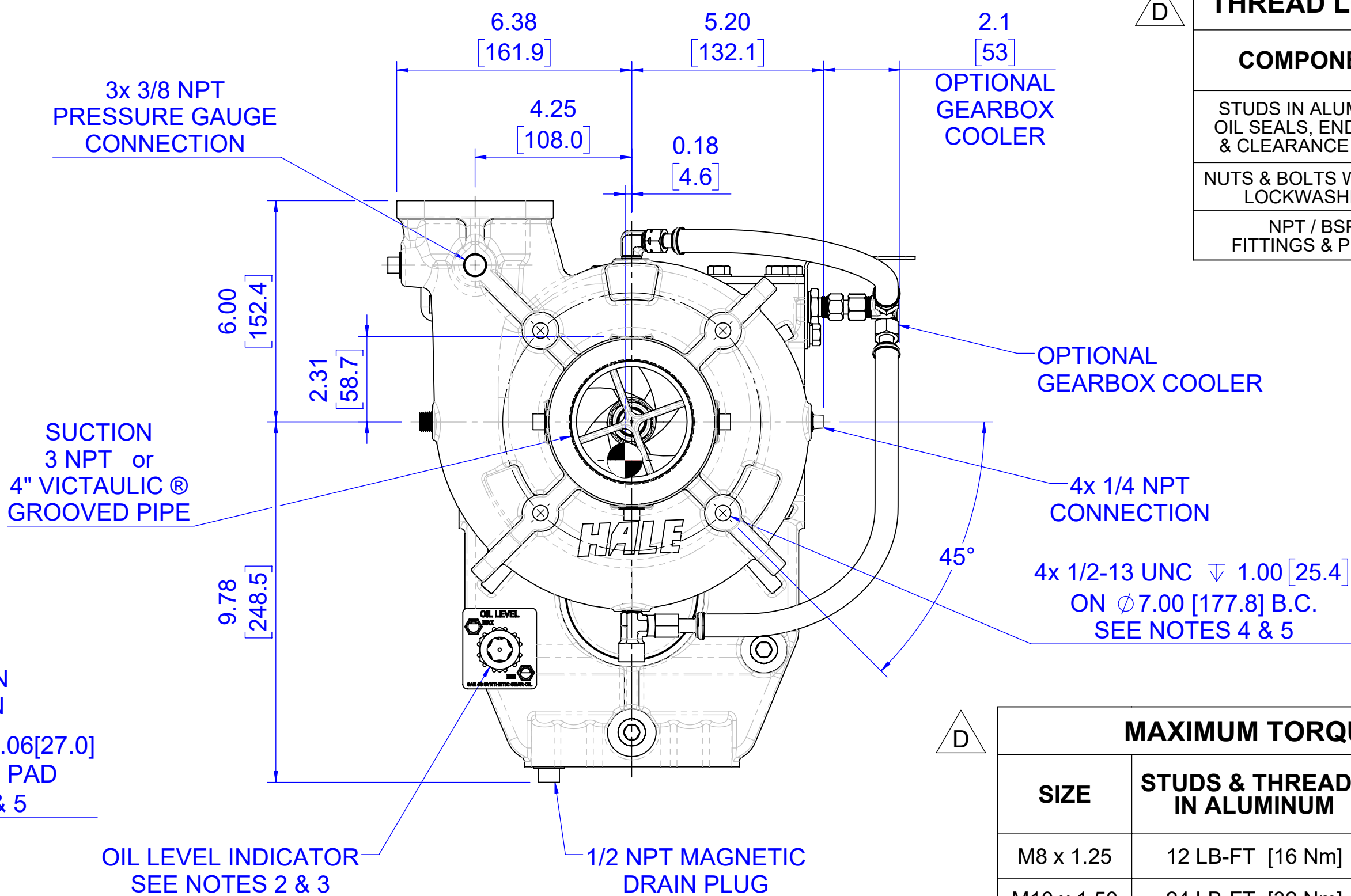
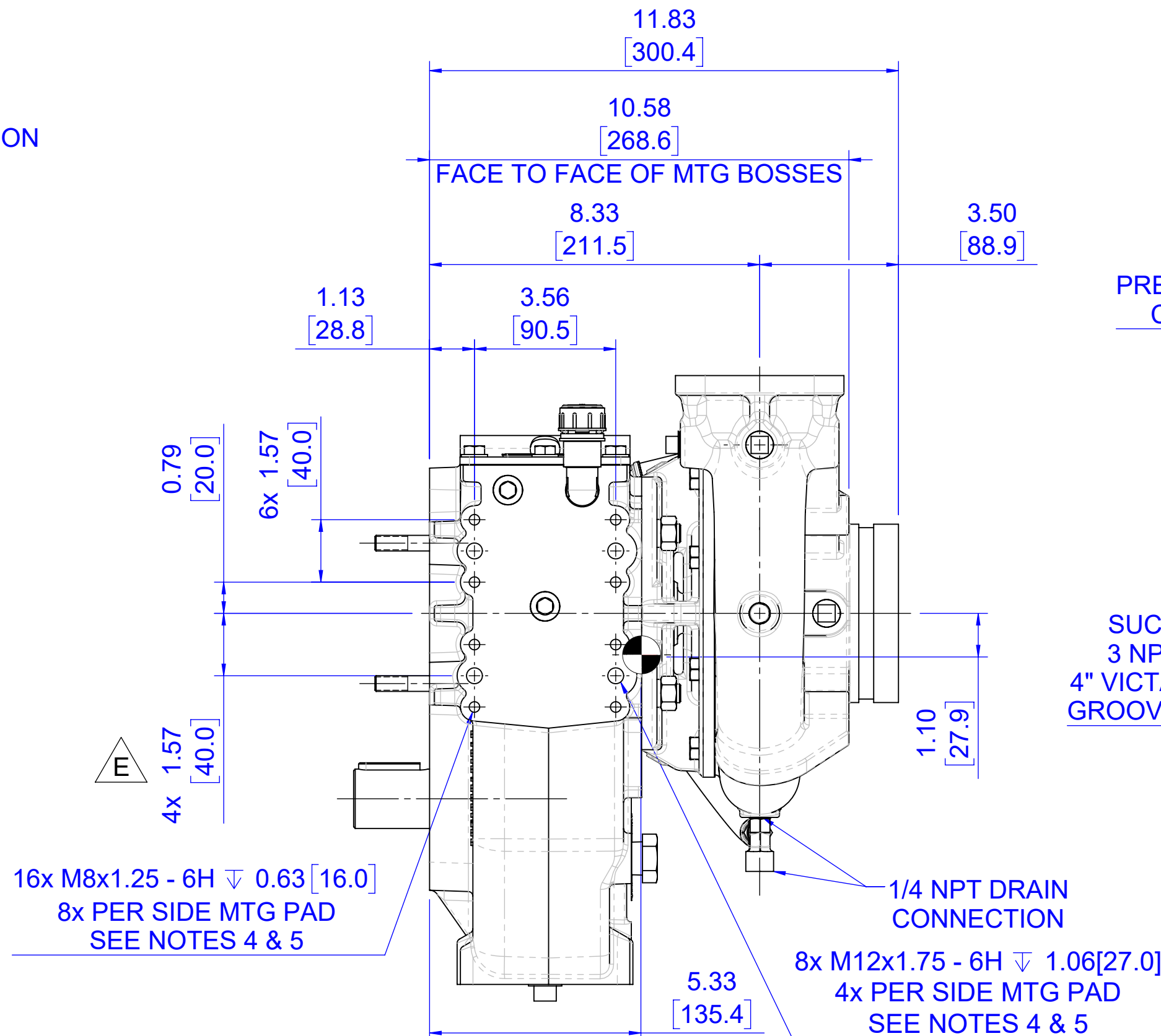
