXT205.
④ Includes parts listed immediately below. Bushing assembly includes 2 bushings.
⑤ Parts make up the assemblies under which they are listed.

Reference	Name of Part	No. Req'd	TXT105 Part No.	TXT205 Part No.	
	BEARING KIT ④ ⑤	1	389910	389911	
40	⑤ Input Shaft Brg. (Input)	1	424076	424078	
42	⑤ Input Shaft Brg. (Backstop)	1	424012	424000	
62	⑤ Output Hub Bearing	2	424020	424022	
①	Input Shaft Key	1	443013	443052	
①	Max Bore Key ⑥	1	241296	242296	
72	⑤ Bushing Screw	6	411390	411390	
74	⑤ Lockwasher	6	419010	419010	
76	⑤ Key, Bushing to Shaft	1" Bore	1	443274
		1-1/16" Bore	1	443274
		1-1/8" Bore	1	443271	443281
		1-3/16" Bore	1	241308	443281
		1-1/4" Bore	1	241307	443281
		1-5/16" Bore	1	241306	443280
		1/3" Bore	1	443280
		1-7/16" Bore	1	241305	443282
		1-1/2" Bore	1	443282
		1-5/8" Bore	1	242172
		1-11/16" Bore	1	242171
		1-3/4" Bore	1	242170
		1-7/8" Bore	1
1-15/16" Bore	1	443283		
①	⑤ Key, Bushing to Output Hub	1 ⑨	443272	443284	
①	⑤ Key, Bushing to Output Hub	1 ⑩	443273	
80	TORQUE-ARM ASSEMBLY ④	1	241097	243097	
82	⑤ Rod End	1	241245	243245	
84	⑤ Hex Nut	1	407093	407095	
84	⑤ Turnbuckle	1	241246	243246	
86	⑤ Extension	1	2431247	243247	
88	⑤ L.H. Hex Nut	1	407242	407091	
90	⑤ Fulcrum	1	241249	242249	
92	⑤ Fulcrum Screw	1	411456	411484	
94	⑤ Hex Nut	1	407091	407093	
96	ADAPTER ASSEMBLY ④	1	259151	259152	
98	⑤ R.H. Adapter Plate	1	241242	242136	
98	⑤ L.H. Adapter Plate	1	241241	242135	
99	⑤ Adapter Plate Assembly	1	
100	⑤ Adapter Bushing	1	242243	243243	
102	⑤ Adapter Bolt	1	411412	411437	
104	⑤ Lockwasher	1	419011	419012	
106	⑤ Hex Nut	1	407087	407089	

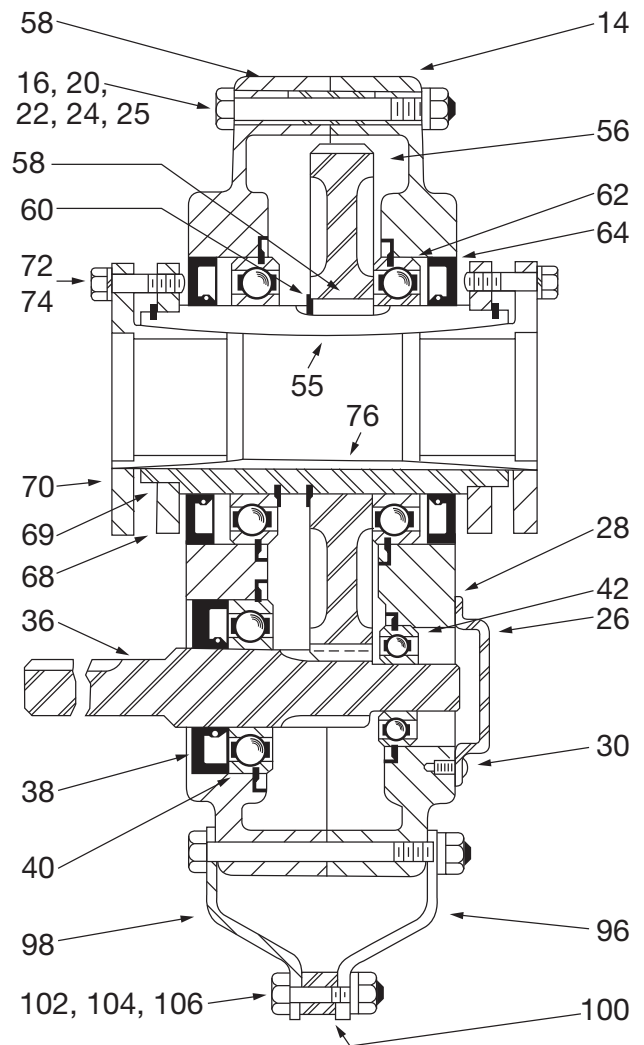
⑥ Straight bore only
⑦ Taper bushed only
⑧ Recommended spare parts
⑨ On size TXT105 for 1" bores; TXT205 for 1-1/8" bores thru 1-1/2" bores.
⑩ One size - TXT105 for 1-1/16" bores and 1-1/8" bores.

