

# **EXCAVATOR ROTARY HEAD**

72"(1829MM) ROTARY HEAD

SERIAL #25181+

**WARRANTY + SERVICE** 888.960.0364  
**PARTS** 888.960.0361



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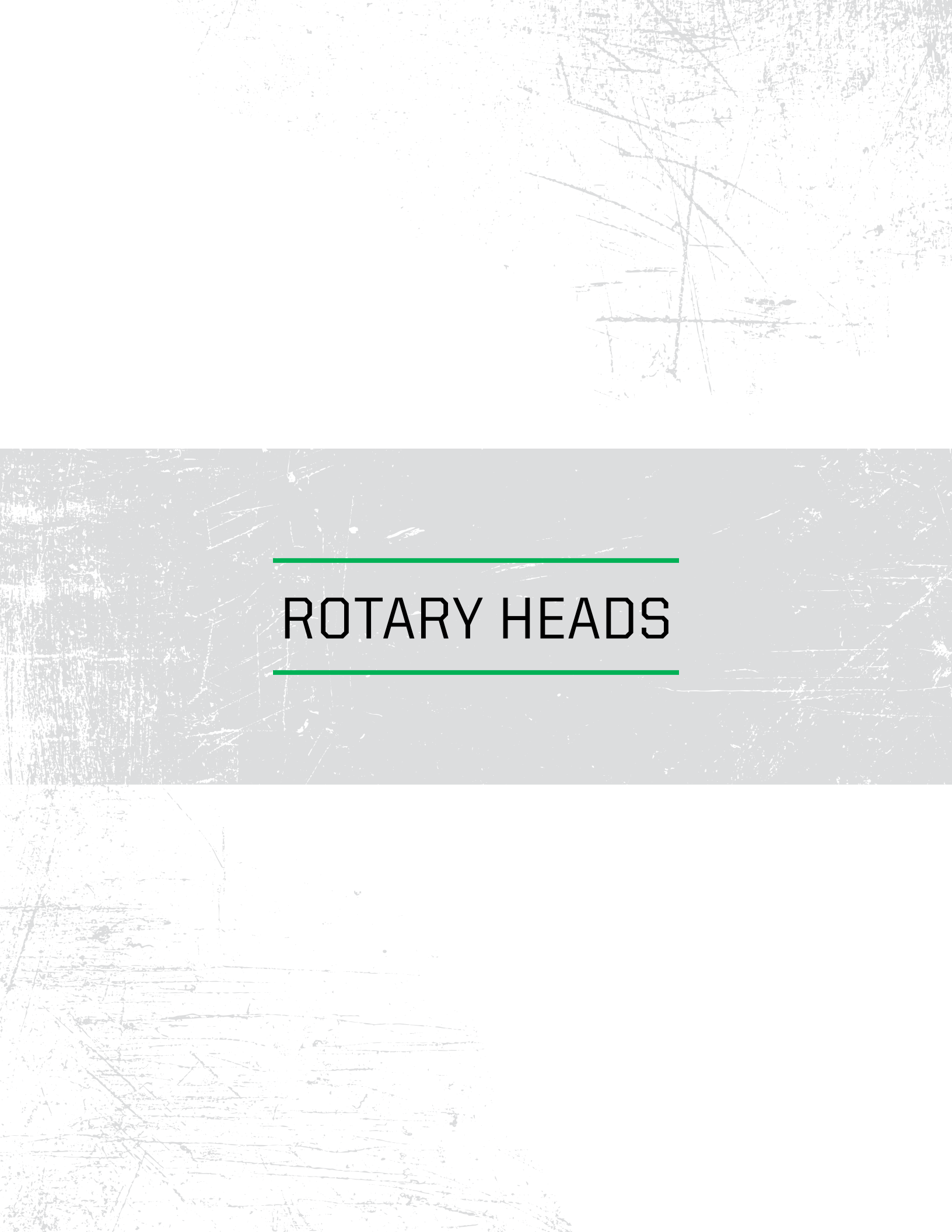
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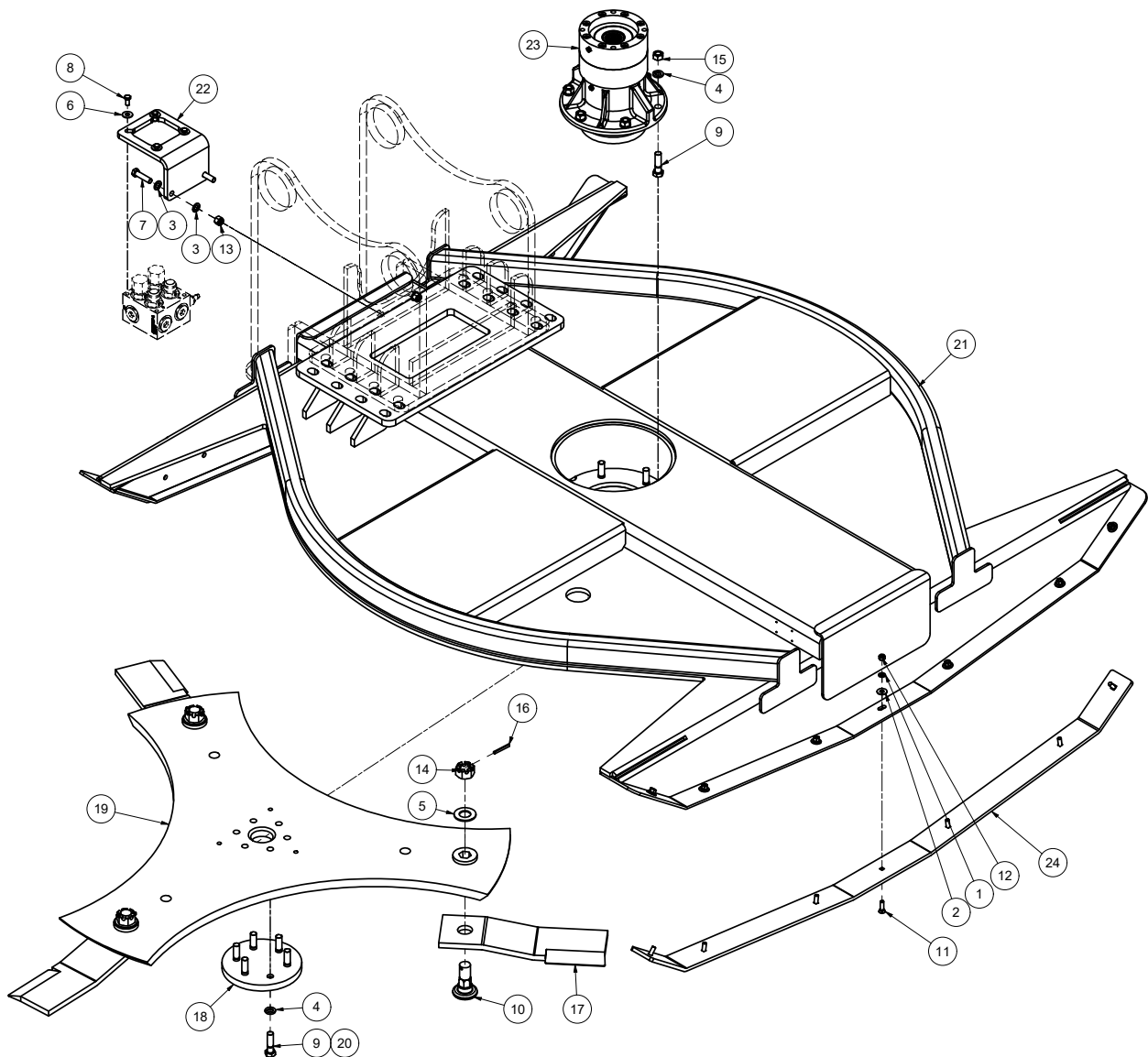
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# ROTARY HEADS

ROTARY HEAD

DECK ASSEMBLY - 72" (1829MM)