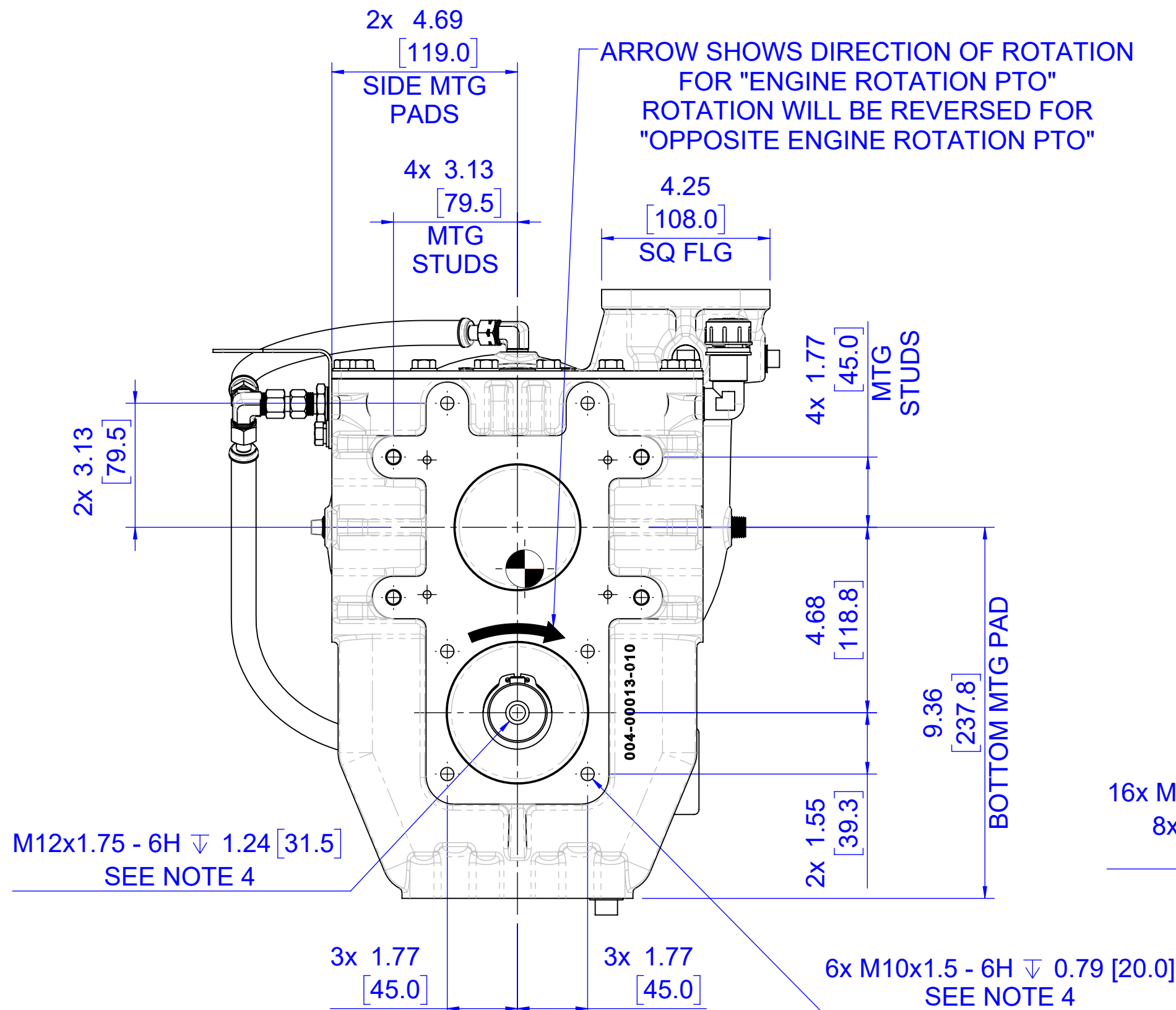
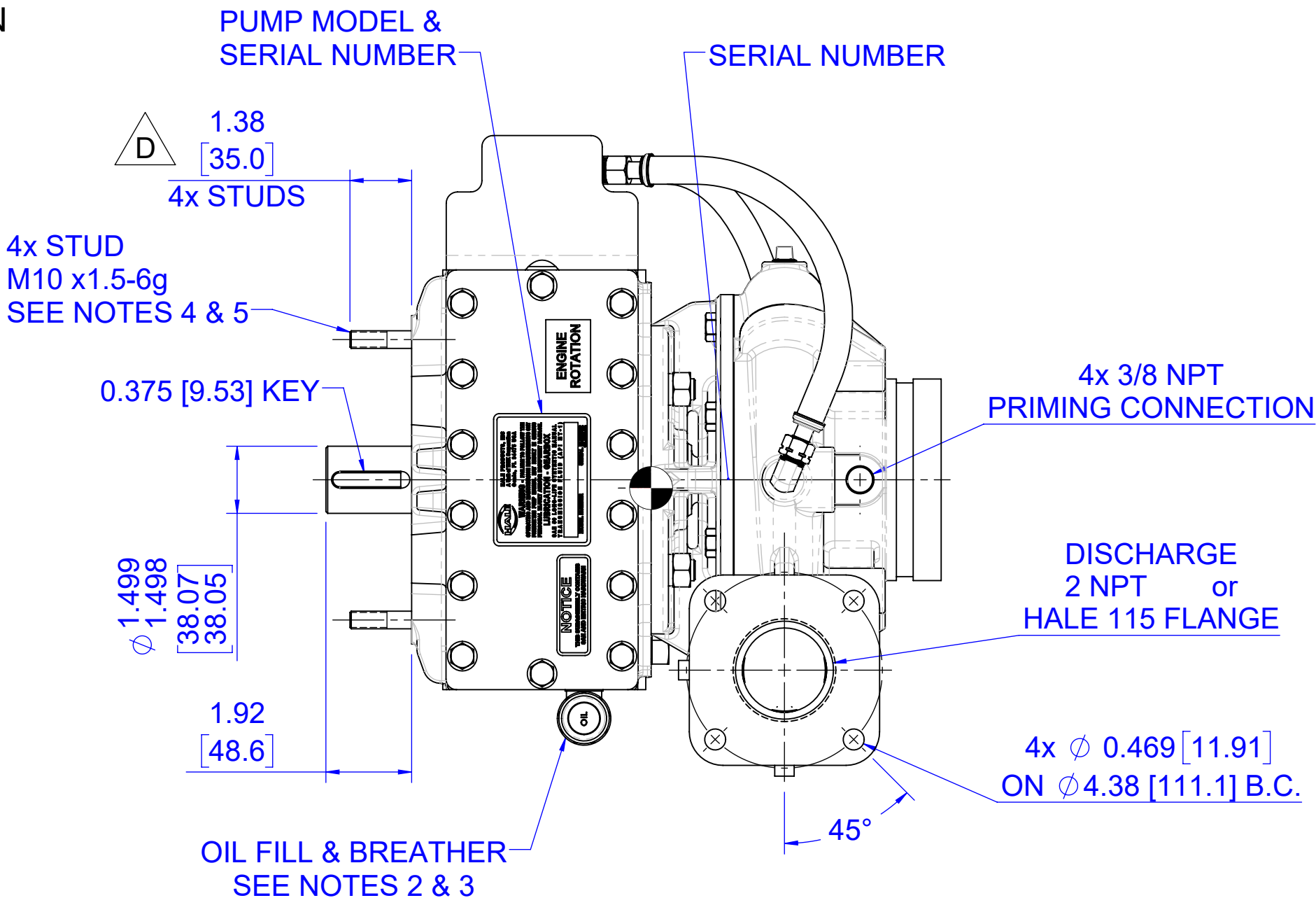


