

New Lubricant Selection Recommendations and Information for DODGE TORQUE-ARM Shaft Mounted & MAXUM Concentric Speed Reducers

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

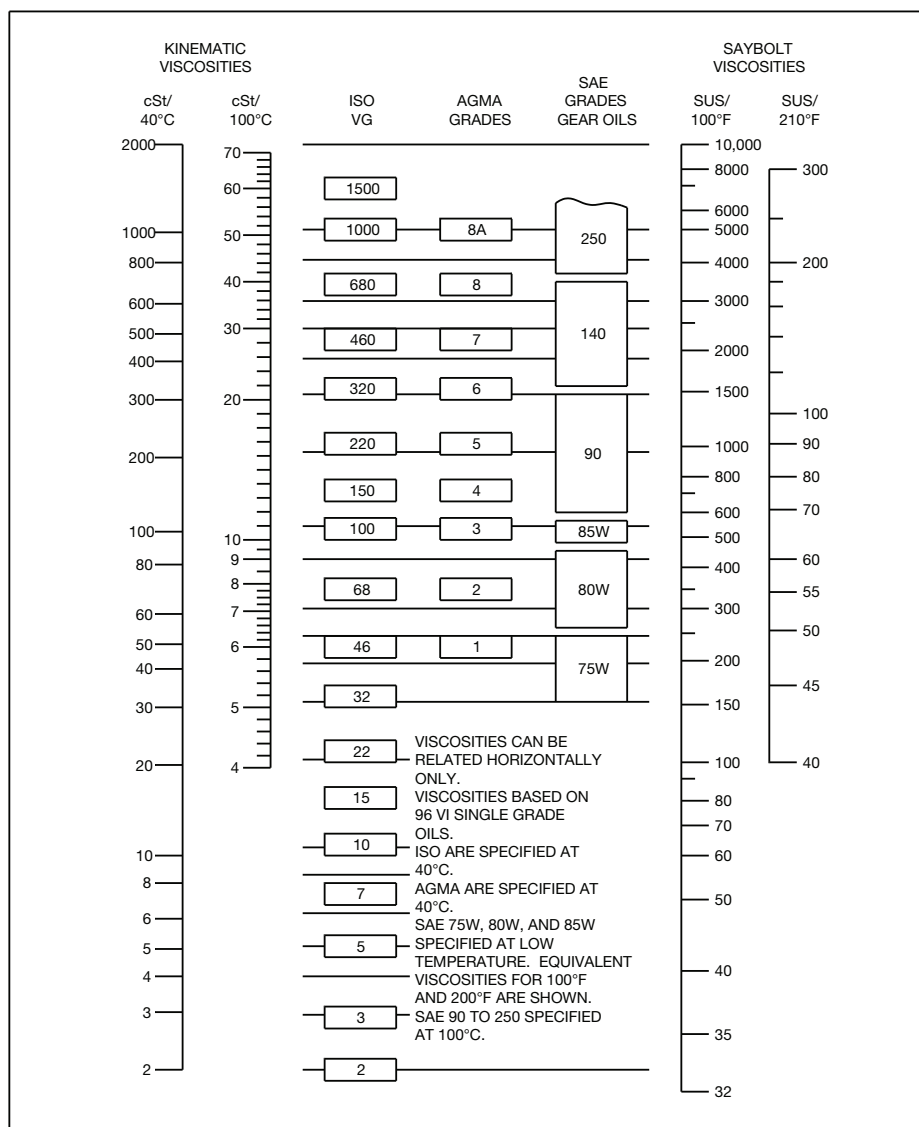
Speed Reducer Lubrication

Maximizing productivity and uptime is paramount in today's industry. By following some simple recommendations on lubrication, OEMs and users can improve product performance

and reduce downtime. Remember, the purpose of speed reducer lubrication is to minimize frictional forces, eliminate wear and dissipate heat.

There are four classifications of oils used in reducers. (See Oil Viscosity Chart).

OIL VISCOSITY EQUIVALENCY CHART



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 Reliance Industrial Company nor are the responsibility of Reliance Industrial 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.

