

# DODGE® SNX, SNX 30, SDX 3000 & 3100, SDXD 3000 & 3100 Series 500 and 600 Adapter Mount & Series 200 and 300 Direct Mount Plummer Blocks

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.**

DODGE SN dimensioned bearings conform with all appropriate ISO standards. They are available in adapter mounting styles from 20mm through 320mm shafts, and in direct mounting styles from 40mm through 160mm shafts. A wide variety of seals are available including felt, felt with V-ring, single or double lip LD radial, TS, TT and End Covers. Oil or grease lubrication is available. Installation and maintenance information is provided in this manual.

## INSPECTION

**Inspect shaft** — Ensure that the shaft is smooth, straight, clean, and within tolerances.

**Inspect bearing** — Do not allow bearing to be exposed to any dirt or moisture. Do not remove preservative compound as it acts as both a protectant and lubricant and is also compatible with standard greases.

**Note: Housing caps and bases are not interchangeable. They must be matched with mating half. Install non-expansion bearing first.**

## INSTALLATION: 500 and 600 Series Adapter Mount

**Note: If both fixed and floating bearings are used, install the fixed bearing first.**

1. Apply a coating of light oil or other rust inhibitor to the adapter area of the shaft.

**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.**

2. Measure the internal clearance of the bearing before mounting. Place the bearing in an upright position as shown in Figure 1. Seat the inner ring and roller elements by pressing down firmly on the inner ring bore while rotating the inner ring a few times. Position the roller assemblies so that a roller is at the top most position on either side. For bore sizes above 135 mm, press these top rollers inward ensuring contact with the center guide flange. Using a feeler gauge measure the clearance for each side by inserting as far as possible and sliding over top of roller (Figure 1). Write down the measured clearance for use in Step 3e.

**Note: Do not rotate bearing when moving feeler between roller and outer ring.**

3. Install the bearing parts in the following sequence. (Refer to parts drawing). Install fixed bearing first.
  - a. **V-ring Seal (if used)** — Slide one of the V-ring seals onto the shaft, making sure lip is toward the bearing.
  - Note: Do not install V-ring seal on seal ring until housing cap has been set in place and tightened.**
  - b. **Seal Ring, Reducing Ring** — Install a seal ring on shaft with largest O.D. toward bearing, or place a reducing ring into seal groove of housing base.
  - c. **Adapter Sleeve** — Slide adapter sleeve onto the shaft, threaded end outboard to the approximate location of the bearing. Apply light coating of oil to sleeve O.D.
  - NOTE: Do not use grease.**
  - d. **Bearing** — Make sure that the internal clearance has been written down. Install bearing on adapter sleeve, large end of tapered bore first. Locate bearing in proper position on shaft.

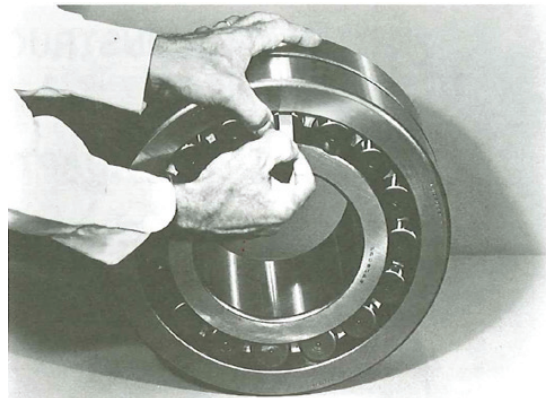


Figure 1 - Internal Clearance

- e. **Lockwasher and Locknut** — Install the lockwasher on the adapter sleeve with inner prong located in the slot of the sleeve and pointing towards the bearing. Install locknut, chamfered face toward bearing as follows:

Tighten locknut using a spanner wrench and hammer until clearance noted in Step 2 is reduced by amount shown in Table 1. During this step, the shaft should be supported so all weight is off the bearing.

**Table 1 - Adapter Mount Bearings Only**

Shaft Diameter, MM	Reduction in Internal Clearance*
35	.020 - .025
40, 45	.025 - .030
50, 55, 60	.030 - .038
65, 70	.041 - .050
75, 80, 85, 90	.046 - .063
100, 110	.051 - .071
115, 125	.064 - .088
135, 140	.076 - .101

\* Amount of clearance to be removed from clearance measured in Step 2.

