

1. REFER TO HALE PUMP/ENGINE COMBINATION LIST 029-0020-52-0 TO SELECT PROPER RATIO TO MATCH PUMP WITH ENGINE.
2. WEIGHT OF STANDARD QMAX 1500 GPM PUMP
AS SHOWN LESS PRIMING PUMP APPROXIMATELY 1400 LBS [635 KG].
3. IMPELLER SHAFT SEAL - PACKING STANDARD, MECHANICAL SEAL OPTIONAL.
4. APPLY LOCTITE #246 HIGH TEMPERATURE THREAD LOCK OR EQUIVALENT TO SCREW THREADS AND TORQUE SCREWS PER HALE ENGINEERING STANDARD ES018-002.
5. UNLESS OTHERWISE INDICATED, FASTENERS ARE GRADE 8 ZINC PLATED STEEL.
6. FOR PUMP COOLING, AN ADDITIONAL 3/8 LINE SHOULD BE INSTALLED BETWEEN THE PUMP DISCHARGE AND BOOSTER TANK. THIS COOLING LINE SHOULD BE CONTROLLED BY A PANEL MOUNTED BALL VALVE AND A CHECK VALVE (HALE P/N: 038-1550-00-0 OR EQUIV) SHOULD BE INSTALLED IN THE BOOSTER TANK END OF THE COOLING LINES.

—4X 5/8-11 UNC-2B X 1.25 [31.8] DEEP MOUNTING HOLES (UNDERSIDE). USE MINIMUM SAE GRADE 5 SCREWS.

PUMP MODEL	GEAR RATIO	DIMENSIONS					OPTIONAL DISCHARGE FLANGES			
		E	F	G	H	J	STANDARD	OPTIONAL	STD. CAST HOLE	
QMAX*-23R	2.28	12.38 [314.5]	6.50 [165.1]	4.31 [109.5]	5.19 [131.8]	2.00 [50.8]	A	BLANK	1-1/4, 2-1/2, 3 & 4 NPT	4.00 [101.6]
QMAX*-21R	2.05	12.56 [319.0]					B	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
QMAX*-19R	1.86	12.75 [323.9]					C	BLANK	1-1/4, 2-1/2, 3 & 4 NPT	4.00 [101.6]
QMAX*-17R	1.71	12.94 [328.7]					D	BLANK	1-1/4, 2, 2-1/2, & 3 NPT	3.00 [76.2]
							E	BLANK	1-1/4, 2, 2-1/2, & 3 NPT	3.00 [76.2]
QMAX*-15R	1.58	13.13 [333.5]	F	BLANK	1-1/4, 2, 2-1/2, & 3 NPT	3.00 [76.2]				
			G	BLANK	1-1/4, 2, 2-1/2, & 3 NPT	3.00 [76.2]				
*RATED CAPACITY 1000, 1250, 1500, 1750, 2000 AND 2250 GPM; 4000, 5000, 6000, 7000 AND 8000 LPM							K	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
EXAMPLE: THE MODEL NUMBER FOR A 1500 GPM RATED PUMP WITH A 2.28 GEAR RATIO AND A FRONT MOUNTED GEARBOX WOULD BE QMAX150-23R.							L	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
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 THE LIMITS OR FAILURE TO FOLLOW THE RECOMMENDATIONS OUTLINED ON THIS DRAWING COULD DAMAGE THE GEARBOX AND RESULT IN PERSONAL INJURY. QMAX MIDSHIP MAXIMUM PUMP PRESSURE: HYDROSTATIC = 600 PSI [41.4 BAR] (500 PSI [34.5 BAR] BRONZE) HYDRODYNAMIC = 400 PSI [27.6 BAR] MAXIMUM POWER INPUT FOR PUMPING = 450 HP [336 kW] MAXIMUM TORQUE ON PUMP SHAFT = 2300 LBS-FT [3120 N-m] MAXIMUM GEARBOX SHAFT TORQUE (ROAD) = 16,000 LBS-FT [21,693 N-m]							M	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
							N	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
							O	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
							P	BLANK	1-1/4, 2-1/2, 3 & 4 NPT	3.00 [76.2]
							Q	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
							R	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
							S	BLANK	3, 4 NPT OR CHECK VALVE	CHECK VALVE
							T	-	3, 4 NPT, CHECK VALVE OR 2417	CAST SOLID
							U	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
							UT	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]
V	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]							
VT	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]							
W	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]							
WT	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]							
X	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]							
XT	BLANK	1-1/4, 2, 2-1/2 & 3 NPT	3.00 [76.2]							
PUMP MODEL	QMAX*-23R	QMAX*-21R			QMAX*-19R		QMAX*-17R		QMAX*-15R	
MAX GEARBOX INPUT	2280	2530			2780		3030		3280	