TORQUE-ARM Reducer Drive Size	Output Bearing	
	DODGE Part Number	SKF Part Number
TXT105	424020	6011NR
TXT205	424022	6013NR

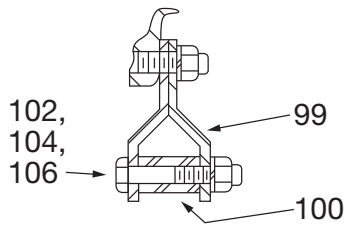
TORQUE-ARM Reducer Drive Size	Input Bearing Input Side		Input Bearing Backstop Side	
	DODGE Part Number	SKF Part Number	DODGE Part Number	SKF Part Number
TXT105	424076	6206NR	424012	6304NR
TXT205	424078	6208NR	424000	305MG



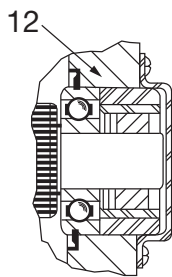
Straight Bore



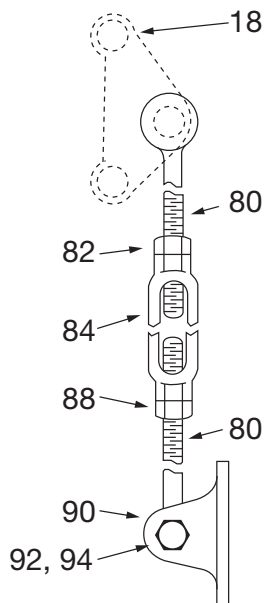
Taper Bushed



Adapter Plate Assembly



Backstop Assembly



Torque-Arm Assembly

REPLACEMENT OF PARTS

A DODGE TORQUE-ARM Speed Reducer can be disassembled and reassembled by careful attention to the instructions following, using tools normally found in a maintenance department.

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 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 serial number, 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 with a gear assembled on the 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

WARNING: External loads may cause machine movement. Block machine before removing any drive train components. 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. 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.