Find a lockwasher tab that aligns with a locknut slot and bend tab into slot. If slot is past tab then tighten, not loosen, locknut to meet a washer tab.

**NOTE: Steps f and g are not necessary if pillow block housing has an end cover, in which case place the end cover into the housing base seal groove.**

- f. **Seal Ring** — Install second seal ring with large O.D. toward locknut, or install second reducing ring.
  - g. **V-ring Seal (if used)** — Slide second V-ring seal onto the shaft, making certain lip is toward bearing. Do not install V-ring seal on seal ring until housing cap has been set in place and tightened.
4. Remove any paint, dirt or burrs from the mating surfaces of the housing halves. Thoroughly clean seal grooves on both sides. Set lower half of housing on base and apply grease to the bearing seats.
  5. Apply grease to the bearing and seal rings. The lubricant should be smeared between the rolling elements (see Grease Lubrication section). This step and the first sentence of Step 9 do not apply for oil-lubricated bearings.
  6. Place shaft with bearing into lower half while carefully guiding the seal rings into the housing grooves.
  7. Bolt lower half of the non-expansion bearing to the base. Move shaft endwise so that spacer ring can be inserted. Center all other bearings on same shaft in their housing seats.
- NOTE: Only one bearing per shaft is non-expansion, other bearings should be expansion.**
8. When closed end is required and the block is not a cast closed, an optional end plug may be fit into the center seal ring groove of the housing. Shaft extension should not be beyond adapter end to ensure no rubbing with end plug or housing on cast closed end.
  9. Grease the bearing seal grooves in the housing cap and place over the bearing after wiping the mating surfaces (does not apply for oil-lubricated bearings). The two dowel pins will align the cap with the lower housing half.

**NOTE: Each cap must be matched with its mating lower half, as these parts are not interchangeable. Cap and base have serial number stamped at joint. The serial numbers should line up for proper match.**

If the blocks are mounted other than in the horizontal position, a sealer must be applied at the cap and base mating surfaces.

10. Tighten cap bolts to the recommended torque shown on Table 2.
11. Assure that there is running clearance at seal rings, then install V-ring onto the seal rings. Coat V-ring seal with grease to protect against ozone attack.

**Table 2 - Recommended Torque Values**

Bolt Size, mm	10	12	16	20	24
Grade 8.8	47-51	81-89	203-215	415-420	720-725
Stainless Steel A2/A4 Class 70	24	40	110	170	—

## **INSTALLATION: 200 and 300 Series Direct Mount**

**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. Read instructions thoroughly before beginning.**

1. Install fixed bearing first. Measure the internal clearance of the bearing before mounting. Place the bearing in an upright position as shown in Figure 1. Seat the inner ring and roller elements by pressing down firmly on the inner ring bore while rotating the inner ring a few times. Position the roller assemblies so that a roller is at the top most position on either side. Using a feeler gauge measure the clearance for each side by inserting as far as possible and sliding over top of roller (Figure 1). Write down the measured clearance and compare with specifications Table 3.

**NOTE: Do not rotate bearing when moving feeler between roller and outer ring.**

**NOTE: For cylindrical bore direct mount bearings, it is not necessary to check internal clearance after mounting. It is, however, important to verify the shaft diameters (Tables 4, 5, and 6) and to measure the unmounted internal clearance to ensure conformance to specifications (Table 3).**

2. Install the bearing parts in the following sequence (refer to parts drawing):
  - a. **V-ring Seal (if used)** — Slide one of the V-ring seals onto the shaft, making sure lip is toward the bearing.

**NOTE: Do not install V-ring seal on seal ring until housing cap has been set in place and tightened.**

  - b. **Seal Ring, Reducing Ring** — Install a seal ring on shaft with largest O.D. toward bearing, or place a reducing ring into seal groove of housing base.