HALE CBP FLEX SERIES PUMP

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

NOTES:

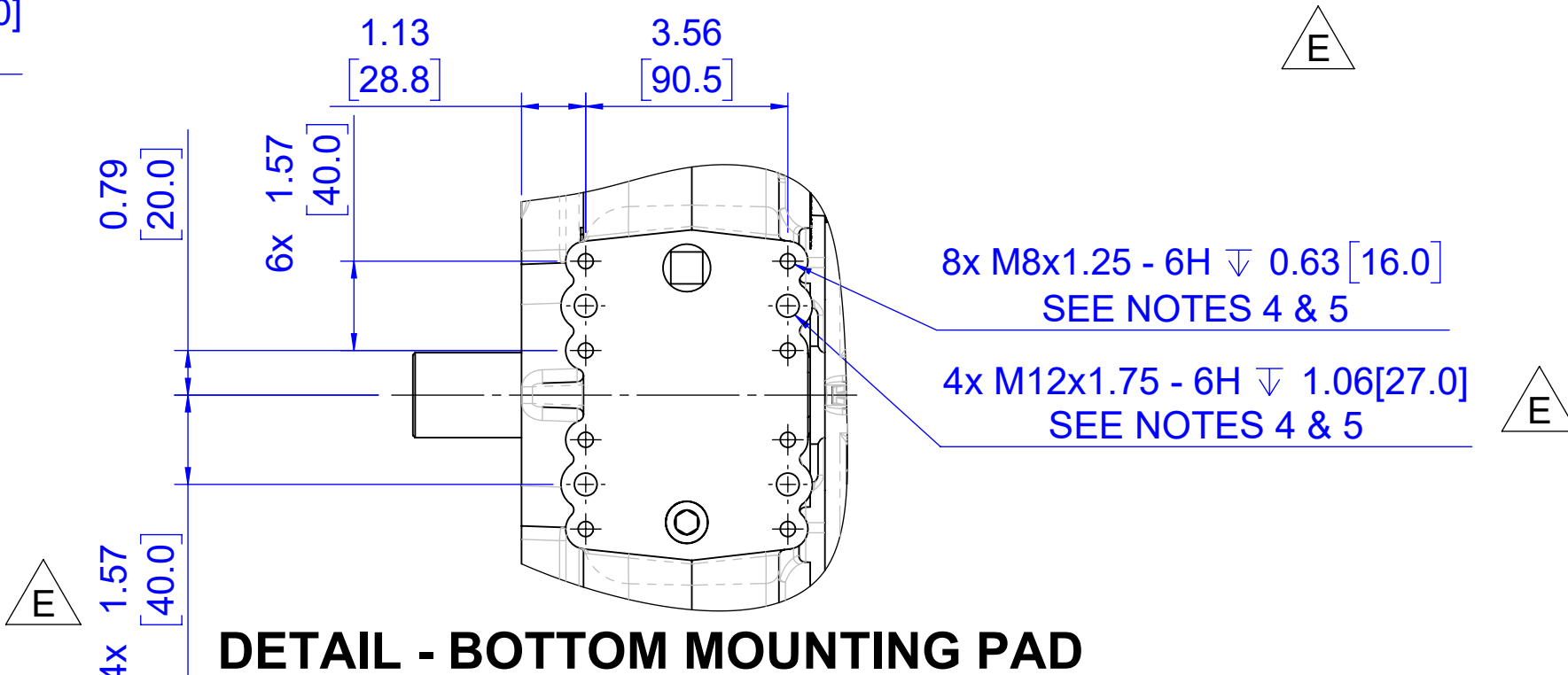
- PRIMING SYSTEM, DISCHARGE & SUCTION VALVES, PRESSURE RELIEF VALVES & CONTROLLERS AND THERMAL RELIEF VALVES ARE AVAILABLE.
- USE SAE 50 LONG-LIFE SYNTHETIC MANUAL TRANSMISSION FLUID MEETING ONE OR MORE OF THE FOLLOWING SPECIFICATIONS.
 - API MT-1
 - EATON PS-164 Rev. 7
 - MACK TO-A Plus
 - MERITOR 0-81
 - NAVISTAR / INTERNATIONAL TMS 6816
 - ROCKWELL / EATON / FULLER CD-50 (PS-081)
 - ZF FreedomLine
- FILL GEARBOX UNTIL OIL LEVEL INDICATOR WINDOW IS 1/2 TO 3/4 FULL. APPROXIMATE OIL CAPACITY IS 1.5 QUART [1.4 LITER].
- ALL METRIC FASTENERS TO HAVE A MINIMUM PROPERTY CLASS 8.8. ALL SAE FASTENERS TO HAVE A MINIMUM GRADE 5 SPECIFICATION.
- PUMP ASSEMBLY MOUNTING:
 - MOUNTING SHOULD BE FROM BOTH VOLUTE AND GEARBOX.
 - PUMP MOUNTING SUPPORT SHOULD BE VIA THE PUMP VOLUTE MOUNTING HOLES (3 MIN.).
 - GEARBOX MOUNTING SUPPORT SHOULD BE FROM THE STUDS PROVIDED (3 MIN.).
 - CONSIDERATION MUST BE TAKEN NOT TO TRANSMIT LOADS OR TWISTING MOMENTS TO OR THROUGH PUMP ASSEMBLY FROM CHASSIS, FRAME, BODY WORK, SUCTION AND DISCHARGE PIPING CONNECTIONS.
- REFER TO "MAXIMUM TORQUE VALUES" AND "THREAD LOCKS & SEALANTS" TABLES WHEN INSTALLING THREADED COMPONENTS.



