

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

IF IN DOUBT ASK

PROJECTION:

ENGINE ROTATION VOLUTE POSITION

POSITION 1

POSITION 2

POSITION 3

POSITION 4

POSITION 5

POSITION 6

POSITION 7

POSITION 8

POSITION 9

POSITION 10

POSITION 11

POSITION 12

OPPOSITE ENGINE ROTATION VOLUTE POSITION

POSITION 13

POSITION 14

POSITION 15

POSITION 16

POSITION 17

POSITION 18

POSITION 19

POSITION 20

POSITION 21

POSITION 22

POSITION 23

POSITION 24

VIEW Y

THE CAST "ARROW" ON PUMP HEAD TO POINT UP FOR ALL GEARBOX POSITIONS, EXCEPT INVERTED POSITION.

VIEW Z

THE CAST "I" ON PUMP HEAD TO POINT UP FOR INVERTED GEARBOX POSITION.

HORIZONTAL LH - 22.5°
(NOT AVAILABLE WITH ENGINE MOUNT)

HORIZONTAL LH

VERTICAL
(PUMP OVER INPUT)

INVERTED
(INPUT OVER PUMP)

HORIZONTAL RH

HORIZONTAL RH - 22.5°
(NOT AVAILABLE WITH ENGINE MOUNT)

GEARBOX AND DISCHARGE POSITIONS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE FOR INCHES DIMENSIONS:
X: ±0.04
X.X: ±0.02
X.XX: ±0.01
X.XXX: ±0.005
ANGLES: ±0.25°
SURFACE TEXTURE IN µm Ra
REMOVE ALL BURRS AND SHARP
EDGES, 0.01MAX