- c. **Bearing** — Install bearing. Bearings with cylindrical bore up to 70 mm may be cold mounted on the shaft. Apply coat of light oil to the shaft and bearing bore, then press on the bearing by mechanical or hydraulic device or use the mounting nut to drive the bearing onto the shaft. Bearings with cylindrical bore above 70 mm are heated for mounting on shaft. Bearings, heated in oil between 93°C and 102°C, should have the bore wiped dry with a clean cloth and while bearings are still in a heated condition, they should be rapidly pushed on the shaft and positioned squarely against the shoulder. A slight twisting motion during fitting facilitates the mounting. It is advisable to use gloves. Large bearings are generally handled with a hoist or crane.
- d. **Install Sleeve** — This sleeve must be supplied by the equipment manufacturer. The O.D. of the sleeve must conform to S-2 dimensions (see Tables 5 and 6). For closed end applications, the locknut and lockwasher must also be supplied by the equipment manufacturer.

**NOTE: Steps e and f are not necessary if pillow block housing is a cast closed end style.**

- e. **Seal Ring** — Install second seal ring with large O.D. toward bearing, or place a reducing ring into seal grove of housing base.
  - f. **V-ring Seal** — Slide second V-ring seal onto the shaft, making certain lip is toward bearing. Do not install V-ring seal on seal ring until housing cap has been set in place and tightened.
3. Remove any paint, dirt or burrs from the mating surfaces of the housing halves. Thoroughly clean seal grooves on each side. Set lower half of housing on mounting base and apply oil to the bearing seats.
  4. Apply grease to the bearing and seal rings. The lubricant should be smeared between the rolling elements (see Grease Lubrication section). This step and the first sentence of Step 8 do not apply for oil lubricated bearings.
  5. Place shaft with bearing into lower half while carefully guiding the seal rings into the housing grooves.
  6. Bolt lower half of the non-expansion bearing to the base. Move shaft endwise so that spacer ring can be inserted. Center all other bearings on same shaft in their housing seats.

**NOTE: Only one bearing per shaft is non-expansion, other bearings should be expansion.**

7. When closed end is required and the block is not a cast closed, the end plug supplied should be fit into the center seal ring groove of the housing. Shaft should not extend beyond locknut end to ensure no rubbing with end plug or housing on cast closed end.
8. Grease the bearing seal grooves in the housing cap and place over the bearing after wiping the mating surfaces (does not apply for oil-lubricated bearings). The two dowel pins will align the cap with the lower housing half. Note: Each cap must be matched with its mating lower half, as these parts are not interchangeable. Cap and base have serial number stamped at joint. The serial numbers should line up for proper match.
9. Tighten cap bolts to the recommended torque shown on Table 2.
10. Assure that there is running clearance at seal rings, then install V-ring seals onto the seal rings. Coat V-ring seals with grease to protect against ozone attack.

**Table 3 - Radial Clearance of 222 Series Spherical Roller Bearings (Straight Bore)**

Basic Bearing No.	C3 Radial Clearance (MM)	
	Min.	Max.
22209	.055	.075
22210	.055	.075
22211	.065	.090
22212	.065	.090
22213	.065	.090
22214	.080	.110
22215	.080	.110
22216	.080	.110
22217	.100	.135
22218	.100	.135
22219	.100	.135
22220	.100	.135
22222	.120	.160
22224	.120	.160
22226	.145	.190
22228	.145	.190
22230	.170	.220
22232	.170	.220

