

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	GEARBOX	SEE GEARBOX TABLE	1
2	GEAR	SEE GEAR TABLE	1
3	017-0650-02-0	KEY, J SERIES GEARBOX	1
4	159-2020-00-0	K PUMP SHAFT BEARING SPACER	1
5	250-8240-00-0	NU2310ECP ROLLER BEARING	1
6	HOUSING	SEE REAR BEARING HSG TABLE	1
7	296-2090-01-0	OIL SEAL	1
8	077-1930-05-0	RETAINING RING	1
9	097-0940-00-0	2-1/8 DIA. WASHER	1
10	018-2614-25-0	SCREW 3/4-10 X 1.50 GR8 ZINC PL	1
11	159-1730-00-0	SPACER, BEARING, K PUMP SHAFT	1
12	250-8340-00-0	31309 J2/QLC7CDF ROLLER BEARING	1
13	046-6800-00-0	GASKET, LK REAR BRG HSG	2
14	044-0260-00-0	VENT, AIR 1/8 MPT	1
15	018-1820-25-0	SCREW, 7/16-14 X 2.00, GR8 ZINC PL	12
16	097-3170-09-0	WASHER, BEARING LOCK (W-09)	1
17	097-2400-00-0	WASHER, CAFSPRO SUPPORT	1
18	110-6110-09-0	NUT, BEARING LOCK (N-09)	1
19	044-1820-00-0	BEARING COVER	1
20	037-2680-00-0	OUTPUT SHAFT	1
21	097-2570-00-0	BEARING RETAINING WASHER	1
22	018-1206-25-0	CSW HH 1/4-20 X 0.75 Z G8	4
23	018-2020-25-0	SCREW, HHCS, 1/2-13 X 2, GRADE 8	1
24	097-0100-00-0	WASHER	1
25	031-1740-00-0	LK IDLER GEAR (43T RH)	1
26	077-9133-01-0	RING, RETAINING	1
27	250-8310-00-0	LK IDLER GEAR BEARING	2
28	SHIM	SEE 048-1550-XX-0 SHIM TABLE	1
29	040-2280-00-0	SHAFT SEAL RING	1
30	037-2290-00-0	SHAFT, INTERMEDIATE	1
31	159-1710-10-0	SPACER, SHAFT, IDLER	1
32	SHIM	SEE 048-1470-XX-0 SHIM TABLE	1
33	018-1814-25-0	SCREW, 7/16-14 X 1-1/2, GR 8	20
34	008-0840-00-0	BEARING CARRIER	1
35	018-2616-25-0	3/4-10 x 1-3/4 BOLT GR8	2
36	097-2050-00-0	WASHER (SEE NOTE 6)	2
37	037-2280-00-0	OUTPUT SHAFT	1
38	250-8140-53-0	4DK TAILSHAFT BEARING ASSEMBLY	1
39	077-2810-00-0	RETAINING RING	1
40	250-8300-00-0	NU207ECJ BEARING	1
41	028-0420-00-0	SHIFT FORK	1
42	048-1430-00-0	SHIFT COLLAR	1
43	250-8110-00-0	NEEDLE BEARING	1
44	031-1720-00-0	DRIVE GEAR (53 TEETH)	1
45	250-8120-00-0	NEEDLE BEARING	1
46	250-8140-52-0	4DK INPUT BEARING ASSEMBLY	1
47	296-2680-00-0	OIL SEAL	2
48	037-2270-00-0	INPUT SHAFT	1
49	YOKE	SEE YOKE TABLE	2
50	018-1810-08-0	SCREW 7/16-14 X 1.00 SOC HD CAP	4
51	250-9550-00-0	GEARBOX BEARING	2
52	018-8350-00-0	4DK SHIFTING FORK SCREW	1
53	046-5060-00-0	GASKET QL-W429	2
54	018-2104-61-0	SCREW-1/2-20 X 1/2 PLATED SET	1
55	042-0060-00-0	SHAFT LOCK SPRING	1
56	039-0050-00-0	GEARSHIFT SHAFT LOCK BALL	1
57	008-0990-00-0	DUST CAP	1
58	200-2450-00-0	SWITCH GEARSHIFT	2
59	082-0422-03-0	1/2 MALE NPT x 3/8 TUBE COMP	4
60	007-3610-00-0	LK COOLING TUBE	2
61	082-0318-02-0	ELBOW, 3/8 COMP X 3/8 COMP, 90 DEG	2
62	604-0033-00-0	TUBE, COPPER	1
63	018-5002-00-0	#4-40 x 1/4LG SCREW	4
64	101-0082-00-0	SERIAL NUMBER PLATE	1
65	217-0501-00-0	PLUG-3/4 NPT M.I.	1
66	018-1422-25-0	SCREW 5/16-18 X 2-1/4, GR8	2
67	040-8210-00-0	SEAL RING	2
68	028-0050-03-0	ROD END, EYE, 406, THREAD 3/8-24	1
69	018-1410-25-0	SCREW, 5/16-18 X 1, ZINC	4
70	217-0501-08-0	3/4 NPT MAGNETIC DRAIN PLUG	1