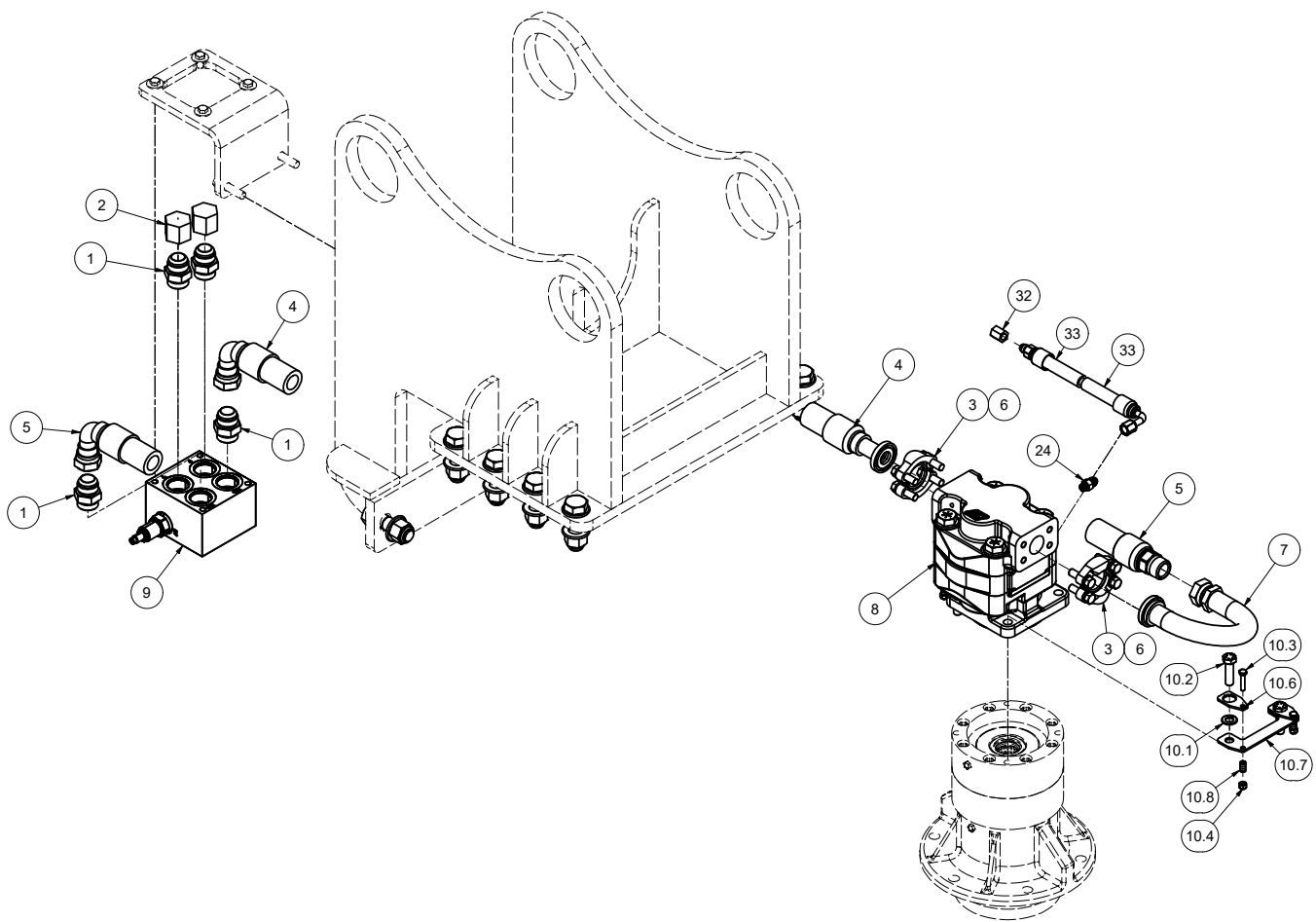


| REF# | PARTS DESCRIPTION                              | REQ | PART#   | TORQUE<br>lubricated<br>ft-lbs | TORQUE<br>lubricated<br>Nm |
|------|------------------------------------------------|-----|---------|--------------------------------|----------------------------|
| 1    | 3/8 LOCK WASHER GR 5                           | 14  | 11-0005 |                                |                            |
| 2    | 3/8 FLAT WASHER GR 5                           | 14  | 11-0009 |                                |                            |
| 3    | 1/2 SAE FLAT WASHER GR 8, YELLOW ZINC          | 4   | 11-0042 |                                |                            |
| 4    | 5/8 HIGH ALLOY LOCK WASHER, YELLOW ZINC        | 12  | 11-0043 |                                |                            |
| 5    | 1.125" SAE HS FLAT WASHER                      | 3   | 11-0057 |                                |                            |
| 6    | 3/8 THRU-HARDENED FLAT WASHER, YELLOW ZINC     | 4   | 11-0092 |                                |                            |
| 7    | 1/2-13 X 2 GR 5 HEX CAP, ZINC                  | 2   | 11-0522 | 57                             | 77                         |
| 8    | 3/8-16 X 3/4 GR 5 HEX CAP, ZINC                | 4   | 11-0545 | 23                             | 31                         |
| 9    | 5/8-18 X 2 1/4 GR 8 HEX CAP, YELLOW ZINC       | 12  | 11-0691 | **180                          | **244                      |
| 10   | 1 1/8" -12 NF HEX BASE D3 BLADE BOLT           | 3   | 11-0759 |                                |                            |
| 11   | 3/8-16 X 1-1/4 GR 5 FLAT HEAD PLOW BOLT, PLAIN | 14  | 11-0804 |                                |                            |
| 12   | 3/8-16 GR 5 HEX NUT, ZINC                      | 14  | 11-1001 | 23                             | 31                         |
| 13   | 1/2-13 GR 2 NYLOCK NUT, ZINC                   | 2   | 11-1018 |                                |                            |
| 14   | 1-1/8" -12 NF SLOTTED HEX NUT GR 8             | 3   | 11-1050 | **400                          | **543                      |
| 15   | 5/8-18 GR 8 STOVER NUT, ZINC                   | 6   | 11-1143 |                                |                            |
| 16   | ROLL PIN, 1/4" X 2"                            | 3   | 11-2005 |                                |                            |
| 17   | BRUSH BLADE - 5/8"                             | 3   | 22-0006 |                                |                            |
| 18   | BOLT PROTECTOR                                 | 1   | 24-0004 |                                |                            |
| 19   | 72" SKID LOADER TRI-HEX DISC                   | 1   | 24-0151 |                                |                            |
| 20   | LOCTITE 263                                    | 1   | 24-0193 |                                |                            |
| 21   | 72" EXCAVATOR, DOUBLE DOOR                     | 1   | 25-0132 |                                |                            |
| 22   | EXCAVATOR RELIEF BLOCK MOUNT PLATE             | 1   | 31-0770 |                                |                            |
| 23   | SPINDLE ASSY, SPLINED INSERT                   | 1   | 35-0088 |                                |                            |
| 24   | SKID SHOE, 72" DOUBLE DOOR EXCAV               | 2   | 42-0036 |                                |                            |

\*\* CRITICAL TORQUE VALUES MUST BE FOLLOWED.

