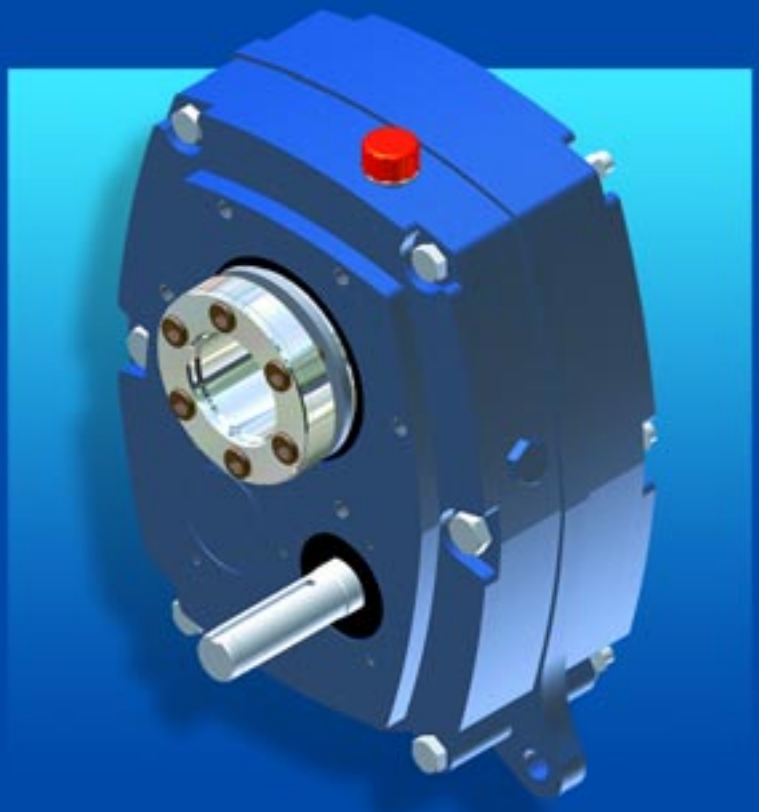
# HSM

## Shaft Mounted Speed Reducer and CEMA Screw Conveyer Drive

featuring Keyless Taper-Grip® Bushing

HSM Shaft Mounted Speed Reducer



SUMITOMO
MACHINERY CORPORATION OF AMERICA

# HSM Shaft Mounted Speed Reducer and CEMA Screw Conveyor Drive

**Keyless Taper-Grip® Bushing**
supplied as standard in popular AGMA bore sizes and in metric. Optional keyed hollow bore is also available.


**Breather Plug**
With integral sealing washer and built-in non-return valve.

**Tapered Roller Bearings**
Supplied as standard.

**Gears**
Helical, Involute form, alloy steels, gas carburized and hardened, shaved and honed (profile ground on selected sizes) insuring low noise emission. The hunting tooth principle adopted to insure maximum working life.

**Shafts**
Machined from alloy steels and precision ground on journals, gear seatings and extensions. Tolerances and keyways conform to international standards.

**Additional Case Lugs**
Eliminate the need for critical tightening of torque arm bolts. Control position of standard torque arm mounting to within recommended limits.

**Rubberized End Caps**
Self-sealing intermediate cover plates, to standard ISO housing dimensions.

**Drain Plugs**
With integral sealing washer.

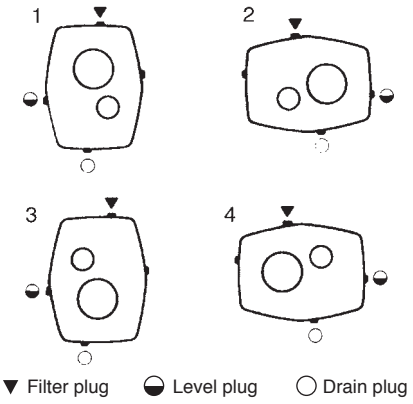
**Backstops (anti-run back device)**
available on all units as an add-on option.

# Lubrication

HSM Shaft Mount Speed Reducers are shipped **without oil**. Before running they should be filled with an appropriate amount of the correct lubricant as shown in the tables.

**Table 4. Approximate Oil Quantity (gallons) Required for Mounting Positions**

| Unit Size | Approximate Capacity (gallons) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ratio = 5:1 | | | | Ratio = 14:1, 20:1 and 25:1 | | | |
| | Mounting Position | | | | Mounting Position | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 107C | 0.13 | 0.13 | 0.13 | 0.16 | 0.11 | 0.16 | 0.13 | 0.16 |
| 115D | 0.21 | 0.24 | 0.21 | 0.26 | 0.18 | 0.24 | 0.21 | 0.24 |
| 203E | 0.32 | 0.45 | 0.37 | 0.48 | 0.26 | 0.48 | 0.37 | 0.42 |
| 207F | 0.66 | 0.69 | 0.63 | 0.66 | 0.61 | 0.69 | 0.63 | 0.58 |
| 215G | 0.87 | 0.85 | 0.85 | 0.87 | 0.79 | 0.85 | 0.85 | 0.85 |
| 307H | 1.08 | 1.40 | 1.08 | 1.53 | 1.00 | 1.45 | 1.11 | 1.35 |
| 315J | 1.51 | 2.27 | 1.56 | 2.27 | 1.43 | 2.25 | 1.56 | 2.19 |
| 407S | 2.88 | 4.86 | 3.59 | 4.86 | 2.40 | 4.33 | 3.33 | 4.07 |
| 415K | 4.02 | 5.73 | 6.66 | 5.47 | 3.36 | 5.73 | 4.15 | 5.07 |
| 507L | – | – | – | – | 5.94 | 9.11 | 13.7 | 7.13 |
| 608M | – | – | – | – | 9.51 | 13.2 | 20.9 | 11.9 |




Units are fitted with filter, level and drain plugs generally in the position shown.

## Recommended Lubricants

**Table 5. Mineral Oil**

| | Ambient Temp. °F | 5:1 RATIO REDUCERS | | | | 14, 20 & 25:1 RATIO REDUCERS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0-100 RPM | 101-200 RPM | 201-400 RPM | | 0-20 RPM | 21-50 RPM | | 51-120 RPM | | 0-50 RPM | 51-80 RPM |
| | | 107C-407S | 107C-407S | 107C | 115D-407S | 107C-407S | 107C-115D | 203E-407S | 107C-115D | 203E-407S | 415K-608M | |
| I.S.O. Viscosity Grade | 14 to 40 | 100 | 100 | 100 | 68 | 150 | 150 | 150 | 100 | 100 | 100 | 100 |
| | 41 to 80 | 460 | 320 | 320 | 220 | 680 | 680 | 460 | 460 | 320 | 320 | 220 |
| | 81 to 105 | 800 | 680 | 680 | 460 | 800 | 800 | 800 | 680 | 460 | 460 | 320 |

**Table 6. Manufacturers and Types**

| | | | | | |
|---|---|---|---|---|---|
| BP ENERGOL GR-XP | CASTROL ALPHAZN ORSP | MOBIL MOBILGEAR & SHC | SHELL OMALA | TEXACO MEROPA | EXXON SPARTAN |