INSTALLATION

REVISIONS						
ECN	REV.	ZONE	CHANGED FROM	BY	DATE	APVD
4564	C		RELEASED TO PRODUCTION	DWS	27SEP2018	DLM
5177	D	D4, G3, L11	INCREASED 4X M10 INPUT SIDE MOUNTING STUD LENGTH TO 35MM; ADDED TORQUE AND THREAD LOCK TABLES	AUG	06AUG2020	KTN
5426	E	A11, B7, C8, D11	ADDED M12 X 1.75 - 6H MOUNTING HOLE DETAILS & NOTES	KTN	15APR2021	TAM

DETAIL - BOTTOM MOUNTING PAD



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-01482, SHT 2
DISCHARGE POSITIONS	FSG-PL-01482, SHT 2
FLEX SERIES GEARBOX ASSEMBLY	FSG-PL-01481

INPUT SHAFT - INERTIA WITH PUMPED WATER

CALCULATIONS FOR INPUT SHAFT DO NOT INCLUDE MATING DRIVE FLANGE, DRIVE COUPLING, YOKES, OR DRIVELINE. CUSTOMER OR SUPPLIER MUST PROVIDE MASS MOMENTS OF INERTIA FOR ADDITIONAL DRIVELINE COMPONENTS

PUMP MODEL	INERTIA (UNITS)	
	(LB-FT ²)	(kg-m ²)
CBP-37F	3.391	0.1429
CBP-29F	2.243	0.0945
CBP-26F	1.872	0.0789
CBP-23F	1.582	0.0666
CBP-19F	1.157	0.0488
CBP-16F	0.943	0.0397
CBP-13F	0.685	0.0288
CBP-11F	0.570	0.0240

GEAR RATIOS & PUMP MODELS

PUMP MODEL	GEAR RATIO
CBP*-37F	3.74
CBP*-29F	2.91
CBP*-26F	2.60
CBP*-23F	2.33
CBP*-19F	1.90
CBP*-16F	1.64
CBP*-13F	1.31
CBP*-11F	1.14

PROJECTION:

CBP(M) 25-23 F

PUMP WEIGHT (DRY):
IRON VERSION: 90 LBS [41 kg]
BRONZE VERSION: 93 LBS [43 kg]

REPRESENTS CENTER OF GRAVITY

* THE HALE TYPE CBP PUMP IS AVAILABLE IN 250 GPM AND 1000 L/min NFPA RATINGS. THE COMPLETE PUMP MODEL NUMBER IS FORMED AS FOLLOWS:

FOR EXAMPLE, A CBP PUMP IS REQUIRED TO HAVE A 250 GPM RATING WITH A 2.33 GEAR RATIO. THE PUMP MODEL NUMBER WOULD BE AS SHOWN:

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.

PUMP MODEL	MAX GEARBOX INPUT RPM	PUMP MODEL	MAX GEARBOX INPUT RPM
CBP-37F	2210	CBP-19F	4340
CBP-29F	2840	CBP-16F	5020
CBP-26F	3180	CBP-13F	6320
CBP-23F	3540	CBP-11F	6720**

SEE HALE TORQUE LIMIT CHART F-72 FOR ADDITIONAL DATA.
MAXIMUM ALLOWABLE HYDRODYNAMIC PRESSURE: 400 PSIG; **340 PSIG
MAXIMUM ALLOWABLE HYDROSTATIC PRESSURE: 500 PSIG

THREAD LOCKS & SEALANTS

COMPONENT	LOCTITE # (OR EQUIVALENT)
STUDS IN ALUMINUM, OIL SEALS, END CAPS, & CLEARANCE RINGS	680
NUTS & BOLTS WITHOUT LOCKWASHERS	243
NPT / BSP FITTINGS & PLUGS	580

D

D

MAXIMUM TORQUE VALUES

SIZE	STUDS & THREADS IN ALUMINUM	NUTS ON STUDS & THREADS IN ALUMINUM
M8 x 1.25	12 LB-FT [16 Nm]	9 LB-FT [12 Nm]
M10 x 1.50	24 LB-FT [32 Nm]	17 LB-FT [23 Nm]
M12 x 1.75	40 LB-FT [54 Nm]	29 LB-FT [39 Nm]

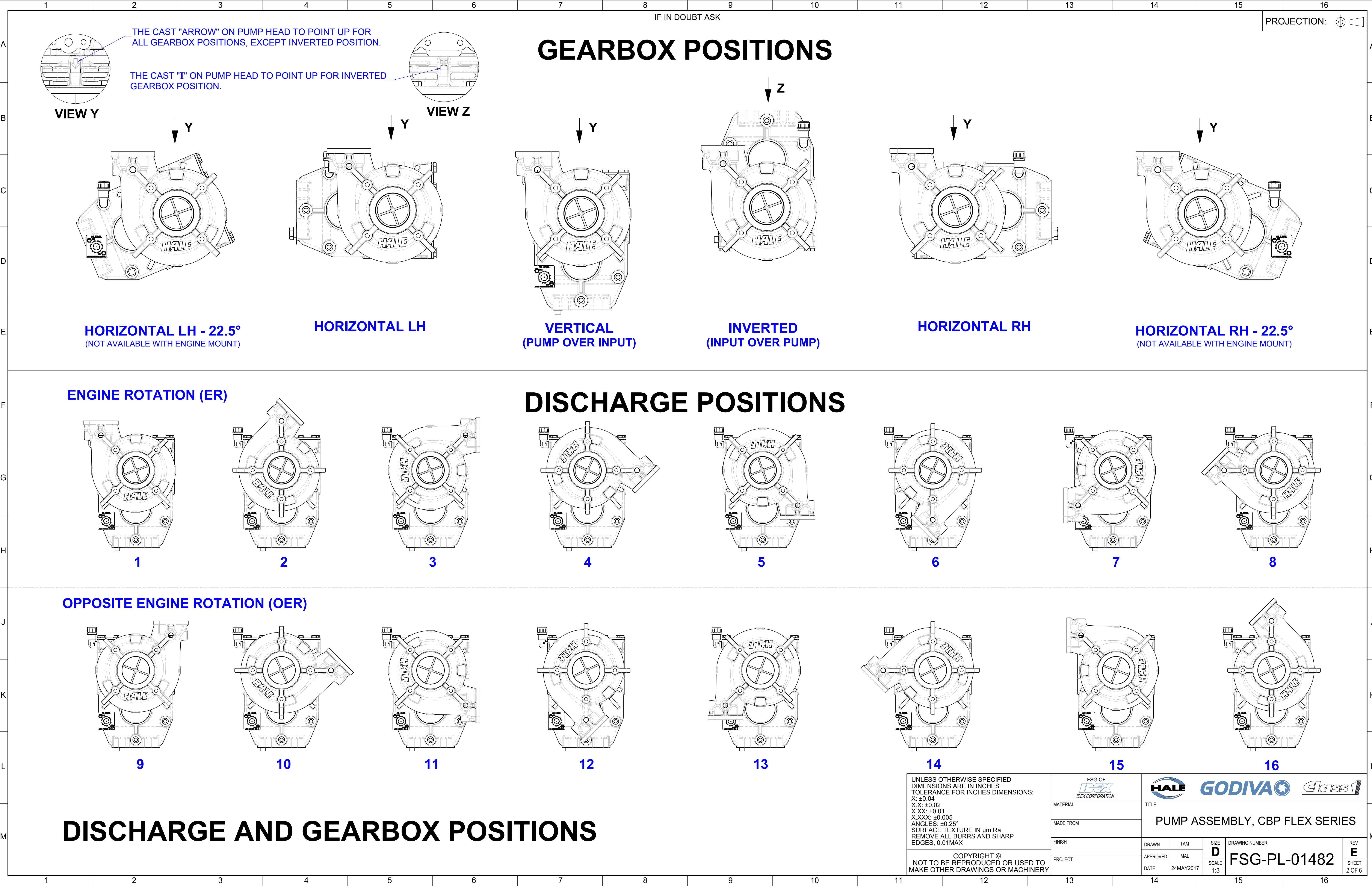
OTHERWISE, FOLLOW STANDARD TORQUE VALUES PER MATERIAL & GRADE / CLASS OF FASTENER.