# ROTARY HEAD

## DRIVE ASSEMBLY - 72"(1829MM)



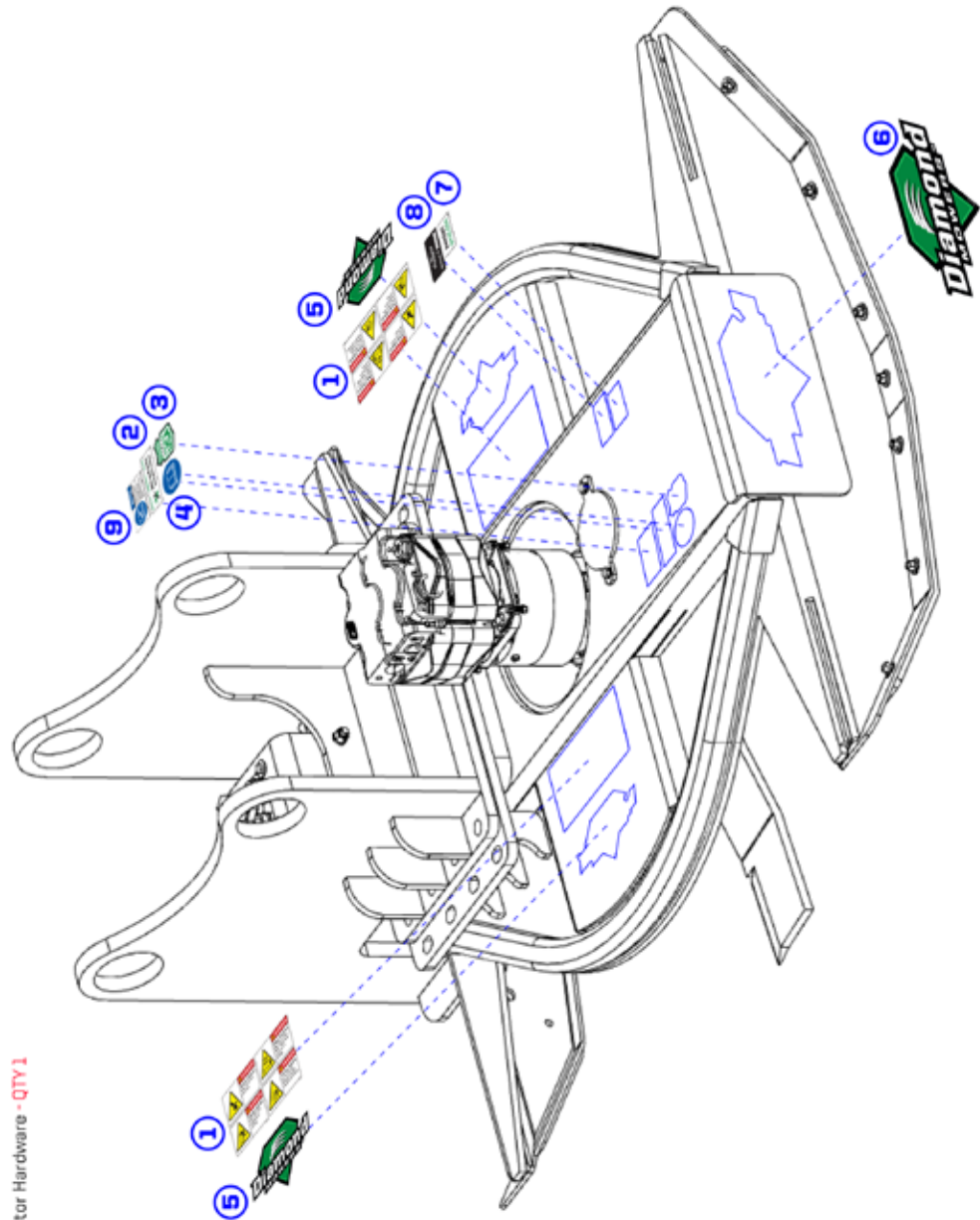
| REF#  | PARTS DESCRIPTION                                      | REQ | PART#   | TORQUE<br>(ft-lbs) | TORQUE<br>(Nm) |
|-------|--------------------------------------------------------|-----|---------|--------------------|----------------|
| 1     | 1MOR X 1MJIC, ADAPTER                                  | 4   | 21-1005 |                    |                |
| 2     | 1FJIC CAP NUT                                          | 2   | 21-1454 |                    |                |
| 3     | #20 FLANGE KIT                                         | 2   | 21-2105 | 49                 | 66             |
| 4     | HOSE 1 X 32 (#20FLG X 1FJIC-90DEG)                     | 1   | 21-4672 |                    |                |
| 5     | HOSE 1 X 40 (1MP X 1FJIC-90DEG)                        | 1   | 21-4673 |                    |                |
| 6     | LOCTITE 263                                            | 1   | 24-0193 |                    |                |
| 7     | PREFORMED TUBE                                         | 1   | 28-0014 |                    |                |
| 8     | MOTOR                                                  | 1   |         |                    |                |
| *     | M365 MOTOR, 1 1/2" GEAR, 16-22 GPM                     | 1   | 30-0515 |                    |                |
| *     | M365 MOTOR, 2 1/2" GEAR, 35-41 GPM                     | 1   | 30-0518 |                    |                |
| *     | M365 MOTOR, 1 3/4" GEAR, 23-28 GPM                     | 1   | 30-0520 |                    |                |
| *     | M365 MOTOR, 2 1/4" GEAR, 39-34 GPM                     | 1   | 30-0524 |                    |                |
| 9     | MANIFOLD, ANTI-CAVITATION, 3300 PSI RELIEF, ATTACHMENT | 1   | 39-0124 |                    |                |
| 10    | MOTOR BOLT LOCKING KIT                                 | 1   | 44-0734 |                    |                |
| 10.1  | 1/2 SAE FLAT WASHER GR 8, YELLOW ZINC                  | 4   | 11-0042 |                    |                |
| 10.2  | 1/2-20 X 1-3/4 GR 8 HEX CAP, YELLOW ZINC               | 4   | 11-0664 | **90               | **122          |
| 10.3  | 1/4 X 1-1/4 NC HEX CAP                                 | 4   | 11-0702 | 6                  | 9              |
| 10.4  | 1/4-20 GR 5 NYLOCK NUT, ZINC                           | 4   | 11-1022 |                    |                |
| *10.5 | SPINDLE HARDWARE WARNING TAG                           | 1   | 15-0099 |                    |                |
| 10.6  | MOTOR BOLT LOCK TAB                                    | 4   | 31-0503 |                    |                |
| 10.7  | V3LOCK BOTTOM                                          | 2   | 31-0504 |                    |                |
| 10.8  | BOLT LOCKING TAB SPRING                                | 4   | 36-0013 |                    |                |

\* NOT SHOWN

\*\* CRITICAL TORQUE VALUES **MUST** BE FOLLOWED.

## DECAL ASSEMBLY

- ① **PART #15-0057** - Decal Group (horizontal) - **QTY 2**
- ② **PART #15-1018** - Warranty and Service - **QTY 1**
- ③ **PART #15-0055** - Made in the USA - **QTY 1**
- ④ **PART #15-0058** - Read Manual - **QTY 1**
- ⑤ **PART #15-0050** - Diamond Mowers Logo 7in - **QTY 2**
- ⑥ **PART #15-0052** - Diamond Mowers Logo 11in - **QTY 1**
- ⑦ **PART #15-0066** - Patent Rotary 1 - **QTY 1**
- ⑧ **SERIAL NUMBER LABEL** - (not included in kit) - **QTY 1**
- ⑨ **PART #15-0101** - Spindle/Motor Hardware - **QTY 1**

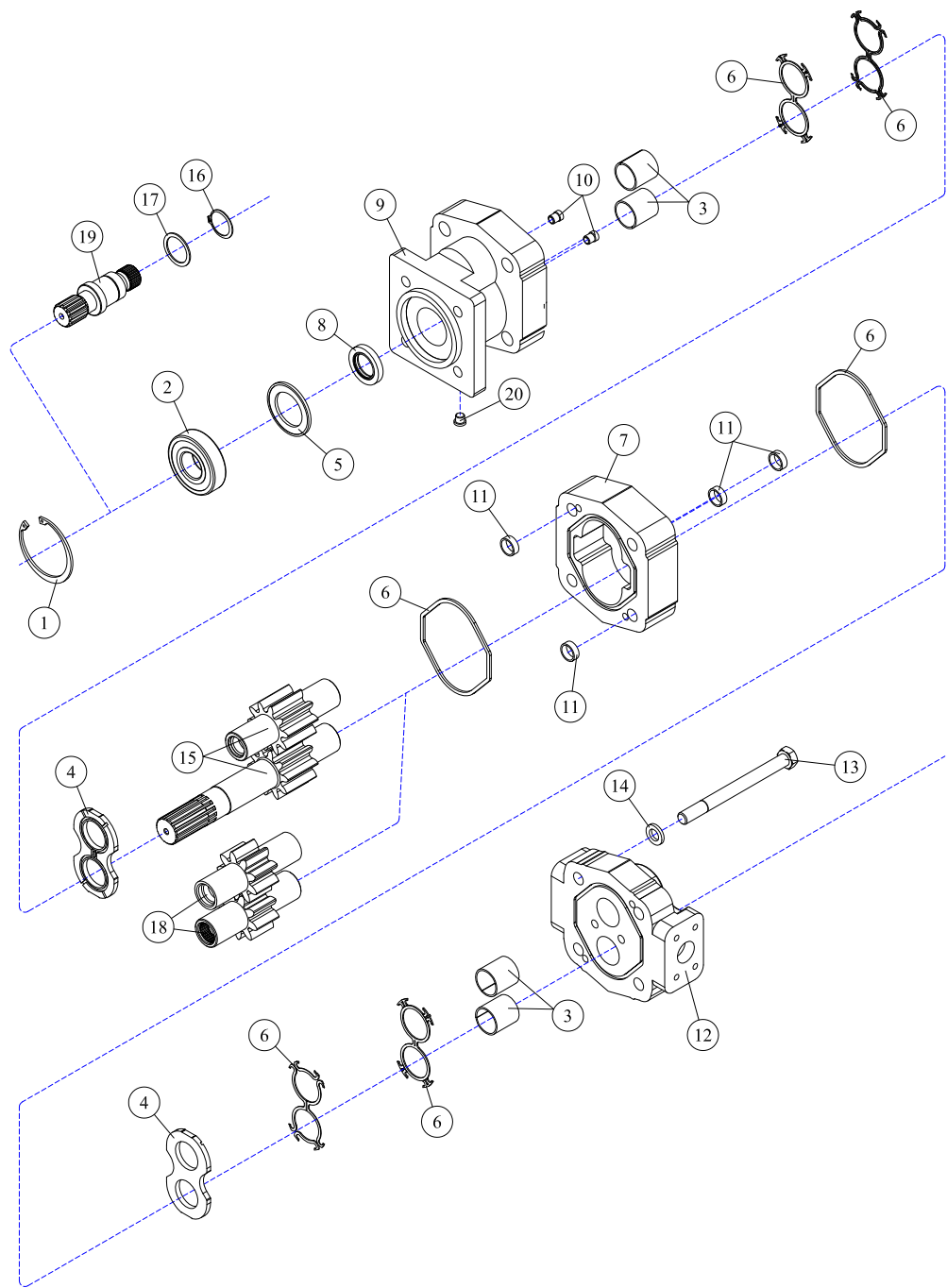


The image shows a close-up, slightly angled view of a wooden deck. The wood grain is visible, with various shades of brown and tan. A horizontal grey band runs across the middle of the image, serving as a background for the title. The title is centered within this band and is flanked by two short green horizontal lines.

