

NOTES:

1. SEE LIMIT CHART, HALE DOCUMENT F-72 FOR MAXIMUM ALLOWABLE PUMP PRESSURE, ENGINE HORSEPOWER AND TORQUE LIMITS FOR CENTRIFUGAL PUMPS.
2. APPLY LOCTITE #246 HIGH TEMPERATURE THREAD LOCKER OR EQUIVALENT TO SCREW THREADS AND TORQUE SCREWS PER HALE ENGINEERING STANDARD ES018-002.
3. UNLESS OTHERWISE INDICATED FASTENERS ARE GRADE 5 ZINC PLATED STEEL.

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.

WARNING

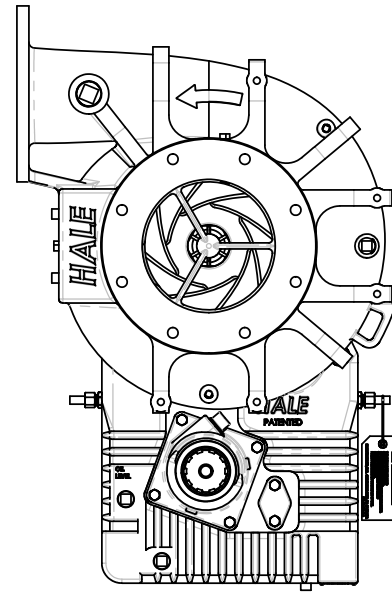
EXCEEDING THESE LIMITS OR FAILURE TO FOLLOW THE RECOMMENDATIONS OUTLINED ON THIS DRAWING COULD DAMAGE THE GEARBOX AND RESULT IN PERSONAL INJURY.

8FGR MAXIMUM PUMP PRESSURE:
HYDROSTATIC = 500 PSI
HYDRODYNAMIC = 400 PSI

MAXIMUM POWER INPUT FOR PUMPING = 450 HP
MAXIMUM TORQUE ON PUMP SHAFT = 2300 LB-FT

PROJECTION:

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	COMMENTS
1	504-0022-000	LG GEARBOX, MARINE 8FGR PTO	1	SEE SHEET 2
2	001-0162-03-0	VOLUTE BODY	1	
3	IMPELLER ASSEMBLY	8FGR BRZ IMP ASSY	1	SEE SHEET 2
4	321-0101-00-0	CLEARANCE RING	1	
5	018-1812-05-0	SCREW, 7/16-14 X 1.25, BRNZ	16	
6	018-1812-25-0	SCREW, 7/16-14 X 1.25, GR8	8	
7	217-0501-01-0	PLUG-3/4 NPT BRASS	3	
8	217-0301-01-0	PLUG-3/8 NPT BRASS	2	
9	217-0401-01-0	PLUG-1/2 NPT BRASS	1	
10	217-0201-01-0	PLUG-1/4 NPT BRASS	3	
11	217-0701-01-0	PLUG-1 1/4 NPT BRASS	1	