**Note:** Do not use E.P. mineral oils other than those recommended when using a backstop.

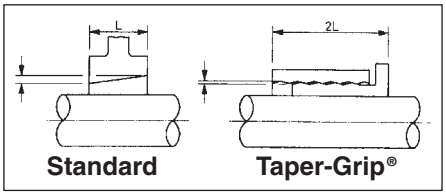
# Taper-Grip Bushing®

**Table 1. Taper-Grip® Bushing Screw Torques**

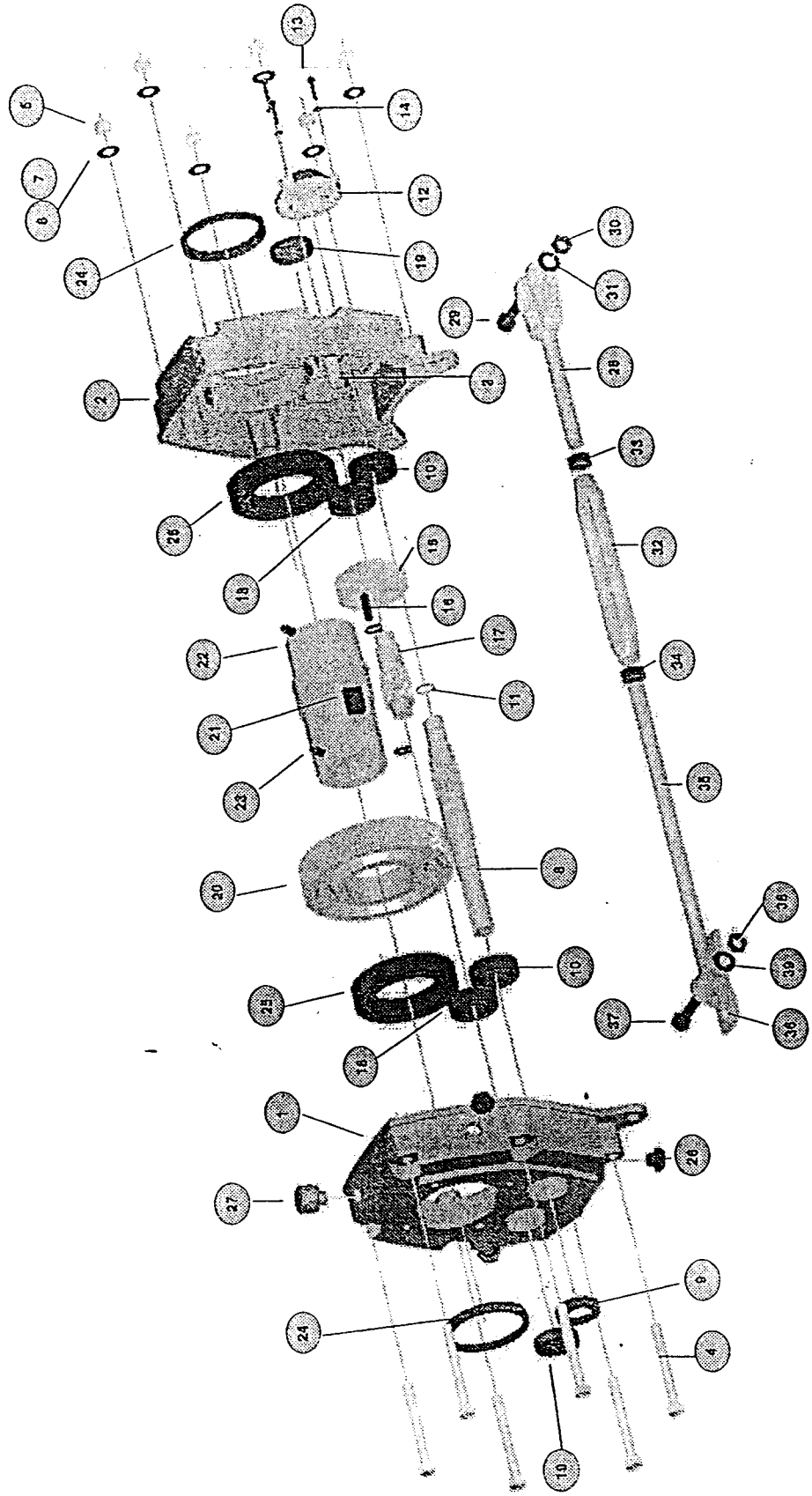
| SM-Shaft Mount Size | Original Taper-Grip® Bushing Screw Torque | | New STEEL Taper-Grip® Bushing Screw Torque | |
|---|---|---|---|---|
| | Nm | lb. ft. | Nm | lb. ft. |
| 107C | 31 | 23 | 50 | 37 |
| 115D | 31 | 23 | 55 | 41 |
| 203E | 51 | 37.5 | 75 | 56 |
| 207F | 51 | 37.5 | 140 | 104 |
| 215G | 128 | 94 | 250 | 185 |
| 307H | 245 | 180 | 300 | 223 |
| 315J | 245 | 180 | 300 | 223 |
| 407S | 245 | 180 | 300 | 223 |
| 415K | 245 | 180 | 250 | 185 |
| 507L | 245 | 180 | 250 | 185 |
| 608M | 245 | 180 | 250 | 185 |

**Table 2. Shaft Tolerances**

| Shaft Dia. | Tolerance |
|---|---|
| 3/4 - 1 1/8 | +0 -.005″ |
| 1 3/16 - 2 | +0 -.006″ |
| 2 1/16 - 3 1/8 | +0 -.007″ |
| 3 3/16 - 4 3/4 | +0 -.008″ |
| 4 13/16 - 6 1/2 | +0 -.009″ |