**Table 4 - Shaft Bearing Diameters For Cylindrical Bore Mount Plummer Blocks (See Figure 2)**

Bearing Bore			Normal Load			High Load		
MM	MM	MM	MM		Mean	MM		Mean
Nom.	Max.	Min.	Max.	Min.	Fit	Max.	Min.	Fit
40	40.000	39.988	40.025	40.009	.023	40.033	40.017	.031
45	45.000	44.988	45.025	45.009	.023	45.033	45.017	.031
50	50.000	49.988	49.025	49.009	.023	50.033	50.017	.031
55	55.000	54.985	55.030	55.011	.028	55.039	55.020	.037
60	60.000	59.985	60.030	60.011	.028	60.039	60.020	.037
65	65.000	64.985	65.030	65.011	.028	65.039	65.020	.037
70	70.000	69.985	70.030	70.011	.028	70.039	70.020	.037
75	75.000	74.985	75.030	75.011	.028	75.039	75.020	.037
80	80.000	79.985	80.030	80.011	.028	80.039	80.020	.037
85	85.000	84.980	85.035	85.013	.034	85.045	85.023	.044
90	90.000	89.980	90.035	90.013	.034	90.045	90.023	.044
95	95.000	94.980	95.035	95.013	.034	95.045	95.023	.044
100	100.000	99.980	100.035	100.013	.034	100.045	100.023	.044
110	110.000	109.980	110.035	110.013	.034	110.045	110.023	.044
120	120.000	119.980	120.035	120.013	.034	120.045	120.023	.044
130	130.000	129.975	130.040	130.015	.040	130.052	130.027	.052
140	140.000	139.975	140.040	140.015	.040	140.052	140.027	.052
150	150.000	149.975	150.040	150.015	.040	150.052	150.027	.052
160	160.000	159.975	160.040	160.015	.040	160.052	160.027	.052

These fits apply to roller bearings with inner ring rotation under radial and thrust loads.

Bearing Bore Diameter	Normal Load	High Load
Up to 160 mm	P/C = 0.10 to 0.18	P/C > 0.18

Where:

P = Equivalent Dynamic Load on the Bearing (N)

C = Basic Dynamic Load Rating of Bearing (N)

(For these values see appropriate rating tables)

**Table 5 - Tolerance**

Shaft Diameter (S-2)		(MM)
Over	Including	Tolerance
35 mm	100 mm	+.000 to -.102
100 mm	150 mm	+.000 to -.127
Over 150 mm		+.000 to -.152

**Table 6 - Shaft Diameter, S-2 (See Figure 2)**

Bearing Bore Diameter (MM)	S-2 (MM)
40	50
45	55
50	60
55	65
60	70
65	75
70	80
75	85
80	90
85	95
90	100
95	110
100	115
110	125
120	135
130	145
140	155
150	165
160	175

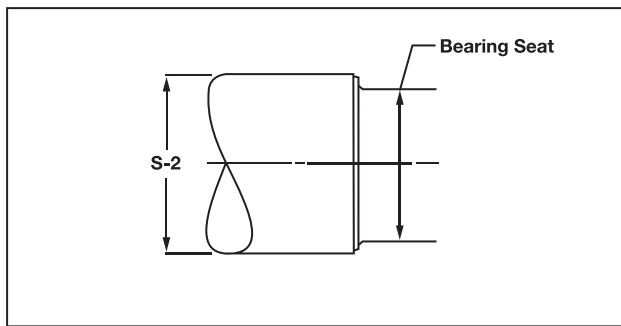


Figure 2 - Shaft Diameter

## MAINTENANCE

**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.**

Remove the housing cap in order to inspect bearing and grease. Before the cap is reinstalled it is important that the V-ring seals be moved away from the housing so they are not pinched. Slide the V-rings back into place after the cap is in place.

### Grease Lubrication (Adapter Mount and Direct Mount)

Dodge SN-dimensioned bearings are specifically designed for dirty, dusty or wet environments. In order to properly protect bearings during installation pack the bearings 100% full immediately after having properly mounted bearing on the shaft.

**WARNING: Regreasing requires rotating parts to be exposed. Exercise extreme care during such operations. Failure to observe these precautions could result in bodily injury.**

If the RPM of the application falls between 20% and 80% of maximum RPM (Table 9 for adapter mount, Table 10 for direct mount), pack the lower half of the housing one-third to one-half full. If the RPM of the application is less than 20% of maximum RPM, pack bearing housing cavity 100% full. If the RPM exceeds 80% of maximum RPM, pack the lower half of the housing one-third full.

At each regreasing cycle, for applications up to 80% of maximum RPM, slowly add grease until fresh grease is seen purging at the seals. Regreasing should be done while bearing is running. Remote re-greasing lines should be added to avoid endangering personnel.

If the RPM is greater than 80% of maximum RPM, add 4 strokes of a handgun at each regreasing cycle for bores up to 50 mm. For bores greater than 50 mm up to 130 mm add 8 strokes of handgun at each regreasing cycle. For bores greater than 130 mm add 16 strokes of a handgun at each regreasing cycle. For units running above 80% of maximum RPM, running temperature should be monitored. If a drastic change in running temperature is noted, it is recommended to remove the used grease completely and recharge with fresh grease per the above instructions.