SCALE 1:6

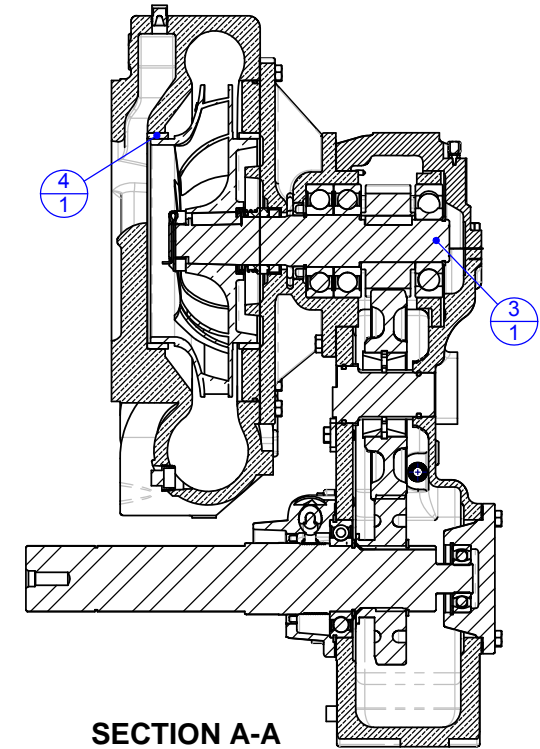
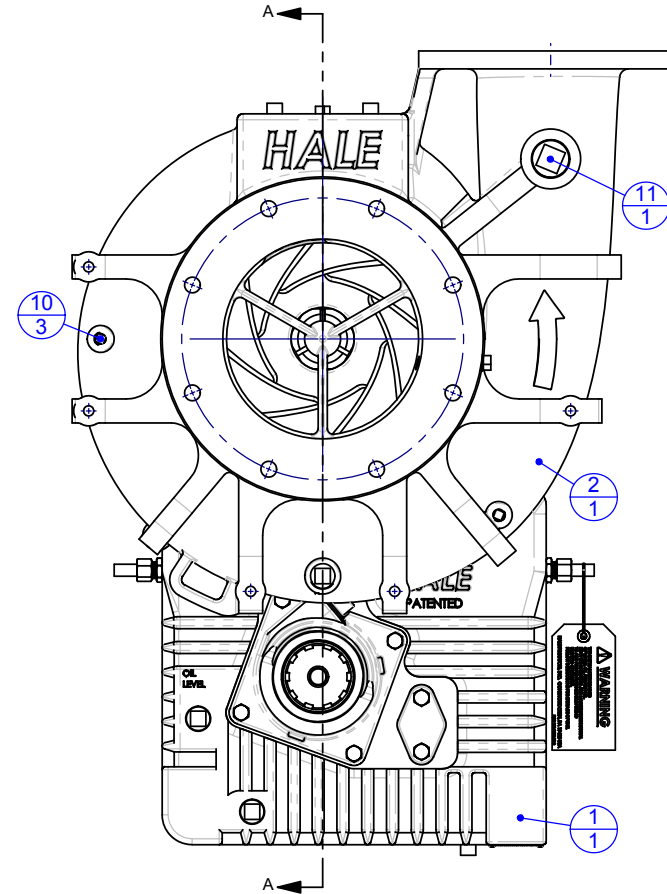
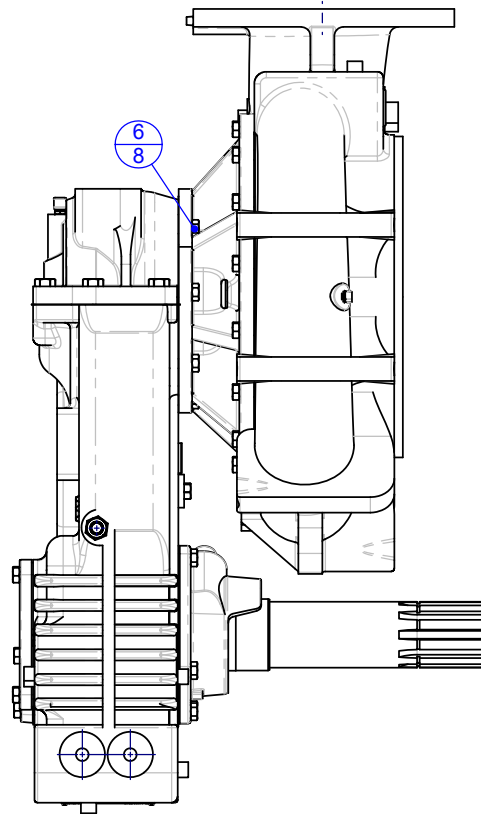
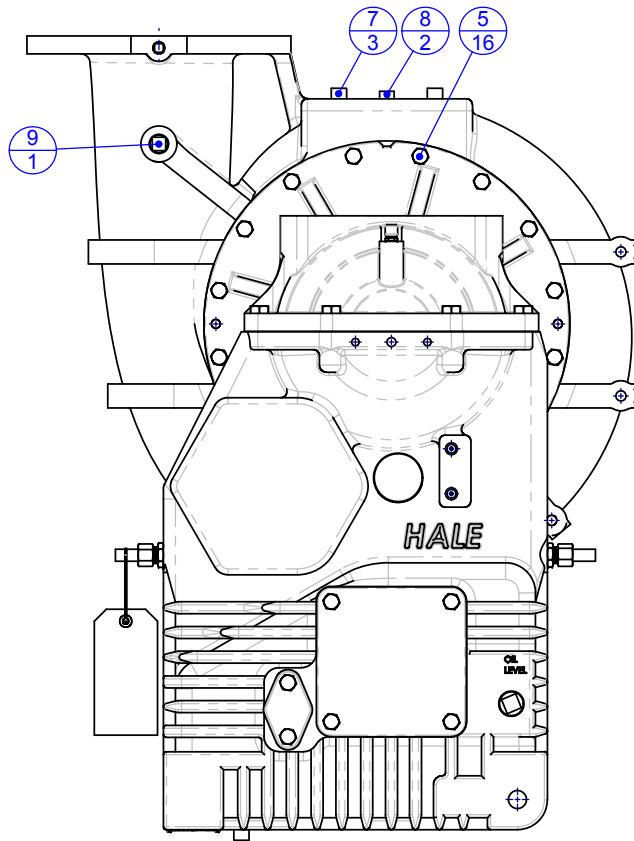
HORIZONTAL VOLUTE - POSITION #13 - CCW ROTATION

