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Supercedes: HY25-0192-B1/US September 2016



Power Take-Offs Crossover

230/231 Series
270/271 Series to 272/282 Series
236/238 Series



ENGINEERING YOUR SUCCESS.

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Offer of Sale

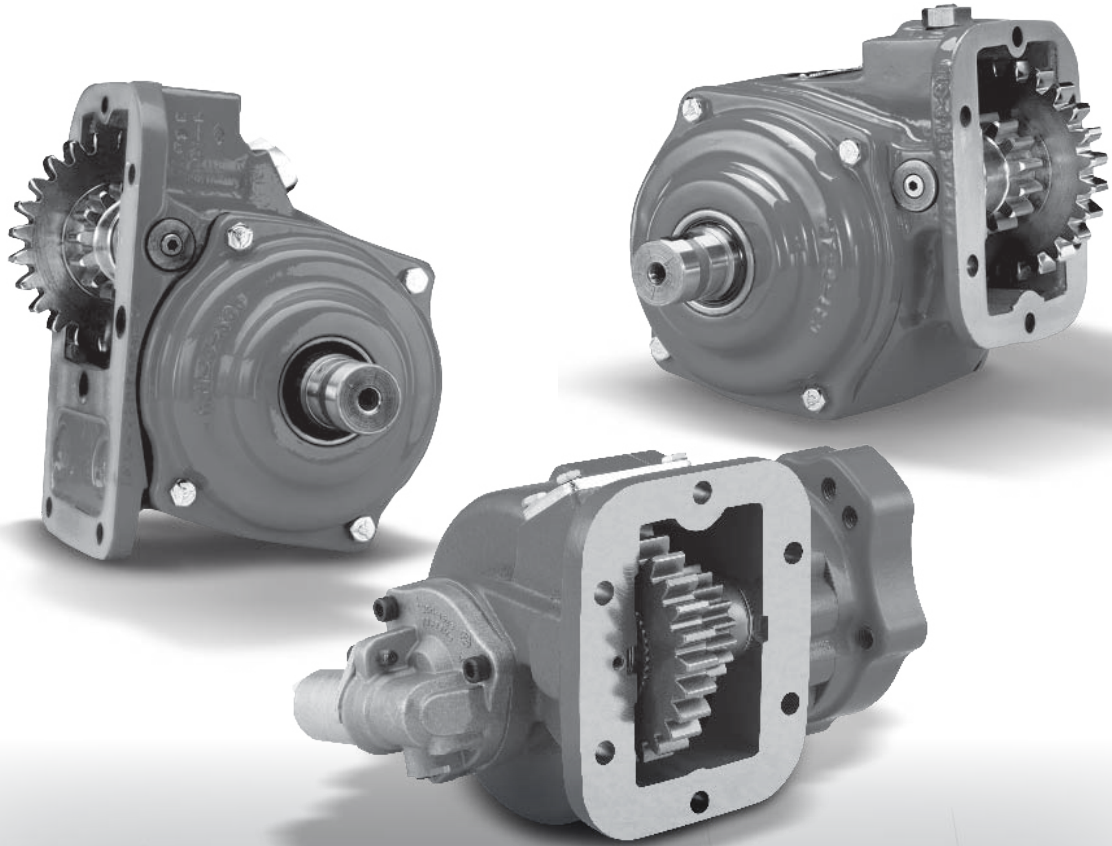
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Patent Information

The Chelsea® Power Take-Off or its components shipped with this owner's manual may be manufactured under one or more of the following U.S. patents:
 7,159,701 7,007,565 6,962,093 1,326,036 60,321,840.7
 Other patents pending.

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230/231 Series to 272 Series



230/231 SERIES AIR POWERSHIFT PTO

CROSSOVER TO 272 SERIES

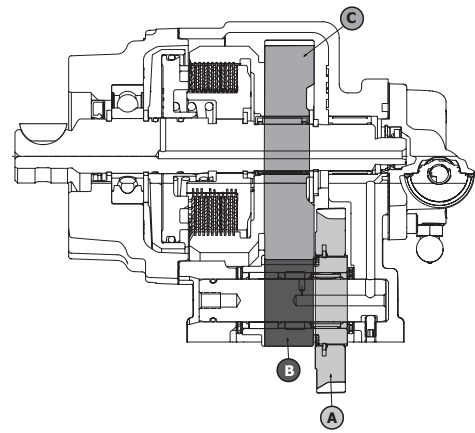
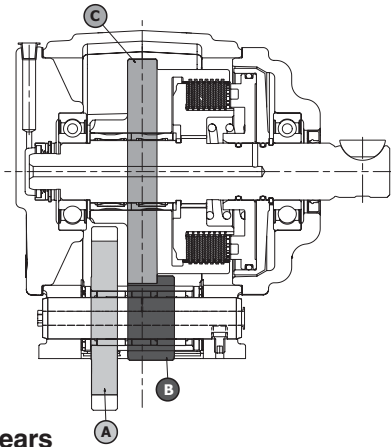
| Model Series | | Mounting Code | | Ratio | | Input Gear | | Lube | | Shift | | Arr. | | Output | |
|--------------|-----|---------------|-----|------------|------|------------|-----|------------|-----|------------|-----|------------|-----|------------|-------|
| Legacy | New | 230 231 | 272 | 230 231 | 272 | 230 231 | 272 | 230 231 | 272 | 230 231 | 272 | 230 231 | 272 | 230 231 | 272 |
| 230 231 | 272 | X (230) | X | A | A | AH | AJ | X | X | A | A | 3 | 3 | XD | XD |
| | | G (230) | G | B | B | AJ | AJ | P | P | N (230) | R | 4 | N/A | XE | RE |
| | | M (231) | M | D | C | AK | AK | N/A | R | P | P | 5 | 5 | XK | RK |
| | | G (231) | N | K | D, G | DA | DA | N/A | S | Q | Q | 6 | N/A | XP | N/A |
| | | N/A | K | Q | M | DB | N/A | N/A | W | S | N/A | | | XR | XR |
| | | N/A | L | U (230) | N/A | HV | HV | N/A | V | T | N/A | | | XX | XV |
| | | N/A | Z | N/A | K | N/A | ES | N/A | Y | V | V | | | XY | RY |
| | | N/A | A | N/A | P | N/A | FN | N/A | | J (230) | 4 | | | AF | RF |
| | | N/A | D | N/A | S | N/A | JK | N/A | | N/A | 1 | | | RA | RK |
| | | N/A | R | | | N/A | JW | N/A | | N/A | 2 | | | RB | RB/RK |
| | | | | | | N/A | KU | N/A | | N/A | 3 | | | RF | RF |
| | | | | | | N/A | KN | N/A | | N/A | J | | | BD | BD |
| | | | | | | | | | | | | | | BA | BD |
| | | | | | | | | | | | | | | N/A | AB |
| | | | | | | | | | | | | | | N/A | AC |
| | | | | | | | | | | | | | | N/A | RS |
| | | | | | | | | | | | | | | N/A | RZ |
| | | | | | | | | | | | | | | N/A | SD |
| | | | | | | | | | | | | | | N/A | SV |

N/A = Not Available

See Chelsea Application Catalog HY25-3000/US for specific applications.

See pages 4 & 5 for option details.

Gear Chart



Input Gears

| 230/231 Series Input Gear | | | | | 272 Series Input Gear | | | | | |
|---------------------------|-------------|-----------|-----------|-------------|-----------------------|-------------|------------|-----------|-------------|-----------|
| Input Designator | Part Number | Teeth "A" | Teeth "B" | Helix Angle | Input Designator | Assembly | N.S.S. | | | |
| | | | | | | | Input Gear | Teeth "A" | Input Ratio | Teeth "B" |
| 230/231*AAH | 5-P-546 | 25 | 18 | Spur | 272*AAJ | 5-P-1510-1X | 5-P-1510 | 25 | 5-P-1498 | 19 |
| 230/231*AAJ | 5-P-567 | | | | 272*AAK | 5-P-1517-1X | 5-P-1517 | 25 | 5-P-1498 | 19 |
| 230/231*AAK | 5-P-548 | 25 | 18 | Spur | 272*AHV | 5-P-1516-1X | 5-P-1516 | 27 | 5-P-1498 | 19 |
| 230/231*AHV | 5-P-1295 | 27 | 18 | Spur | 272*ADA | 5-P-1511-1X | 5-P-1511 | 27 | 5-P-1498 | 19 |
| 230*ADA | 5-P-1370 | 27 | 18 | Spur | | | | | | |
| 230/231*BAH | 5-P-547 | 25 | 15 | Spur | 272*BAJ | 5-P-1510-2X | 5-P-1510 | 25 | 5-P-1499 | 22 |
| 230/231*BAJ | 5-P-568 | | | | 272*BHV | 5-P-1516-2X | 5-P-1516 | 27 | 5-P-1499 | 22 |
| 230/231*BHV | 5-P-1296 | 27 | 15 | Spur | 272*BDA | 5-P-1511-2X | 5-P-1511 | 27 | 5-P-1499 | 22 |
| 230*BDA | 5-P-1371 | 27 | 15 | Spur | | | | | | |
| 230/231*DAJ | 5-P-695 | 25 | 24 | Spur | 272*CAJ | 5-P-1510-3X | 5-P-1510 | 25 | 5-P-1500 | 25 |
| 230/231*DAK | 5-P-807 | 25 | 24 | Spur | 272*CAK | 5-P-1517-3X | 5-P-1517 | 25 | 5-P-1500 | 25 |
| 230/231*DHV | 5-P-1297 | 27 | 20 | Spur | 272*CHV | 5-P-1516-3X | 5-P-1516 | 27 | 5-P-1500 | 25 |
| 230*DDA | 5-P-1372 | 27 | 24 | Spur | 272*CDA | 5-P-1511-3X | 5-P-1511 | 27 | 5-P-1500 | 25 |
| 230/231*KAJ | 5-P-769 | 25 | 29 | Spur | 272*DAJ | 5-P-1510-4X | 5-P-1510 | 25 | 5-P-1501 | 28 |
| | | | | | 272*GAJ | 5-P-1510-5X | 5-P-1510 | 25 | 5-P-1502 | 31 |
| 231*KAK | 5-P-881 | 25 | 29 | Spur | 272*DAK | 5-P-1517-4X | 5-P-1517 | 25 | 5-P-1501 | 28 |
| | | | | | 272*GAK | 5-P-1517-5X | 5-P-1517 | 25 | 5-P-1502 | 31 |
| 230*KDA | 5-P-843 | 27 | 29 | Spur | 272*DDA | 5-P-1511-4X | 5-P-1511 | 27 | 5-P-1501 | 28 |
| | | | | | 272*GDA | 5-P-1511-5X | 5-P-1511 | 27 | 5-P-1502 | 31 |
| 230/231*KHV | 5-P-1417 | 27 | 29 | Spur | 272*DHV | 5-P-1516-4X | 5-P-1516 | 27 | 5-P-1501 | 28 |
| | | | | | 272*GHV | 5-P-1516-5X | 5-P-1516 | 27 | 5-P-1502 | 31 |
| 230/231*QAJ | 5-P-770 | 25 | 34 | Spur | 272*MAJ | 5-P-1510-7X | 5-P-1510 | 25 | 5-P-1504 | 35 |
| 230*QDA | 5-P-844 | 27 | 34 | Spur | 272*MDA | 5-P-1511-7X | 5-P-1511 | 27 | 5-P-1504 | 35 |
| 230*UAJ | 5-P-1144 | 25 | N/A | Spur | | | | | N/A | |
| 230*UDB | 5-P-995 | 43 | N/A | Spur | | | | | N/A | |