# DECK ASSEMBLIES

DECK ASSEMBLIES

MOTOR ASSEMBLY - 30-0515

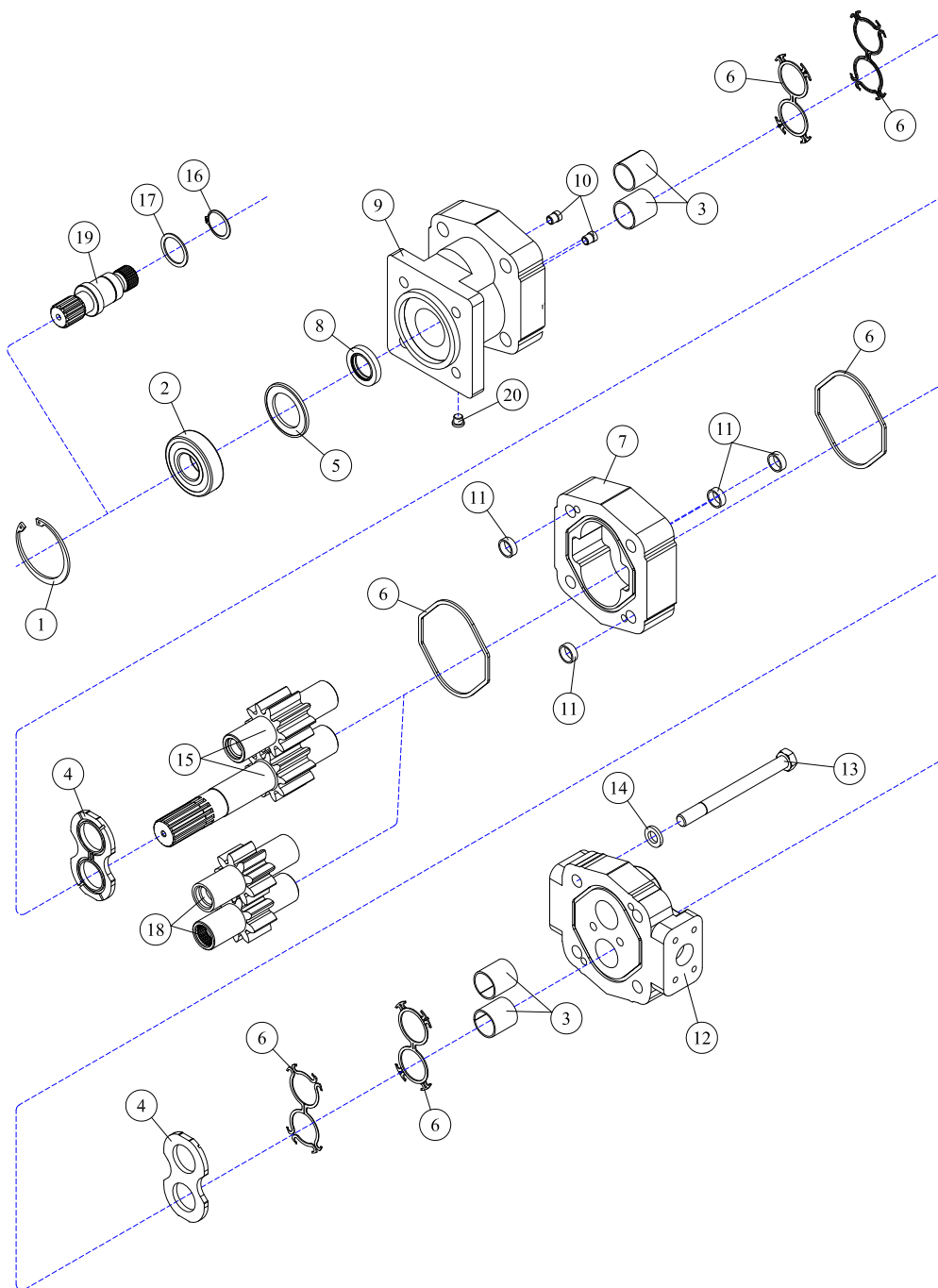


| REF# | PARTS DESCRIPTION                   | REQ   | PART #  |
|------|-------------------------------------|-------|---------|
| 1    | SNAP RING                           | 1     | 30-1009 |
| 2    | OUTBOARD BEARING                    | 1     | 30-1010 |
| 3    | BUSHING                             | 4     | 30-1011 |
| 4    | THRUST PLATE                        | 2     | 30-1012 |
| 5    | SEAL RETAINER                       | 1     | 30-1017 |
| 6    | M365 SEAL KIT                       | Avail | 30-1021 |
| 7    | GEAR HOUSING                        | 1     | 30-1023 |
| 8    | <b>SHAFT SEAL</b>                   |       |         |
|      | 150 PSI (included in M365 seal kit) | 1     | 30-1210 |
|      | 500 PSI                             | 1     | 30-1156 |
| 9    | SHAFT END COVER                     | 1     | 30-1086 |
| 10   | CHECK ASSEMBLY                      | 2     | 30-1087 |
| 11   | ALIGNMENT BUSHING                   | 4     | 30-1090 |

| REF# | PARTS DESCRIPTION                | REQ   | PART #  |
|------|----------------------------------|-------|---------|
| 12   | PORT END COVER                   | 1     | 30-1091 |
| 13   | STUD                             | 4     | 30-1092 |
| 14   | WASHER                           | 4     | 30-1093 |
|      | <b>GEAR SET OPTION A:</b>        |       |         |
| 15   | 1-1/2" GEAR SET                  | 1     | 30-1159 |
|      | <b>GEAR SET OPTION B:</b>        |       |         |
| 16   | RETAINING RING                   | 1     | 30-1019 |
| 17   | WASHER                           | 1     | 30-1020 |
| 18   | 1-1/2" GEAR SET                  | 1     | 30-1022 |
| 19   | CONTINENTAL SHAFT, SPLINED       | 1     | 30-1144 |
| 20   | PLUG                             | 1     | 30-1096 |
| *    | SEAL APPLICATOR TOOL (not shown) | Avail | 30-1048 |