PUMP ASSEMBLY PART NUMBERS

PART NUMBER	DESCRIPTION
501-00020-000	8FGR-15LG PTO, VERT GRBX, P#1
501-00020-001	8FGR-17LG PTO, VERT GRBX, P#1
501-00020-002	8FGR-19LG PTO, VERT GRBX, P#1
501-00020-003	8FGR-21LG PTO, VERT GRBX, P#1
501-00020-004	8FGR-23LG PTO, VERT GRBX, P#1

PUMP ASSEMBLY PART NUMBERS

PART NUMBER	DESCRIPTION
501-00020-010	8FGR-15LG PTO, VERT GRBX, P#13
501-00020-011	8FGR-17LG PTO, VERT GRBX, P#13
501-00020-012	8FGR-19LG PTO, VERT GRBX, P#13
501-00020-013	8FGR-21LG PTO, VERT GRBX, P#13
501-00020-014	8FGR-23LG PTO, VERT GRBX, P#13



SECTION A-A

VERTICAL VOLUTE - POSITION #1 - CCW ROTATION

MARINE 8FGR-LG PTO PUMP WITH VERTICAL GEARBOX

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

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MATERIAL	TITLE		
MADE FROM	8FGR-LG PTO, VERTICAL GEARBOX		
FINISH	DRAWN	JRP	SIZE
PROJECT	APPROVED	JRP	D
	DATE	05NOV2013	SCALE
		1:4	DRAWING NUMBER
			FSG-PL-01352
			REV
			A
			SHEET
			1 OF 3

REVISIONS

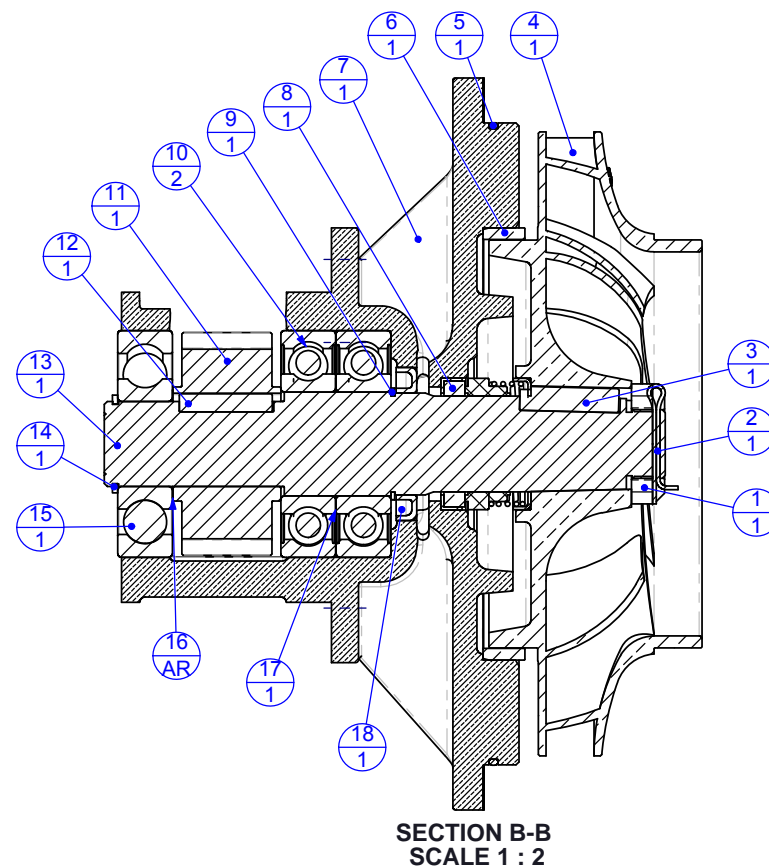
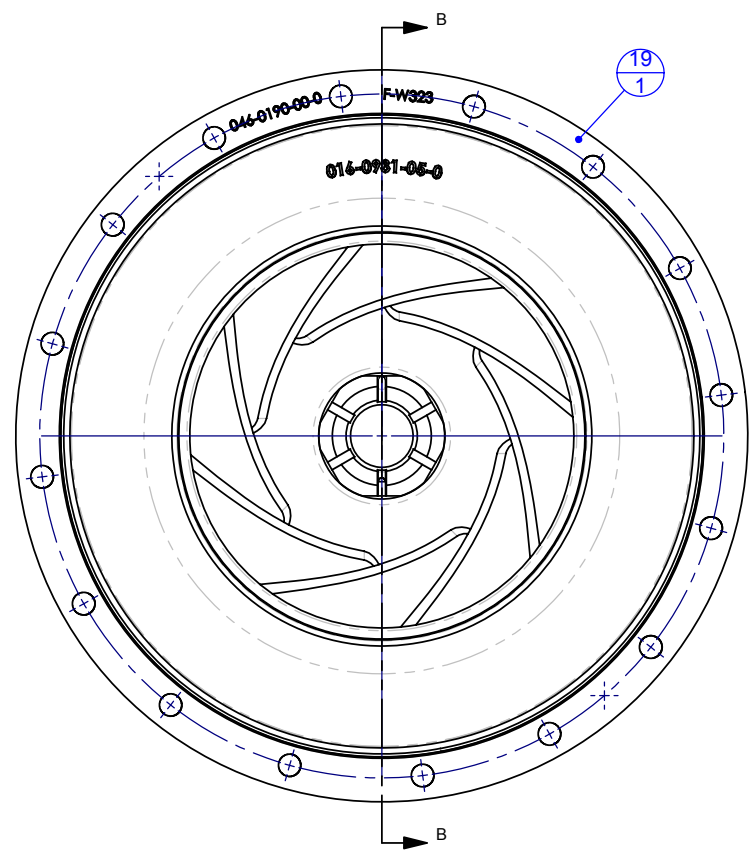
ECN	REV.	ZONE	CHANGED FROM	BY	DATE	APVD
CFL3140	A	-	RELEASE FOR DOCUMENTATION	JRP	05NOV2013	JRP