N.S.S. = Not Sold Separately

N/A = Not Available

Output Gears

| 230/231 Series | | | 272 Series | | |
|------------------|-------------|---------------|------------------|-------------|---------------|
| Ratio Designator | Part Number | No. Teeth "C" | Ratio Designator | Part Number | No. Teeth "C" |
| 230/231*A | 2-P-473 | 53 | 272*A | 2-P-925 | 53 |
| 230/231*B | 2-P-481 | 34 | 272*B | 2-P-926 | 50 |
| 230/231*D | 2-P-606 | 47 | 272*C | 2-P-927 | 47 |
| 230/231*K | 2-P-638 | 42 | 272*D | 2-P-928 | 44 |
| | | | 272*K | 2-P-926 | 41 |
| 230/231*Q | 2-P-639 | 37 | 272*M | 2-P-933 | 37 |
| 230*UAJ | 2-P-640 | 17 | 272*D | | N/A |
| 230*UDB | 2-P-748 | 29 | 272*D | | N/A |

230 X K AJ X - P 3 XD

Basic Model

- 230 - Standard Housing
- 231 - Low-Profile Housing

Mounting Option

- 230 Only**
- X = Standard Stud Kit
- 231 Only**
- M = Standard Stud Kit
- 230/231**
- G = Metric Stud Kit

Gear Ratio

- 230/231**
- A = 18/53
- B = 15/34
- D = 24/47
- K = 29/42
- Q = 34/37
- 230 Only**
- U = No Input Ratio Gear (230 Only)

Input Option

Aisin, Allison, Eaton Fuller, and Mack Transmissions
See Current Price Book for Options

Lube Option

- P = Pressure Lube
- X = No Pressure Lube

Assembly Arrangement

- 3, 4, 5, 6

Output Option

Driveline Output

- XD = 1-1/4" Rd Standard Shaft
- ³ XX = 1-1/4" Tapered Output Shaft w/ Keyway
- BD = 1-1/4" Round Shaft w/Brake (Manual Transmission)
- BA = 1-1/4" Round Shaft w/Brake (Automatic Transmission)

Pump Mount

- XE = SAE "A" 2 or 4-Bolt Flange, SAE "A" Shaft (5/8" - 9T)
- ³ XP = SAE "A" 2-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
- XK = SAE "B" 2 or 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
- ³ AF = SAE "B" 2 or 4-Bolt Flange, SAE "BB" Shaft (1" - 15T)
- XY = DIN 5462 8T
- ³ RA = Rotatable SAE "B" 2-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
- RB = Rotatable SAE "B" 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
- RF = Rotatable SAE "B" 2-Bolt Flange, SAE "BB" Shaft (1" - 15T)
- XR = Chelsea Special SAE "B" Shaft (7/8" - 13T)

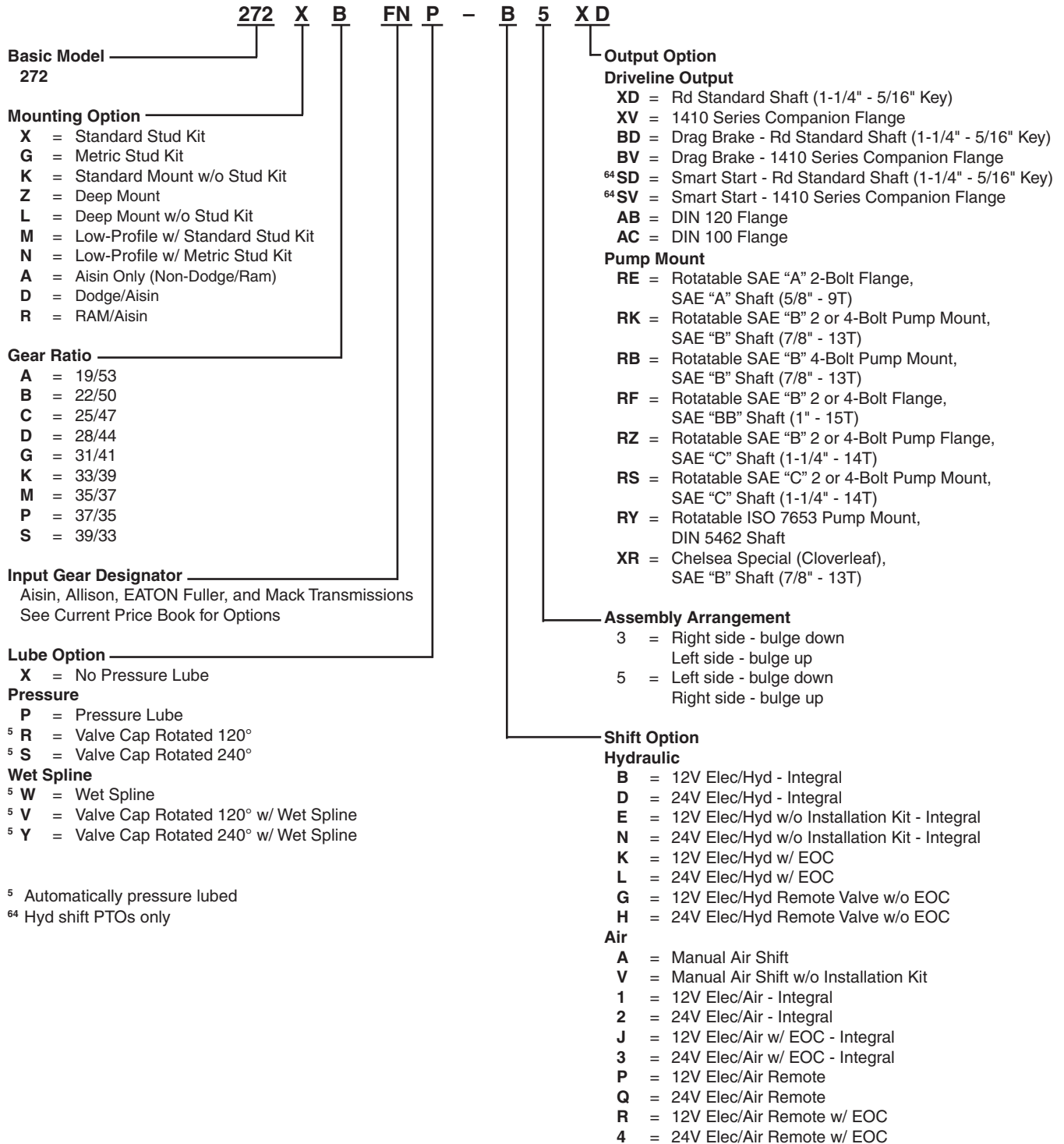
Shift Option

- ¹ A = Manual Air Shift
- ¹ P = 12 Volt Electric Over Air
- ¹ Q = 24 Volt Electric Over Air
- N = 12V Electronic Overspeed Ctrl
- J = 24V Electronic Overspeed Ctrl
- S = Air Shift with PTO/Dump Pump Combo Valve w/ Kick Out w/ Neutral Spring Return
- T = Air Shift with PTO/Dump Pump Combo Valve w/o Kickout & Neutral Spring Return
- V = Air Shift Less Installation Kit