# DECK ASSEMBLIES

## MOTOR ASSEMBLY - 30-0518

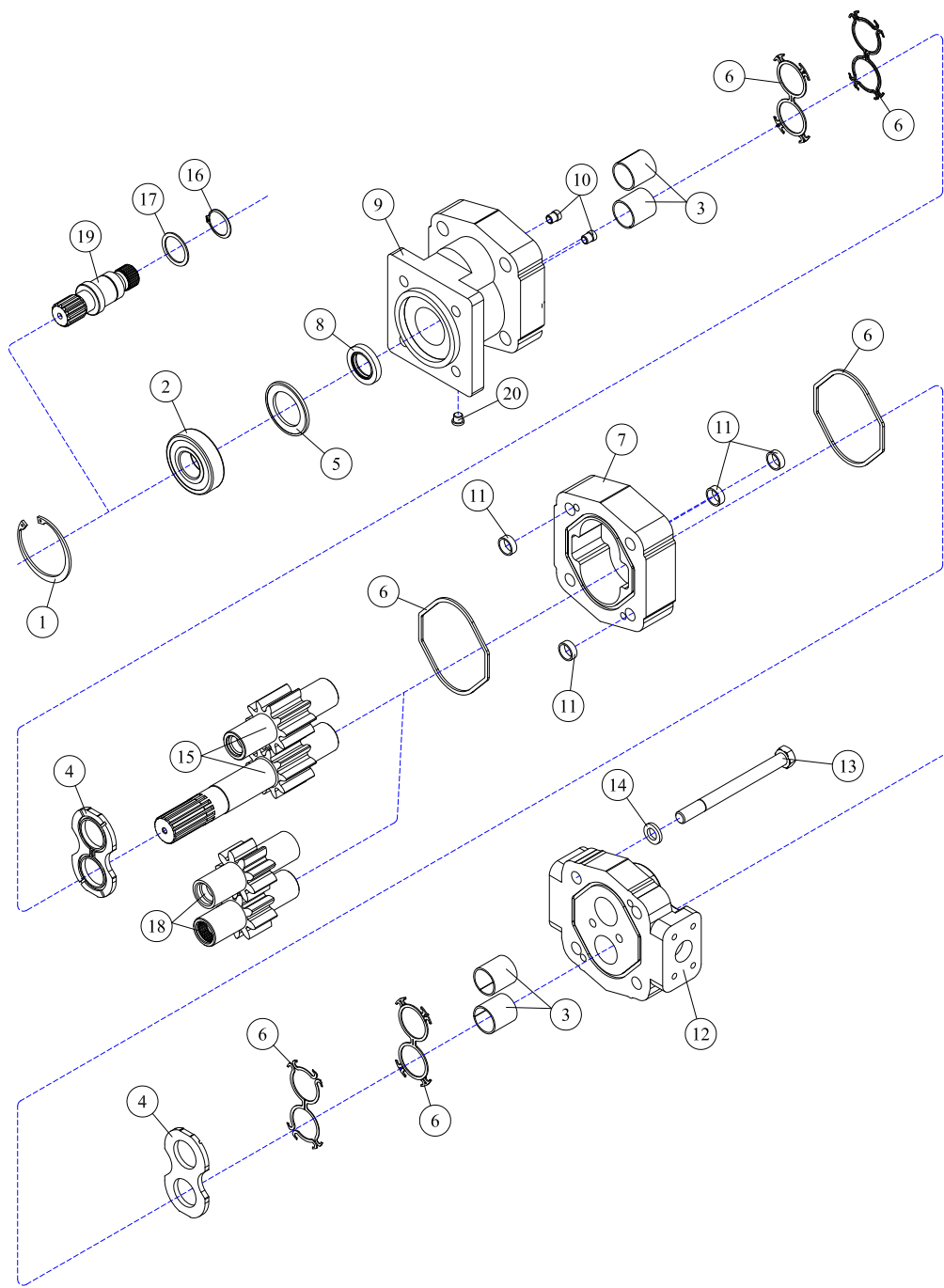


| REF# | PARTS DESCRIPTION                   | REQ   | PART #  |
|------|-------------------------------------|-------|---------|
| 1    | SNAP RING                           | 1     | 30-1009 |
| 2    | OUTBOARD BEARING                    | 1     | 30-1010 |
| 3    | BUSHING                             | 4     | 30-1011 |
| 4    | THRUST PLATE                        | 2     | 30-1012 |
| 5    | SEAL RETAINER                       | 1     | 30-1017 |
| 6    | M365 SEAL KIT                       | Avail | 30-1021 |
| 7    | 2-1/2" M365 GEAR HOUSING            | 1     | 30-1137 |
| 8    | <b>SHAFT SEAL</b>                   |       |         |
|      | 150 PSI (included in M365 seal kit) | 1     | 30-1210 |
|      | 500 PSI                             | 1     | 30-1156 |
| 9    | SHAFT END COVER                     | 1     | 30-1086 |
| 10   | CHECK ASSEMBLY                      | 2     | 30-1087 |
| 11   | ALIGNMENT BUSHING                   | 4     | 30-1090 |

| REF# | PARTS DESCRIPTION                | REQ   | PART #  |
|------|----------------------------------|-------|---------|
| 12   | PORT END COVER                   | 1     | 30-1091 |
| 13   | STUD                             | 4     | 30-1334 |
| 14   | WASHER                           | 4     | 30-1093 |
|      | <b>GEAR SET OPTION A:</b>        |       |         |
| 15   | 2-1/2" GEAR SET                  | 1     | 30-1170 |
|      | <b>GEAR SET OPTION B:</b>        |       |         |
| 16   | RETAINING RING                   | 1     | 30-1019 |
| 17   | WASHER                           | 1     | 30-1020 |
| 18   | 2-1/2" GEAR SET                  | 1     | 30-1136 |
| 19   | CONTINENTAL SHAFT, SPLINED       | 1     | 30-1144 |
| 20   | PLUG                             | 1     | 30-1096 |
| *    | SEAL APPLICATOR TOOL (not shown) | Avail | 30-1048 |

DECK ASSEMBLIES

MOTOR ASSEMBLY - 30-0520

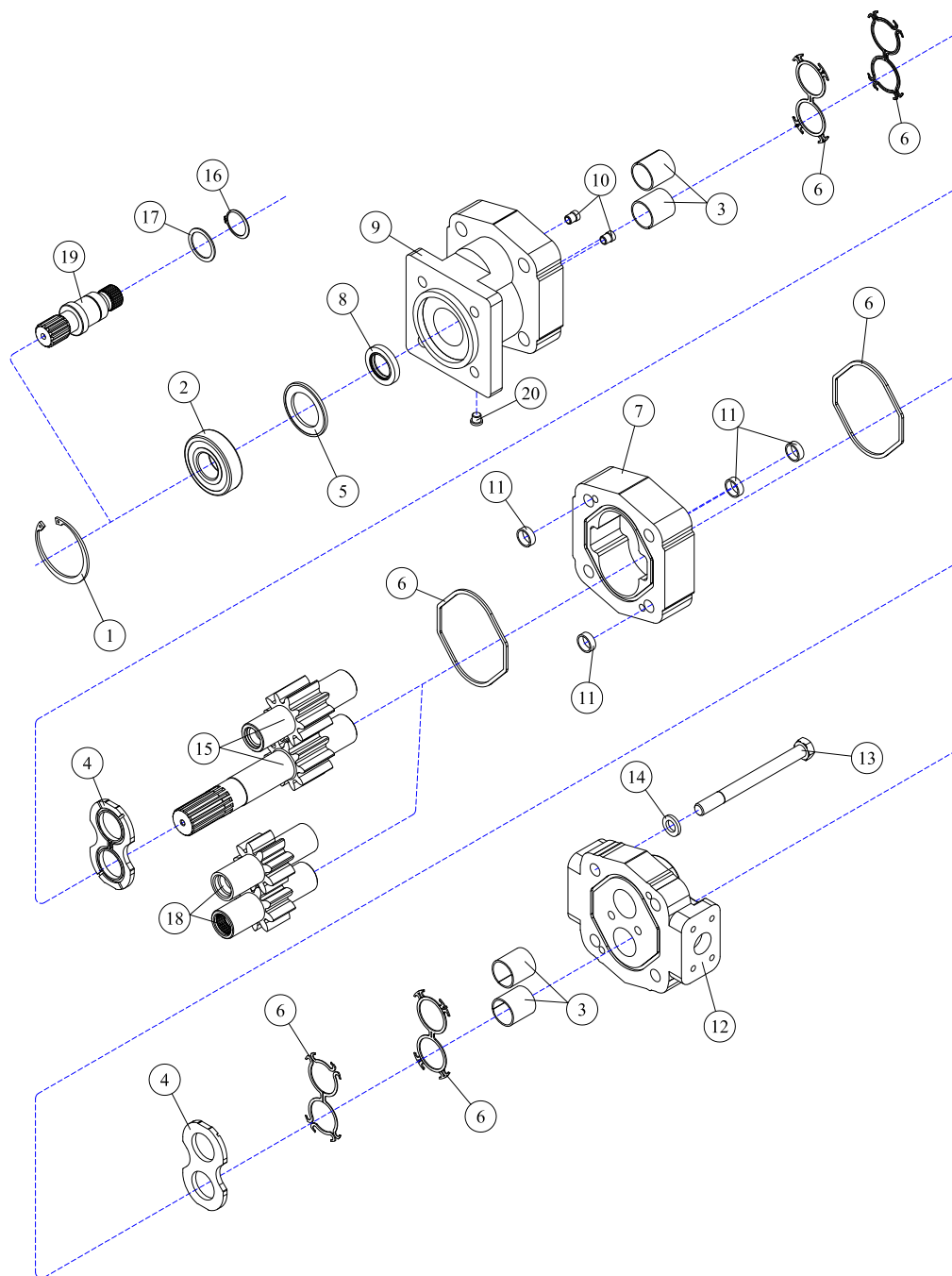


| REF# | PARTS DESCRIPTION                   | REQ   | PART #  |
|------|-------------------------------------|-------|---------|
| 1    | SNAP RING                           | 1     | 30-1009 |
| 2    | OUTBOARD BEARING                    | 1     | 30-1010 |
| 3    | BUSHING                             | 4     | 30-1011 |
| 4    | THRUST PLATE                        | 2     | 30-1012 |
| 5    | SEAL RETAINER                       | 1     | 30-1017 |
| 6    | M365 SEAL KIT                       | Avail | 30-1021 |
| 7    | GEAR HOUSING                        | 1     | 30-1015 |
| 8    | <b>SHAFT SEAL</b>                   |       |         |
|      | 150 PSI (included in M365 seal kit) | 1     | 30-1210 |
|      | 500 PSI                             | 1     | 30-1156 |
| 9    | SHAFT END COVER                     | 1     | 30-1086 |
| 10   | CHECK ASSEMBLY                      | 2     | 30-1087 |
| 11   | ALIGNMENT BUSHING                   | 4     | 30-1090 |

| REF# | PARTS DESCRIPTION                | REQ   | PART #  |
|------|----------------------------------|-------|---------|
| 12   | PORT END COVER                   | 1     | 30-1091 |
| 13   | STUD                             | 4     | 30-1092 |
| 14   | WASHER                           | 4     | 30-1093 |
|      | <b>GEAR SET OPTION A:</b>        |       |         |
| 15   | 1-3/4" GEAR SET                  | 1     | 30-1166 |
|      | <b>GEAR SET OPTION B:</b>        |       |         |
| 16   | RETAINING RING                   | 1     | 30-1019 |
| 17   | WASHER                           | 1     | 30-1020 |
| 18   | 1-3/4" GEAR SET                  | 1     | 30-1013 |
| 19   | CONTINENTAL SHAFT, SPLINED       | 1     | 30-1144 |
| 20   | PLUG                             | 1     | 30-1096 |
| *    | SEAL APPLICATOR TOOL (not shown) | Avail | 30-1048 |