Select a grease with a viscosity at operating temperature which will provide full film lubrication (See Table 7). Use a 30°C - 55°C increase in bearing temperature above ambient, depending on

RPM and load. Use Table 8 as a general guide for regreasing the bearings. A small amount of grease at frequent intervals is preferable to a large amount of grease at infrequent intervals. For special applications involving high speeds or high temperatures consult DODGE Product Support.

Table 7 - Viscosity of Oil in the Grease

DN	Viscosity for Loads Up To 18% of Dyn. Cap* (Cst @ Oper. Temp.)	DN	Viscosity for Loads Up To 18% of Dyn. Cap* (Cst @ Oper. Temp.)
2500	700	35000	125
5000	650	40000	100
7500	580	45000	85
10000	500	50000	75
12500	425	75000	62
15000	390	100000	42
17500	325	125000	30
20000	280	150000	27
22500	235	175000	22
25000	200	200000	20

DN = Bore Diameter (MM) × RPM

\* = For loads above 18% of dynamic capacity an EP grease with the above viscosity oil is recommended.

Table 8 - Regreasing Intervals (Months)\*  
(Based on 12 Hours Per Day — 66°C Max.)

Size, MM	RPM*									
	250	500	750	1000	1250	1500	2000	2500	3000	3500
35-60	8	6	4	3	2	1	.5	.5	.25	.25
65	7	5	3	2	1	1	.5	.25	.25	
70-85	6	4	3	2	1	.5	.25	.25		
90-100	5	3	2	1	.5	.5	.25			
110-130	4	3	2	1	.5	.25				
140-160	3	2	1	.5	.25					

Table 9 - Maximum RPM (Adapter Mount)

Shaft Size, MM	Basic Bearing Description	Maximum RPM	
		Grease	Oil
40	22209K C3	5600	7000
45	22210K C3	5300	6700
50	22211K C3	4500	5600
55	22212K C3	4000	5000
60	22213K C3	3600	4500
65	22215K C3	3400	4300
70	22216K C3	3200	4000
75	22217K C3	3000	3800
80	22218K C3	2600	3400
85	22219K C3	2400	3200
90	22220K C3	2200	3000
100	22222K C3	2000	2800
110	22224K C3	1800	2400
115	22226K C3	1700	2200
125	22228K C3	1600	2000
135	22230K C3	1500	1900
140	22232K C3	1400	1800

## LONG-TERM STORAGE OF PRE-ASSEMBLED BEARINGS

Applications such as conveyor pulleys and fans are shipped to a job site with bearings already mounted to the shafts. Since these units may be stored for long periods of time in unprotected areas subject to rain, dust, etc., bearings should be packed 100% full and so tagged at bearing assembly to prevent contamination or corrosion of the bearings. Rotate bearings on shaft at least once a month. Prior to installation on the structure, if the application RPM is greater than 20% of catalog maximum speed, excess grease must be removed to the levels previously outlined. Removal of excess grease must be done in a clean, protected environment.

### Oil Lubrication (Adapter Mount or Direct Mount)

USN and SNX bearings are specifically designed to handle either grease or oil lubrication. Oil lubrication is normally required at high speeds as well as high loads or whenever heat from an external source is flowing into the bearing. Oil lubrication may be static or circulating. With static oil, fill the bearing cavity with oil up to the center line of the lower roller. The dimension is identified as W and is shown on Tables 11 and 12. Mount an oil sight gauge in the drilled and tapped drain hole on the side of the plummer block for visual indication of this level. The oil level may drop or rise during operation depending on the rotation of the bearing. Oil should be added only when the bearing is not operating. Both the static oil level and the running oil level should be marked on the oil sight gauge and properly identified.

Oil should be replaced semi-annually. For circulating oil, the flow rate and size of return drains are shown in Tables 11 and 12. Consult DODGE application engineering for recommendations.