¹Includes mounting parts
³Available in 3 & 5 assembly only

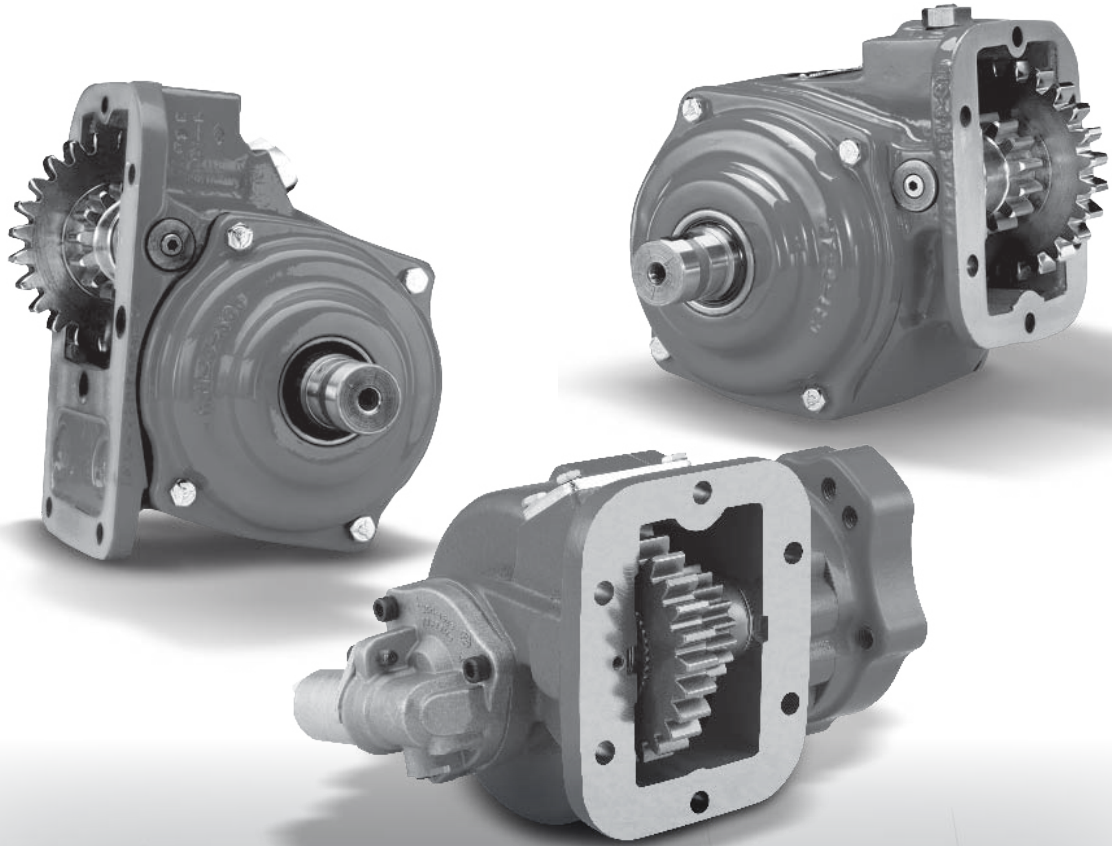
| Specifications Chart | Approximate Weight: 49 lbs. [22 kg] | | | | |
|---|-------------------------------------|------------|------------|------------|------------|
| | 230*A | 230*B | 230*D | 230*K | 230*Q |
| Intermittent Torque Rating lbs-ft [Nm] (w/ Pressure Lube) | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] |
| Intermittent Torque Rating lbs-ft [Nm] (w/ Standard Lube) | 250 [339] | 250 [339] | 250 [339] | 250 [339] | 250 [339] |
| HP Rating for Intermittent Service | | | | | |
| At 500 RPM of Output Shaft HP [Kw] (w/ Pressure Lube) | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] |
| At 500 RPM of Output Shaft HP [Kw] (w/ Standard Lube) | 24 [18] | 24 [18] | 24 [18] | 24 [18] | 24 [18] |
| At 1000 RPM of Output Shaft HP [Kw] (w/ Pressure Lube) | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] |
| At 1000 RPM of Output Shaft HP [Kw] (w/ Standard Lube) | 48 [36] | 48 [36] | 48 [36] | 48 [36] | 48 [36] |

| Specifications Chart | Approximate Weight: 49 lbs. [22 kg] | | | | |
|---|-------------------------------------|-----------|-----------|-----------|-----------|
| | 231*A | 231*B | 231*D | 231*K | 231*Q |
| Intermittent Torque Rating lbs-ft [Nm] (w/ Pressure Lube) | 250 [339] | 250 [339] | 250 [339] | 250 [339] | 250 [339] |
| Intermittent Torque Rating lbs-ft [Nm] (w/ Standard Lube) | 225 [305] | 225 [305] | 225 [305] | 225 [305] | 225 [305] |
| HP Rating for Intermittent Service | | | | | |
| At 500 RPM of Output Shaft HP [Kw] (w/ Pressure Lube) | 24 [18] | 24 [18] | 24 [18] | 24 [18] | 24 [18] |
| At 500 RPM of Output Shaft HP [Kw] (w/ Standard Lube) | 21 [16] | 21 [16] | 21 [16] | 21 [16] | 21 [16] |
| At 1000 RPM of Output Shaft HP [Kw] (w/ Pressure Lube) | 48 [36] | 48 [36] | 48 [36] | 48 [36] | 48 [36] |
| At 1000 RPM of Output Shaft HP [Kw] (w/ Standard Lube) | 43 [32] | 43 [32] | 43 [32] | 43 [32] | 43 [32] |



| Specifications Chart | Approximate Weight: 49 lbs. [22 kg] | | | | | | | | |
|--|-------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 272*A | 272*B | 272*C | 272*D | 272*G | 272*K | 272*M | 272*P | 272*S |
| Intermittent & Continuous Torque Rating lbs-ft [Nm] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] |
| HP Rating for Intermittent & Continuous Service | | | | | | | | | |
| At 500 RPM of Output Shaft HP [Kw] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] |
| At 1000 RPM of Output Shaft HP [Kw] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] |

270/271 Series to 272 Series



270/271 SERIES AIR POWERSHIFT PTO

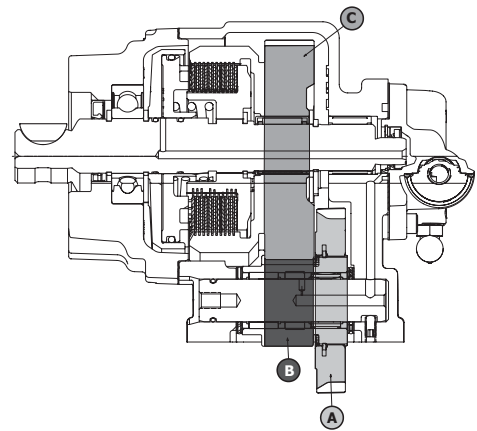
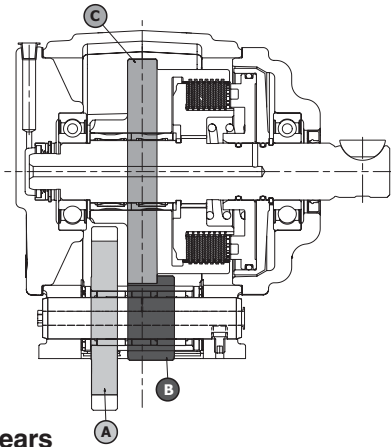
CROSSOVER TO 272 SERIES

| Model Series | | Mounting Code | | Ratio | | Input Gear | | Lube | | Shift | | Arr. | | Output | |
|--------------|-----|---------------|-----|------------|------|------------|-----|------------|-----|------------|-----|------------|-----|------------|-------|
| Legacy | New | 270 271 | 272 | 270 271 | 272 | 270 271 | 272 | 270 271 | 272 | 270 271 | 272 | 270 271 | 272 | 270 271 | 272 |
| 270 271 | 272 | X | X | A | A | AH | AJ | X | X | B | G | 3 | 3 | XD | XD |
| | | G (270) | G | B | B | AJ | AJ | P | P | D | H | 4 | N/A | XE | RE |
| | | G (271) | N | D | C | AK | AK | N/A | R | K | K | 5 | 5 | XK | RK |
| | | A | A | K | D, G | HV | HV | N/A | S | L | L | 6 | N/A | XP | N/A |
| | | M (271) | M | Q | M | KU | KU | N/A | W | S | N/A | | | XR | XR |
| | | D | D | N/A | K | N/A | DA | N/A | V | T | N/A | | | XX | XV |
| | | R | R | N/A | P | N/A | ES | N/A | Y | N/A | B | | | XY | RY |
| | | N/A | Z | N/A | S | N/A | FN | N/A | | N/A | D | | | AF | RF |
| | | N/A | K | | | N/A | JK | | | N/A | E | | | RA | RK |
| | | N/A | L | | | N/A | JW | | | N/A | N | | | RB | RB/RK |
| | | | | | | N/A | KN | | | | | | | RF | RF |
| | | | | | | | | | | | | | | BA | BD |
| | | | | | | | | | | | | | | N/A | AB |
| | | | | | | | | | | | | | | N/A | AC |
| | | | | | | | | | | | | | | N/A | RS |
| | | | | | | | | | | | | | | N/A | RZ |
| | | | | | | | | | | | | | | N/A | SD |
| | | | | | | | | | | | | | | N/A | SV |
| | | | | | | | | | | | | | | N/A | BV |

N/A = Not Available

See Chelsea Application Catalog HY25-3000/US for specific applications.
See pages 10 & 11 for option details.