# PARTS IDENTIFICATION SIZES 107 ~ 207



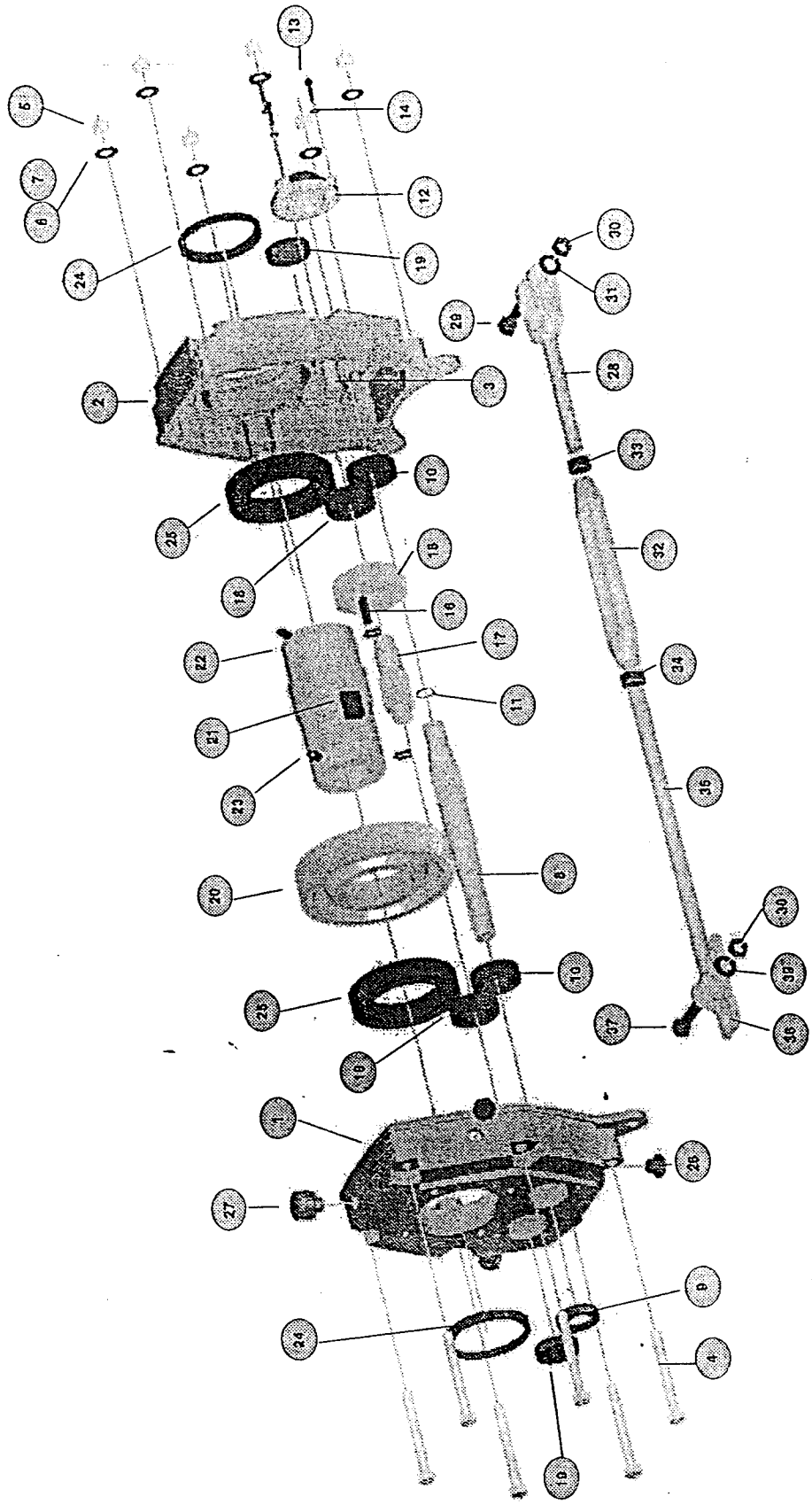
# INDIVIDUAL PART NUMBERS

## Sizes 107 ~ 207

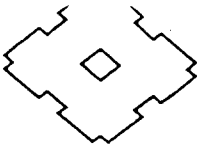
| Part Ident | Description | | No. Req | 107 | 115 | 203 | 207 |
|---|---|---|---|---|---|---|---|
| 1 | Case IPS | | 1 | 116BCD6001 | 116CCCC6001 | 116DCC6001 | 116ECC6001 |
| 2 | Case BSS | | 1 | 116BCD6001 | 116CCD6001 | 116DCD6001 | 116ECD6001 |
| 3 | Hollow dowel | | 2 | 016A7004 | 016C7004 | 016C7004 | 016E7004 |
| 4 | Case bolt | | See [1] | 943702 | 943830 | 943835 | 943840 |
| 5 | Case nut | | See [1] | 943810 | 943811 | 943811 | 943812 |
| 6 | Case plain washer | | 4 | 943820 | 943821 | 943821 | 943872 |
| 7 | Case lockwasher | | See [1] | 943870 | 943871 | 943871 | 943872 |
| 8 | Input shaft & pinion (5:1) | metric | 1 | 116BPA6005 | 116CPA6005 | 116DPA6005 | 116EPA6005 |
| | | AGMA | 1 | 116BPB6005 | 116CPB6005 | 116DPB6005 | 116EPB6005 |
| | Input shaft & pinion (13:1) | metric | 1 | 116BPA6013 | 116CPA6013 | 116DPA6013 | 116EPA6013 |
| | | AGMA | 1 | 116BPB6013 | 116CPB6013 | 116DPB6013 | 116EPB6013 |
| | Input shaft & pinion (20:1) | metric | 1 | 116BPA6020 | 116CPA6020 | 116DPA6020 | 116EPA6020 |
| | | AGMA | 1 | 116BPB6020 | 116CPB6020 | 116DPB6020 | 116EPB6020 |
| | Input shaft & pinion (25:1) | metric | 1 | 116BPA6025 | 116CPA6025 | 116DPA6025 | 116EPA6025 |
| | | AGMA | 1 | 116BPB6025 | 116CPB6025 | 116DPB6025 | 116EPB6025 |
| 9 | Input shaft oilseal | | 1 | 946030 | 946031 | 946032 | 946033 |
| 10 | Input shaft bearing | | 2 | 941801 | 941802 | 941803 | 941804 |
| 11 | Input shaft retaining ring | | | | | | |
| | | (20:1) | 1 | 944180 | 944181 | 944196 | - |
| | | (25:1) | | 944180 | - | - | 944196 |
| 12 | Backstop cover | | 1 | 116BED6000 | 116CED6000 | 116DED6000 | 116EED6000 |
| 13 | Backstop cover screw | | 3 | 942571 | 942572 | 942572 | 942601 |
| 14 | Backstop cover lockwasher | | 3 | 943687 | 943687 | 943687 | 943680 |
| 15 | 1st. Reduction gear (13:1) | | 1 | 116BGA6013 | 116CGA6013 | 116DGA6013 | 116EGA6013 |
| | 1st. Reduction gear (20:1) | | 1 | 116BGA6020 | 116CGA6020 | 116DGA6020 | 116EGA6020 |
| | 1st. Reduction gear (25:1) | | 1 | 116BGA6025 | 116CGA6025 | 116DGA6025 | 116EGA6025 |
| 16 | 1st. Reduction gear key | | 1 | 944320 | 944321 | 944321 | 944322 |
| 17 | Intermediate pinion | | 1 | 116BPC6005 | 116CPC6005 | 116DPC6005 | 116EPC6005 |
| 18 | Intermediate bearing | | 2 | 941801 | 941802 | 941803 | 941804 |
| 19 | Intermediate cover | | 2 | 016B7025 | 016C7025 | 016D7025 | 016E7025 |
| 20 | 2nd. Reduction gear | | 1 | 116BGB6005 | 116CGB6005 | 116DGB6005 | 116EGB6005 |
| 21 | 2nd Reduction gear key | | 1 | 944310 | 944311 | 944312 | 944313 |
| 22 | Output hub | | 1 | 116BHB6000 | 116CHB6000 | 116DHB6000 | 116EHB6000 |
| 23 | Output hub screw | | 4 | 942612 | 942706 | 942706 | 942714 |
| 24 | Output hub oilseal | | 2 | 946023 | 946024 | 946025 | 946026 |
| 25 | Output hub bearing | Deep groove | 2 | 941351 | 941352 | 941353 | 941354 |
| | | Taper roller | | 941220 | 941221 | 941211 | 941212 |
| 26 | Pipe plug | | 3 | 942395 | 942395 | 942395 | 942392 |
| 27 | Breather plug | | 1 | 946097 | 946097 | 946097 | 946098 |
| Torque arm components: | | | | | | | |
| 28 | | rod end | 1 | 040M7102 | 040N7102 | 040N7102 | 040A7102 |
| 29 | | rod end bolt | 1 | 943701 | 943756 | 943756 | 943715 |
| 30 | | rod end nut | 1 | 943810 | 943811 | 943811 | 943813 |
| 31 | | rod end lockwasher | 1 | 943681 | 943682 | 943682 | 943684 |
| 32 | | turnbuckle | 1 | 016B7045 | 016D7045 | 016D7045 | 016F7045 |
| 33 | | locknut RH | 1 | 943812 | 943813 | 943813 | 943815 |
| 34 | | locknut LH | 1 | 943790 | 943791 | 943791 | 943792 |
| 35 | | extension | 1 | 016B7043 | 016D7043 | 016D7043 | 016F7043 |
| 36 | | fulcrum | 1 | 016B6046 | 040N6101 | 040N6101 | 016F7046 |
| 37 | | fulcrum bolt | 1 | 943832 | 943843 | 943843 | 943854 |
| 38 | | fulcrum nut | 1 | 943811 | 943812 | 943812 | 943813 |
| 39 | | fulcrum lockwasher | 1 | 943682 | 943683 | 943683 | 943684 |