# DECK ASSEMBLIES

## MOTOR ASSEMBLY - 30-0524



| REF# | PARTS DESCRIPTION                   | REQ   | PART #  |
|------|-------------------------------------|-------|---------|
| 1    | SNAP RING                           | 1     | 30-1009 |
| 2    | OUTBOARD BEARING                    | 1     | 30-1010 |
| 3    | BUSHING                             | 4     | 30-1011 |
| 4    | THRUST PLATE                        | 2     | 30-1012 |
| 5    | SEAL RETAINER                       | 1     | 30-1017 |
| 6    | M365 SEAL KIT                       | Avail | 30-1021 |
| 7    | 2-1/4" M365 GEAR HOUSING            | 1     | 30-1026 |
| 8    | <b>SHAFT SEAL</b>                   |       |         |
|      | 150 PSI (included in M365 seal kit) | 1     | 30-1210 |
|      | 500 PSI                             | 1     | 30-1156 |
| 9    | SHAFT END COVER                     | 1     | 30-1086 |
| 10   | CHECK ASSEMBLY                      | 2     | 30-1087 |
| 11   | ALIGNMENT BUSHING                   | 4     | 30-1090 |

| REF# | PARTS DESCRIPTION                | REQ   | PART #  |
|------|----------------------------------|-------|---------|
| 12   | PORT END COVER                   | 1     | 30-1091 |
| 13   | STUD                             | 4     | Call    |
| 14   | WASHER                           | 4     | 30-1093 |
|      | <b>GEAR SET OPTION A:</b>        |       |         |
| 15   | 2-1/4" GEAR SET                  | 1     | 30-1165 |
|      | <b>GEAR SET OPTION B:</b>        |       |         |
| 16   | RETAINING RING                   | 1     | 30-1019 |
| 17   | WASHER                           | 1     | 30-1020 |
| 18   | 2-1/4" GEAR SET                  | 1     | 30-1025 |
| 19   | CONTINENTAL SHAFT, SPLINED       | 1     | 30-1144 |
| 20   | PLUG                             | 1     | 30-1096 |
| *    | SEAL APPLICATOR TOOL (not shown) | Avail | 30-1048 |

## SPINDLE ASSEMBLY - 35-0088

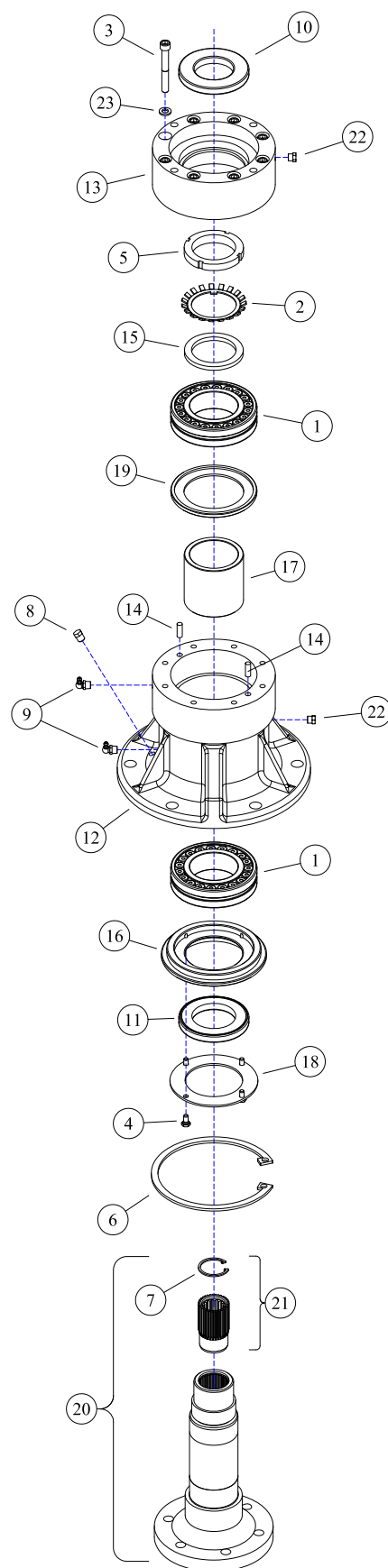
Grease with #2 lithium based grease every 500hrs.  
Use 10 pumps (.44oz) into each of the two grease zerk.

### Warning: Do not overgrease

Overgreasing will cause damage or premature failure of the bearings, housing & seals.

| REF# | PARTS DESCRIPTION                | REQ | PART #  |
|------|----------------------------------|-----|---------|
| 1    | BEARING                          | 2   | 10-0055 |
| 2    | LOCKING WASHER                   | 1   | 11-0048 |
| 3    | 3/8 X 2-3/4 NC SKT HEAD CAPSCREW | 8   | 11-0703 |
| 4    | 1/4 X 1/2 NC CAPSCREW            | 4   | 11-0741 |
| 5    | 2-1/2 SPANNER NUT                | 1   | 11-1037 |
| 6    | LARGE SNAP RING                  | 1   | 11-2021 |
| 7    | SMALL SNAP RING                  | 1   | 11-2022 |
| 8    | PIPE PLUG                        | 1   | 21-1136 |
| 9    | 1/8 X 90 GREASE ZERK             | 2   | 23-0005 |
| 10   | UPPER SEAL                       | 1   | 33-0035 |
| 11   | LOWER SEAL                       | 1   | 33-0057 |
| 12   | SPINDLE HOUSING                  | 1   | 35-0021 |
| 13   | SEAL/MOTOR MOUNT                 | 1   | 35-0022 |
| 14   | ALIGNMENT PIN                    | 2   | 35-0032 |
| 15   | SPACER                           | 1   | 35-0050 |
| 16   | BOTTOM SEAL PLATE                | 1   | 35-0063 |
| 17   | SPACER                           | 1   | 35-0064 |
| 18   | BOTTOM PLATE                     | 1   | 35-0065 |
| 19   | GREASE CATCH                     | 1   | 35-0066 |
| 20   | SPINDLE SHAFT COMPLETE           | 1   | 35-0090 |
| *21  | SPLINED INSERT KIT               | 1   | 35-0091 |
| 22   | BREATHER                         | 2   | 80-1016 |
| 23   | 3/8 LOCK WASHER GR 5             | 8   | 11-0005 |

\* The splined insert kit includes the insert removal tool 11-0913.





# APPENDIX

## O-RINGS - S.A.E.

### ORING (AS568) BOSS FITTINGS [KIT PART# 33-0122] SAE SIZES

| STANDARD<br>ORING<br>PART # | HYDRAULIC<br>SIZE | ORING ID<br>SAE<br>(IN) | ORING WIDTH<br>SAE<br>(IN) | ORING MATERIAL       |
|-----------------------------|-------------------|-------------------------|----------------------------|----------------------|
| 902                         | -2                | 0.24                    | 0.06                       | 90-durometer Nitrile |
| 903                         | -3                | 0.30                    | 0.06                       | 90-durometer Nitrile |
| 904                         | -4                | 0.35                    | 0.07                       | 90-durometer Nitrile |
| 905                         | -5                | 0.41                    | 0.07                       | 90-durometer Nitrile |
| 906                         | -6                | 0.47                    | 0.08                       | 90-durometer Nitrile |
| 908                         | -8                | 0.64                    | 0.09                       | 90-durometer Nitrile |
| 910                         | -10               | 0.76                    | 0.1                        | 90-durometer Nitrile |
| 912                         | -12               | 0.92                    | 0.12                       | 90-durometer Nitrile |
| 914                         | -14               | 1.05                    | 0.12                       | 90-durometer Nitrile |
| 916                         | -16               | 1.17                    | 0.12                       | 90-durometer Nitrile |
| 920                         | -20               | 1.48                    | 0.12                       | 90-durometer Nitrile |
| 924                         | -24               | 1.72                    | 0.12                       | 90-durometer Nitrile |
| 932                         | -32               | 2.34                    | 0.12                       | 90-durometer Nitrile |