Gear Chart



Input Gears

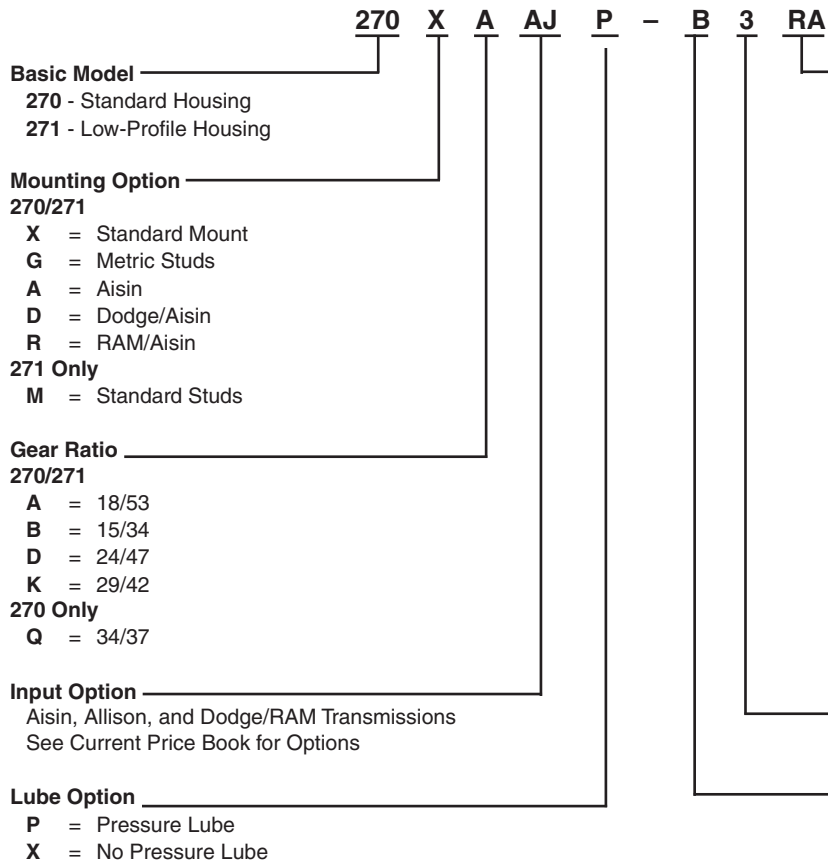
| 270/271 Series | | | | | Helix Angle | 272 Series | | | | | | | | |
|-----------------|-------------|-----------|-----------|-----------------|-------------|-------------|------------|-----------|-------------|-----------|-----|--|--|--|
| Gear Designator | Part Number | Teeth "A" | Teeth "B" | Gear Designator | | Assembly | N.S.S. | | | | | | | |
| | | | | | | | Input Gear | Teeth "A" | Input Ratio | Teeth "B" | | | | |
| 270/271*AAH | 5-P-546 | 25 | 18 | Spur | 272*AAJ | 5-P-1510-1X | 5-P-1510 | 25 | 5-P-1498 | 19 | | | | |
| 270/271*AAJ | 5-P-567 | 25 | 18 | Spur | | | | | | | | | | |
| 270/271*AAK | 5-P-548 | 25 | 18 | Spur | | | | | | | | | | |
| 270/271*AHV | 5-P-1295 | 27 | 18 | Spur | | | | | | | | | | |
| 270*AKU | 5-P-1353 | 36 | 18 | Spur | | | | | | | | | | |
| 270/271*BAH | 5-P-547 | 25 | 15 | Spur | 272*BAJ | 5-P-1510-2X | 5-P-1510 | 25 | 5-P-1499 | 22 | | | | |
| 270/271*BAJ | 5-P-568 | 25 | 15 | Spur | | | | | | | | | | |
| 270/271*BHV | 5-P-1296 | 27 | 15 | Spur | | | | | | | | | | |
| 270*BFR | 5-P-961 | 35 | 15 | Spur | | | | | | | N/A | | | |
| 270*BKU | 5-P-1354 | 36 | 15 | Spur | | | | | | | | | | |
| 270/271*DAJ | 5-P-695 | 25 | 24 | Spur | 272*CAJ | 5-P-1510-3X | 5-P-1510 | 25 | 5-P-1500 | 25 | | | | |
| 270/271*DAK | 5-P-807 | 25 | 24 | Spur | | | | | | | | | | |
| 270/271*DHV | 5-P-1297 | 27 | 24 | Spur | | | | | | | | | | |
| 270*DFR | 5-P-960 | 35 | 24 | Spur | | | | | | | N/A | | | |
| 270*DKU | 5-P-1355 | 36 | 24 | Spur | | | | | | | | | | |
| 270/271*KAJ | 5-P-769 | 25 | 29 | Spur | 272*DAJ | 5-P-1510-4X | 5-P-1510 | 25 | 5-P-1501 | 28 | | | | |
| | | | | | 272*GAJ | 5-P-1510-5X | 5-P-1510 | 25 | 5-P-1502 | 31 | | | | |
| 270/271*KAK | 5-P-881 | 25 | 29 | Spur | 272*DAK | 5-P-1517-4X | 5-P-1517 | 25 | 5-P-1501 | 28 | | | | |
| | | | | | 272*GAK | 5-P-1517-5X | 5-P-1517 | 25 | 5-P-1502 | 31 | | | | |
| 270*KFR | 5-P-949 | 35 | 29 | Spur | N/A | | | | | | | | | |
| 270/271*KHV | 5-P-1417 | 27 | 29 | Spur | 272*DHV | 5-P-1516-4X | 5-P-1516 | 27 | 5-P-1501 | 28 | | | | |
| | | | | | 272*GHV | 5-P-1516-5X | 5-P-1516 | 27 | 5-P-1502 | 31 | | | | |
| 270*KKU | 5-P-1356 | 36 | 29 | Spur | 272*DKU | 5-P-1515-4X | 5-P-1515 | 36 | 5-P-1501 | 28 | | | | |
| | | | | | 272*GKU | 5-P-1515-5X | 5-P-1515 | 36 | 5-P-1502 | 31 | | | | |
| 270*QKU | 5-P-1359 | 36 | 34 | Spur | 272*MKU | 5-P-1515-7X | 5-P-1515 | 36 | 5-P-1504 | 35 | | | | |

N.S.S. = Not Sold Separately

N/A = Not Available

Output Gears

| 230/231 Series | | | 272 Series | | |
|------------------|-------------|---------------|------------------|-------------|---------------|
| Ratio Designator | Part Number | No. Teeth "C" | Ratio Designator | Part Number | No. Teeth "C" |
| 270/271*A | 2-P-473 | 53 | 272*A | 2-P-925 | 53 |
| 270/271*B | 2-P-481 | 34 | 272*B | 2-P-926 | 50 |
| 270/271*D | 2-P-606 | 47 | 272*C | 2-P-927 | 47 |
| 270/271*K | 2-P-638 | 42 | 272*D | 2-P-928 | 44 |
| | | | 272*G | 2-P-929 | 44 |
| 270/271*Q | 2-P-639 | 37 | 272*M | 2-P-933 | 37 |