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

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FSG OF IDEX CORPORATION	
MATERIAL	
MADE FROM	
FINISH	
PROJECT	

HALE GODIVA class1	
PUMP ASSEMBLY, CBP FLEX SERIES	
DRAWN	TAM
APPROVED	MAL
DATE	24MAY2017
SIZE	D
SCALE	1:3
DRAWING NUMBER	FSG-PL-01482
REV	E
SHEET	1 OF 6

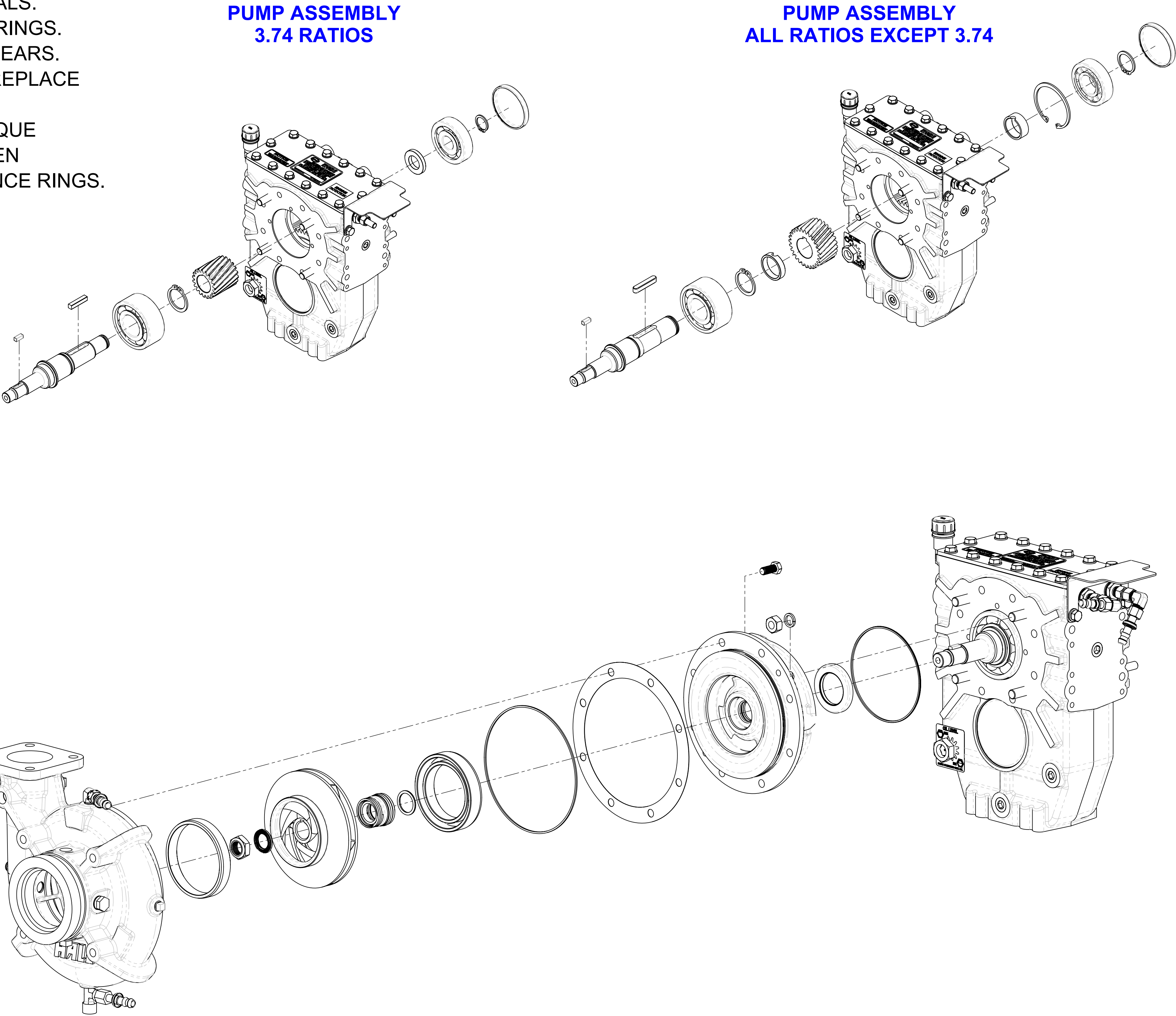


- NOTES:
1. LEVEL 1 REPAIR KIT PROVIDES EVERYTHING NEEDED TO CHANGE SEALS.
 2. LEVEL 2 REPAIR KIT PROVIDES LEVEL 1 AND ITEMS NEEDED FOR BEARINGS.
 3. LEVEL 3 REPAIR KIT PROVIDES LEVEL 1 & 2 AND ITEMS TO REPLACE GEARS.
 4. IMPELLER RENEW KIT PROVIDES LEVEL 1 REPAIR KIT AND ITEMS TO REPLACE IMPELLER.
 5. REFER TO TECHNICAL MANUAL (FSG-MNL-00184) AND "MAXIMUM TORQUE VALUES" AND "THREAD LOCKS & SEALANTS" TABLES ON SHEET 1 WHEN INSTALLING THREADED COMPONENTS, OIL SEALS/CAPS, OR CLEARANCE RINGS.

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	546-00067-100	546-00067-237	546-00067-337
-29F	2.91		546-00067-200	546-00067-329
-26F	2.60			546-00067-326
-23F	2.33			546-00067-323
-19F	1.90			546-00067-319
-16F	1.64			546-00067-316
-13F	1.31			546-00067-313
-11F	1.14			546-00067-311

IMPELLER RENEW KIT PART NUMBERS	
DESCRIPTION	PART NUMBER
IMPELLER RENEW KIT (OER)	516-00026-023
IMPELLER RENEW KIT (ER)	516-00026-024