Table 10 - Maximum RPM (Direct Mount)

Shaft Size, MM	Basic Bearing Description	Maximum RPM	
		Grease	Oil
40	22308 C3	4300	5300
45	22209 C3	5600	7000
50	22310 C3	3400	4300
55	22211 C3	4500	5600
60	22212 C3	4000	5000
65	22213 C3	3600	4500
70	22314 C3	2400	3200
75	22215 C3	3400	4300
80	22216 C3	3200	4000
85	22217 C3	3000	3800
90	22218 C3	2600	3400
95	22219 C3	2400	3200
100	22220 C3	2200	3000
110	22222 C3	2000	2800
120	22224 C3	1800	2400
130	22226 C3	1700	2200
140	22228 C3	1600	2000
150	22230 C3	1500	1900
160	22232 C3	1400	1800

Table 11 - SNX Oil Levels

Shaft Size, mm				SNX Housing Designation	Static Oil Level mm W**		Dry Hole, Dry Sump***		
500 Adtr Mount	200 Drct Mount	600 Adtr Mount	300 Drct Mount		500 & 200 Series	600 & 300 Series	Location, mm		Size
							X	Y	
40	45	--	--	509 209	24,0	--	29	20	R1/4"
45	50	35	40	510 210 608 308	29,0	26,5	31	17	R1/4"
50	55	40	45	511 211 609 309	28,5	32,5	33	22	R1/4"
55	60	45	50	512 212 610 310	32,0	28,6	38	20	R1/4"
60	65	50	55	513 213 611 311	27,0	33,9	41	25	R1/4"
65	75	55	60	515 215 612 312	38,0	30,7	44	21	R1/4"
70	80	60	65	516 216 613 313	34,5	41,7	49	31	R1/4"
75	85	--	70	517 217 314	35,5	37,3	53	28	R1/2"
80	90	65	75	518 218 615 315	47,0	38,8	57	28	R1/2"
85	95	70	80	519 219 616 316	39,5	46,9	60	35	R1/2"
90	100	75	85	520 220 617 317	45,0	42,1	67	30	R1/2"
100	110	85	95	522 222 619 319	53,5	50,1	73	34	R1/2"
110	120	90	100	524 224 620 320	57,0	58,1	81	42	R1/2"
115	130	--	--	526 226	49,0	--	84	39	R1/2"
125	140	--	--	528 228	51,5	--	92	35	R1/2"
135	150	--	--	530 230	53,0	--	91	34	R1/2"
140	160	--	--	532 232	53,2	--	102	34	R1/2"

\*\*Static level is measured from bottom of block base to meniscus on oil sight gauge. (Non-rotating mode)

\*\*\*For wet sump, consult Dodge Engineering.

Table 12 - SDX Oil Levels

Shaft Size, mm		SDX Housing		Static Oil Level mm W ①		Dry Hole, Dry Sump SDX 3000 ②			Dry Hole, Dry Sump SDX 3100 ②		
SDX 3000	SDX 3100			SDX 3000	SDX 3100	Location, mm		Size	Location, mm		Size
		X	Y			X	Y				
--	150	--	SDX 3134	--	57,5	--	--	--	102	40	R1/2"
--	160	--	SDX 3136	--	60	--	--	--	103	40	R1/2"
--	170	--	SDX 3138	--	62,5	--	--	--	120	30	R1/2"
180	180	SDX 3040	SDX 3140	62,5	75	120	30	R1/2"	125	50	R1/2"
200	200	SDX 3044	SDX 3144	70,0	72,5	125	50	R1/2"	145	40	R1/2"
220	220	SDX 3048	SDX 3148	70,0	80	145	40	R1/2"	115	45	R1/2"
240	240	SDX 3052	SDX 3152	75,0	85	115	45	R1/2"	150	50	R1/2"
260	260	SDX 3056	SDX 3156	85,0	95	150	50	R1/2"	165	40	R1/2"
280	280	SDX 3060	SDX 3160	90,0	100	165	40	R1/2"	182	36	R1/2"
300	300	SDX 3064	SDX 3164	100,0	105	182	36	R1/2"	180	50	R1/2"
320	--	SDX 3068	--	105,0	--	180	50	R1/2"	--	--	--

① Static level is measured from bottom of block base to meniscus on oil sight gauge. (Non-rotating mode)

② For wet sump, consult Dodge Engineering.

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