FSG OF
IDEX
IDEX CORPORATION

MATERIAL

MADE FROM

FINISH

PROJECT

TITLE
Pump Assembly, AP Flex Series

DRAWN
TAM

APPROVED
DLM

DATE
03/05/2018

SIZE
D

SCALE
1:7

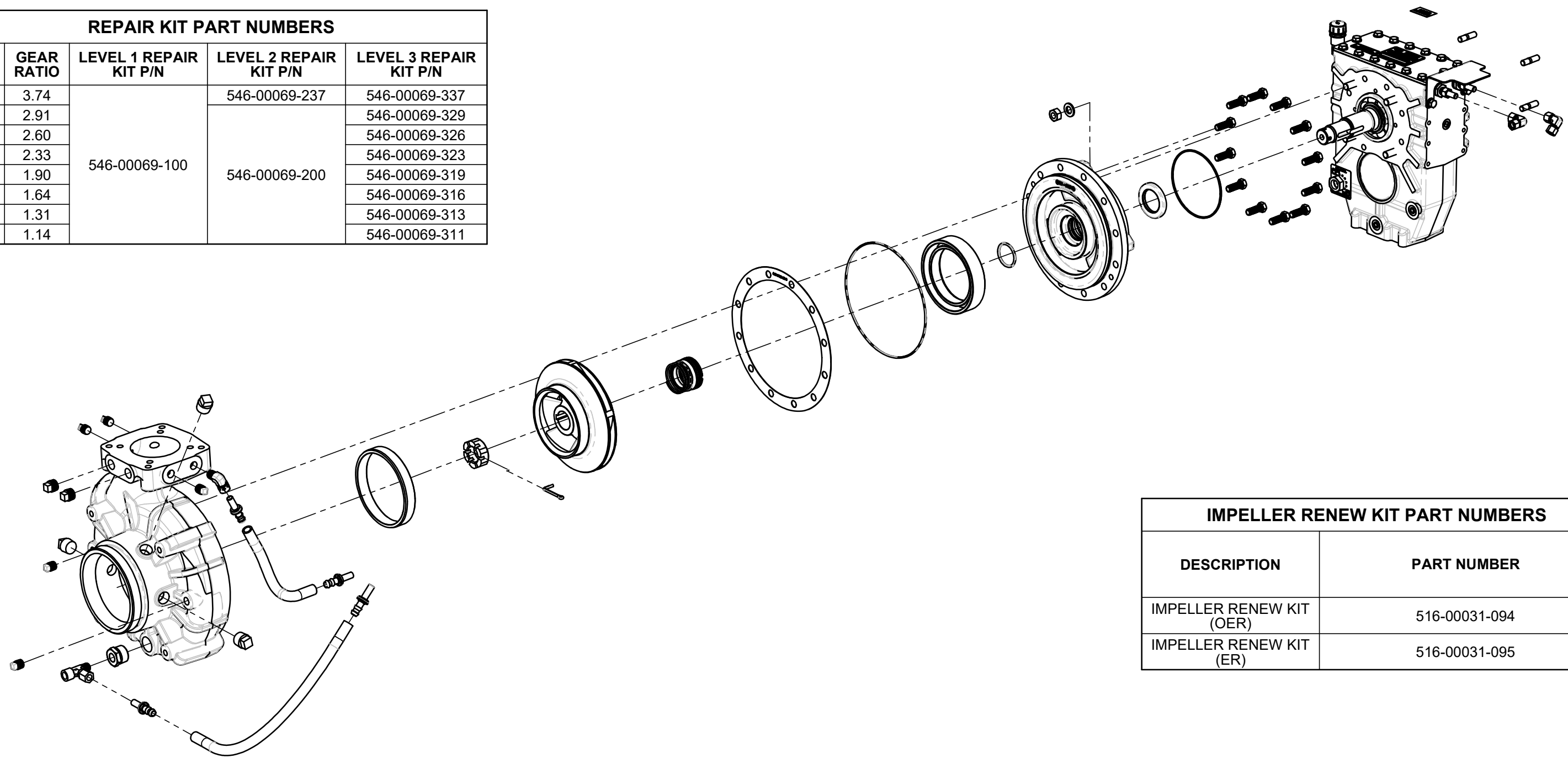
DRAWING NUMBER
FSG-PL-01483

REV
B
SHEET
2 OF 6

NOTE:

- 1. LEVEL 1 REPAIR KIT PROVIDES EVERYTHING NEEDED TO CHANGE SEALS.
- 2. LEVEL 2 REPAIR KIT PROVIDES LEVEL 1 AND ITEMS NEEDED FOR BEARINGS.
- 3. LEVEL 3 REPAIR KIT PROVIDES LEVEL 1 & 2 AND ITEMS TO REPLACE GEARS.
- 4. IMPELLER RENEW KIT PROVIDES LEVEL 1 REPAIR KIT AND ITEMS TO REPLACE IMPELLER.

REPAIR KIT PART NUMBERS				
RATIO NAME	GEAR RATIO	LEVEL 1 REPAIR KIT P/N	LEVEL 2 REPAIR KIT P/N	LEVEL 3 REPAIR KIT P/N
-37F	3.74	546-00069-100	546-00069-237	546-00069-337
-29F	2.91		546-00069-200	546-00069-329
-26F	2.60			546-00069-326
-23F	2.33			546-00069-323
-19F	1.90			546-00069-319
-16F	1.64			546-00069-316
-13F	1.31			546-00069-313
-11F	1.14			546-00069-311



IMPELLER RENEW KIT PART NUMBERS	
DESCRIPTION	PART NUMBER
IMPELLER RENEW KIT (OER)	516-00031-094
IMPELLER RENEW KIT (ER)	516-00031-095

REPAIR PART KITS IDENTIFICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE FOR INCHES DIMENSIONS:
X: ±0.04
X.X: ±0.02
X.XX: ±0.01
X.XXX: ±0.005
ANGLES: ±0.25°
SURFACE TEXTURE IN µm Ra
REMOVE ALL BURRS AND SHARP
EDGES, 0.01MAX