Note: [1] 6 required sizes 107 to 215, 10 required sizes 307 to 315, 12 required size 407.

# PARTS IDENTIFICATION SIZES 215 ~ 415



# INDIVIDUAL PART NUMBERS

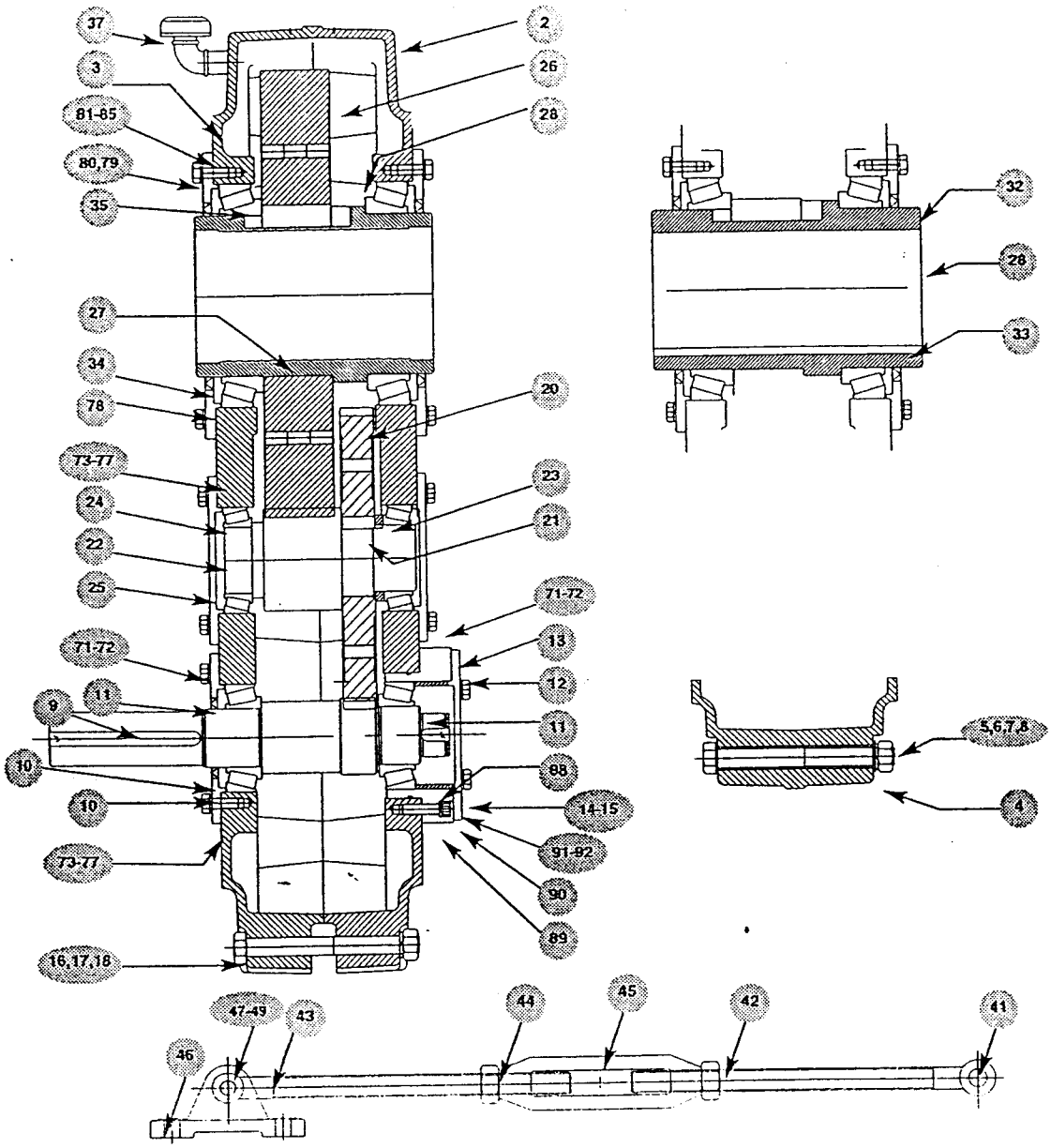


## Sizes 215 ~ 415

| Part Ident | Description | | No. Req | 215 | 307 | 315 | 407 | 415 |
|---|---|---|---|---|---|---|---|---|
| 1 | Case IPS | | 1 | 116FCC6001 | 116GCC6001 | 116HCC6001 | 116JCC6001 | 116SCC6001 |
| 1 | Case IPS | | 1 | 116FCC6001 | 116GCC6001 | 116HCC6001 | 116JCC6001 | 116SCC6001 |
| 2 | Case BSS | | 1 | 116FCD6001 | 116GCD6001 | 116HCD6001 | 116JCD6001 | 116SCD6001 |
| 3 | Hollow dowel | | 2 | 016F7004 | 016F7004 | 016H7004 | 016H7004 | 016K7004 |
| 4 | Case bolt | | See [1] | 943850 | 943851 | 943841 | 943842 | 016S7005 |
| 5 | Case nut | | See [1] | 943813 | 943813 | 943812 | 943812 | 943813 |
| 6 | Case plain washer | | 4 | 943823 | 943823 | 943822 | 943822 | 943823 |
| 7 | Case lockwasher | | See [1] | 943873 | 943873 | 943872 | 943872 | 943873 |
| | Input shaft | metric | 1 | 116FPA6005 | 116GPA6005 | 116HPA6005 | 116JPA6005 | 116SPA6005 |
| | & pinion (5:1) | AGMA | 1 | 116FPB6005 | 116GPB6005 | 116HPB6005 | 116JPB6005 | 116SPB6005 |
| | Input shaft | metric | 1 | 116FPA6013 | 116GPA6013 | 116HPA6013 | 116JPA6013 | 116SPA6013 |
| 8 | & pinion (13:1) | AGMA | 1 | 116FPB6013 | 116GPB6013 | 116HPB6013 | 116JPB6013 | 116SPB6013 |
| | Input shaft | metric | 1 | 116FPA6020 | 116GPA6020 | 116HPA6020 | 116JPA6020 | 116SPA6020 |
| | & pinion (20:1) | AGMA | 1 | 116FPB6020 | 116GPB6020 | 116HPB6020 | 116JPB6020 | 116SPB6020 |
| | Input shaft | metric | 1 | 116FPA6025 | 116GPA6025 | 116HPA6025 | 116JPA6025 | 116SPA6025 |
| | & pinion (25:1) | AGMA | 1 | 116FPB6025 | 116GPB6025 | 116HPB6025 | 116JPB6025 | 116SPB6025 |
| 9 | Input shaft oilseal | | 1 | 946034 | 946035 | 946036 | 946037 | 946038 |
| 10 | Input shaft bearing | | 2 | 941805 | 941806 | 941807 | 941808 | 941809 |
| 11 | Input shaft retaining ring | | | | | | | |
| | | (20:1) | 1 | - | 944184 | 944185 | 944186 | - |
| | | (25:1) | | 944182 | 116GFF6001 | 116HFF6001 | 116JFF6001 | 944088 |
| 12 | Backstop cover | | 1 | 116FED6000 | 116GED6000 | 116HED6000 | 116JED6000 | 116SED6000 |
| 13 | Backstop cover screw | | 3 | 942751 | 942784 | 942784 | 942811 | 942811 |
| 14 | Backstop cover lockwasher | | 3 | 943681 | 943682 | 943682 | 943683 | 943683 |
| | 1st. Reduction | | | | | | | |