ITEM NO.	PART NO.	DESCRIPTION	QTY.
32	048-1470-05-0	SHIM, BRG CARRIER, .005 THICK	AS REQUIRED
32	048-1470-07-0	SHIM, BRG CARRIER, .007 THICK	AS REQUIRED
32	048-1470-20-0	SHIM, BRG CARRIER, .020 THICK	AS REQUIRED

ITEM NO.	PART NO.	DESCRIPTION	QTY.
28	048-1550-03-0	SHIM, BEARING, .003 THICK	AS REQUIRED
28	048-1550-05-0	SHIM, BEARING, .005 THICK	AS REQUIRED
28	048-1550-07-0	SHIM, BEARING, .007 THICK	AS REQUIRED

REVISIONS					
ECN	REV	ZONE	CHANGED FROM	BY	DATE
CFL3159	D	-	REDRAWN IN SOLID WORKS; REDRAWN ON FSG BORDER	JRP	26JUL2013
3432	E	-	SEE ECN 3432 FULL FORM	JSJ	18JUNE2015

GEARBOX MODEL	GEAR RATIO	GEARBOX PART NO.	BRG HOUSING PART NO.	GEAR PART NO.	A	B	C	D	E	F
LKA	2.52	504-0670-00-0	062-0860-01-0	031-1660-00-0 (21T)	503.9 [19.84]	335.8 [13.22]	-	-	158.0 [6.22]	373.9 [14.72]
	031-1670-00-0 (23T)			337.3 [13.28]		6.4 [0.25]	-			
	031-1680-00-0 (26T)			345.2 [13.59]		-	-			
	031-1690-00-0 (28T)			350.0 [13.78]		-	2.8 [0.11]			
	031-1700-00-0 (31T)			354.8 [13.97]		-	10.9 [0.43]			
XKA	1.89	504-0680-00-0	062-0860-01-0	031-1710-00-0 (33T)	562.4 [22.14]	359.4 [14.15]	-	6.4 [0.25]	186.9 [7.36]	432.1 [17.01]
	031-1660-00-0 (21T)			394.0 [15.51]		-	-			
	031-1670-00-0 (23T)			395.7 [15.58]		6.4 [0.25]	-			
	031-1680-00-0 (26T)			403.6 [15.89]		-	-			
	031-1690-00-0 (28T)			408.4 [16.08]		-	2.8 [0.11]			
XKA	1.71	504-0680-00-0	062-0860-01-0	031-1700-00-0 (21T)	562.4 [22.14]	413.3 [16.27]	-	10.9 [0.43]	186.9 [7.36]	432.1 [17.01]
	031-1710-00-0 (33T)			418.1 [16.45]		-	6.4 [0.25]			
	031-1660-00-0 (21T)			394.0 [15.51]		-	-			
	031-1670-00-0 (23T)			395.7 [15.58]		6.4 [0.25]	-			
	031-1680-00-0 (26T)			403.6 [15.89]		-	-			