FOR ADDITIONAL OPTIONS AND ACCESSORIES REFER TO THE FOLLOWING DRAWINGS	
OPTION	DRAWING NUMBER
ESP PRIMING PUMP	PL821
PVG PRIMING VALVE	PL480
SPV PRIMING VALVE	PL819
SPEED COUNTER ADAPTER	PL910
PUMP SHIFT INDICATOR LIGHTS	PL746
RG GEARBOX ASSEMBLY	PL766
SUCTION & DISCHARGE ADAPTERS	PL831

(2) FRONT AND (2) REAR OPENINGS
MACHINED FOR 115 SERIES FLANGES.
STANDARD FLANGES: FRONT AND REAR BLANK.
OPTIONAL FLANGES: 1-1/4 NPT, 2-1/2 NPT, AND 3 NPT.

OPTIONAL:
MIVE MASTER INTAKE VALVE (NOT SHOWN)
AVAILABLE FOR MOUNTING BETWEEN THE
SUCTION TUBE AND MIX SUCTION TUBE EXTENSION
ON LEFT, RIGHT, OR BOTH SIDES. ALSO AVAILABLE
ON FRONT, REAR, AND BOTTOM FLANGED OPENING.
(SEE FSG-PL-01491)

STANDARD FLANGES:
THE HALE COMBINATION FLANGES ARE
SIZED FOR SPICER 1600, 1700, & 1800
SERIES FLANGES.

1600 SERIES WITH ϕ 6-5/8 FEMALE PILOT
—USE (8) ϕ 3/8 SAE GRADE 8 BOLTS.

1700 SERIES WITH Ø 7-3/4 FEMALE PILOT
USE (8) Ø 3/8 SAE GRADE 8 BOLTS.

1800 SERIES WITH $\varnothing 7\text{-}3/4$ FEMALE PILOT
USE (12) $\varnothing 7/16$ SAE GRADE 8 BOLTS.

RELIEF VALVE CONNECTION
BLANK FLANGE STANDARD. ALL L

OPTIONAL:

QD RELIEF VALVE (UP TO 1250 GPM PUMP - SEE PL404)
QG RELIEF VALVE (UP TO 1750 GPM PUMP - SEE PL404)
TPM RELIEF VALVE (REQ. 2000 GPM PUMP - SEE PL 742)
DUAL TPM RELIEF VALVE (REQ. 2250 GPM PUMP)

ESP ELECTRIC PRIMING PORT, 3/4 NPT.
ALL PRIMING CONNECTIONS TO BE MADE HERE.
(SEE PL821 FOR DETAILS)

STANDARD LENGTH SUCTION TUBES SHOWN
AVAILABLE IN 4-1/2, 5, AND 6 NS THREAD.
9" LONG TUBES OPTIONAL (SEE PL831)

TANK SUCTION CONNECTION
BLANK FLANGE STANDARD.
OPTIONAL:
3 NPT OR 4 NPT FLANGE
AND/OR CHECK VALVE

Q 4.37
[111.0]
CLEARANCE REQ.
TO REMOVE
BEARING HOUSING

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 6 FOR FURTHER COOLING INSTRUCTIONS.