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**Table 1 - Optional Lubricants
for TORQUE-ARM & MAXUM**

W/ or W/O Backstop					EP Oils W/O Backstop					W/ or W/O Backstop					EP Oils W/O Backstop				
MOBIL										CHEVRON									
150	MOBIL DTE Extra Heavy				MOBIL GEAR	629	150	Machine				150	Gear Compound				150		
220					BB	630	220					220	EP						
320					AA	632	320					320					320		
TEXACO										UNICAL									
150	Regal Oil R & O				150	Meropa	150	150	Turbine Oil				150						
220							220					220							
320							320					320							
SHELL										MOBIL SYNTHETIC									
150	Morlina Oil				150	Omaha	150	150	SHC				629	SHC	629				
220							220					220	SHC				630	SHC	630
320							320					320	SHC				632	SHC	632
EXXON																			
150	Terresstic				150	Spartan EP	150												
220							220												
320							320												

Lubricant Selection

Selecting an oil with a high viscosity index will provide the proper viscosity over a wider temperature range. A properly selected lubricant should have a pour point at least 10°F lower than the expected minimum ambient starting temperature. In extreme cold and hot ambients temperatures, a synthetic oil may be a good selection.

This change was necessitated by the increased horsepower that helical gearing is being asked to transmit. As a result, higher ISO viscosity grades have been selected. The proper oil viscosity is based upon ambient temperature and gearing pitch line velocity. DODGE has converted pitch line velocity into reducer output speed (RPM). (See Tables 2 and 3).

The American Gear Manufacturing Association (AGMA) and ISO have recently changed their lubrication standards.

Lubrication of Torque Arm Reducers

Table 2 — Lubrication Recommendations — ISO Grades For Ambient Temperatures of 50°F through 125°F*

Output RPM	TXT, SCXT, HXT Reducers														
	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	

Table 3 — Lubrication Recommendations — ISO Grades For Ambient Temperatures of 15°F through 60°F*

Output RPM	TXT, SCXT, HXT Reducers														
	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	

Lubrication of MAXUM Reducers

Table 4 - Lubrication of MAXUM Reducers
Lubrication Recommendations—ISO Grades For Ambient Temperatures of 50°F thru 125°F

Output RPM	MAXUM Reducer Size											
	1	2	3	4	5	6	7	8	9	10	11	12
230	220	220	220	220	220	220	220	220	220	220	220	220
190	320	320	220	220	220	220	220	220	220	220	220	220
155	320	320	320	220	220	220	220	220	220	220	220	220
125	320	320	320	320	320	220	220	220	220	220	220	220
100	320	320	320	320	320	320	220	220	220	220	220	220
84	320	320	320	320	320	320	220	220	220	220	220	220
68	320	320	320	320	320	320	320	320	220	220	220	220
56	320	320	320	320	320	320	320	320	320	320	320	220
45	320	320	320	320	320	320	320	320	320	320	320	320

NOTES:

1. Use ISO 220 above 230 Output RPM.
2. Use ISO 320 below 45 Output RPM.
3. Assumes Auxiliary Cooling where Recommended in the Catalog.

Table 5 - Lubrication of MAXUM Reducers
Lubrication Recommendations—ISO Grades For Ambient Temperatures of 15°F thru 60°F

Output RPM	MAXUM Reducer Size											
	1	2	3	4	5	6	7	8	9	10	11	12
230	150	150	150	150	150	150	150	150	150	150	150	150
190	220	220	150	150	150	150	150	150	150	150	150	150
155	220	220	220	150	150	150	150	150	150	150	150	150
125	220	220	220	220	220	150	150	150	150	150	150	150
100	220	220	220	220	220	220	150	150	150	150	150	150
84	220	220	220	220	220	220	150	150	150	150	150	150
68	220	220	220	220	220	220	220	220	150	150	150	150
56	220	220	220	220	220	220	220	220	220	220	220	150
45	220	220	220	220	220	220	220	220	220	220	220	220

NOTES:

1. Use ISO 150 above 230 Output RPM.
2. Use ISO 220 below 45 Output RPM.
3. Assumes Auxiliary Cooling where Recommended in the Catalog.

Where required these heavier oils make it more important to change oil seasonally. For reducers that see a significant seasonal swing in ambient temperature, change the grade of oil as needed (thinner oil in the winter, thicker oil in the summer). This will extend the life of the lubricants and seals.