FOR ADDITIONAL OPTIONS AND ACCESSORIES REFER TO THE FOLLOWING DRAWINGS	
OPTION	DRAWING
PUMP SHIFT INDICATOR LIGHTS	PL748
PVG PRIMING VALVE	PL480
SPV PRIMING VALVE	PL819
ESP PRIMING PUMP	PL821

INSTALLER TO CONNECT ONE END OF DRIVE UNIT COOLING TUBE TO PUMP DISCHARGE AND THE OTHER END TO PUMP SUCTION WITH 3/8 TUBING. A DRAIN VALVE MUST BE PROVIDED FOR THIS COOLING TUBE TO DRAIN IN FREEZING CONDITIONS. (SEE NOTE 7 FOR FURTHER COOLING INSTRUCTIONS).

NOTES:
1. APPLY LOCTITE #246 HIGH TEMPERATURE THREAD LOCKER OR EQUIVALENT TO SCREW THREADS AND TORQUE SCREWS PER HALE ENGINEERING STANDARD ES018-002.
2. UNLESS OTHERWISE INDICATED, ALL FASTENERS TO BE GRADE 5 ZINC PLATED STEEL.
3. XK GEARBOX REQUIRES (1) ADDITIONAL 007-3610-10-0 COOLING TUBE, (2) ADDITIONAL 082-0422-03-0 FITTINGS, (2) ADDITIONAL 082-0318-02-0 FITTINGS AND (1) ADDITIONAL 604-0033-00-0 COPPER TUBE.
4. INSTALL 048-1470-XX-0 SERIES SHIMS AS REQUIRED TO PRODUCE A 0.060 +/- 0.010 INCH GAP BETWEEN 037-2270-00-0 INPUT SHAFT AND 037-2280-00-0 OUTPUT SHAFT. REFER TO 029-0020-63-0 MAINTENANCE MANUAL SECTION 9.3 FOR DETAILS.
5. INSTALL 048-1550-XX-0 SERIES SHIMS AS REQUIRED UNTIL INTERMEDIATE GEAR CAN BE FREELY SPUN BY HAND AFTER 018-2025-25-0 INTERMEDIATE SHAFT SCREW HAS BEEN FULLY TORQUED.
6. APPLY THIN COATING OF LOCTITE #290 OR EQUIVALENT TO INSIDE FACE OF WASHER PRIOR INSTALLATION TO PREVENT OIL LEAKS THROUGH DRIVE SHAFT SPLINES.
7. SEE PL1145 FOR KPS POWER SHIFT COMPONENTS. SEE PL1086 FOR KPS CONTROL VALVE ASSEMBLY.
8. SEE PL1157 FOR REAR BEARING HOUSING ORIENTATION.

HALE TYPE "LKA/XKA" SERIES GEARBOX

⚠ WARNING ⚠

EXCEEDING THESE LIMITS OR FAILURE TO FOLLOW THE RECOMMENDATIONS OUTLINED ON THIS DRAWING COULD DAMAGE THE GEARBOX AND RESULT IN PERSONAL INJURY.

MAX. TORQUE ON AUXILIARY OUTPUT SHAFT: 2300 LBS-FT (3118 N-m)
MAX. GEARBOX SHAFT TORQUE (ROAD): 18,500 LBS-FT (25,083 N-m)
SEE HALE TORQUE LIMIT CHART F-72 FOR ADDITIONAL DATA

DRIVE LINE RECOMMENDATIONS

APPARATUS BUILDER SUPPLIED DRIVE LINES SHALL BE OF APPROPRIATE SIZE TO MATCH THE CHASSIS AND PUMP REQUIREMENTS WITH INDIVIDUAL JOINT CANCELLATION AND PHASING BEFORE AND AFTER THE PUMP. DRIVE SHAFT BALANCE (INCLUDING YOKES) SHALL NOT EXCEED THE RECOMMENDED LIMIT OF EITHER THE DRIVE SHAFT OR CHASSIS TRANSMISSION MANUFACTURER'S SPECIFICATIONS. DRIVE SHAFT FULL RANGE OPERATING SPEEDS SHALL NOT EXCEED 42% OF ITS CRITICAL SPEED.