IMPELLER ASSEMBLY

SHIM NOTE:

USING 0.005" FEELER GAUGE, CHECK PUMP SHAFT FLOAT BETWEEN 409 BEARING AND GEARBOX HOUSING. IF FLOAT IS LESS THAN 0.005" SHIMS MUST BE REMOVED AS FOLLOWS:

1. REMOVE 7/16-14 X 1-1/4 CAP SCREWS THAT HOLD IMPELLER ASSEMBLY TO GEARBOX.
2. REMOVE RETAINING RING SECURING 409 BEARING TO PUMP SHAFT.
3. REMOVE 409 BEARING AND SHIM.
4. RE-INSTALL 409 BEARING ONTO SHAFT AND SECURE IN PLACE USING RETAINING RING.
5. RE-INSTALL 7/16-14 X 1-1/4 CAP SCREWS.



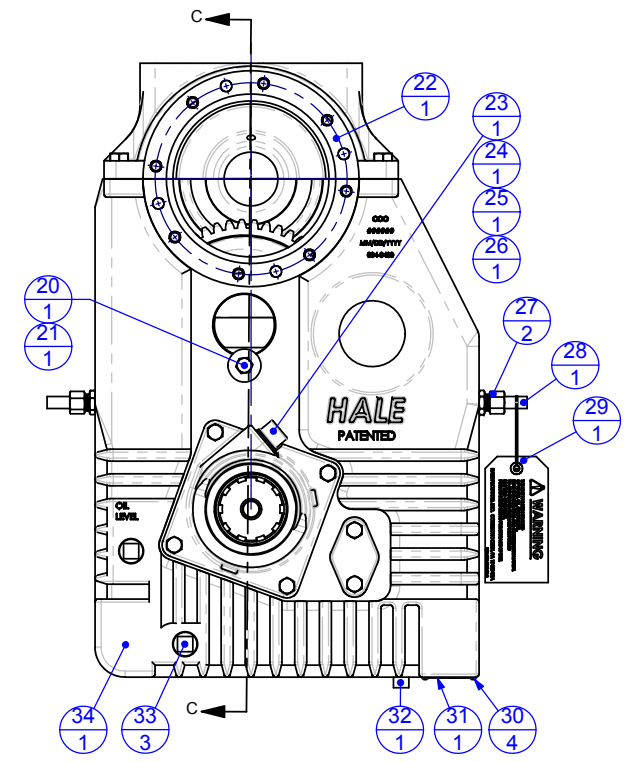
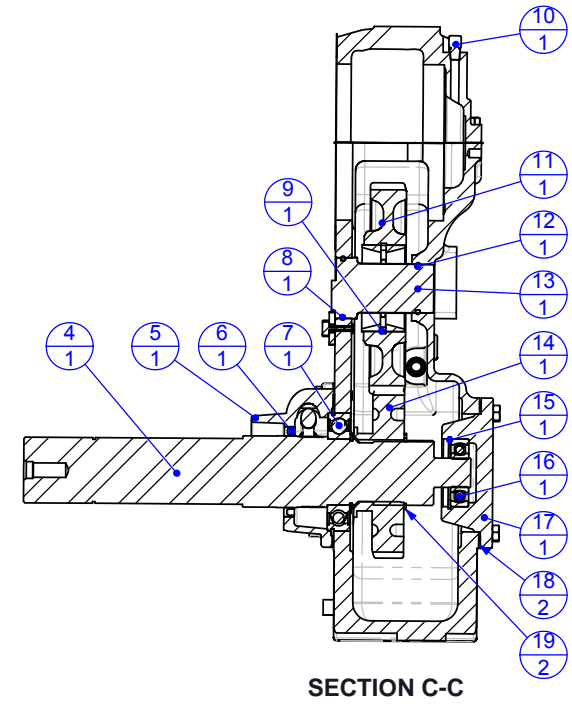
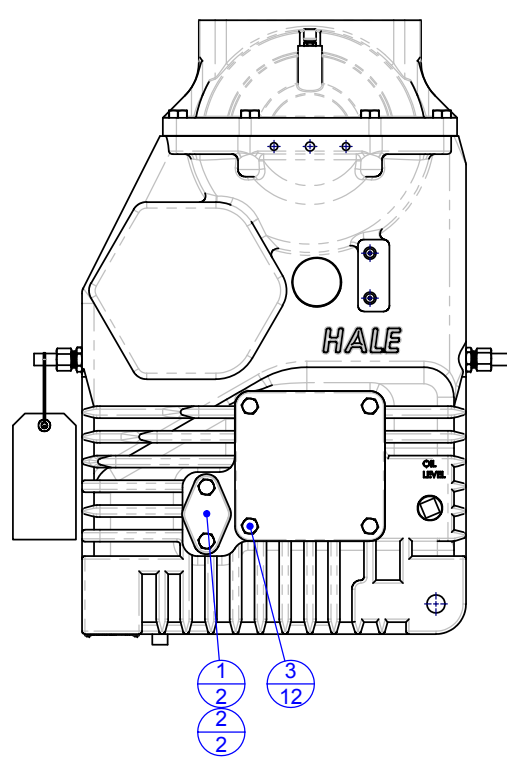
PROJECTION:

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	110-7060-00-0	ZM-274 IMPELLER NUT	1
2	064-5080-01-0	PIN-5/32X2.5L SST COTTER	1
3	017-0650-00-0	60FCG IMPELLER KEY	1
4	016-0931-00-0	8FGR IMPELLER	1
5	040-2790-00-0	SEAL RING	1
6	321-0101-00-0	CLEARANCE RING	1
7	REAR BEARING HSG	SEE GEAR AND BEARING HOUSING TABLE	1
8	296-5210-09-0	MECHANICAL SEAL	1
9	077-2120-01-0	RETAINING RING	1
10	250-0311-20-0	BEARING, 311M	2
11	PUMP SHAFT GEAR	SEE GEAR AND BEARING HOUSING TABLE	1
12	017-0300-00-0	DRIVEN SHAFT KEY	1
13	037-1860-00-0	8FG PUMP SHAFT	1
14	077-1750-05-0	78S175 (5F-77) RETAINING RING	1
15	250-0409-00-0	BEARING, 409K, 409S, 6409	1
16	048-0170-00-0	344-09 (C-344) SHIM	AR
17	048-0150-00-0	344-11 (T-344) SHIM	1
18	296-2090-01-0	OIL SEAL	1
19	046-0190-00-0	F-W323 GASKET	1

GEAR AND REAR BEARING HOUSING TABLE				
GEAR RATIO	GEAR TEETH	GEAR PART NO.	REAR HOUSING PART NO.	IMPELLER ASSY PART NO.
1.58	26	031-0960-00-0	062-0661-03-0	516-0660-16-0
1.71	24	031-0950-00-0	062-0661-04-0	516-0660-18-0
1.86	22	031-0940-00-0	062-0661-05-0	516-0660-20-0
2.05	20	031-0930-00-0	062-0661-04-0	516-00017-021
2.28	18	031-0920-00-0	062-0661-03-0	516-00021-023