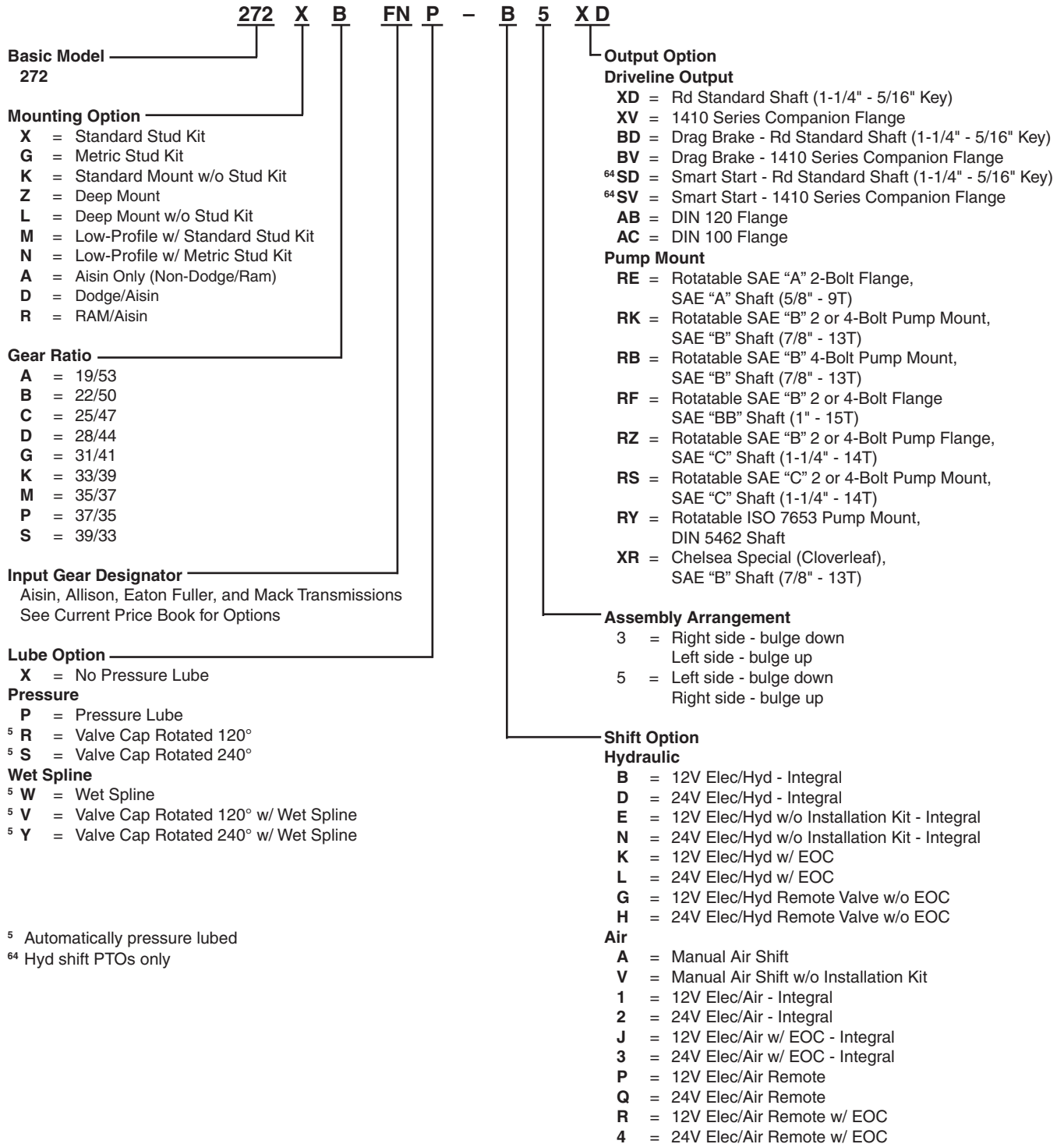


- Output Option**
Driveline Output
³ **XD** = Rd Standard Shaft (1-1/4" - 5/16" Key)
XX = 1-1/4" Tapered Output Shaft w/ Keyway
BA = 1-1/4" Rd Standard Shaft w/Brake
- Pump Mount**
XE = SAE "A" 2 Flange,
 SAE "A" Shaft (5/8" - 9T)
XP = SAE "A" 2-Bolt Flange,
 SAE "B" Shaft (7/8" - 13T)
XK = SAE "B" 2 or 4-Bolt Flange,
 SAE "B" Shaft (7/8" - 13T)
AF = SAE "B" 2 or 4-Bolt Flange,
³ SAE "BB" Shaft (1" - 15T)
XY = Meiller Pump
³ **RA** = Rotatable SAE "B" 2-Bolt Flange,
 SAE "B" Shaft (7/8" - 13T)
RB = Rotatable SAE "B" 4-Bolt Flange,
 SAE "B" Shaft (7/8" - 13T)
³ **RF** = Rotatable SAE "B" 2-Bolt Flange,
 SAE "BB" Shaft (1" - 15T)
XR = CHELSEA Special (Cloverleaf),
 SAE "B" Shaft (7/8" - 13T)
- Assembly Arrangement**
 3, 4, 5, 6
- Shift Option**
¹ **B** = 12V Elec/Hyd
¹ **D** = 24V Elec/Hyd
K = 12V Elec/Hyd w/ EOC
L = 24V Elec/Hyd w/ EOC
S = Air Shift with PTO/Dump Pump Combo Valve
 w/ Kickout & Neutral Spring Return
T = Air Shift with PTO/Dump Pump Combo Valve
 w/o Kickout & Neutral Spring Return

¹ Includes mounting parts
³ Available in 3 & 5 assembly only

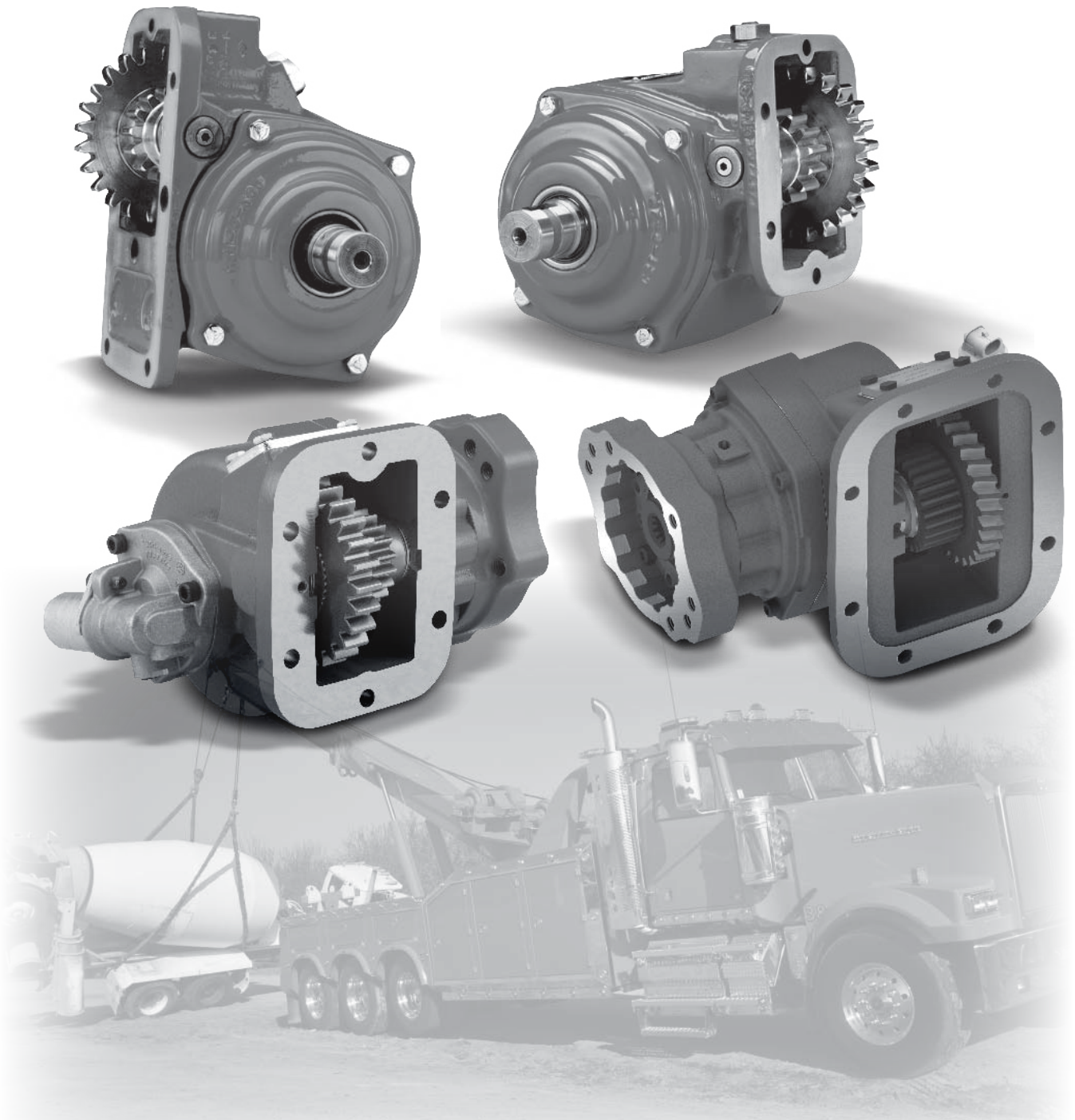
| Specifications Chart | Approximate Weight: 49 lbs. [22 kg] | | | | |
|---|-------------------------------------|-----------|-----------|-----------|-----------|
| | 270*A | 270*B | 270*D | 270*K | 270*Q |
| Intermittent Torque Rating lbs-ft [Nm] (w/ Pressure Lube) | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] |
| Intermittent Torque Rating lbs-ft [Nm] (w/ Standard Lube) | 250 [339] | 250 [339] | 250 [339] | 250 [339] | 250 [339] |
| HP Rating for Intermittent Service | | | | | |
| At 500 RPM of Output Shaft HP [Kw] (w/ Pressure Lube) | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] |
| At 500 RPM of Output Shaft HP [Kw] (w/ Standard Lube) | 24 [18] | 24 [18] | 24 [18] | 24 [18] | 24 [18] |
| At 1000 RPM of Output Shaft HP [Kw] (w/ Pressure Lube) | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] |
| At 1000 RPM of Output Shaft HP [Kw] (w/ Standard Lube) | 48 [36] | 48 [36] | 48 [36] | 48 [36] | 48 [36] |

| Specifications Chart | Approximate Weight: 49 lbs. [22 kg] | | | |
|---|-------------------------------------|-----------|-----------|-----------|
| | 271*A | 271*B | 271*D | 271*K |
| Intermittent Torque Rating lbs-ft [Nm] (All Lube Types) | 250 [339] | 250 [339] | 250 [339] | 250 [339] |
| HP Rating for Intermittent Service | | | | |
| At 500 RPM of Output Shaft HP [Kw] (All Lube Types) | 24 [18] | 24 [18] | 24 [18] | 24 [18] |
| At 1000 RPM of Output Shaft HP [Kw] (All Lube Types) | 48 [36] | 48 [36] | 48 [36] | 48 [36] |



| Specifications Chart | Approximate Weight: 49 lbs. [22 kg] | | | | | | | | |
|--|-------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 272*A | 272*B | 272*C | 272*D | 272*G | 272*K | 272*M | 272*P | 272*S |
| Intermittent & Continuous Torque Rating lbs-ft [Nm] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] |
| HP Rating for Intermittent & Continuous Service | | | | | | | | | |
| At 500 RPM of Output Shaft HP [Kw] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] |
| At 1000 RPM of Output Shaft HP [Kw] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] |