Oil should be changed every 2,500 hours or six months except in units that are lubricated for life. An oil testing service can develop a change interval based on specific operating conditions. This is done by establishing a baseline and then comparing future oil analysis to this baseline. When checking oil always make sure the reducer is filled to the proper oil level. Too much oil will cause the reducer to run hot and too little will result in gear and/or bearing problems.

Reducers with internal backstops should use only rust and oxidation (R&O) oils. If extreme pressure (EP) oils are used, their additives package may cause the backstops to not perform properly. Also, when selecting an oil, be certain it is compatible with the reducer seals. With the number of lubricant vendors and the large selection of lubricants, it can become overwhelming. We have made the process easier and checked the compatibility with seals and backstops. DODGE has put together an optional lubricants list. (See Table 1, Optional Lubricants.)

Remember these tips to maximize reducer operating performance:

- Select an oil with a properly high viscosity index.
- Pour point of at least 10°F lower than expected minimum starting temperature.
- Select the proper oil viscosity grade.
- Change oil seasonally if necessary.
- Change oil at proper intervals.
- Fill reducer to proper oil level.
- **Do not use EP** oils with internal backstops.
- Be certain oil is compatible with seals.

TORQUE-ARM Shaft Mount Speed Reducers

Lubrication of TORQUE-ARM Reducers

CAUTION: Unit is shipped without oil. Add proper amount of rust and oxidation inhibited (R & O) gear oil before operating. Failure to observe these precautions could result in damage to , or destruction of, the equipment.

Lubrication is extremely important for satisfactory operation. The proper oil level as shown in Table 8 must be maintained at all times. Frequent inspections with the unit not running and allowing sufficient time for the oil to cool and the entrapped air to settle out of the oil should be made by removing the level plug to see that the level is being maintained. If low, add the proper type and viscosity of lubricant through one of the upper openings until it comes out of the oil level hole. Replace the oil level plug securely. Refer to Tables 6 and 7 for viscosity recommendations.

After an initial operation of about two weeks, the oil should be changed. If desired, this oil may be filtered and reused. Very often, small metal particles will show up in the oil due to the wearing in process. After the initial break-in period, the lubricant should be drained, magnetic drain plug cleaned, gear case flushed and refilled every 2500 hours of operation under average industrial conditions.

CAUTION: Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly.

More frequent oil changes are recommended when operating continuously or at high temperatures or under conditions of extreme dirt or dust. Use only recommended lubricants listed on this page, or equivalent. Special attention should be given to checking of lubricants when any of the following conditions exist:

1. High operating temperatures resulting from heavy intermittent loads causing the temperature of the gear case to rise rapidly and then cool.
2. Unusual ambient conditions, which may tend to cause condensation on the inside of the gear case hereby contaminating the oil.
3. Operating temperatures that would cause oil to approach 200°F continually.
4. Subjection of reducer to unusual vapors or moist atmosphere.
5. Subjection of reducer to extremely dusty or dirty environment.

Under these extreme operating conditions, the oil should be changed every 1 to 3 months depending on severity of conditions.

Operating Temperatures

Heating is a natural characteristic of enclosed gearing, and a maximum gear case temperature approaching 200°F is not uncommon for some units operating in normal ambient temperatures (80°F). When operating at rated capacity, no damage will result from this temperature as this was taken into consideration in the design of the gear case and in the selection of the lubricants.

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 remaining plugs on the sides of the reducer, the lowest one is the minimum oil level plug.

The running position of the reducer in a horizontal application is not limited to the four positions shown. However, if running position is over 20° 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° of the positions shown. 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.

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 remaining holes on the sides of the reducer, use a plug in the upper housing half for the minimum oil level plug.