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	115-0091-01-0	GEARSHIFT SHAFT FLANGE	2
2	046-5060-00-0	GASKET QL-W429	2
3	018-1812-25-0	SCREW, 7/16-14 X 1.25, GR8	12
4	037-1920-01-0	8FG PTO SLIDING GEAR SHAFT	1
5	008-0571-00-0	FRONT BEARING CAP	1
6	296-2540-00-0	QHD OIL SEAL	1
7	250-0214-06-0	214KG BEARING	1
8	040-2280-00-0	SHAFT SEAL RING	1
9	250-8040-00-0	BEARING, G INTERMEDIATE TAPER	1
10	044-0260-00-0	VENT, AIR 1/8 MPT	1
11	031-0980-00-0	INTERMEDIATE GEAR	1
12	040-2240-00-0	SEAL RING	1
13	037-1530-00-0	G INTERMEDIATE SHAFT	1
14	031-0970-00-0	SLIDING GEAR	1
15	077-2810-00-0	RETAINING RING	1
16	250-0306-20-0	306W BEARING	1
17	044-1120-00-0	BEARING COVER	1
18	046-5130-01-0	GEARBOX BEARING COVER GASKET	2
19	077-2750-01-0	RETAINING RING	2
20	018-1810-02-0	SCREW, 7/16-14 X 1, GR8	1
21	097-1330-00-0	WASHER, G GEARBOX INTERMEDIATE SHAFT	1
22	046-6020-00-0	GASKET, CIR-W263	1
23	008-0070-00-0	SPEEDOMETER DUST CAP	1
24	007-0040-00-0	ZSF-425 SPEEDCOUNTER ADAPTER	1
25	040-0180-00-0	O-RING	1
26	031-0170-00-0	ZSF-204 S'COUNTER DRIVE GEAR	1
27	088-0040-00-0	1/2 NPT TO 1/2 TUBE CONNECTOR BRASS	2
28	007-0100-00-0	DRIVE UNIT COOLING TUBE	1
29	101-0310-00-0	TAG WATER/OIL/FUEL DRAINED	1
30	018-5002-00-0	#4-40 x 1/4LG SCREW	4
31	101-0082-00-0	SERIAL NUMBER PLATE	1
32	217-0501-08-0	3/4 NPT MAGNETIC DRAIN PLUG	1
33	217-0501-00-0	PLUG-3/4 NPT M.I.	3
34	504-0340-00-0	GEARBOX	1

504-00022-000 GEARBOX ASSY



MARINE 8FGR-LG PTO PUMP WITH VERTICAL GEARBOX

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 X: ±1
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 X.XX: ±0.25
 X.XXX: ±0.125
 ANGLES: ±0.25°
 SURFACE TEXTURE IN µm Ra REMOVE ALL SHARP EDGES, 0.25MAX

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FSG OF IDEX CORPORATION		HALE GODIVA Class 1	
MATERIAL	TITLE		
MADE FROM	8FGR-LG PTO, VERTICAL GEARBOX		
FINISH	DRAWN	JRP	SIZE
PROJECT	APPROVED	JRP	D
DATE	05NOV2013	SCALE	1:4
DRAWING NUMBER		REV	
FSG-PL-01352		A	
		SHEET 2 OF 3	

REVISIONS					
ECN	REV.	ZONE	CHANGED FROM	BY	DATE
CFL3140	A	-	RELEASE FOR DOCUMENTATION	JRP	05NOV2013

PUMP RATING OPTIONS (SELECT ONE):

- 1500 GPM @ 150 PSI
- 1750 GPM @ 150 PSI
- 2000 GPM @ 150 PSI
- 2250 GPM @ 150 PSI
- 2500 GPM @ 150 PSI
- 3000 GPM @ 150 PSI
- 3000 GPM @ 100 PSI

PUMP LIGHT KIT OPTION (SELECT ONE):

- NFPA MIDSHIP LIGHT KIT
- NO LIGHT KIT

PUMP MANUAL OPTION (SELECT ONE):

- PAPER MANUAL
- CD VERSION (2)

PANEL PLACARD OPTION (SELECT ONE):

- STAMPED SERIAL NUMBER PLACARD
- NO PANEL PLACARD

PAINT OPTION (SELECT ONE):

- BLACK PRIMER
- GRAY PRIMER
- HALE BLACK FINISH COAT
- HALE RED FINISH COAT

TACHOMETER OPTION (SELECT ONE):

- NO CABLE OR PANEL ADAPTER
- PANEL ADAPTER ONLY
- CABLE AND PANEL ADAPTER

DISCHARGE FLANGE OPTIONS (SELECT ONE):

- NONE (6 X 11 ASA 150# OPEN PUMP FLANGE)
- DISCHARGE FLANGE 6.0 INCH NPT (CAST IRON)
- DISCHARGE FLANGE 6.0 INCH NPT (STAINLESS)

SUCTION FLANGE OPTIONS (SELECT ONE):