236/238 Series to 272/282 Series

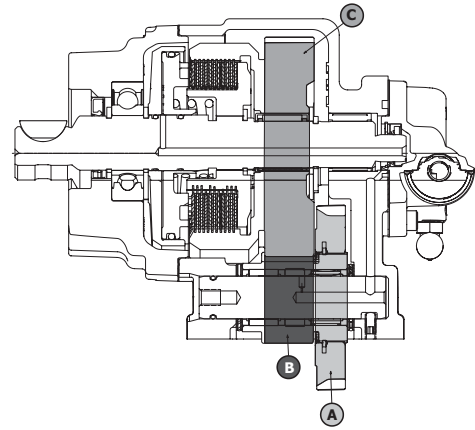
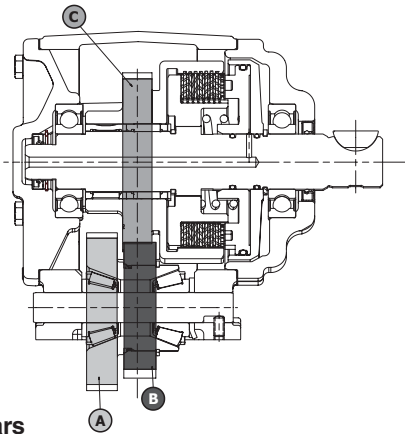


| Model Series | | Mounting Code | | Ratio | | Input Gear | | Lube | | Shift | | Arr. | | Output | |
|--------------|-----|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Legacy | New | 236 238 | 272 282 | 236 238 | 272 282 | 236 238 | 272 282 | 236 238 | 272 282 | 236 238 | 272 282 | 236 238 | 272 282 | 236 238 | 272 282 |
| 236 | 272 | X | X | A | B (272) | AH | AJ | X | X | A | A | 3 | 3 | XD | XD |
| 238 | 282 | G | G | D | D, G | DA | DA | P | P | P | P | 4 | N/A | XE | RE |
| | | K | K | K | M | DB (236) | N/A | N/A | R | Q | Q | 5 | 5 | XK | RK |
| | | L (236) | L | Q | S | ES (236) | ES | N/A | S | S | N/A | 6 | N/A | XP | N/A |
| | | Z | Z | U | T (282) | FN (236) | FN | N/A | W | T | N/A | | | XR | XR |
| | | E (238) | N/A | N/A | K | JK (236) | JK | N/A | V | V | V | | | XX | XV |
| | | N/A | A | N/A | P | JW (236) | JW | N/A | Y | N/A | J | | | XY | RY |
| | | N/A | D | N/A | S | | | N/A | | N/A | 1 | | | AF | RF |
| | | N/A | R | | | | | N/A | | N/A | 2 | | | RA | RK |
| | | | | | | | | N/A | | N/A | 3 | | | RB | RB/RK |
| | | | | | | | | N/A | | N/A | 4 | | | RF | RF |
| | | | | | | | | N/A | | N/A | R | | | BD | BD |
| | | | | | | | | | | | | | | N/A | BV |
| | | | | | | | | | | | | | | N/A | AB |
| | | | | | | | | | | | | | | N/A | AC |
| | | | | | | | | | | | | | | N/A | RS |
| | | | | | | | | | | | | | | N/A | RZ |
| | | | | | | | | | | | | | | N/A | SD |
| | | | | | | | | | | | | | | N/A | SV |

N/A = Not Available

See Chelsea Application Catalog HY25-3000/US for specific applications.
See pages 18 & 19 for option details.

Gear Chart



Input Gears

| 236 Series | | | | | | Helix Angle | 272 Series | | | | |
|-----------------|-------------|-----------|-------------|-----------|----------|-----------------|-------------|------------|-----------|-------------|-----------|
| Gear Designator | Part Number | Teeth "A" | Part Number | Teeth "B" | Assembly | | N.S.S. | | | | |
| | | | | | | Gear Designator | Assembly | Input Gear | Teeth "A" | Input Ratio | Teeth "B" |
| 236*AAH | 5-P-1486† | 22 | N/A | 21 | Spur | 272*BAJ | 5-P-1510-2X | 5-P-1510 | 25 | 5-P-1499 | 22 |
| 236*ADA | 5-P-1487† | 23 | N/A | 21 | Spur | 272*BDA | 5-P-1511-2X | 5-P-1511 | 27 | 5-P-1499 | 22 |
| 236*DAH | 5-P-1004 | 22 | 5-P-1378 | 28 | Spur | 272*DAJ | 5-P-1510-4X | 5-P-1510 | 25 | 5-P-1501 | 28 |
| | | | | | | 272*GAJ | 5-P-1510-5X | 5-P-1510 | 25 | 5-P-1502 | 31 |
| 236*DDA | 5-P-1037 | 23 | 5-P-1378 | 28 | Spur | 272*DDA | 5-P-1511-4X | 5-P-1511 | 27 | 5-P-1501 | 28 |
| | | | | | | 272*GDA | 5-P-1511-5X | 5-P-1511 | 27 | 5-P-1502 | 31 |
| 236*DES | 5-P-1059 | 22 | 5-P-1378 | 28 | LH | 272*DES | 5-P-1512-4X | 5-P-1512 | 23 | 5-P-1501 | 25 |
| | | | | | | 272*GES | 5-P-1512-5X | 5-P-1512 | 23 | 5-P-1502 | 28 |
| 236*DFN | 5-P-1070 | 26 | 5-P-1378 | 28 | LH | 272*DFN | 5-P-1509-4X | 5-P-1509 | 28 | 5-P-1501 | 28 |
| | | | | | | 272*GFN | 5-P-1509-5X | 5-P-1509 | 28 | 5-P-1502 | 31 |
| 236*DJK | 5-P-1261 | 24 | 5-P-1378 | 28 | LH | 272*BJK | 5-P-1513-2X | 5-P-1513 | 26 | 5-P-1499 | 22 |
| | | | | | | 272*DJK | 5-P-1513-4X | 5-P-1513 | 26 | 5-P-1501 | 28 |
| 236*DJW | 5-P-1319 | 23 | 5-P-1378 | 28 | LH | 272*BJW | 5-P-1514-2X | 5-P-1514 | 25 | 5-P-1499 | 22 |
| | | | | | | 272*DJW | 5-P-1514-4X | 5-P-1514 | 25 | 5-P-1501 | 28 |
| 236*KAH | 5-P-1004 | 22 | 5-P-1379 | 32 | Spur | 272*MAJ | 5-P-1510-7X | 5-P-1510 | 25 | 5-P-1504 | 35 |
| 236*KDA | 5-P-1037 | 23 | 5-P-1379 | 32 | Spur | 272*MDA | 5-P-1511-7X | 5-P-1511 | 27 | 5-P-1504 | 35 |
| 236*KES | 5-P-1059 | 22 | 5-P-1379 | 32 | LH | 272*KES | 5-P-1512-6X | 5-P-1512 | 23 | 5-P-1503 | 33 |
| 236*KFN | 5-P-1070 | 26 | 5-P-1379 | 32 | LH | 272*MFN | 5-P-1509-7X | 5-P-1509 | 28 | 5-P-1504 | 37 |
| 236*KJK | 5-P-1261 | 24 | 5-P-1379 | 32 | LH | 272*GJK | 5-P-1513-5X | 5-P-1513 | 26 | 5-P-1502 | 31 |
| 236*KJW | 5-P-1319 | 23 | 5-P-1379 | 32 | LH | 272*GJW | 5-P-1514-5X | 5-P-1514 | 25 | 5-P-1502 | 31 |
| 236*QAH | 5-P-1004 | 22 | 5-P-1380 | 38 | Spur | 272*SAJ | 5-P-1510-9X | 5-P-1510 | 25 | 5-P-1506 | 39 |
| 236*QDA | 5-P-1037 | 23 | 5-P-1380 | 38 | Spur | 272*SDA | 5-P-1511-9X | 5-P-1511 | 27 | 5-P-1506 | 39 |
| 236*QFN | 5-P-1070 | 26 | 5-P-1380 | 38 | LH | 272*SFN | 5-P-1509-9X | 5-P-1509 | 28 | 5-P-1506 | 39 |
| 236*QJK | 5-P-1261 | 24 | 5-P-1380 | 38 | LH | 272*MJK | 5-P-1513-7X | 5-P-1513 | 26 | 5-P-1504 | 35 |
| 236*QJW | 5-P-1319 | 23 | 5-P-1380 | 38 | RH | 272*MJW | 5-P-1514-7X | 5-P-1514 | 25 | 5-P-1504 | 35 |
| 236*UJK | 5-P-1261 | 24 | 5-P-1381 | 40 | LH | 272*SJK | 5-P-1513-9X | 5-P-1513 | 26 | 5-P-1506 | 39 |
| 236*UJW | 5-P-1319 | 23 | 5-P-1381 | 40 | LH | 272*SJW | 5-P-1514-9X | 5-P-1514 | 25 | 5-P-1506 | 39 |

N.S.S. = Not Sold Separately

N/A = Not Available

Continued on next page

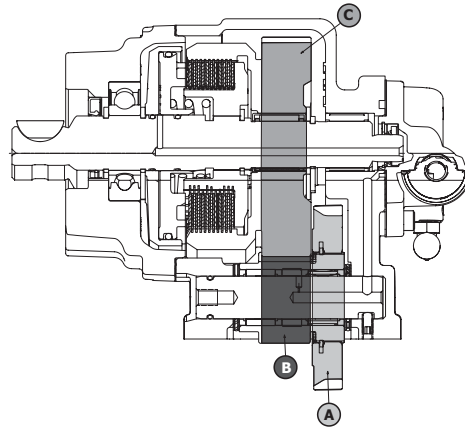
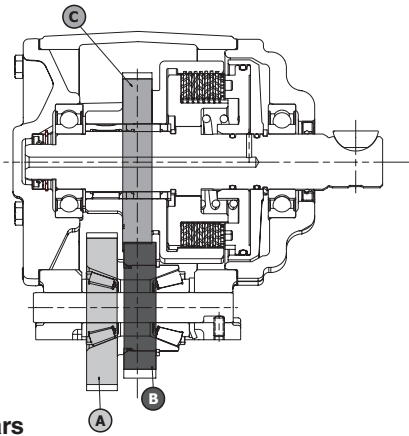
†One piece gear