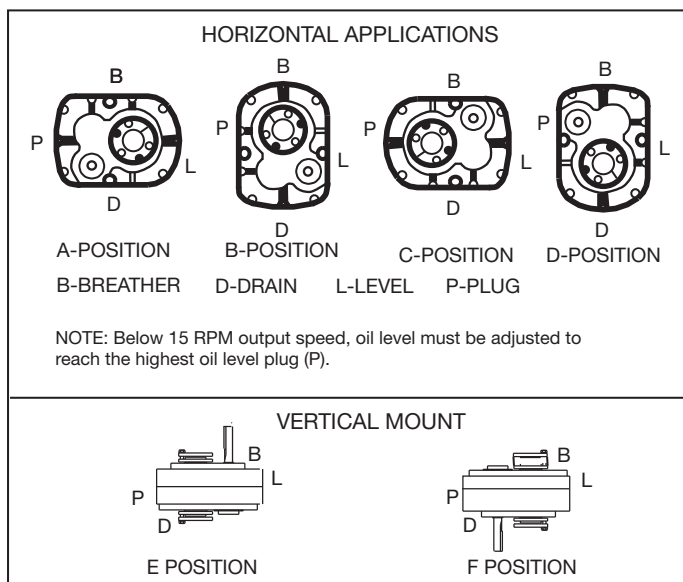


Table 6 - Lubrication Recommendations—ISO Grades For Ambient Temperatures of 50°F thru 125°F

Output RPM	TXT, SCXT, HXT Reducers														
	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	

Table 7 - Lubrication Recommendations—ISO Grades For Ambient Temperatures of 15°F thru 60°F

Output RPM	TXT, SCXT, HXT Reducers														
	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	

Table 8 — Approx. Oil Capacity in Quart *

Reducer Size TXT SCXT HXT	Reducer Positions					
	Horizontal			Vertical		
	A	B	C	D	E	F
109, 115, 125	1/2	1/2	5/8	3/4	1	1-1/4
105	5/8	3/4	5/8	3/4	1-1/8	1-3/8
209, 215, 225	7/8	1	5/8	1	1-5/8	1-3/4
205	3/4	7/8	7/8	7/8	1-3/4	2-1/4
309, 315, 325	1-1/2	1-1/2	3/4	2-1/4	2-5/8	3
305	7/8	1-1/2	1-3/8	1-3/8	2-1/2	3-1/8
409, 415, 425	1-7/8	2-1/4	1-1/4	1-3/4	3-3/8	4-1/4
405	1-1/2	2-1/4	2-1/8	1-7/8	4	4-7/8
509, 515, 525	3-1/4	4	3-1/4	4	7	8-5/8
505	3-3/8	4-1/4	3-7/8	3-3/4	7-3/4	9
609, 615, 625	4-1/4	5	4-1/4	5	8-5/8	9-1/8
605	4-1/2	5-3/4	4-1/2	5	12	11
709, 715, 725	6-1/2	8	7-1/4	9-1/4	15-3/8	16-3/8
705	7-1/2	9	7-1/2	9-1/4	19	17-1/4
815, 825	8-1/2	11	10-1/2	8-1/2	19-1/8	19-1/8
805	6	15	10	8-1/2	22	18-3/4
915, 926	13	13	12-1/2	14-1/4	25-3/8	25-3/8
905	14-3/4	15	16-1/4	13-3/4	31-7/8	31-7/8
1015, 1024	23	14	15-3/4	18-3/4	41	41
1215, 1225	59	38	59	36-1/2	100	100
TDT1325	86	62	86	59	110	110
TDT1425	120	88	120	61	150	150
TDT1530	197	138	192	170	281	281

* U.S. Measure: 1 qt. = 32 fluid oz.

Lubricant Grade Equivalents	
ISO	AGMA
150	4
220	5
320	6

NOTES:

1. Mobile SHC 630 Series oil is recommended for high ambient temperatures.
2. Assumes auxiliary cooling where recommended in the catalog
3. Pour point of lubricant selected should be at least 10°F lower than expected minimum ambient starting temperature
4. Extreme pressure (EP) lubricants are not recommended for average operating conditions.
5. Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a manufacturer's representative for his recommendations.
6. Do not use oils containing EP additives such as graphite or, molybdenum disulphide in the reducer when backstop is used. These additives will destroy sprag action.
7. For reducers operating in ambient temperatures between -22°F (-30°C) and 20°F (6.6°C), use a synthetic hycrocarbon lubricant, 100 ISO grade or AGMA 35 grade (for example, Mobil SHC627). Above 125F (51.6C), consult DODGE Gear Application Engineering at (803)288-9050 for lubrication recommendation.

MAXUM Concentric Reducers

Lubrication of MAXUM Reducers

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.