| | gear (13:1) | | 1 | 116FGA6013 | 116GGA6013 | 116HGA6013 | 116JGA6013 | 116SGA6013 |
| 15 | 1st. Reduction | | | | | | | |
| | gear (20:1) | | 1 | 116FGA6020 | 116GGA6020 | 116HGA6020 | 116JGA6020 | 116SGA6020 |
| | 1st. Reduction | | | | | | | |
| | gear (25:1) | | 1 | 116FGA6025 | 116GGA6025 | 116HGA6025 | 116JGA6025 | 116SGA6025 |
| 16 | 1st. Reduction gear key | | 1 | 944323 | 944324 | 944325 | 944326 | 944326 |
| 17 | Intermediate pinion | | 1 | 116FPC6005 | 116GPC6005 | 116HPC6005 | 116JPC6005 | 116SPC6005 |
| 18 | Intermediate bearing | | 2 | 941805 | 941806 | 941807 | 941808 | 941809 |
| 19 | Intermediate cover | | 2 | 016F7025 | 946285 | 946285 | 016J7025 | 016S7025 |
| 20 | 2nd. Reduction gear | | 1 | 116FGB6005 | 116GGB6005 | 116HGB6005 | 116JGB6005 | 116SGB6005 |
| 21 | 2nd. Reduction gear key | | 1 | 944314 | 944315 | 944316 | 944317 | 944318 |
| 22 | Output hub | | 1 | 116FHB6000 | 116GHB6000 | 116HHB6000 | 116JHB6000 | 116SHB6000 |
| 23 | Output hub screw | | 4 | 942714 | 942727 | 942727 | 942727 | 942730 |
| 24 | Output hub oilseal | | 2 | 946016 | 946027 | 946028 | 946029 | 946315 |
| | Output hub | Deep groove | 2 | 941355 | 941356 | 941357 | 941358 | 941050 |
| 25 | bearing | Taper roller | 2 | 941213 | 941214 | 941215 | 941216 | 941222 |
| 26 | Pipe plug | | 3 | 942392 | 942392 | 942392 | 942392 | 942392 |
| 27 | Breather plug | | 1 | 946098 | 946098 | 946098 | 946098 | 946098 |
| Torque arm components: | | | | | | | | |
| 28 | | rod end | 1 | 040A7102 | 040B7102 | 040B7102 | 040B7102 | 040B7102 |
| 29 | | rod end bolt | 1 | 943715 | 943726 | 943726 | 943726 | 943726 |
| 30 | | rod end nut | 1 | 943813 | 943815 | 943815 | 943815 | 943815 |
| 31 | | rod end lockwasher | 1 | 943684 | 943685 | 943685 | 943685 | 943685 |
| 32 | | turnbuckle | 1 | 016F7045 | 016H7045 | 016H7045 | 016H7045 | 016H7045 |
| 33 | | locknut RH | 1 | 943815 | 943816 | 943816 | 943816 | 943816 |
| 34 | | locknut LH | 1 | 943792 | 943793 | 943793 | 943793 | 943793 |
| 35 | | extension | 1 | 016F7043 | 016H7043 | 016H7043 | 016H7043 | 016H7043 |
| 36 | | fulcrum | 1 | 016F7046 | 016H6046 | 016H6046 | 016H6046 | 016H6046 |
| 37 | | fulcrum bolt | 1 | 943854 | 943855 | 943855 | 943855 | 943855 |
| 38 | | fulcrum nut | 1 | 943813 | 943813 | 943813 | 943813 | 943813 |
| 39 | | fulcrum lockwasher | 1 | 943684 | 943684 | 943684 | 943684 | 943684 |

Note: [1] 6 required sizes 107 to 215, 10 required sizes 307 to 315, 12 required size 407.