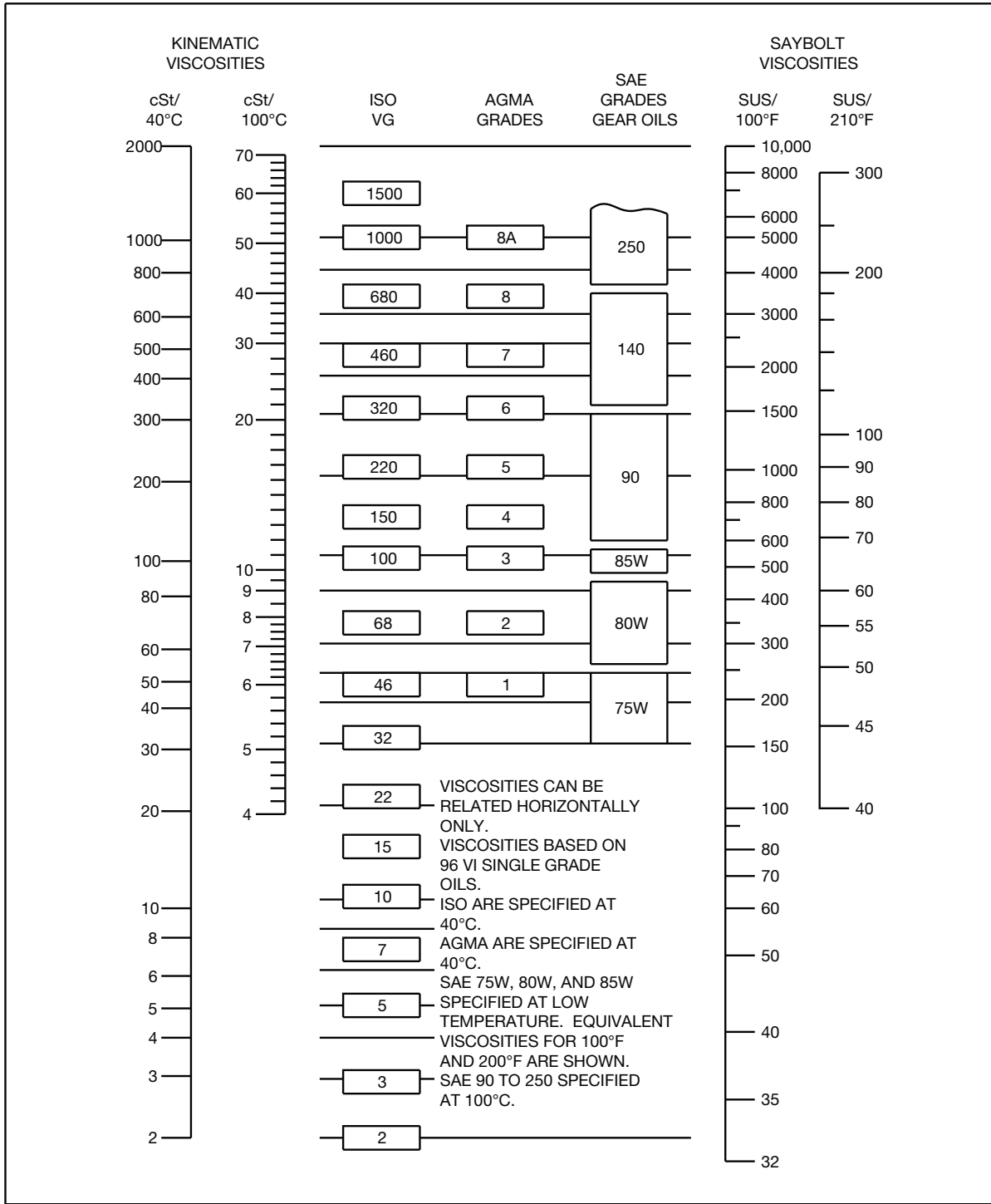
REASSEMBLY

1. **Output Hub Assembly:** Heat gear to 325°F to 350°F to shrink onto hub. Heat bearings to 250°F to 270°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:** Shaft and pinion are integral. Press bearings on shaft. Press against inner (not outer) race of bearings.
3. 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.
4. Place output hub assembly in housing half. Place input shaft assembly in housing half. Tap lightly with a soft hammer (rawhide not 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.
5. Clean housing flange surfaces on both halves, making sure not to nick or scratch flange face. Place a new bead of gasket replacer 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 replacer. 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 to draw housing halves together. Torque housing bolts per torque values listed below:

Housing Bolt Torque Values	
Reducer Size	Recommended Torque (in.-lbs.)
TXT105, TXT205	360

6. 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 tape or paper which can be removed subsequently. Chamfer or deburr 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; apply force only on outer corner seals. A slight oil leakage at the seals may be evident during initial running in, but will disappear unless the seals have been damaged.

OIL VISCOSITY EQUIVALENCY CHART



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Dodge Product Support

6040 Ponders Court, Greenville, SC 29615-4617 U.S.A., Ph: (1) 864.297.4800, Fax: (1) 864.281.2433

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