Lubrication is extremely important for satisfactory operation. The proper oil level as shown in Table 8 must be maintained at all times. Frequent inspections with the unit not running and allowing sufficient time for the oil to cool and the entrapped air to settle out of the oil should be made by removing the level plug to see that the level is being maintained. If low, add the proper type and viscosity of lubricant through one of the upper openings until it comes out of the oil level hole. Replace the oil level plug securely. Refer to Tables 9 and 10 below for viscosity recommendations.

After an initial operation of about two weeks, the oil should be changed. If desired, this oil may be filtered and reused. Very often, small metal particles will show up in the oil due to the wearing in process. After the initial break in period, the lubricant should be drained, magnetic drain plug cleaned, gear case flushed and refilled every 2500 hours of operation under average industrial conditions. More frequent oil changes are recommended when operating continuously or at high temperatures or under conditions of extreme dirt or dust. Use only recommended lubricants listed on this page, or equivalent. Special attention should be given to checking of lubricants when any of the following conditions exist:

1. High operating temperatures resulting from heavy intermittent loads causing the temperature of the gear case to rise rapidly and then cool.
2. Unusual ambient conditions, which may tend to cause condensation on the inside of the gear case thereby contaminating the oil.
3. Operating temperatures that would cause oil to approach 200°F continually.
4. If the reducer is subjected to unusual vapors or moist atmosphere.

Operating Temperatures

Heating is a natural characteristic of enclosed gearing, and a maximum gear case temperature approaching 200°F is not uncommon for some units operating in normal ambient temperatures (80°F). When operating at rated capacity, no damage will result from this temperature as this was taken into consideration in the design of the gear case and in the selection of the lubricants.

Lubricant Grade Equivalents	
ISO	AGMA
150	4
220	5
320	6

NOTE: Mobil SHC 630 Series oil is recommended for high ambient temperatures. For a wide range of ambient temperatures (-10°F/120°F) use Mobil SHC 629

**Table 9 — Lubrication Recommendations - ISO Grades
For Ambient Temperatures of 50°F thru 125°F**

Output RPM	MAXUM Reducer Size											
	1	2	3	4	5	6	7	8	9	10	11	12
230	220	220	220	220	220	220	220	220	220	220	220	220
190	320	320	220	220	220	220	220	220	220	220	220	220
155	320	320	320	220	220	220	220	220	220	220	220	220
125	320	320	320	320	320	220	220	220	220	220	220	220
100	320	320	320	320	320	320	220	220	220	220	220	220
84	320	320	320	320	320	320	220	220	220	220	220	220
68	320	320	320	320	320	320	320	320	220	220	220	220
56	320	320	320	320	320	320	320	320	320	320	320	220
45	320	320	320	320	320	320	320	320	320	320	320	320

NOTES:

1. Use ISO 220 above 230 Output RPM.
2. Use ISO 320 below 45 Output RPM.
3. Assumes Auxiliary Cooling where Recommended in the Catalog.

**Table 10 — Lubrication Recommendations—ISO Grades
For Ambient Temperatures of 15°F thru 60°F***

Output RPM	MAXUM Reducer Size											
	1	2	3	4	5	6	7	8	9	10	11	12
230	150	150	150	150	150	150	150	150	150	150	150	150
190	220	220	150	150	150	150	150	150	150	150	150	150
155	220	220	220	150	150	150	150	150	150	150	150	150
125	220	220	220	220	220	150	150	150	150	150	150	150
100	220	220	220	220	220	220	150	150	150	150	150	150
84	220	220	220	220	220	220	150	150	150	150	150	150
68	220	220	220	220	220	220	220	220	150	150	150	150
56	220	220	220	220	220	220	220	220	220	220	220	150
45	220	220	220	220	220	220	220	220	220	220	220	220

NOTES:

1. Use ISO 150 above 230 Output RPM.
2. Use ISO 220 below 45 Output RPM.
3. Assumes Auxiliary Cooling where recommended in the catalog