# PARTS IDENTIFICATION SIZES 507 ~ 608



# INDIVIDUAL PART NUMBERS

## Sizes 507 ~ 608

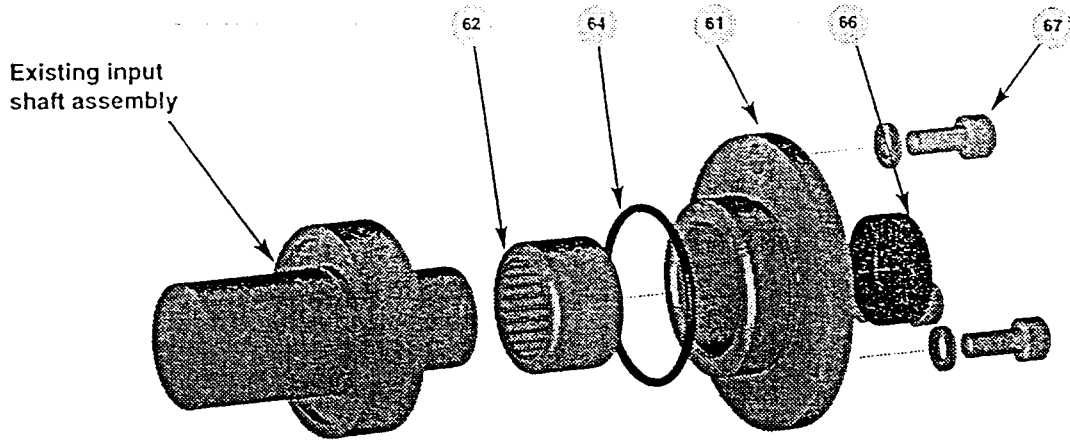
| Part Ident. | Description | No. Req | 507 | 608 |
|---|---|---|---|---|
| 2 | Case Right Hand | 1 | 16L6002 | 16M6002 |
| 3 | Case Left Hand | 1 | 16L6003 | 16M6003 |
| 4 | Hollow Dowel | 2 | 16L7004 | 16M7004 |
| 5 | Case Bolt | See [1] | 16L7005 | 16M7005 |
| 6 | Case Nut | See [1] | 943815 | 943815 |
| 7 | Case Plain Washer | 4 | 943825 | 943825 |
| 8 | Case Lockwasher | See [1] | 943825 | 943825 |
| 9 | Input Shaft & Pinion (13:1) | 1 | 16L6100 | 16M6100 |
| 10 | Input Shaft Oil Seal | 1 | 946308 | 946314 |
| 11 | Input Shaft Bearing | 2 | 941370 | 941373 |
| 12 | Backstop Cover | 1 | 16L6012 | 16M6012 |
| 13 | Backstop Cover Gasket | 1 | 16L7075 | 16M7075 |
| 14 | Backstop Cover Screw | 6 | 943762 | 943773 |
| 15 | Backstop Cover Lockwasher | 6 | 943683 | 943684 |
| 16 | Torque Arm Case Bolt | 2 | 16L7016 | 16M7016 |
| 17 | Torque Arm Case Bolt Nut | 2 | 943816 | 943818 |
| 18 | Torque Arm Case Bolt Lockwasher | 2 | 943689 | 943880 |
| 19 | 1st Reduction Gear (13:1) | 1 | 16L6101 | 16M6101 |
| 20 | 1st Reduction Gear (20:1) | 1 | 16L6111 | 16M6111 |
| 21 | 1st Reduction Gear Key | 3 | 16L7021 | 16M7021 |
| 22 | Intermediate Pinion (13:1, 20:1) | 1 | 16L6022 | 16M6022 |
| 23 | Intermediate Pinion Distance Piece | 1 | 16L6023 | 16M6023 |
| 24 | Intermediate Bearing | 2 | 941371 | 941373 |
| 25 | Intermediate Cover | 2 | 16L6012 | 16M6012 |
| 26 | 2nd Reduction Gear | 1 | 16L6026 | 16M6026 |
| 27 | 2nd Reduction Gear Key | 1 | 16L6127 | 16M6127 |
| 28 | Output Hub - STD Bore | 1 | 16L6105 | 16M6105 |
| 29 | Output Hub - Taper-grip | 1 | 16L6107 | 16M6107 |
| 32 | Output Hub - collar screw (over key) [2] | 1 | 942730 | 942730 |
| 33 | Output Hub - collar screw (over shaft) [2] | 3 | 942734 | 942734 |
| 34 | Output Hub Oilseal | 2 | 946316 | 916317 |
| 35 | Output Hub Bearing | 2 | 941372 | 941374 |

| Part Ident. | Description | No. Req | 507 | 608 |
|---|---|---|---|---|
| 36 | 3/4 BSP Plug | 7 | 942394 | 942394 |
| 37 | 3/4 Breather Plug | 1 | 946093 | 946093 |
| 38 | Breather Adapter Bend | 1 | 946180 | 946180 |
| 41 | Torque Arm Rod End | 1 | 16L7041 | 16M7041 |
| 42 | Rod End Locknut | 1 | 943817 | 943817 |
| 43 | Torque Arm Extension | 1 | 16L7043 | 16L7043 |
| 44 | Extension Locknut | 1 | 943794 | 943794 |
| 45 | Turnbuckle | 1 | 16L7045 | 16L7045 |
| 46 | Fulcrum | 1 | 16L6046 | 16L6046 |
| 47 | Fulcrum Bolt | 1 | 16L6047 | 16L6047 |
| 48 | Fulcrum Bolt Nut | 1 | 943818 | 943818 |
| 49 | Fulcrum Lockwasher | 1 | 943880 | 943880 |
| 70 | Input Shaft Cover | 1 | 16L6070 | 16M6070 |
| 71 | Input & Intermediate Cover Screw | 18 | 943762 | 943773 |
| 72 | Input & Intermediate Cover Screw Lockwasher | 18 | 943683 | 943684 |
| 73 | Input & Inter. Cover Shim (0.50mm) | AR | 16L7073 | 16M7073 |
| 74 | Input & Inter. Cover Shim (0.25mm) | AR | 16L7074 | 16M7074 |
| 75 | Input & Inter. Cover Shim (0.15mm) | AR | 16L7075 | 16M7075 |
| 76 | Input & Inter. Cover Shim (0.07mm) | AR | 16L7076 | 16M7076 |
| 77 | Input & Inter. Cover Shim (0.05mm) | AR | 16L7077 | 16M7077 |
| 78 | Output Cover | 2 | 16L6078 | 16M6078 |
| 79 | Output Cover Screw | See [3] | 943773 | 943723 |
| 80 | Output Cover Lockwasher | See [3] | 943684 | 943685 |
| 81 | Output Cover Shim (0.5mm) | AR | 16L7081 | 16M7081 |
| 82 | Output Cover Shim (0.25mm) | AR | 16L7082 | 16M7082 |
| 83 | Output Cover Shim (0.15mm) | AR | 16L7083 | 16M7083 |
| 84 | Output Cover Shim (0.07mm) | AR | 16L7084 | 16M7084 |
| 85 | Output Cover Shim (0.05mm) | AR | 16L7085 | 16M7085 |
| 87 | Backstop Housing Dowel | 3 | 16L6087 | 16M6087 |
| 88 | Input Bearing Distance Piece | 1 | 16L6088 | 16M6088 |
| 89 | Backstop & Bearing Housing | 1 | 16L6089 | 16M6089 |
| 90 | 'O' Ring | 1 | 946421 | 946420 |
| 91 | Housing Locking Screw | 6 | 942810 | 942801 |
| 92 | Housing Locking Screw Lockwasher | 6 | 943683 | 943684 |

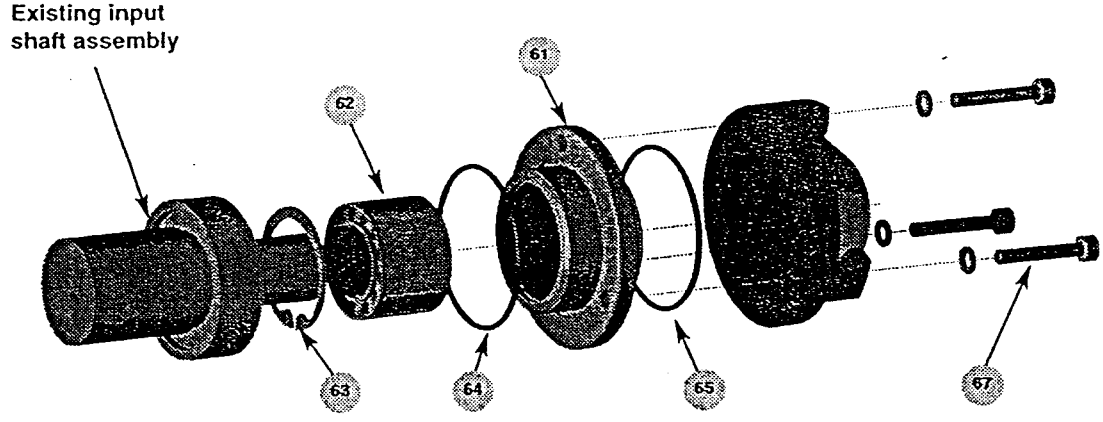
Notes: [1] 12 required size 507, 15 required size 608.
[2] Not supplied on Taper-Grip® Hubs.
[3] 12 required size 415 & 507, 16 required size 608.