COPYRIGHT ©
NOT TO BE REPRODUCED OR USED TO
MAKE OTHER DRAWINGS OR MACHINERY

FSG OF
IDEX
IDEX CORPORATION

MATERIAL

MADE FROM

FINISH

PROJECT

HALE **GODIVA** **Class1**

TITLE
Pump Assembly, AP Flex Series

DRAWN	TAM	SIZE D	DRAWING NUMBER	REV B
APPROVED	DLM	SCALE 1:3	FSG-PL-01483	SHEET 3 OF 6
DATE	03/05/2018			

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	001-0760-00-0	AP Volute Body	1
	001-0760-01-0	VOLUTE BODY, AP ENG ROT, BRONZE	1
	001-0750-00-0	VOLUTE BODY, AP OPP ENG ROT	1
	001-0750-01-0	VOLUTE BODY, AP OPP ENG ROT, BRONZE	1
2	321-0150-05-0	AP CLEARANCE RING	1
3	110-7040-00-0	NUT, IMPELLER	1
4	016-0950-00-0	IMPELLER, (AS PURCHASED), AP ENG ROT	1
	016-0940-00-0	IMPELLER, (AS PURCHASED), AP OPP ENG ROT	1
5	296-5023-00-0	MECHANICAL SEAL	1
6	046-0440-00-0	GASKET HP-W323	1
7	040-1700-00-0	O-RING	1
8	321-00014-000	RING, REAR, WRAP AROUND, AP-F	1
9	040-2220-10-0	O-Ring, TBP Mechanical Seal PTFE	1
10	002-00019-001	HEAD, PUMP, AP/MBP-F	1
	002-00019-003	HEAD, PUMP, AP/MBP-F, BRONZE	1
11	MS35/10	NUT, FULL M12	4
12	MS29/8	WASHER, SPR SQ M12	4
13	296-00019-000	SEAL, OIL, VITON	1
14	040-1580-00-0	O-RING, AS568-158, NITRILE	1
15	018-1812-25-0	SCREW, 7/16-14 X 1.25, GR8	12
	018-1812-12-0	SCREW, 7/16-14 X 1.25, G8, BRZ PUMP	12
16	FSG-PL-01481	HALE FLEX SERIES GEARBOX	1
17	101-0900-00-0	ENGINE ROTATION DECAL	1
	101-0900-01-0	OPPOSITE ENG ROTATION DECAL	1
18	MS49/25	STUD, M10 X 25 LG	4
19	082-0318-02-0	ELBOW, 3/8 COMP X 3/8 COMP, 90 DEG	2
	082-3071-02-0	TEE, 3/8 CPRSN UNION (NOT SHOWN)	
20	064-5070-01-0	PIN-5/32X2L SST COTTER	1
21	082-0303-02-0	ELBOW - 3/8 MNPT X 3/8 CPRSN	1
22	340-0490-00-0	HOSE, COOLER, RETURN, QTY. 3.5 FT	1
23	082-3028-00-0	FITTING 3/8 HOSE BARB x 3/8 TUBE	4
24	082-0333-02-0	TEE, 3/8 COMP RUN X 1/4 MNPT BR	1
25	082-0513-00-0	BUSHING, 3/4 MNPT X 1/4 FNPT	1
	082-0513-02-0	BUSHING, 3/4 MNPT X 1/4 FNPT, BRZ PUMP	
26	217-0201-00-0	1/4 NPT SQUARE HEAD STEEL PLUG	5
	217-0201-01-0	1/4 NPT SQUARE HEAD PLUG, BRZ PUMP	
27	217-0401-00-0	PLUG, SQU, 1/2 NPT	3
	217-0401-01-0	PLUG, SQU, 1/2 NPT, BRZ PUMP	
	029-0110-00-0	ANODE (OPTIONAL), QTY 2	
	217-0301-00-0	PLUG-3/8 NPT SQUARE HEAD	
28	217-0301-01-0	PLUG-3/8 NPT SQUARE HEAD, BRZ PUMP	2