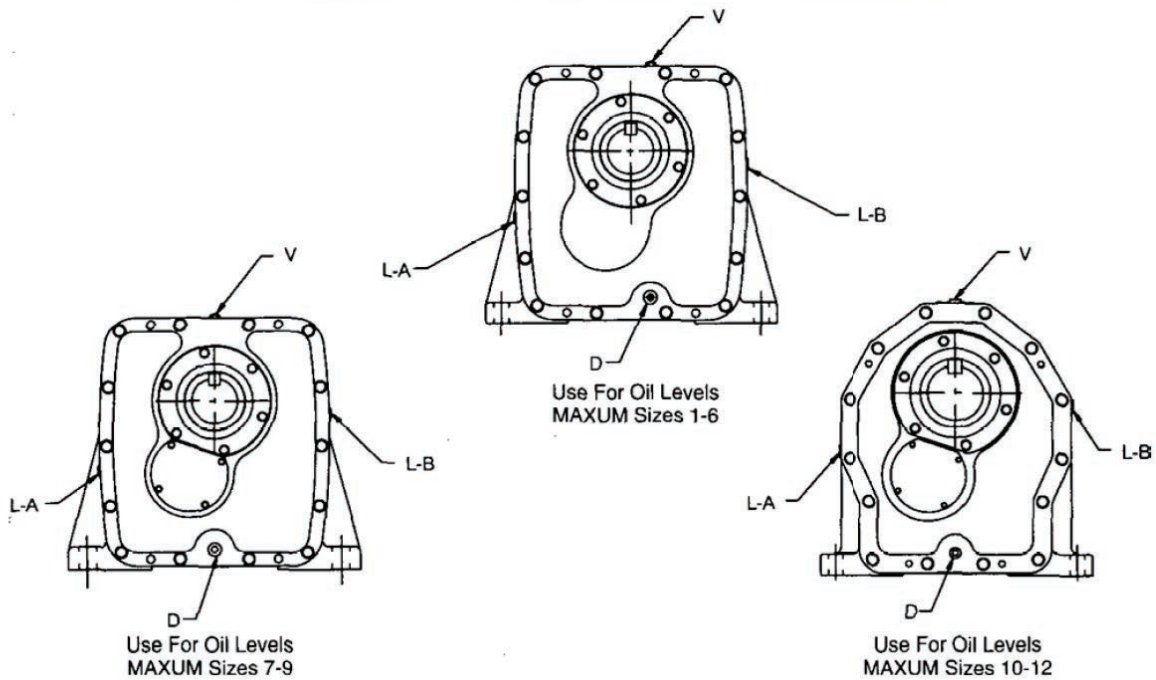
MAXUM Concentric Reducer

Oil Level Locations for Position A-1

L = LEVEL PLUG

D = DRAIN PLUG

V = VENT PLUG



Approximate Oil Capacities and Oil Levels* vs Output RPM's for Floor Mounted Position

Maxum Size	Output RPM	Approximate Oil Capacity	Level Position
1	ABOVE 375 BELOW 375	2.8 QUARTS 5.2 QUARTS	L-A L-B
2	ABOVE 355 BELOW 355	4.1 QUARTS 7.3 QUARTS	L-A L-B
3	ABOVE 300 BELOW 300	6.5 QUARTS 12.0 QUARTS	L-A L-B
4	ABOVE 270 BELOW 270	9.0 QUARTS 16.6 QUARTS	L-A L-B
5	ABOVE 250 BELOW 250	10.9 QUARTS 21.2 QUARTS	L-A L-B
6	ABOVE 215 BELOW 215	15.7 QUARTS 30.7 QUARTS	L-A L-B

Maxum Size	Output RPM	Approximate Oil Capacity	Level Position
7	ABOVE 175 BELOW 175	8.3 GALLONS 17.6 GALLONS	L-A L-B
8	ABOVE 160 BELOW 160	10.7 GALLONS 20.9 GALLONS	L-A L-B
9	ABOVE 140 BELOW 140	12.6 GALLONS 27.2 GALLONS	L-A L-B
10	ABOVE 120 BELOW 120	12.9 GALLONS 29.8 GALLONS	L-A L-B
11	ABOVE 110 BELOW 110	16.3 GALLONS 36.9 GALLONS	L-A L-B
12	ABOVE 95 BELOW 95	20.0 GALLONS 8.3 GALLONS	L-A L-B

* Always fill to the oil plug regardless of the stated quantities. Refer to instruction manual for more information.

The lubrication instructions in this manual are offered for general guidelines. Refer to the instruction manual shipped with the reducer for specific lubrication instructions.



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

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