# PARTS IDENTIFICATION BACKSTOPS

Sizes 107 ~ 415




Size 107




Sizes 115 to 415

| Unit Size | Assembly | Description (ref.) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Outer Race (61) | Sprag Clutch (62) | Circlip (63) | Inner O-ring (64) | Outer O-ring (65) | Cover (66) | Screw (67) |
| 107 | 044B0100 | 044B6101 | 0947263 | - | 0946451 | - | 0946289 | 0942570 |
| 115 | 044C0100 | 044C6101 | 0947040 | 0944120 | 0946452 | 0946452 | - | 0942573 |
| 203 | 044D0100 | 044D6101 | 0947040 | 0944120 | 0946453 | 0946453 | - | 0942573 |
| 207 | 044E0100 | 044E6101 | 0947041 | 0944121 | 0946454 | 0946454 | - | 0942602 |
| 215 | 044F0100 | 044F6101 | 0947042 | 0944122 | 0946455 | 0946455 | - | 0942752 |
| 307 | 044G0100 | 044G6101 | 0947043 | 0944123 | 0946456 | 0946456 | - | 0942781 |
| 315 | 044H0100 | 044H6101 | 0947044 | 0944124 | 0946456 | 0946456 | - | 0942781 |
| 407 | 044J0100 | 044J6101 | 0947045 | 0944125 | 0946457 | 0946458 | - | 0942814 |
| 415 | 044S0100 | 044S6101 | 0947045 | 0944125 | 0946459 | 0946459 | - | 0942810 |

SUMITOMO
MACHINERY CORPORATION OF AMERICA

# HSM

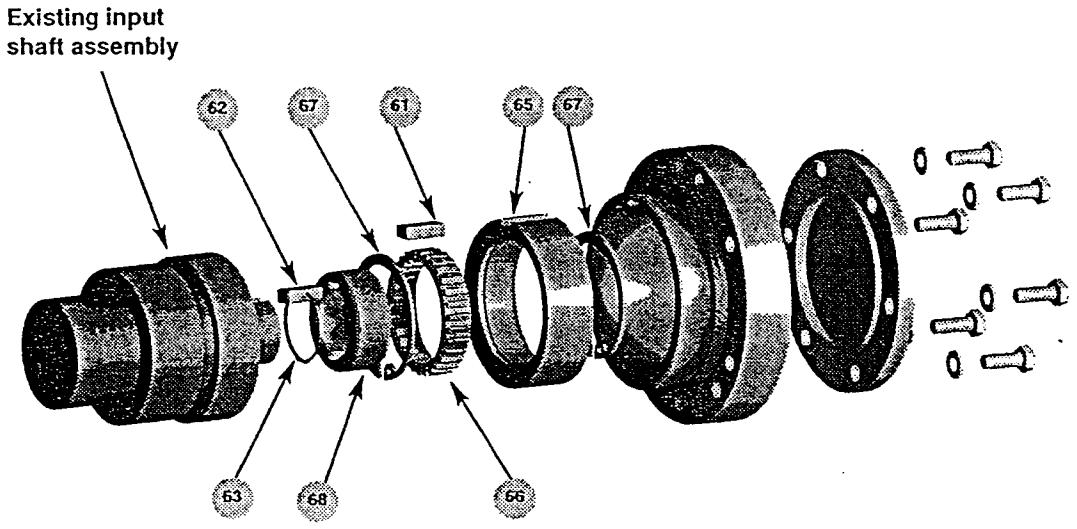
## Bearings and Seals

| HSM Size | | H.S. Oil Seal | ** S.S. Oil Seal | ** H.S. Bearing | ** Inter. Bearing | ** S.S. Bearing |
|---|---|---|---|---|---|---|
| 107C | Sumitomo P.N. | 946030 | 946023 | 941801 | 941801 | 32013 |
| 107C | Size | D20/40x10 | D65/80x8 | NJ204 | NJ204 | 503T-32012X |
| 115D | Sumitomo P.N. | 946031 | 946024 | 941802 | 941802 | 32015 |
| 115D | Size | D25/47x10 | D75/90x10 | NJ205 | NJ205 | G941221 |
| 203E | Sumitomo P.N. | 946032 | 946025 | 941803 | 941803 | 32017 |
| 203E | Size | D30/52x10 | D85/100x10 | NJ206 | NJ206 | 503T-32017X |
| 207F | Sumitomo P.N. | 946033 | 946026 | 941801 | 941804 | 32020 |
| 207F | Size | D30/62x10 | D100/120x10 | NJ306 | NJ306 | 503T-32020X |
| 215G | Sumitomo P.N. | 946034 | 946016 | 941805 | 941805 | 32022 |
| 215G | Size* | D35/70x10 | D110/130x12 | NJ307 | NJ307 | G941213 |
| 307H | Sumitomo P.N. | 946035 | 946027 | 941806 | 941806 | 32026 |
| 307H | Size* | D45/90x10 | D130/160x12 | NJ309 | NJ309 | G941214 |
| 315J | Sumitomo P.N. | 946036 | 946028 | 941807 | 941807 | 32030 |
| 315J | Size* | D50/90x10 | D150/180x12 | NJ310 | NJ310 | G941215 |
| 407S | Sumitomo P.N. | 946037 | 946029 | 941808 | 941808 | 32032 |
| 407S | Size* | D60/110x10 | D160/200x12 | NJ312 | NJ312 | 503T-32032X |
| 415K | Sumitomo P.N. | 946038 | 946315 | 941809 | 941809 | 32936 |
| 415K | Size* | D65/120x12 | D180/210x12 | NJ313 | NJ313 | G941222 |
| 507L | Sumitomo P.N. | 946308 | 946316 | 941370 | 941371 | 941372 |
| 507L | Size* | D75/100x10 | D200/230x15 | JH415647/JH415610 | JM718149/JM718110 | 67983/67920 |
| 608M | Sumitomo P.N. | 946314 | 946317 | 941373 | 941373 | 941374 |
| 608M | Size* | D90/110x13 | D240/270x15 | JHM318448/JHM318410 | JHM318448/JHM318410 | 8578/8520 |

Note: Oil Seal Size in Millimeters
** 2 pieces required per unit

# PARTS IDENTIFICATION BACKSTOPS

## Sizes 507 ~ 608




### Sizes 507 to 608

| Unit Aize | Assembly | Description (ref.) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Outer Race (61) | Inner Race Key (62) | Inner Race Circlip (63) | Backstop Outer Race (65) | Sprag Clutch (66) | Backstop Outer Race Circlip (67) | Inner Race (68) |
| 507 | 044L0002 | 016L7061 | 016L7062 | 944188 | 044L6001 | 947313 | 944156 | 044L6002 |
| 608 | 044M0002 | 016M7062 | 016M7062 | 944263 | 044M6001 | 947311 | 944290 | 044M6002 |

# Operation

**DANGER**

- Never approach or touch any rotating parts (shaft, etc.) during operation. Loose clothing caught in these rotating parts may result in severe injury and/or death.