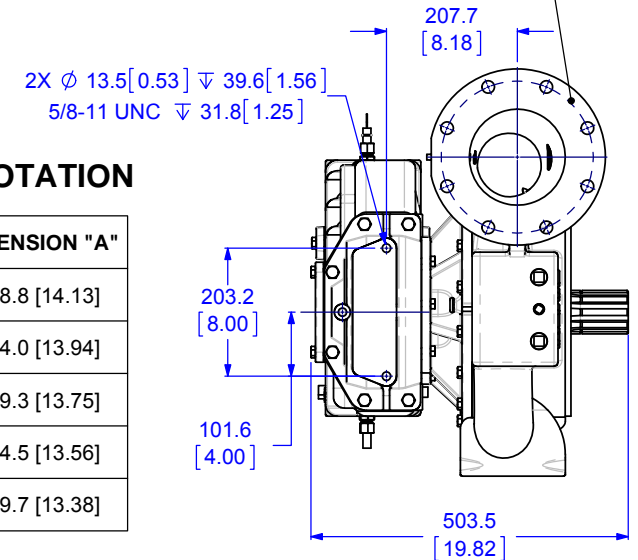
- NONE (8 X 13 ASA 150# OPEN PUMP FLANGE)
- SUCTION FLANGE 8.0 INCH NPT (CAST IRON)
- SUCTION FLANGE 8.0 INCH NPT (STAINLESS)

AUX. DISCH. PORT OPTIONS (SELECT ONE):

- TRV-120
- TRV-120L
- MAGNESIUM ANODE
- ALLOY ANODE
- 1-1/4 NPT PLUG (STANDARD)

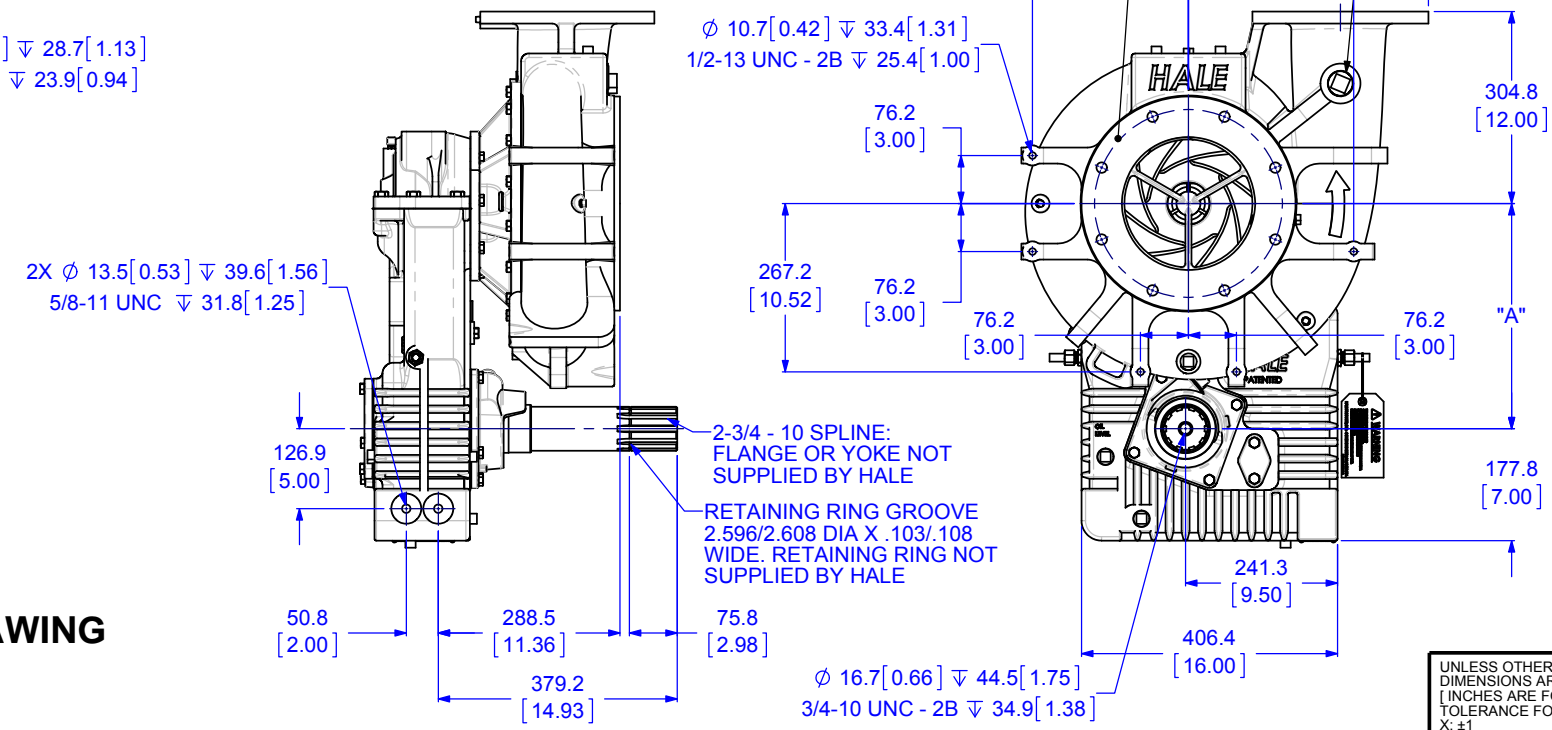
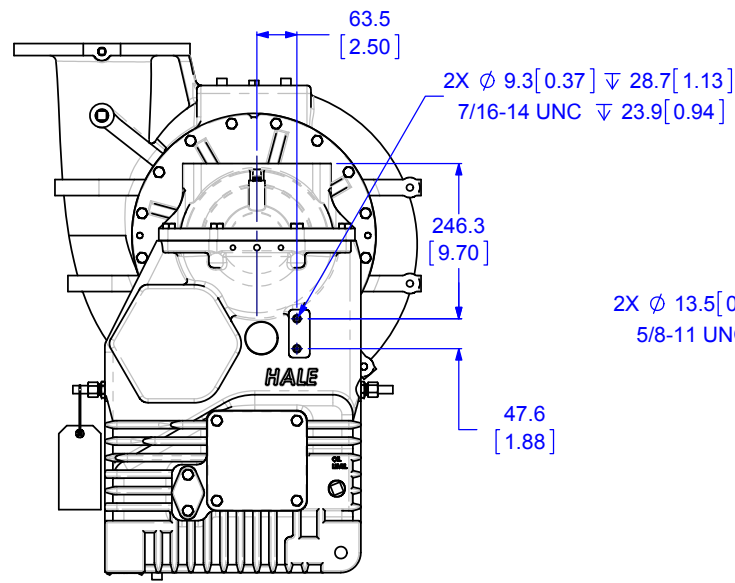
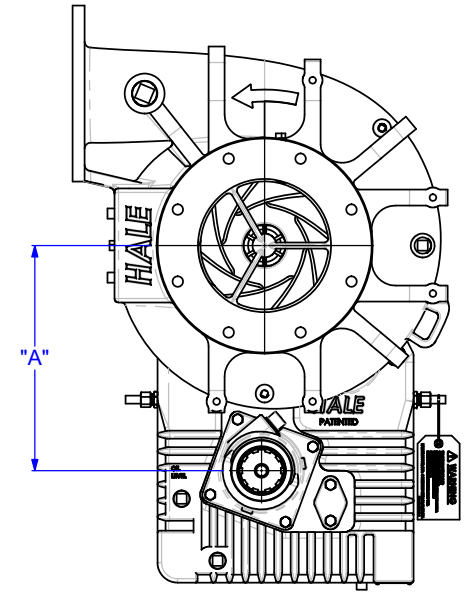
VERTICAL VOLUTE - POSITION #1 - CCW ROTATION