### ORING (AS568) FLAT SEAL FITTINGS [KIT PART# 33-0123] SAE SIZES & METRIC SIZES

| STANDARD<br>ORING<br>PART # | HYDRAULIC<br>SIZE | END SIZE    |                | ORING ID    |                | ORING WIDTH |                | ORING MATERIAL       |
|-----------------------------|-------------------|-------------|----------------|-------------|----------------|-------------|----------------|----------------------|
|                             |                   | SAE<br>(IN) | METRIC<br>(MM) | SAE<br>(IN) | METRIC<br>(MM) | SAE<br>(IN) | METRIC<br>(MM) |                      |
| 011                         | -4                | 1/4         | 6              | 0.30        | 7.70           | 0.07        | 1.78           | 90-durometer Nitrile |
| 012                         | -6                | 3/8         | 8, 10          | 0.36        | 9.30           | 0.07        | 1.78           | 90-durometer Nitrile |
| 014                         | -8                | 1/2         | 12             | 0.49        | 12.40          | 0.07        | 1.78           | 90-durometer Nitrile |
| 016                         | -10               | 5/8         | 14, 15, 16     | 0.61        | 15.60          | 0.07        | 1.78           | 90-durometer Nitrile |
| 018                         | -12               | 3/4         | 18, 20         | 0.74        | 18.80          | 0.07        | 1.78           | 90-durometer Nitrile |
| 020                         | -14               | 7/8         | 22             | 0.86        | 21.80          | 0.07        | 1.78           | 90-durometer Nitrile |
| 021                         | -16               | 1           | 25             | 0.93        | 23.50          | 0.07        | 1.78           | 90-durometer Nitrile |
| 025                         | -20               | 1 1/4       | 28, 30, 32     | 1.18        | 29.90          | 0.07        | 1.78           | 90-durometer Nitrile |
| 029                         | -24               | 1 1/2       | 35, 38         | 1.49        | 37.80          | 0.07        | 1.78           | 90-durometer Nitrile |
| 135                         | -32               | 2           | 50             | 1.93        | 49.00          | 0.10        | 2.54           | 90-durometer Nitrile |

## S.A.E. TORQUE SPECIFICATIONS

| Nominal<br>Dia.              | threads<br>per<br>inch | Tensile<br>Stress<br>Area |  | ASTM A307 Grade A |           |           |  | SAE J429 Grade 5  |           |            |  | SAE J429 Grade 8  |            |            |  | FNL Grade 9       |            |            |
|------------------------------|------------------------|---------------------------|-----------------------------------------------------------------------------------|-------------------|-----------|-----------|-----------------------------------------------------------------------------------|-------------------|-----------|------------|-----------------------------------------------------------------------------------|-------------------|------------|------------|-------------------------------------------------------------------------------------|-------------------|------------|------------|
|                              |                        |                           | Clamp<br>Load<br>(Lbs.)                                                           | Tightening Torque |           |           | Clamp<br>Load<br>(Lbs.)                                                           | Tightening Torque |           |            | Clamp<br>Load<br>(Lbs.)                                                           | Tightening Torque |            |            | Clamp<br>Load<br>(Lbs.)                                                             | Tightening Torque |            |            |
|                              |                        |                           |                                                                                   | K = 0.15          | K = 0.17  | K = 0.20  |                                                                                   | K = 0.15          | K = 0.17  | K = 0.20   |                                                                                   | K = 0.15          | K = 0.17   | K = 0.20   |                                                                                     | K = 0.15          | K = 0.17   | K = 0.20   |
| (in.)                        |                        | (sq. in.)                 | (Lbs.)                                                                            |                   |           |           | (Lbs.)                                                                            |                   |           |            | (Lbs.)                                                                            |                   |            |            | (Lbs.)                                                                              |                   |            |            |
| Unified Coarse Thread Series |                        |                           |                                                                                   |                   |           |           |                                                                                   |                   |           |            |                                                                                   |                   |            |            |                                                                                     |                   |            |            |
| 1/4                          | 20                     | 0.0318                    | 859                                                                               | 32 in-lbs         | 37 in-lbs | 43 in-lbs | 2029                                                                              | 76 in-lbs         | 86 in-lbs | 101 in-lbs | 2864                                                                              | 107 in-lbs        | 122 in-lbs | 143 in-lbs | 3357                                                                                | 126 in-lbs        | 143 in-lbs | 168 in-lbs |
| 5/16                         | 18                     | 0.0524                    | 1416                                                                              | 66                | 75        | 88        | 3342                                                                              | 157               | 178       | 209        | 4719                                                                              | 221               | 251        | 295        | 5531                                                                                | 259               | 294        | 346        |
| 3/8                          | 16                     | 0.0775                    | 2092                                                                              | 10 ft-lbs         | 11 ft-lbs | 13 ft-lbs | 4940                                                                              | 23 ft-lbs         | 26 ft-lbs | 31 ft-lbs  | 6974                                                                              | 33 ft-lbs         | 37 ft-lbs  | 44 ft-lbs  | 8174                                                                                | 38 ft-lbs         | 43 ft-lbs  | 51 ft-lbs  |
| 7/16                         | 14                     | 0.1063                    | 2870                                                                              | 16                | 18        | 21        | 6777                                                                              | 37                | 42        | 49         | 9568                                                                              | 52                | 59         | 70         | 11214                                                                               | 61                | 70         | 82         |
| 1/2                          | 13                     | 0.1419                    | 3831                                                                              | 24                | 27        | 32        | 9046                                                                              | 57                | 64        | 75         | 12771                                                                             | 80                | 90         | 106        | 14969                                                                               | 94                | 106        | 125        |
| 9/16                         | 12                     | 0.1819                    | 4912                                                                              | 35                | 39        | 46        | 11599                                                                             | 82                | 92        | 109        | 16375                                                                             | 115               | 130        | 154        | 19193                                                                               | 135               | 153        | 180        |
| 5/8                          | 11                     | 0.2260                    | 6102                                                                              | 48                | 54        | 64        | 14408                                                                             | 113               | 128       | 150        | 20340                                                                             | 159               | 180        | 212        | 23840                                                                               | 186               | 211        | 248        |
| 3/4                          | 10                     | 0.3345                    | 9030                                                                              | 85                | 96        | 113       | 21322                                                                             | 200               | 227       | 267        | 30101                                                                             | 282               | 320        | 376        | 35281                                                                               | 331               | 375        | 441        |
| 7/8                          | 9                      | 0.4617                    | 12467                                                                             | 136               | 155       | 182       | 29436                                                                             | 322               | 365       | 429        | 41556                                                                             | 455               | 515        | 606        | 48707                                                                               | 533               | 604        | 710        |
| 1                            | 8                      | 0.6057                    | 16355                                                                             | 204               | 232       | 273       | 38616                                                                             | 483               | 547       | 644        | 54517                                                                             | 681               | 772        | 909        | 63899                                                                               | 799               | 905        | 1065       |
| 1 1/4                        | 7                      | 0.9691                    | 26166                                                                             | 409               | 463       | 545       | 53786                                                                             | 840               | 952       | 1121       | 87220                                                                             | 1363              | 1545       | 1817       | 102229                                                                              | 1597              | 1810       | 2130       |
| 1 1/2                        | 6                      | 1.4053                    | 37942                                                                             | 711               | 806       | 949       | 77991                                                                             | 1462              | 1657      | 1950       | 126473                                                                            | 2371              | 2688       | 3162       | 148237                                                                              | 2779              | 3150       | 3706       |
| Fine Thread Series           |                        |                           |                                                                                   |                   |           |           |                                                                                   |                   |           |            |                                                                                   |                   |            |            |                                                                                     |                   |            |            |
| 1/4                          | 28                     | 0.0364                    | 982                                                                               | 37 in-lbs         | 42 in-lbs | 49 in-lbs | 2319                                                                              | 87 in-lbs         | 99 in-lbs | 116 in-lbs | 3274                                                                              | 123 in-lbs        | 139 in-lbs | 164 in-lbs | 3837                                                                                | 144 in-lbs        | 163 in-lbs | 192 in-lbs |
| 5/16                         | 24                     | 0.0581                    | 1568                                                                              | 73                | 83        | 98        | 3702                                                                              | 174               | 197       | 231        | 5226                                                                              | 245               | 278        | 327        | 6125                                                                                | 287               | 325        | 383        |
| 3/8                          | 24                     | 0.0878                    | 2371                                                                              | 11 ft-lbs         | 13 ft-lbs | 15 ft-lbs | 5599                                                                              | 26 ft-lbs         | 30 ft-lbs | 35 ft-lbs  | 7905                                                                              | 37 ft-lbs         | 42 ft-lbs  | 49 ft-lbs  | 9265                                                                                | 43 ft-lbs         | 49 ft-lbs  | 58 ft-lbs  |
| 7/16                         | 20                     | 0.1187                    | 3205                                                                              | 18                | 20        | 23        | 7568                                                                              | 41                | 47        | 55         | 10684                                                                             | 58                | 66         | 78         | 12523                                                                               | 68                | 78         | 91         |
| 1/2                          | 20                     | 0.1600                    | 4319                                                                              | 27                | 31        | 36        | 10197                                                                             | 64                | 72        | 85         | 14396                                                                             | 90                | 102        | 120        | 16873                                                                               | 105               | 120        | 141        |
| 9/16                         | 18                     | 0.2030                    | 5480                                                                              | 39                | 44        | 51        | 12940                                                                             | 91                | 103       | 121        | 18268                                                                             | 128               | 146        | 171        | 21412                                                                               | 151               | 171        | 201        |
| 5/8                          | 18                     | 0.2560                    | 6911                                                                              | 54                | 61        | 72        | 16317                                                                             | 127               | 144       | 170        | 23036                                                                             | 180               | 204        | 240        | 27000                                                                               | 211               | 239        | 281        |
| 3/4                          | 16                     | 0.3730                    | 10070                                                                             | 94                | 107       | 126       | 23776                                                                             | 223               | 253       | 297        | 33566                                                                             | 315               | 357        | 420        | 39343                                                                               | 369               | 418        | 492        |
| 7/8                          | 14                     | 0.5095                    | 13756                                                                             | 150               | 171       | 201       | 32479                                                                             | 355               | 403       | 474        | 45853                                                                             | 502               | 568        | 669        | 53743                                                                               | 588               | 666        | 784        |
| 1                            | 14                     | 0.6799                    | 18357                                                                             | 229               | 260       | 306       | 43343                                                                             | 542               | 614       | 722        | 61190                                                                             | 765               | 867        | 1020       | 71720                                                                               | 896               | 1016       | 1195       |
| 1 1/4                        | 12                     | 1.0729                    | 28970                                                                             | 453               | 513       | 604       | 59548                                                                             | 930               | 1055      | 1241       | 96565                                                                             | 1509              | 1710       | 2012       | 113182                                                                              | 1768              | 2004       | 2358       |
| 1 1/2                        | 12                     | 1.5810                    | 42688                                                                             | 800               | 907       | 1067      | 87747                                                                             | 1645              | 1865      | 2194       | 142292                                                                            | 2668              | 3024       | 3557       | 166778                                                                              | 3127              | 3544       | 4169       |