**CAUTION**

- The reducer will get very hot during operation. Do not touch or come in contact in any way with the reducer; otherwise, you may suffer burns.
- If the reducer is operating in an abnormal way, stop the unit immediately; otherwise, injury may result.
- Do not operate the reducer in a manner that exceeds its rating criteria; otherwise, injury or damage to the system may result.
- Do not remove any covers or open the reducer during operation; otherwise, splashing lubrication may cause burns.
- Do not loosen the oil filler plug during operation; otherwise, splashing lubricant may cause burns.
- When reversing the direction of rotation, first bring the unit to a complete stop, then commence reverse rotation; otherwise, the system may be damaged.

After installation, check the following points prior to operation.
(1) Is the reducer correctly coupled with the mating machine?
(2) Are foundation bolts firmly tightened?
(3) Does the direction of rotation conform to the one specified and designed for?
After confirming the above, allow for a no-load break-in period. Then gradually apply the design load.
At this time, confirm the following:

**Table**

| Items to be checked during break-in period/possible causes. | |
|---|---|
| Abnormal sound and vibration. | (1) The housing is deformed because the installation surface is irregular.<br>(2) Resonance is occurring due to the lack of rigidity of the installation base.<br>(3) The shaft center is not properly aligned with the mating machine.<br>(4) The vibration of the mating machine is transmitted to the reducer. |
| The surface temperature of the reducer is abnormally high. | (1) The motor current has exceeded the rated current shown in the rating plate.<br>(2) The variable speed range of the motor is too large.<br>(3) The ambient temperature at which the reducer is operating is too high.<br>(4) The oil is not at its specified level (too low or too high). |

When an anomaly is found, stop operation, and contact the nearest agent, dealer, or service office.

# Daily Inspection and Maintenance

**! DANGER**

- Never approach or touch any rotating parts (shaft, etc.) when maintaining or inspecting the reducer during operation.
  Loose clothing caught in these rotating parts may result in severe injury and/or death.
- Be sure to stop both the driving and driven machines before checking any tooth surfaces; otherwise, you may be caught in the gear engaging section, resulting in severe injury and/or death.
- Do not operate any units without all (safety) covers in place. Failure to do so may cause injury and/or death.

**! CAUTION**

- The surface of the reducer will get hot. Do not touch the reducer; otherwise, a burn may result.
- Do not change the oil during operation or soon after operation has ceased; otherwise, the hot oil may cause burns.
- Do not remove any covers or open the reducer during operation; otherwise, splashing hot lubricant may cause burns.
- Change lubricant according to the maintenance manual, and use only those recommended lubricants; otherwise, the system may be damaged.

### Daily inspection

To ensure proper and continued optimum operation, use the table below to perform daily inspections of the unit.

### Table

| Inspection item | Items to be checked during break-in period/possible causes. |
|---|---|
| Noise | Is there abnormal sound or sudden change in the noise characteristics during operation? |
| Vibration | Is there sudden change in the vibration of the reducer? Excessive vibration? |
| Surface temperature | Is the temperature of the surface of the reducer abnormally high (more than 190°F)? Or is it rising rapidly? (The temperature rise during operation differs according to the type of reducer. A surface temperature of approx. 175°F will not cause any adverse effects as long as it doesn't rise significantly above this level.) |
| Oil level | Is the oil level decreasing? (Check the oil level with a dipstick or visible oil gauge when the reducer is not operating.) |
| Oil leakage | Is oil leaking from the oil seal, etc.? |
| Foundation bolt | Have any bolts come loose? |
| Chain and belt | Have any transmission belts or chains come loose? |

When any anomaly is found during daily inspection, take appropriate corrective measures based on "9. Troubleshooting (p. 12)."
If normal operation is still not possible, contact the nearest agent, distributor, or service office.

### Change of lubricant

(1) Change oil 500 hours or 6 months, whichever comes first, after initial start-up. The second oil change should be after 2500 hours or 6 months, whichever comes first.
(2) In case the oil temperature is below 160°F, a 5000 hour or 1 year (whichever comes first) change interval is recommended.
(3) In case the oil temperature is above 160°F, a 2500 hour or 1 year (whichever comes first) change interval is recommended.
(4) Deterioration of the oil will be accelerated when the ambient temperature changes rapidly or the ambient atmosphere contains corrosive gases. In these situations, consult with the lubricant manufacturer.

# Troubleshooting

**⚠ CAUTION**

- Identify and provide appropriate corrective action in a timely fashion for any abnormal operation characteristics according to the maintenance manual. Do not operate the unit until corrective action has been taken.

When any anomaly occurs in the reducer, refer to the following table and take appropriate measures as soon as possible.

**Table**

| Details of trouble | | Cause | Correction |
|---|---|---|---|
| The input shaft rotates, but the output shaft will not. | | Damage due to overloaded gears or shafts | Repair at a specialized workshop |
| The output shaft turns when there is no load. | But it seizes up when a load is applied. | The key is out of position | Place the key in position |
| | | Scorched bearing | Repair at a specialized workshop |
| | | Poor adjustment of protective device | Adjust the protective device |
| | Reverse rotation is possible. | Incorrect wiring for the motor | Change the connection |
| Excessive temperature rise. | | Overload | Reduce the load to the specified value |
| | | The ambient temperature is too high | Improve the ventilation method |
| | | Damage due to overload applied to gears, bearings, etc. | Repair at a specialized workshop |
| Oil leakage | Oil leaks from the input/output shaft sections. | Damaged oil seal | Change the oil seal |
| | | Scratches or abrasion of the lip contact section | Repair at a specialized workshop |
| | Oil leaks from the joint surface of the housing. | Loose joint bolt | Tighten the joint bolts to their proper torque |
| Abnormal sound.<br>Excessively high vibration. | | Damaged gears, shafts, or bearings | Repair at a specialized workshop |
| | | Deformation of the housing due to uneven installation surface | Flatten the installation surface or use shims for adjustment |
| | | Resonance due to insufficient rigidity of installation base | Reinforce the installation base to improve the rigidity |
| | | Incorrect alignment with the mating machine | Align the shaft center |
| | | Transmission of the mating machine's vibration to the reducer | Independently operate the reducer to check the source of abnormal sound |

## Disassembly/Reassembly and Disposal

### Disassembly and reassembly

**⚠ CAUTION**

- Repair, disassembly, and reassembly should be handled by properly trained technicians; otherwise, the system may be damaged.

### Disposal

**⚠ CAUTION**

- Dispose of the reducer and lubricant as general industrial waste.