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1

2

3

4

5

6

7

8

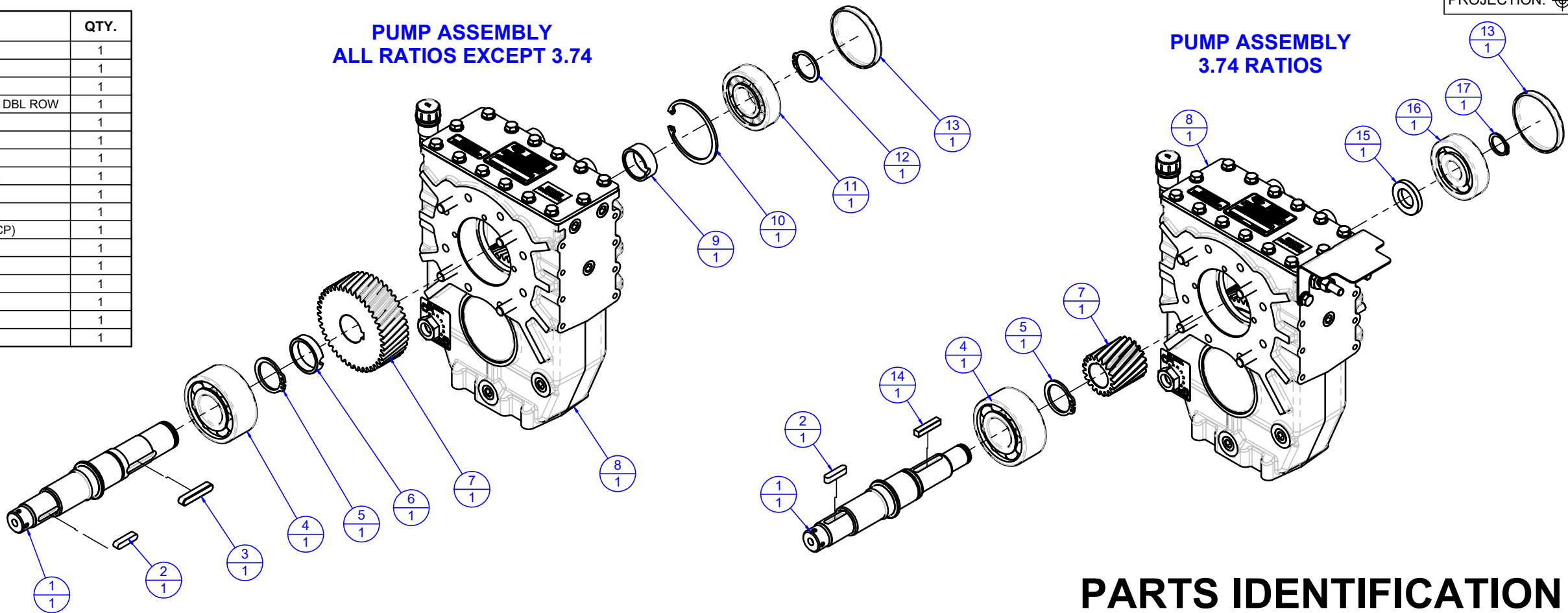
9

10

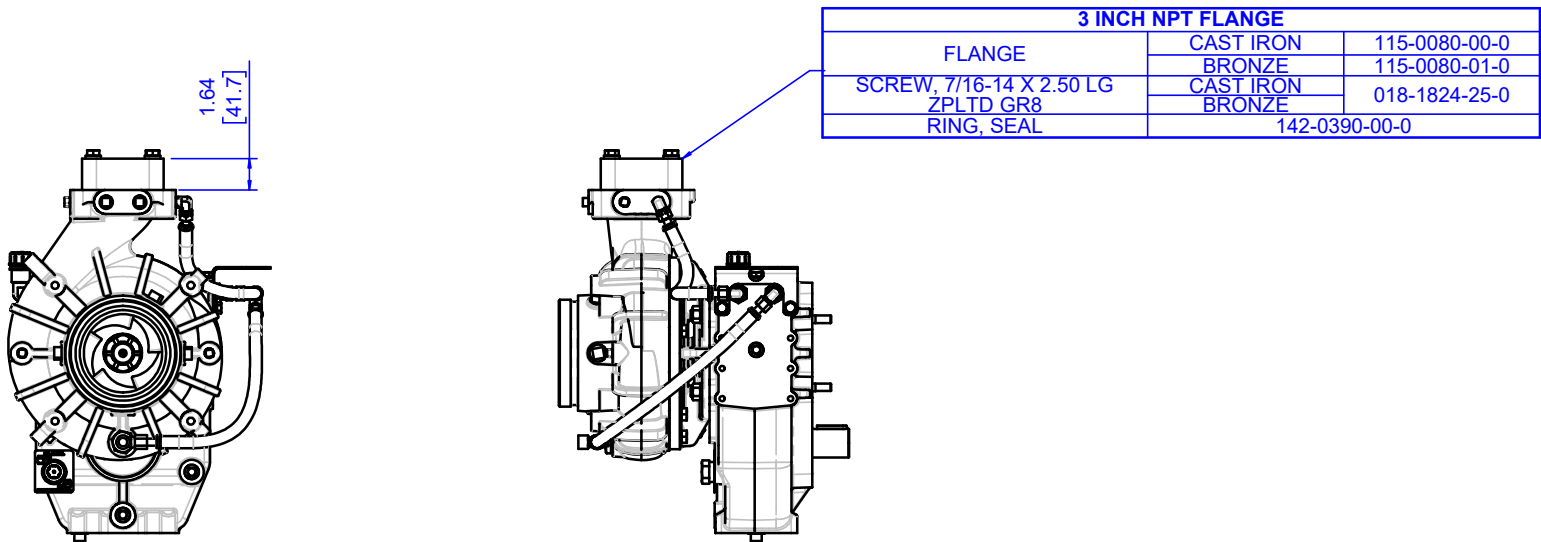
11

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	037-00028-000	SHAFT, PUMP, AP-F	1
2	017-0581-00-0	KEY	1
3	017-00015-000	KEY, 3/8 x 3/8 x 2.07, RE	1
4	250-00010	BEARING, 5308CS, ANGULAR CONTACT, DBL ROW	1
5	077-1560-05-0	RETAINING RING	1
6	159-00059-000	SPACER, GEAR	1
7	031-2250-00-0	GEAR, PINION, 42T, 1.14:1	1
8	FSG-PL-01481	HALE FLEX SERIES GEARBOX	1
9	159-2250-00-0	SPACER, GEARBOX, BORG	1
10	077-3150-00-0	RETAINING RING	1
11	250-8307-00-0	ROLLER BEARING (SKF RN307ECP)	1
12	077-1370-05-0	RETAINING RING	1
13	217-1300-00-0	ENDCAP, 80X10EC	1
14	017-0210-00-0	KEY, DRIVE SHAFT, P75-95X	1
15	159-00053-000	SPACER, GEAR, 3.74 RATIO	1
16	250-00013-000	BEARING, BALL, 405S	1
17	077-0980-05-0	78S98, RETAINING RING	1

ITEM 7 TABLE PUMP GEAR PART NUMBER			
RATIO NAME	GEAR RATIO	PUMP GEAR P/N (GEAR TEETH)	MATING GEAR P/N (GEAR TEETH)
-37F	3.74	031-1880-00-0 (19T)	031-00012-000 (71T)
-29F	2.91	031-2190-00-0 (23T)	031-2260-00-0 (67T)
-26F	2.60	031-2200-00-0 (25T)	031-2270-00-0 (65T)
-23F	2.33	031-2210-00-0 (27T)	031-2280-00-0 (63T)
-19F	1.90	031-2220-00-0 (31T)	031-2290-00-0 (59T)
-16F	1.64	031-2230-00-0 (34T)	031-2300-00-0 (56T)
-13F	1.31	031-2240-00-0 (39T)	031-2310-00-0 (51T)
-11F	1.14	031-2250-00-0 (42T)	031-2320-00-0 (48T)