REPAIR PART KITS IDENTIFICATION

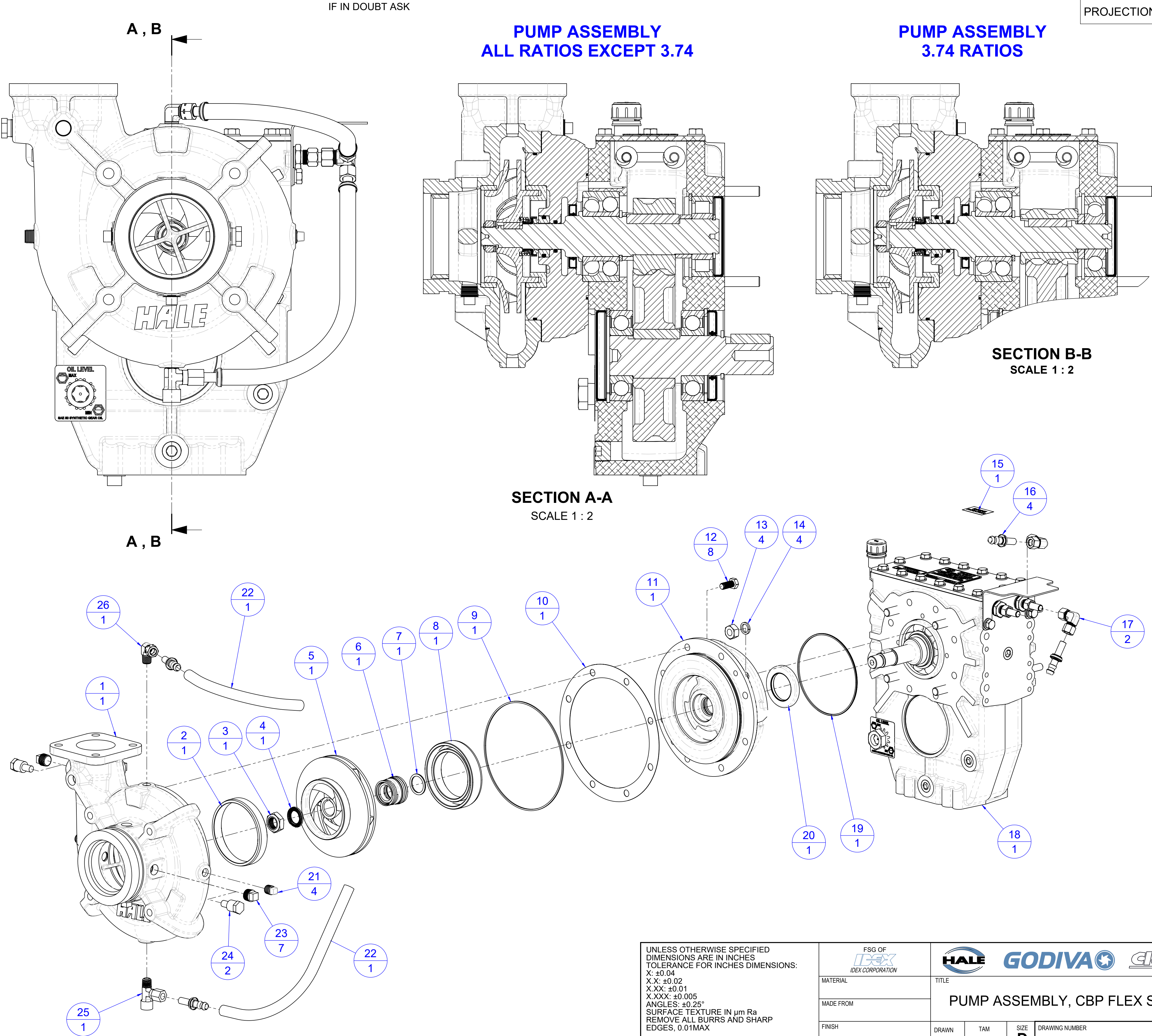


UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCHES DIMENSIONS: X: ±0.04 X.X: ±0.02 X.XX: ±0.01 X.XXX: ±0.005 ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP EDGES, 0.01MAX		FSG OF  IDEX CORPORATION		  	
		MATERIAL		TITLE	
		MADE FROM		PUMP ASSEMBLY, CBP FLEX SERIES	
		FINISH	DRAWN TAM	SIZE D	DRAWING NUMBER
COPYRIGHT © NOT TO BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY		PROJECT	APPROVED MAL	SCALE 1:3	FSG-PL-01482
		DATE 24MAY2017			REV E SHEET 3 OF 6

	1	2	3	4	
	ITEM NO.	PART NUMBER	DESCRIPTION		QTY.
A	1	001-0200-00-0	CBP-320RD BODY-VOLUTE (ENG ROT) (SHOWN)		1
		001-0190-00-0	CBP-320LD BODY-VOLUTE (OPP ENG ROT)		
		001-0200-01-0	CBP-320RD BODY-VOLUTE (ENG ROT), BRONZE		
		001-0190-01-0	CBP-320LD BODY-VOLUTE (OPP ENG ROT), BRONZE		
	2	321-0070-00-0	RING, CLEARANCE		1
	3	110-2711-11-0	NUT, 3/4-16 NYLON LOCK STNL JAM		1
B	4	097-90031-999	WASHER, NORD-LOCK 3/4" SS		1
	5	016-0240-00-0	CBP-16R-6 IMPELLER (ENG ROT) (SHOWN)		1
		016-0230-00-0	CBP-16L-6 IMPELLER (OPP ENG ROT)		
		6	296-5050-08-0	MECHANICAL SEAL HP100/75	
	7	040-00214-010	O-RING, AS568-214, TEFLON		1
	8	321-00013-000	RING, REAR, WRAP AROUND, CBP-F		1
C	9	040-1640-00-0	O-RING, AS568-164, NITRILE		1
	10	046-0350-00-0	GASKET VOLUTE BODYFZ-W323		1
	11	002-00018-001	HEAD, PUMP, CBP-F		1
		002-00018-003	HEAD, PUMP, CBP-F, BRONZE		
D	12	018-1607-25-0	CSW HH 3/8-16x0.88 GR8, IRON PUMP		8
		018-1607-12-0	CSW HH 3/8-16x0.88 SS, BRONZE PUMP		
	13	MS35/10	NUT, FULL M12		4
	14	MS29/8	WASHER, SPRING SQ M12		4
E	15	101-0900-00-0	ENGINE ROTATION DECAL		1
		101-0900-01-0	OPPOSITE ENGINE ROTATION DECAL		
	16	082-3028-00-0	FITTING 3/8 HOSE BARB x 3/8 TUBE		4
	F	17	082-0318-02-0	ELBOW, 3/8 COMP X 3/8 COMP, 90 DEG (SHOWN)	
082-3071-02-0			TEE, 3/8 CPRSN UNION (NOT SHOWN)		
18		FSG-PL-01481	HALE FLEX SERIES GEARBOX		1
19		040-1580-00-0	O-RING, AS568-158, NITRILE		1
	20	296-00019-000	SEAL, OIL, VITON		1
G	21	217-0201-00-0	1/4 NPT SQUARE HEAD STEEL PLUG, IRON PUMP		4
		217-0201-01-0	1/4 NPT SQUARED HEAD BRASS PLUG, BRONZE PUMP		
	22	340-0490-00-0	HOSE, COOLER, CBP, RETURN, QTY. 3.5 FT		1
	23	217-0301-00-0	PLUG-3/8 NPT SQUARE HEAD, IRON PUMP		7
217-0301-01-0		PLUG-3/8 NPT SQUARE HED, BRONZE PUMP			
	24	029-0110-00-0	ANODE OPTION		2
	25	082-0207-02-0	TEE, 3/8 COMP X 1/4 MPT X 1/4 FPT		1
	26	082-0203-02-0	ELBOW 1/4 NPT x 3/8 COMPRESSION - 90°		1

NOTES:
1. REFER TO TECHNICAL MANUAL (FSG-MNL-00184) AND "MAXIMUM TORQUE VALUES" AND "THREAD LOCKS & SEALANTS" TABLES ON SHEET 1 WHEN INSTALLING THREADED COMPONENTS, OIL SEALS, OR CLEARANCE RINGS.