APPROX. GEARBOX WEIGHT:
LKA GEARBOX = 410 LBS
XKA GEARBOX = 450 LBS

203.2 [8.00]
101.6 [4.00]
126.9 [5.00]
166.6 [6.56]
270.0 [10.63]
164.3 [6.47]
81.7 [3.22]
53.9 [2.12]
2.00" - 10 SPLINE 7.861/7.887 [3095/3105] TOOTH WIDTH
22.4 [0.88]
44.5 [1.75]
50.8 [2.00]
12.7 [0.50]
25.4 [1.00]
88.9 [3.50]
140.5 [5.53]
406.4 [16.00]
203.2 [8.00]
114.4 [4.50]
50.4 [2.00]
80.1 [3.15]
47.6 [1.88]
5/8-11 UNC-2B X 25.4 [1.00] DEEP (5 PER SIDE)
B = DISTANCE TO CENTER LINE OF PUMP SHAFT
2X 7/16-14 X 22.4 [0.88] DEEP OPTIONAL PRIMER MOUNTING PAD
2X 1/2-13 UNC-2B X 30.2 [1.19] DEEP
2X 5/8-11 UNC-2B X 31.8 [1.25] DEEP
6X 018-2422-25-0 SCREW, 5/8-11 X 2.25 GR5 ZINC PL
2X 046-6890-00-0 GASKET
OIL DRAIN PLUG
OIL LEVEL PLUG. USE SAE EP-90 OR 80W-90 API GL-5 OIL. APPROXIMATE OIL CAPACITY: LK & XK = 4 QUARTS
CHECK GAP BETWEEN SHAFTS HERE
SECTION B-B KPS POWER SHIFT SCALE 1 : 10

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

PROJECTION:

ITEM NO.

PART NO.

DESCRIPTION

QTY.

1

018-2412-02-0

SCREW-5/8-11 X 1-1/4

1

2

097-0890-03-0

IMPELLER WASHER

1

3

037-2580-00-0

KA AUX. OUTPUT SHAFT

1

4

077-1500-25-0

RETAINING RING

1

5

296-2610-00-0

OIL SEAL

1

6

BEARING COVER

SEE BEARING COVER TABLE

1

7

044-0260-00-0

VENT, AIR 1/8 MPT

1

8

159-1730-00-0

SPACER, BEARING, K PUMP SHAFT

1

9

GEAR

SEE GEAR TABLE

1

10

017-0650-02-0

KEY, J SERIES GEARBOX

1

11

046-6800-00-0

GASKET, LK REAR BRG HSG

2

12

HOUSING

SEE BEARING HOUSING TABLE

1

13

077-1930-05-0

RETAINING RING

1

14

097-0940-00-0

2-1/8 DIA. WASHER

1

15

018-2614-25-0

SCREW 3/4-10 X 1.50 GR8 ZINC PL

1

16

296-2090-01-0

OIL SEAL

1

17

250-8240-00-0

NU2310ECP ROLLER BEARING

1

18

159-2020-00-0

K PUMP SHAFT BEARING SPACER

1

19

250-8340-00-0

31309 J2/QLC7CDF ROLLER BEARING

1

20

097-2570-00-0

BEARING RETAINING WASHER

1

21

018-1206-25-0

CSW HH 1/4-20 X 0.75 Z G8

4

22

018-1822-25-0

SCRW, 7/16-14x2.25, GR8, ZINC PL

12

23

097-2400-00-0

WASHER, CAFSPRO SUPPORT

1

24

097-3170-09-0

WASHER, BEARING LOCK (W-09)