DISCHARGE CONNECTION OPTION



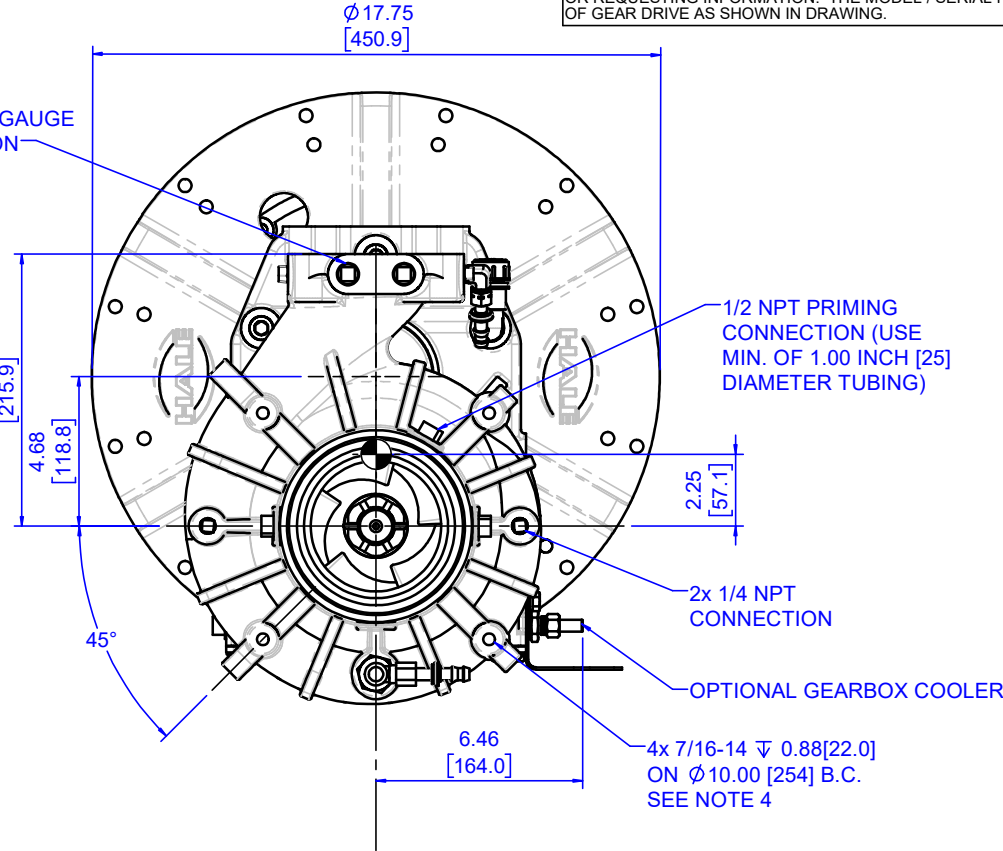
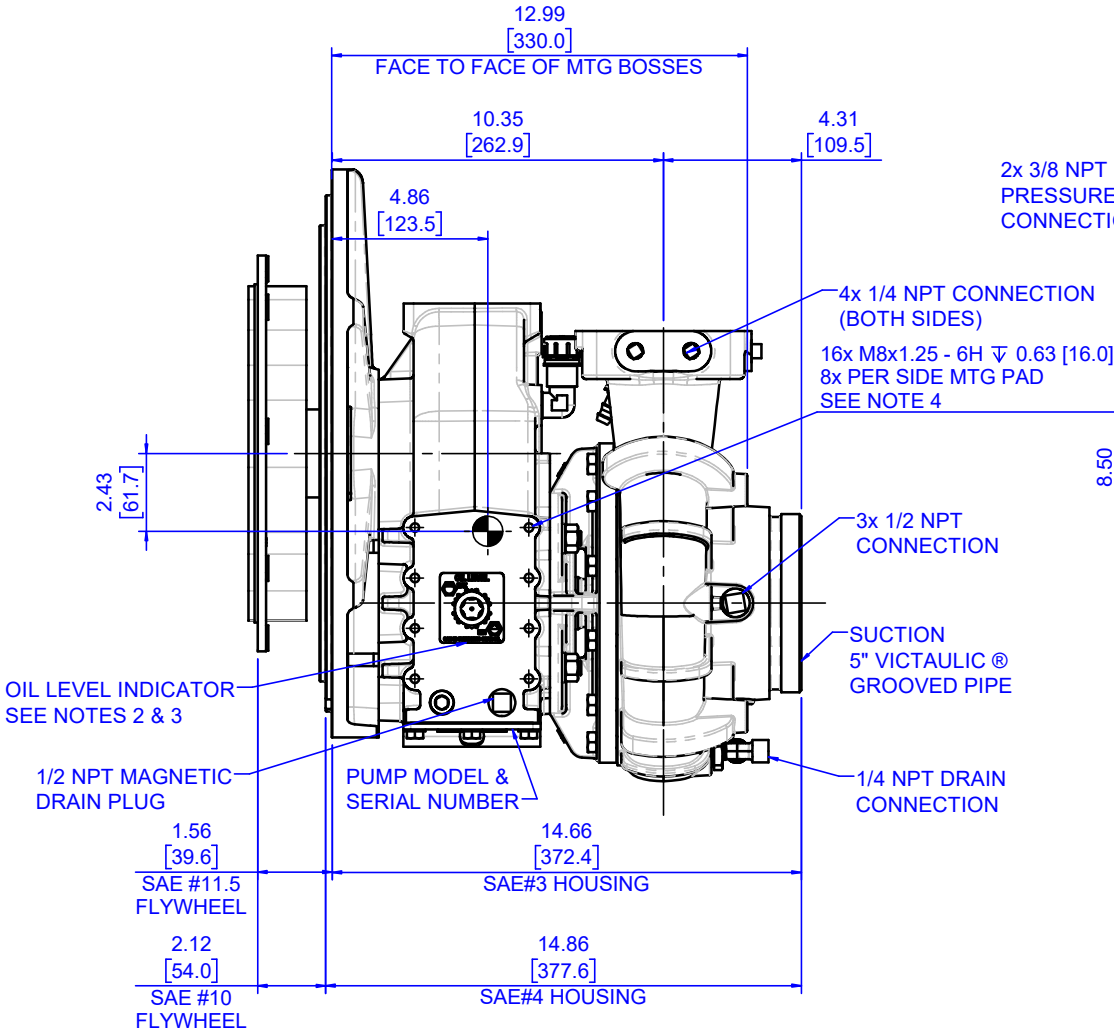
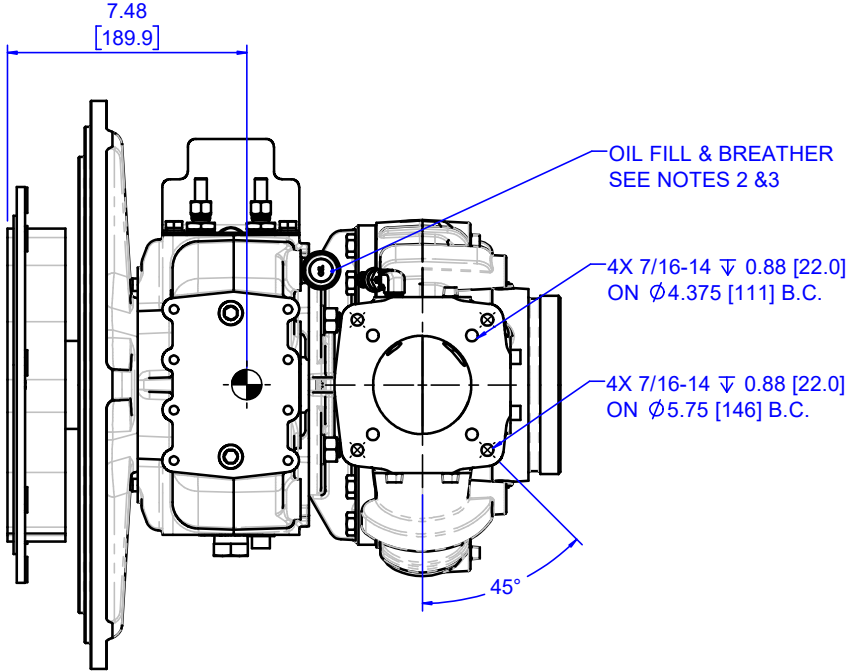
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCHES DIMENSIONS: X: ±0.04 X.X: ±0.02 X.XX: ±0.01 X.XXX: ±0.005 ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP EDGES, 0.01MAX	FSG OF  IDEX CORPORATION		  				
	MATERIAL		TITLE				
	MADE FROM		Pump Assembly, AP Flex Series				
	FINISH		DRAWN	TAM	SIZE	DRAWING NUMBER	REV
	PROJECT		APPROVED	DLM	D	FSG-PL-01483	B
COPYRIGHT © NOT TO BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY		DATE	03/05/2018	SCALE		SHEET	
				1:3		5 OF 6	