PARTS IDENTIFICATION PUMP HEAD GROUP



ITEM NO.

PART NUMBER

DESCRIPTION

QTY.

1

037-00027-000

SHAFT, PUMP, CBP-F

1

1

037-00027-001

SHAFT, PUMP, CBP-F, 3.74 RATIO

1

2

017-0500-00-0

CBP IMPELLER 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

SEE TABLE

GEAR, PUMP

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)

NOTES:

1. REFER TO TECHNICAL MANUAL (FSG-MNL-00184) AND "MAXIMUM TORQUE VALUES" AND "THREAD LOCKS & SEALANTS" TABLES ON SHEET 1 WHEN INSTALLING THREADED COMPONENTS OR OIL SEALS/CAPS.

PROJECTION:

PUMP ASSEMBLY

ALL RATIOS EXCEPT 3.74

PUMP ASSEMBLY

3.74 RATIOS

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

MADE FROM

FINISH

PROJECT

HALE

GODIVA

Class 1

TITLE

PUMP ASSEMBLY, CBP FLEX SERIES

DRAWN

TAM

DATE

24MAY2017

APPROVED

MAL

SIZE

D

SCALE

1:3

DRAWING NUMBER

FSG-PL-01482

REV

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SHEET

5 OF 6

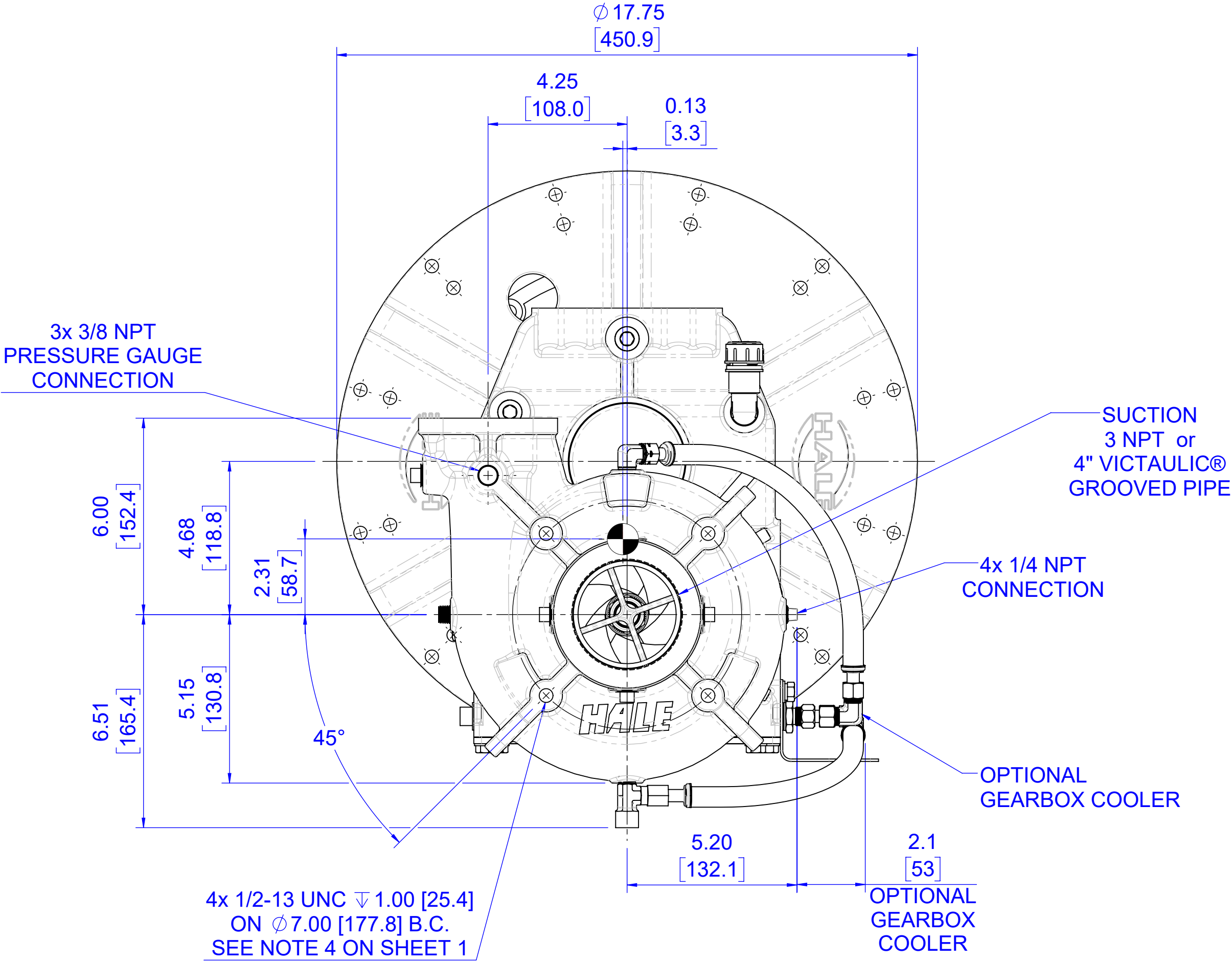
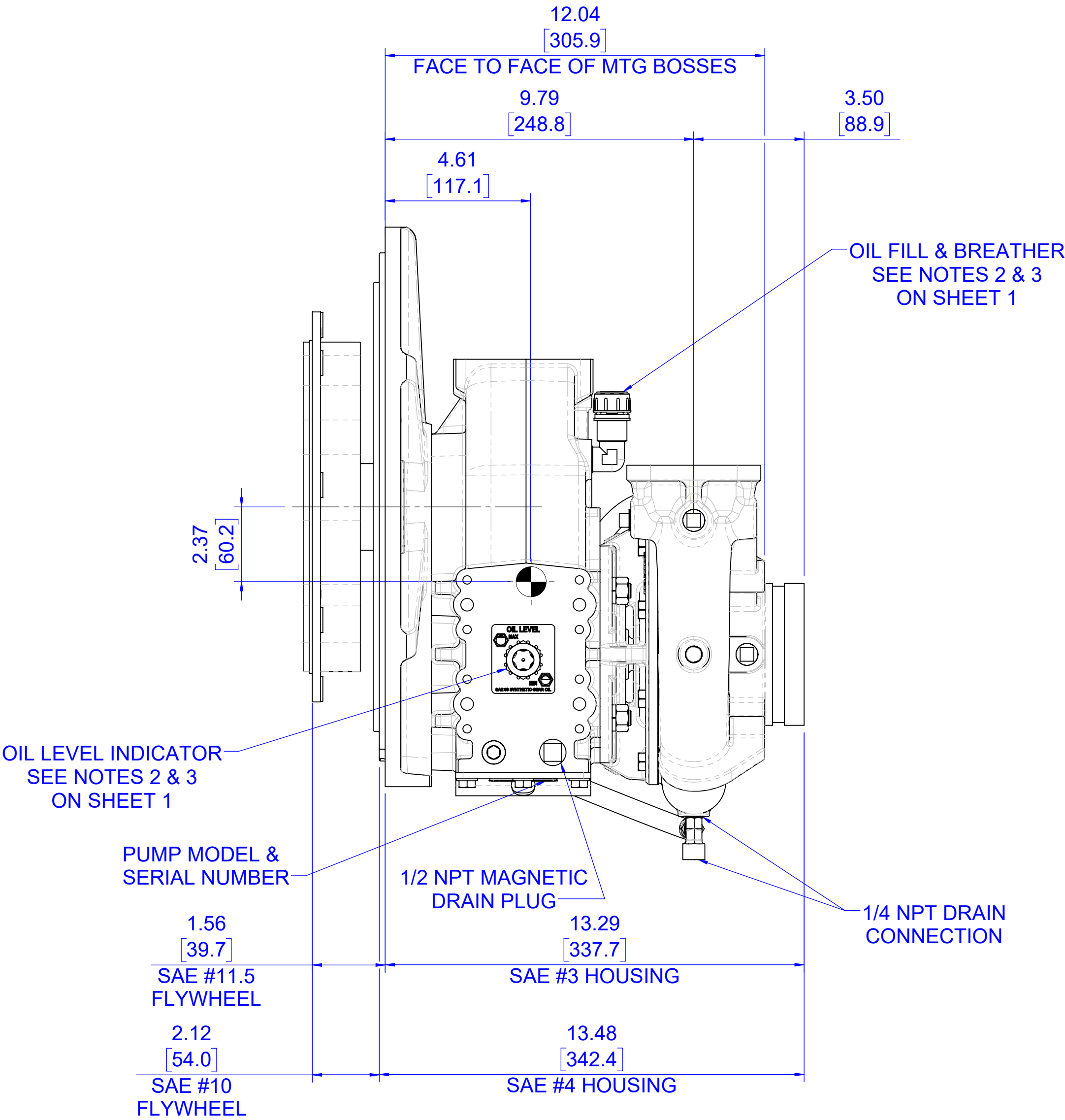
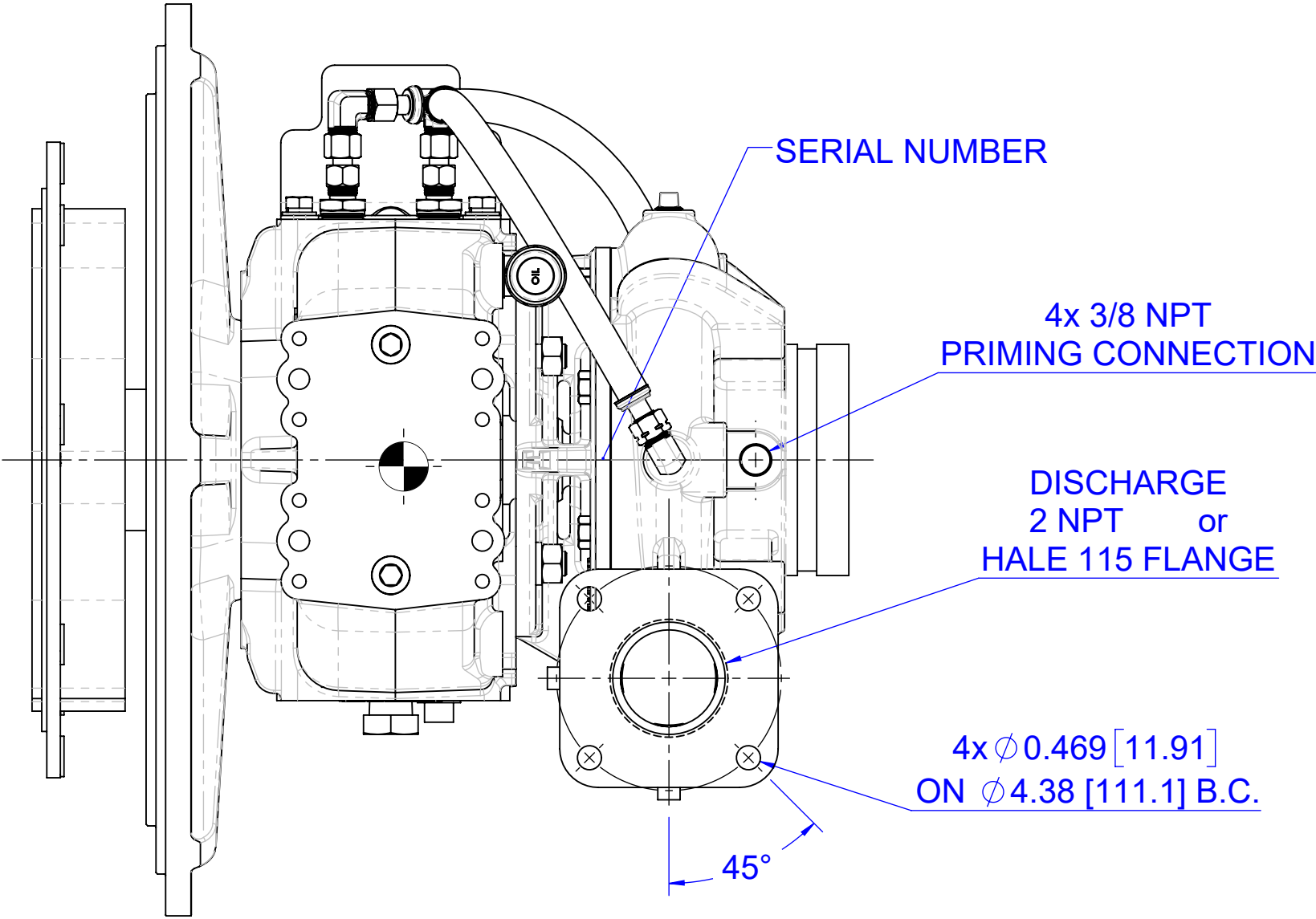
PARTS IDENTIFICATION

PUMP SHAFT GROUP

HALE FLEX SERIES CBPM PUMP

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

- NOTES:
- REFER TO "MAXIMUM TORQUE VALUES" AND "THREAD LOCKS & SEALANTS" TABLES ON SHEET 1 WHEN INSTALLING THREADED COMPONENTS.



ENGINE MOUNT (M) INSTALLATION

MAXIMUM ENGINE 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
MAXIMUM ALLOWABLE HYDROSTATIC PRESSURE: 500 PSIG

PROJECTION:

PUMP WEIGHT (DRY):
IRON VERSION: 135 LBS [61 kg]
BRONZE VERSION: 138 LBS [63 kg]

REPRESENTS CENTER OF GRAVITY

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

MADE FROM

FINISH

PROJECT

HALE

GODIVA

Class 1

TITLE
PUMP ASSEMBLY, CBP FLEX SERIES

DRAWN
TAM

APPROVED
MAL

DATE
24MAY2017

SIZE
D
SCALE
1:3

DRAWING NUMBER
FSG-PL-01482

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E
SHEET
6 OF 6