LH = Left Hand

RH = Right Hand

NOTE: 236 only crossover to 272 and 238 only crossover to 282

Gear Chart



Input Gears

| 238 Series | | | | | Helix Angle | 282 Series | | | | | |
|-----------------|-------------|-----------|-------------|-----------|-------------|-----------------|--------------|-----------|-------------|-----------|----|
| Gear Designator | Part Number | Teeth "A" | Part Number | Teeth "B" | | Gear Designator | Assembly | N.S.S. | | | |
| | | | | | Input Gear | | | Teeth "A" | Input Ratio | Teeth "B" | |
| 238*AAH | 5-P-1486† | 22 | N/A | 21 | Spur | 282*BAJ | 5-P-1510-2X | 5-P-1510 | 25 | 5-P-1478 | 22 |
| 238*ADA | 5-P-1487† | 23 | N/A | 21 | Spur | 282*BDA | 5-P-1511-2X | 5-P-1511 | 27 | 5-P-1478 | 22 |
| 238*DAH | 5-P-1004 | 22 | 5-P-1378 | 28 | Spur | 282*DAJ | 5-P-1510-4X | 5-P-1510 | 25 | 5-P-1479 | 28 |
| | | | | | | 282*GAJ | 5-P-1510-5X | 5-P-1510 | 25 | 5-P-1480 | 31 |
| 238*DDA | 5-P-1037 | 23 | 5-P-1378 | 28 | Spur | 282*DDA | 5-P-1511-4X | 5-P-1511 | 27 | 5-P-1479 | 28 |
| | | | | | | 282*GDA | 5-P-1511-5X | 5-P-1511 | 27 | 5-P-1480 | 31 |
| 238*KAH | 5-P-1004 | 22 | 5-P-1379 | 32 | Spur | 282*MAJ | 5-P-1510-7X | 5-P-1510 | 25 | 5-P-1482 | 35 |
| 238*KDA | 5-P-1037 | 23 | 5-P-1379 | 32 | Spur | 282*MDA | 5-P-1511-7X | 5-P-1511 | 27 | 5-P-1482 | 35 |
| 238*QAH | 5-P-1004 | 22 | 5-P-1380 | 38 | Spur | 282*SAJ | 5-P-1510-9X | 5-P-1510 | 25 | 5-P-1484 | 39 |
| 238*QDA | 5-P-1037 | 23 | 5-P-1380 | 38 | Spur | 282*SDA | 5-P-1511-9X | 5-P-1511 | 27 | 5-P-1484 | 39 |
| 238*UAH | 5-P-1004 | 22 | 5-P-1381 | 40 | Spur | 282*TAJ | 5-P-1510-10X | 5-P-1510 | 25 | 5-P-1497 | 41 |
| 238*UDA | 5-P-1037 | 23 | 5-P-1381 | 40 | Spur | 282*TDA | 5-P-1511-10X | 5-P-1511 | 27 | 5-P-1497 | 41 |

N.S.S. = Not Sold Separately

N/A = Not Available

†One piece gear

LH = Left Hand

RH = Right Hand

NOTE: 236 only crossover to 272 and 238 only crossover to 282

Gear Chart (Continued)

Ratio Gear Chart

| 236/238 Series | | | | | 272 Series | | |
|------------------|-------------|---------------|-------------|---------------|------------------|-------------|---------------|
| Ratio Designator | Part Number | No. Teeth "B" | Part Number | No. Teeth "C" | Ratio Designator | Part Number | No. Teeth "C" |
| 236/238*A | N/A† | N/A† | 2-P-473 | 53 | 272*B | 2-P-926 | 50 |
| 236/238*D | 5-P-1378 | 28 | 2-P-606 | 47 | 272*D | 2-P-928 | 44 |
| | | | | | 272*G | 2-P-929 | 41 |
| 236/238*K | 5-P-1379 | 32 | 2-P-638 | 42 | 272*M | 2-P-933 | 37 |
| 236/238*Q | 5-P-1380 | 38 | 2-P-639 | 37 | 272*S | 2-P-936 | 33 |
| 236*U | 5-P-1381 | 40 | 2-P-810 | 34 | N/A | | |
| 238*U | 5-P-1381 | 40 | 2-P-810 | 34 | 282*T | 2-P-937 | 31 |

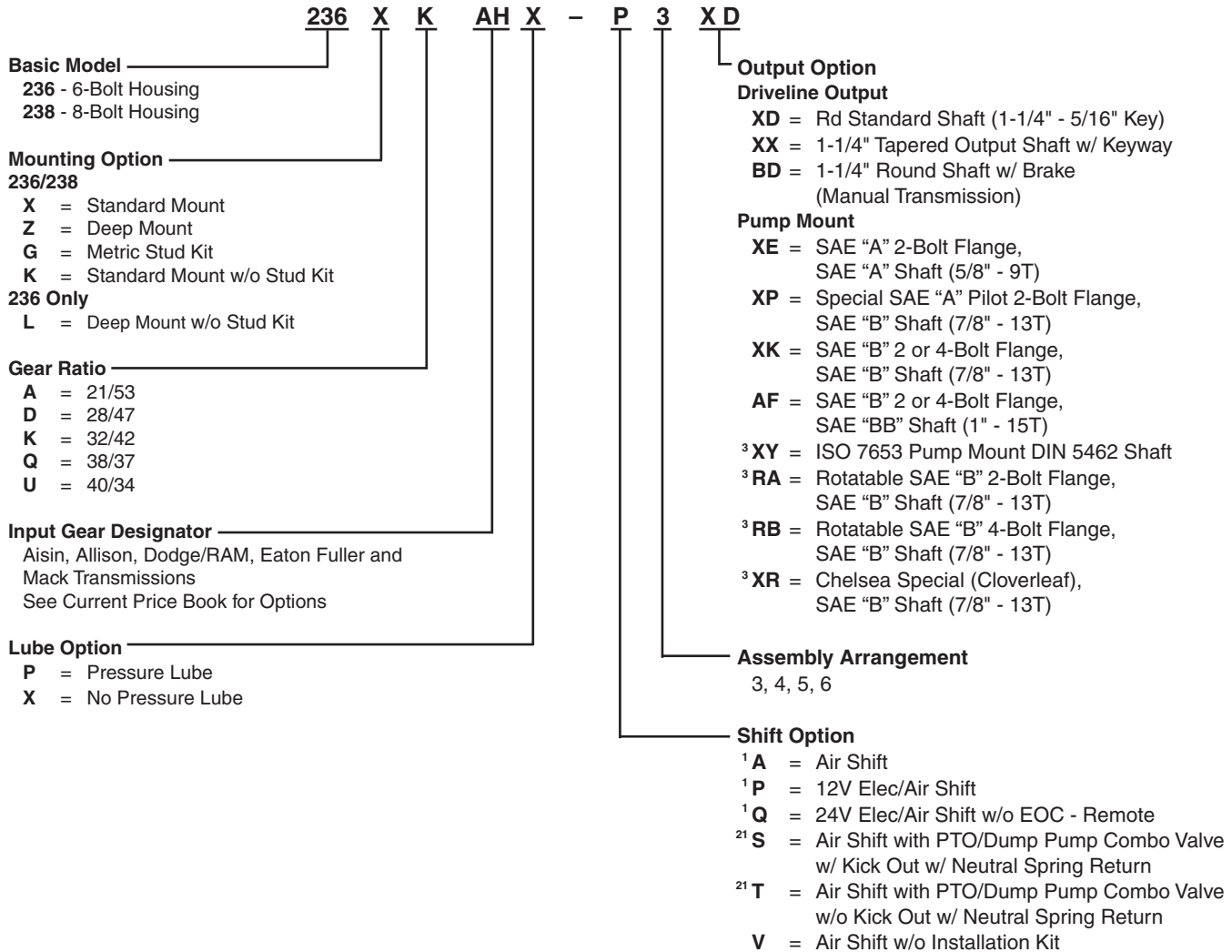
†1 piece gear

Input Gears w/o Available Crossover

| 236/238 Series | | | | 236/238 Series | | | |
|-----------------|-------------|---------------|-------------|-----------------|-------------|---------------|-------------|
| Gear Designator | Part Number | No. Teeth "A" | Helix Angle | Gear Designator | Part Number | No. Teeth "A" | Helix Angle |
| AB | 5-P-1001 | 19 | Spur | HG | 5-P-1192 | 19 | RH |
| AP | 5-P-1006 | 21 | LH | HH | 5-P-1193 | 28 | RH |
| AR | 5-P-1008 | 21 | LH | HL | 5-P-1196 | 22 | RH |
| AX | 5-P-1010 | 22 | LH | HM | 5-P-1197 | 20 | RH |
| BG | 5-P-1015 | 23 | LH | HR | 5-P-1201 | 26 | RH |
| BM | 5-P-1020 | 22 | LH | HS | 5-P-1202 | 26 | RH |
| BP | 5-P-1022 | 26 | RH | HY | 5-P-1237 | 26 | LH |
| BQ | 5-P-1023 | 25 | LH | JA | 5-P-1243 | 27 | LH |
| BR | 5-P-1024 | 26 | RH | JC | 5-P-1247 | 27 | RH |
| BS | 5-P-1025 | 26 | LH | JG | 5-P-1256 | 28 | LH |
| CB | 5-P-1029 | 25 | LH | JH | 5-P-1257 | 29 | LH |
| DB | 5-P-1038 | 39 | Spur | JL | 5-P-1262 | 24 | RH |
| DM | 5-P-1045 | 17 | LH | JM | 5-P-1262 | 22 | LH |
| DN | 5-P-1046 | 19 | LH | JN | 5-P-1264 | 22 | RH |
| DU | 5-P-1050 | 28 | LH | JP | 5-P-1268 | 33 | LH |
| EV | 5-P-1060 | 40 | Spur | JS | 5-P-1310 | 20 | LH |
| EW | 5-P-1061 | 20 | LH | JU | 5-P-1316 | 25 | LH |
| GQ | 5-P-1150 | 26 | LH | JY | 5-P-1312 | 20 | RH |
| GY | 5-P-1184 | 21 | RH | KA | 5-P-1318 | 25 | RH |
| HA | 5-P-1186 | 22 | RH | KB | 5-P-1321 | 23 | RH |
| HB | 5-P-1187 | 23 | RH | KX | 5-P-1311 | 26 | LH |
| HD | 5-P-1189 | 25 | RH | KY | 5-P-1312 | 26 | RH |
| HF | 5-P-1191 | 17 | RH | | | | |