HALE AP FLEX SERIES PUMP

GEARBOX POSITION - INVERTED, DISCHARGE POSITION - 1,
ENGINE ROTATION AND OPTIONAL GEARBOX COOLER SHOWN

NOTES:

1. PRIMING SYSTEM, DISCHARGE & SUCTION VALVES, PRESSURE RELIEF VALVES & CONTROLLERS AND THERMAL RELIEF VALVES ARE AVAILABLE.
2. USE SAE 50 LONG-LIFE SYNTHETIC MANUAL TRANSMISSION FLUID MEETING ONE OR MORE OF THE FOLLOWING SPECIFICATIONS.
 - API MT-1
 - EATON PS-164 Rev. 7
 - MACK TO-A Plus
 - MERITOR 0-81
 - NAVISTAR / INTERNATIONAL TMS 6816
 - ROCKWELL / EATON / FULLER CD-50 (PS-081)
 - ZF FreedomLine
3. FILL GEARBOX UNTIL OIL LEVEL INDICATOR WINDOW IS 1/2 TO 3/4 FULL. APPROXIMATE OIL CAPACITY IS 1.5 QUART [1.4 LITER].
4. ALL METRIC FASTENERS TO HAVE A MINIMUM PROPERTY CLASS 8.8. ALL SAE FASTENERS TO HAVE A MINIMUM GRADE 5 SPECIFICATION.