1

25

110-6110-09-0

NUT, BEARING LOCK (N-09)

1

GEARBOX MODEL

GEAR RATIO

GEAR

BEARING COVER

BEARING HOUSING

LKA-25 & XKA-25

2.52

031-1660-00-0

044-2050-00-0

062-0860-01-0

LKA-23 & XKA-23

2.30

031-1670-00-0

044-2050-00-0

062-0860-01-0

LKA-21 & XKA-21

2.04

031-1680-00-0

044-2050-01-0

062-0850-01-0

LKA-19 & XKA-19

1.89

031-1690-00-0

044-2050-01-0

062-0850-01-0

LKA-17 & XKA-17

1.71

031-1700-00-0

044-2050-00-0

062-0860-01-0

LKA-16 & XKA-16

1.60

031-1710-00-0

044-2050-00-0

062-0860-01-0

OPTIONAL AUXILIARY OUTPUT

LKA & XKA PTO

LKA & XKA DRIVETHRU

ITEM NO.

PART NO.

DESCRIPTION

QTY.

1

018-1814-25-0

SCREW, 7/16-14 X 1-1/2, GR 8

8

2

048-1470-05-0

SHIM BEARING CARRIER (.005 THICK)

1

3

048-1430-00-0

SHIFT COLLAR

1

4

040-1610-00-0

SEAL RING

1

5

008-0840-00-0

BEARING CARRIER

1

6

250-8140-10-0

K DRIVETHRU BEARING ASSY

1

7

250-8140-52-0

4DK INPUT BEARING ASSEMBLY

1

8

296-2680-00-0

OIL SEAL

2

9

031-1720-00-0

DRIVE GEAR (53 TEETH)

1

10

250-8110-00-0

NEEDLE BEARING

1

11

250-8120-00-0

NEEDLE BEARING

1

12

018-2616-25-0

3/4-10 x 1-3/4 BOLT GR8

2

13

097-2050-00-0

WASHER

2

14

115-1450-00-0

RPL25 HALF ROUND YOKE (MOCK VERSION)

2

15

037-2700-00-0

SHAFT - INPUT/OUTPUT

1

16

028-0420-00-0

SHIFT FORK

1

SHIM NOTE:

PRIOR TO INSTALLING END YOKEs, CHECK CLEARANCE BETWEEN GEARBOX HOUSING AND 008-0840-00-0 BEARING CARRIER USING FEELER GAUGE. INSTALL 048-1470-XX-0 SHIMS BASED ON GAP BETWEEN GEARBOX HOUSING AND BEARING CARRIER.

REVISIONS

ECN

REV.

ZONE

CHANGED FROM

BY

DATE

APVD

CFL3159

D

-

REDRAWN IN SOLID WORKS; REDRAWN ON FSG BORDER

JRP

26JUL2013

JRP

3432

E

-

SEE ECN 3432 FULL FORM

JSJ

18JUNE2015

AJG

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
[INCHES ARE FOR REFERENCE, ONLY]
TOLERANCE FOR MILLIMETER DIMENSIONS:
X: ±1
X.X: ±0.5
X.XX: ±0.25
X.XXX: ±0.125
ANGLES: ±0.25°
SURFACE TEXTURE IN µm Ra
REMOVE ALL SHARP EDGES, 0.25MAX

FSG OF
IDEX CORPORATION

MATERIAL

MADE FROM

FINISH

PROJECT

HALE

GODIVA

class1

TITLE

HALE TYPE "LKA/XKA" SERIES GEARBOX

DRAWN

RJT

DATE

01OCT2008

SIZE

D

SCALE

1:3

DRAWING NUMBER

PL1177

REV

E

SHEET

2 OF 2

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HALE TYPE "LKA/XKA" SERES GEARBOX