The torque values can only be achieved if nut (or tapped hole) has a proof load greater than or equal to the bolt's minimum ultimate tensile strength.

Clamp load calculated as 75% of the proof load when specified by the standard. ASTM A307 utilized 75% of 36,000 PSI.

Torque values for 1/4 and 5/16-in series are in inch-pounds. All other torque values are in foot-pounds.

Torque values calculated from formula  $T = KDF$ , where

$K = 0.15$  for "lubricated" conditions

$K = 0.17$  for zinc plated and dry conditions; we have also found various forms of customer applied thread lockers to have a similar  $K$  value.

$K = 0.20$  for plain and dry conditions

$D$  = Nominal Diameter

$F$  = Clamp Load

**Note: When using Zinc Plated (lubricated with wax) Top Lock Nuts, the  $K$  value can vary between 0.12-0.16**

## METRIC TORQUE SPECIFICATIONS

| Nominal Dia.<br>(mm) | Pitch | 4.6 Class 4.6     |                     |                      |                    | 8.8 Class 8.8     |                     |                      |                    | 10.9 Class 10.9   |                     |                      |                    | 12.9 Class 12.9   |                     |                      |                    |
|----------------------|-------|-------------------|---------------------|----------------------|--------------------|-------------------|---------------------|----------------------|--------------------|-------------------|---------------------|----------------------|--------------------|-------------------|---------------------|----------------------|--------------------|
|                      |       | Tightening Torque |                     |                      |                    | Tightening Torque |                     |                      |                    | Tightening Torque |                     |                      |                    | Tightening Torque |                     |                      |                    |
|                      |       | Clamp Load (lbs)  | Lubricated (ft-lbs) | Zinc Plated (ft-lbs) | Plain&Dry (ft-lbs) | Clamp Load (lbs)  | Lubricated (ft-lbs) | Zinc Plated (ft-lbs) | Plain&Dry (ft-lbs) | Clamp Load (lbs)  | Lubricated (ft-lbs) | Zinc Plated (ft-lbs) | Plain&Dry (ft-lbs) | Clamp Load (lbs)  | Lubricated (ft-lbs) | As-Received (ft-lbs) | Plain&Dry (ft-lbs) |
| 4                    | 0.7   | 333               | 0.7                 | 0.7                  | 0.9                | 858               | 1.7                 | 1.9                  | 2.3                | 1228              | 2.4                 | 2.7                  | 3.2                | 1436              | 2.8                 | 3.2                  | 3.8                |
| 5                    | 0.8   | 538               | 1.3                 | 1.5                  | 1.8                | 1387              | 3.4                 | 3.9                  | 4.5                | 1985              | 4.9                 | 5.5                  | 6.5                | 2319              | 5.7                 | 6.5                  | 7.6                |
| 6                    | 1     | 763               | 2.3                 | 2.6                  | 3.0                | 1968              | 5.8                 | 6.6                  | 7.7                | 2816              | 8.3                 | 9.4                  | 11.1               | 3291              | 9.7                 | 11.0                 | 13.0               |
| 7                    | 1     | 1095              | 3.8                 | 4.3                  | 5.0                | 2822              | 9.7                 | 11.0                 | 13.0               | 4039              | 13.9                | 15.8                 | 18.5               | 4720              | 16.3                | 18.4                 | 21.7               |
| 8                    | 1.25  | 1389              | 5.5                 | 6.2                  | 7.3                | 3580              | 14.1                | 16.0                 | 18.8               | 5123              | 20.2                | 22.9                 | 26.9               | 5987              | 23.6                | 26.7                 | 31.4               |
| 10                   | 1.5   | 2200              | 10.8                | 12.3                 | 14.4               | 5671              | 27.9                | 31.6                 | 37.2               | 8115              | 39.9                | 45.2                 | 53.2               | 9484              | 46.7                | 52.9                 | 62.2               |
| 12                   | 1.75  | 3197              | 18.9                | 21.4                 | 25.2               | 8240              | 48.7                | 55.1                 | 64.9               | 11792             | 69.6                | 78.9                 | 92.8               | 13781             | 81.4                | 92.2                 | 108.5              |
| 14                   | 2     | 4379              | 30.2                | 34.2                 | 40.2               | 11289             | 77.8                | 88.1                 | 103.7              | 16154             | 111.3               | 126.1                | 148.4              | 18879             | 130.0               | 147.4                | 173.4              |
| 16                   | 2     | 5943              | 47                  | 53                   | 62                 | 15320             | 121                 | 137                  | 161                | 21924             | 173                 | 196                  | 230                | 25622             | 202                 | 229                  | 269                |
| 18                   | 2.5   | 7301              | 65                  | 73                   | 86                 | 18822             | 167                 | 189                  | 222                | 26934             | 239                 | 270                  | 318                | 31477             | 279                 | 316                  | 372                |
| 20                   | 2.5   | 9286              | 91                  | 104                  | 122                | 23938             | 236                 | 267                  | 314                | 34256             | 337                 | 382                  | 449                | 40034             | 394                 | 446                  | 525                |
| 22                   | 2.5   | 11509             | 125                 | 141                  | 166                | 29669             | 321                 | 364                  | 428                | 42457             | 460                 | 521                  | 613                | 49619             | 537                 | 609                  | 716                |
| 24                   | 3     | 13372             | 158                 | 179                  | 211                | 34471             | 407                 | 461                  | 543                | 49329             | 582                 | 660                  | 777                | 57649             | 681                 | 771                  | 908                |
| 27                   | 3     | 17428             | 232                 | 262                  | 309                | 44924             | 597                 | 676                  | 796                | 64288             | 854                 | 968                  | 1139               | 75132             | 998                 | 1131                 | 1331               |
| 30                   | 3.5   | 21266             | 314                 | 356                  | 419                | 54819             | 809                 | 917                  | 1079               | 78448             | 1158                | 1312                 | 1544               | 91680             | 1353                | 1534                 | 1804               |
| 33                   | 3.5   | 26310             | 427                 | 484                  | 570                | 67821             | 1101                | 1248                 | 1468               | 97055             | 1576                | 1786                 | 2101               | 113425            | 1842                | 2087                 | 2455               |
| 36                   | 4     | 30982             | 549                 | 622                  | 732                | 79866             | 1415                | 1603                 | 1886               | 114291            | 2024                | 2294                 | 2699               | 133569            | 2366                | 2681                 | 3154               |

The torque values can only be achieved if nut (or tapped hole) has a proof load greater than or equal to the bolt's minimum ultimate tensile strength.

Clamp loads estimated as 75% of proof load for specified bolts.

Torque values listed in foot-pounds.

Torque values calculated from formula  $T = KDF$  where;  $K = 0.15$  for "lubricated" condition,  $K = 0.17$  for zinc plated and dry condition (or as-received for the 12.9),  $K = 0.20$  for plain and dry condition

**DEMAND  
BRILLIANCE**