OPTIONS AND ACCESSORIES	
OPTION	DRAWING NUMBER
ESP PRIMING PUMP	PL821
PVG PRIMING VALVE	PL480
SPV PRIMING VALVE	PL828
PUMP SHIFT INDICATOR LIGHTS	PL825
GEARBOX POSITIONS	FSG-PL-01483, SHT 2
DISCHARGE POSITIONS	FSG-PL-01483, SHT 2
FLEX SERIES GEARBOX ASSEMBLY	FSG-PL-01481

GEAR RATIOS & PUMP MODELS		PROJECTION: 
PUMP MODEL	GEAR RATIO	
AP*-37F	3.74	
AP*-29F	2.91	
AP*-26F	2.60	
AP*-23F	2.33	PUMP WEIGHT (DRY): IRON VERSION: 170 LBS [77 kg] BRONZE VERSION: 181 LBS [82 kg]  REPRESENTS CENTER OF GRAVITY
AP*-19F	1.90	
AP*-16F	1.64	
AP*-13F	1.31	
AP*-11F	1.14	
MAXIMUM INPUT RPM		
WARNING EXCEEDING THESE LIMITS OR FAILURE TO FOLLOW THE RECOMMENDATIONS OUTLINED ON THIS DRAWING COULD DAMAGE THE PUMP AND RESULT IN PERSONAL INJURY.		
MAXIMUM ALLOWABLE ENGINE SPEED: 4000 RPM (DRIVE CPLNG) MAXIMUM ALLOWABLE HYDRODYNAMIC PRESSURE: 400 PSIG; **340 PSIG MAXIMUM ALLOWABLE HYDROSTATIC PRESSURE: 500 PSIG		
HALE TYPE AP/AP-GB PUMP MODEL IDENTIFICATION		
THE HALE TYPE AP/AP-GB PUMP IS AVAILABLE WITH MULTIPLE DRIVE RATIOS TO ADAPT TO A WIDE VARIETY OF APPLICATIONS. THE RATING, RATIO AND DRIVE UNIT TYPE DETERMINE THE MODEL NUMBER. FOR EXAMPLE:		
AP IDENTIFICATION (GPM) THE MODEL NUMBER FOR AN AP RATED AT 500 GPM WITH A DRIVE RATIO OF 2.33 AND HALE DRIVE UNIT WOULD BE: APM50-23E PUMP TYPE GEARBOX TYPE RATED CAPACITY - GPM DRIVE RATIO (2.33 = 23) AP IDENTIFICATION (L/S) THE MODEL NUMBER FOR AN AP RATED AT 31 (L/S) WITH A DRIVE RATIO OF 2.33 AND HALE DRIVE UNIT WOULD BE: APM31-GB-23E PUMP TYPE GEARBOX TYPE RATED CAPACITY - L/S GB FOR 31 LPS LS FOR 32 LPS DRIVE RATIO (2.33 = 23) GEARBOX TYPE		
BE SURE TO INCLUDE THE MODEL NUMBER AND SERIAL NUMBER WHEN ORDERING PARTS OR REQUESTING INFORMATION. THE MODEL / SERIAL NUMBER PLATE IS LOCATED ON TOP OF GEAR DRIVE AS SHOWN IN DRAWING.		

ENGINE MOUNT INSTALLATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCHES DIMENSIONS: X: $\pm$ 0.04 X.X: $\pm$ 0.02 X.XX: $\pm$ 0.01 X.XXX: $\pm$ 0.005 ANGLES: $\pm$ 0.25° SURFACE TEXTURE IN μ m Ra REMOVE ALL BURRS AND SHARP EDGES, 0.01MAX		FSG OF DEX CORPORATION			
MATERIAL		TITLE		Pump Assembly, AP Flex Series	
MADE FROM		DRAWN		TAM	SIZE
FINISH		APPROVED		DLM	D
PROJECT		DATE		03/05/2018	SCALE 1:3
		DRAWING NUMBER		FSG-PL-01483	REV B
		SHEET		6 OF 6	