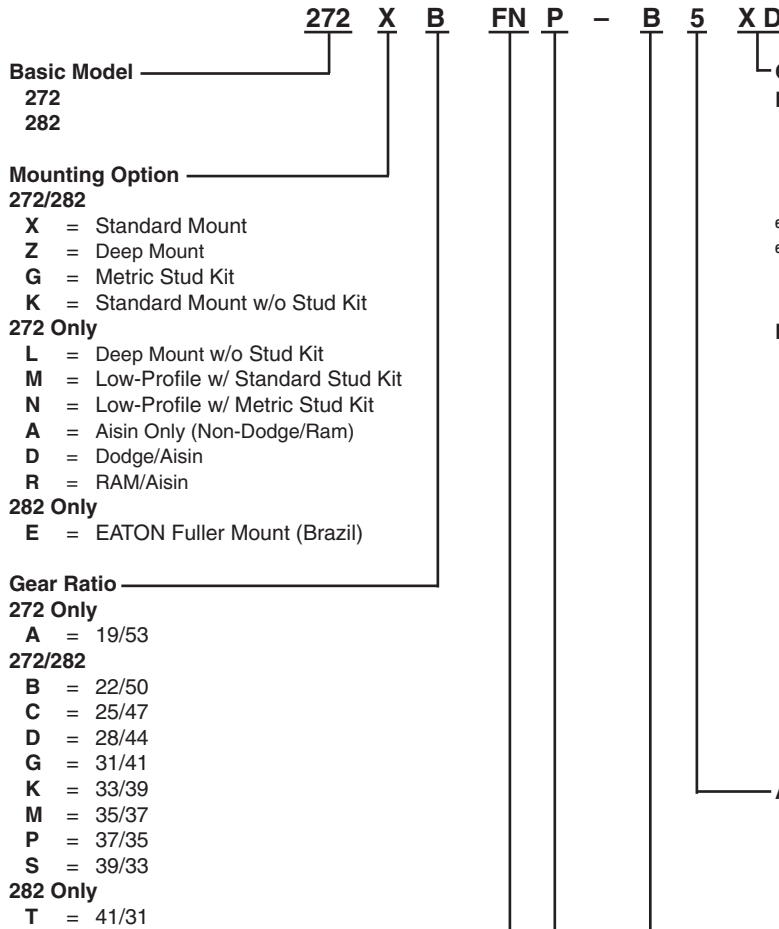
LH = Left Hand

RH = Right Hand



¹ Includes mounting parts
³ Available in 3 & 5 assembly only
²¹ Includes installation kit, console sold separately

| Specifications Chart | | Approximate Weight: 49 lbs. [22 kg] | | | | |
|---|-----------|-------------------------------------|-----------|-----------|-----------|--|
| | 236/238*A | 236/238*D | 236/238*K | 236/238*Q | 236/238*U | |
| Intermittent Torque Rating lbs-ft [Nm] (w/ Pressure Lube) | 250 [339] | 250 [339] | 250 [339] | 250 [339] | 225 [305] | |
| HP Rating for Intermittent Service | | | | | | |
| At 500 RPM of Output Shaft HP [Kw] (w/ Pressure Lube) | 24 [18] | 24 [18] | 24 [18] | 24 [18] | 21 [16] | |
| At 1000 RPM of Output Shaft HP [Kw] (w/ Standard Lube) | 48 [36] | 48 [36] | 48 [36] | 48 [36] | 43 [32] | |



Basic Model
 272
 282

Mounting Option
 272/282
 X = Standard Mount
 Z = Deep Mount
 G = Metric Stud Kit
 K = Standard Mount w/o Stud Kit

272 Only
 L = Deep Mount w/o Stud Kit
 M = Low-Profile w/ Standard Stud Kit
 N = Low-Profile w/ Metric Stud Kit
 A = Aisin Only (Non-Dodge/Ram)
 D = Dodge/Aisin
 R = RAM/Aisin

282 Only
 E = EATON Fuller Mount (Brazil)

Gear Ratio
 272 Only
 A = 19/53
 272/282
 B = 22/50
 C = 25/47
 D = 28/44
 G = 31/41
 K = 33/39
 M = 35/37
 P = 37/35
 S = 39/33

282 Only
 T = 41/31

Input Gear Designator
 Aisin, Allison, EATON Fuller, and Mack Transmissions
 See Current Price Book for Options

Lube Option
 X = No Pressure Lube

Pressure
 P = Pressure Lube
⁵ R = Valve Cap Rotated 120°
⁵ S = Valve Cap Rotated 240°

Wet Spline
⁵ W = Wet Spline
⁵ V = Valve Cap Rotated 120° w/ Wet Spline
⁵ Y = Valve Cap Rotated 240° w/ Wet Spline

⁵ Automatically pressure lubed
⁶⁴ Hyd shift PTOs only

Output Option

Driveline Output

XD = Rd Standard Shaft (1-1/4" - 5/16" Key)
XV = 1410 Series Companion Flange
BD = Drag Brake - Rd Standard Shaft (1-1/4" - 5/16" Key)
BV = Drag Brake - 1410 Series Companion Flange
⁶⁴**SD** = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key)
⁶⁴**SV** = Smart Start - 1410 Series Companion Flange
AB = DIN 120 Flange
AC = DIN 100 Flange

Pump Mount

RE = Rotatable SAE "A" 2-Bolt Flange, SAE "A" Shaft (5/8" - 9T)
RK = Rotatable SAE "B" 2 or 4-Bolt Pump Mount, SAE "B" Shaft (7/8" - 13T)
RB = Rotatable SAE "B" 4-Bolt Pump Mount, SAE "B" Shaft (7/8" - 13T)
RF = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "BB" Shaft (1" - 15T)
RZ = Rotatable SAE "B" 2 or 4-Bolt Pump Flange, SAE "C" Shaft (1-1/4" - 14T)
RS = Rotatable SAE "C" 2 or 4-Bolt Pump Mount, SAE "C" Shaft (1-1/4" - 14T)
RY = Rotatable ISO 7653 Pump Mount, DIN 5462 Shaft
XR = Chelsea Special (Cloverleaf), SAE "B" Shaft (7/8" - 13T)

Assembly Arrangement

3 = Right side - bulge down
 Left side - bulge up
5 = Left side - bulge down
 Right side - bulge up

Shift Option

Hydraulic

B = 12V Elec/Hyd - Integral
D = 24V Elec/Hyd - Integral
E = 12V Elec/Hyd w/o Installation Kit - Integral
N = 24V Elec/Hyd w/o Installation Kit - Integral
K = 12V Elec/Hyd w/ EOC
L = 24V Elec/Hyd w/ EOC
G = 12V Elec/Hyd Remote Valve w/o EOC
H = 24V Elec/Hyd Remote Valve w/o EOC

Air

A = Manual Air Shift
V = Manual Air Shift w/o Installation Kit
1 = 12V Elec/Air - Integral
2 = 24V Elec/Air - Integral
J = 12V Elec/Air w/ EOC - Integral
3 = 24V Elec/Air w/ EOC - Integral
P = 12V Elec/Air Remote
Q = 24V Elec/Air Remote
R = 12V Elec/Air Remote w/ EOC
4 = 24V Elec/Air Remote w/ EOC

| Specifications Chart | Approximate Weight: 49 lbs. [22 kg] | | | | | | | | | |
|--|-------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------|
| | 272*A | 272*B 282*B | 272*C 282*C | 272*D 282*D | 272*G 282*G | 272*K 282*K | 272*M 282*M | 272*P 282*P | 272*S 282*S | 282*T |
| Intermittent & Continuous Torque Rating lbs-ft [Nm] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] | 300 [407] |
| HP Rating for Intermittent & Continuous Service | | | | | | | | | | |
| At 500 RPM of Output Shaft HP [Kw] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] | 29 [21] |
| At 1000 RPM of Output Shaft HP [Kw] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] | 57 [43] |

Parker Hannifin Corporation – Chelsea Division

Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.

2. Price Adjustments; Payments. Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyer's request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. Warranty. Seller warrants that all products sold, other than the 590 Series, conform to the applicable Parker Chelsea standard specification for the lesser period of 2 years (24 Months) from date of service or 2-1/2 years (30 Months) from date of build (as marked on the product name plate). Seller warrants that the 590 Series will conform to the applicable Seller standard specification for the lesser period of 2 years (24 Months) from date of service or 2000 hours of usage. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

7. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. Force Majeure. Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. Termination. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

20. Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act. Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

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