PART NO. (SELECT ONE)	DESCRIPTION	GEAR RATIO	DIMENSION "A"
501-00020-000	8FGR-15LG PTO, VERT GRBX, P#1	1.58	358.8 [14.13]
501-00020-001	8FGR-17LG PTO, VERT GRBX, P#1	1.71	354.0 [13.94]
501-00020-002	8FGR-19LG PTO, VERT GRBX, P#1	1.86	349.3 [13.75]
501-00020-003	8FGR-21LG PTO, VERT GRBX, P#1	2.05	344.5 [13.56]
501-00020-004	8FGR-23LG PTO, VERT GRBX, P#1	2.28	339.7 [13.38]



HORIZONTAL VOLUTE - POSITION #13 - CCW ROTATION

PART NO. (SELECT ONE)	DESCRIPTION	GEAR RATIO	DIMENSION "A"
501-00020-010	8FGR-15LG PTO, VERT GRBX, P#13	1.58	358.8 [14.13]
501-00020-011	8FGR-17LG PTO, VERT GRBX, P#13	1.71	354.0 [13.94]
501-00020-012	8FGR-19LG PTO, VERT GRBX, P#13	1.86	349.3 [13.75]
501-00020-013	8FGR-21LG PTO, VERT GRBX, P#13	2.05	344.5 [13.56]
501-00020-014	8FGR-23LG PTO, VERT GRBX, P#13	2.28	339.7 [13.38]







SALES/OPTION ORDER ENTRY DRAWING

MARINE 8FGR-LG PTO PUMP WITH VERTICAL GEARBOX

REVISIONS						
ECN	REV.	ZONE	CHANGED FROM	BY	DATE	APVD
CFL3140	A	-	RELEASE FOR DOCUMENTATION	JRP	05NOV2013	JRP

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 ANGLES: ±0.25°
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MATERIAL		TITLE		DRAWN		REV	
MADE FROM		8FGR-LG PTO, VERTICAL GEARBOX		JRP		A	
FINISH		DATE		APPROVED		SCALE	
PROJECT		05NOV2013		JRP		1:6	
DRAWING NUMBER		FSG-PL-01352		SHEET		3 OF 3	