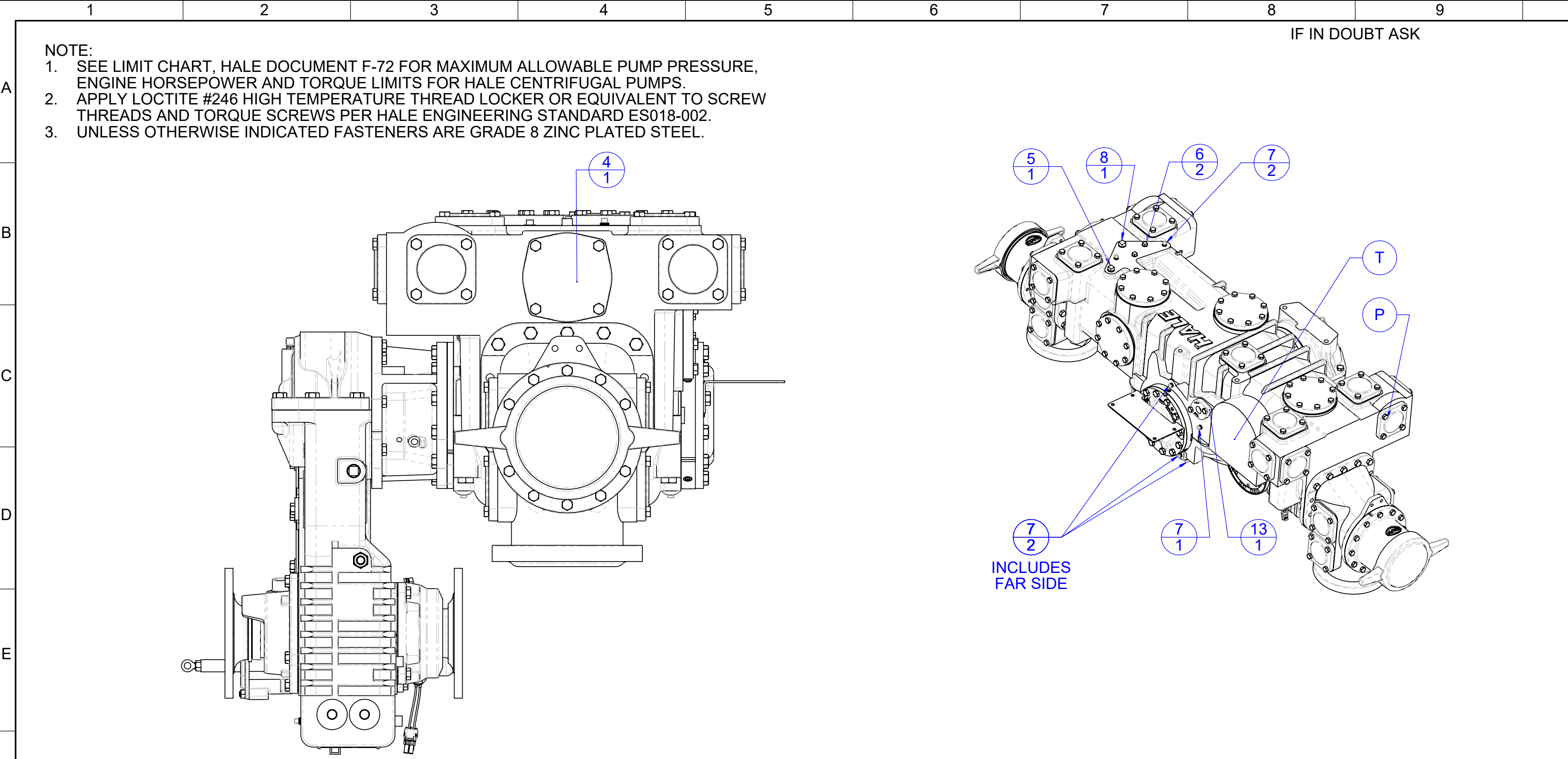
3/4 NPT OIL LEVEL PLUG
USE SAE EP-90 OR 80W-90 API GL-5 OIL.
APPROX.CAPACITY = 4.0 QT [3.8 L]

TANK SUCTION CONNECTION
STANDARD CAST SOLID
OPTIONAL:
3 NPT OR 4 NPT FLANGE
CHECK VALVE AND/OR
17 SERIES FLANGE (SEE PL831)

HALE TYPE QMAX SERIES PUMP INSTALLATION (WITH RG GEARBOX)

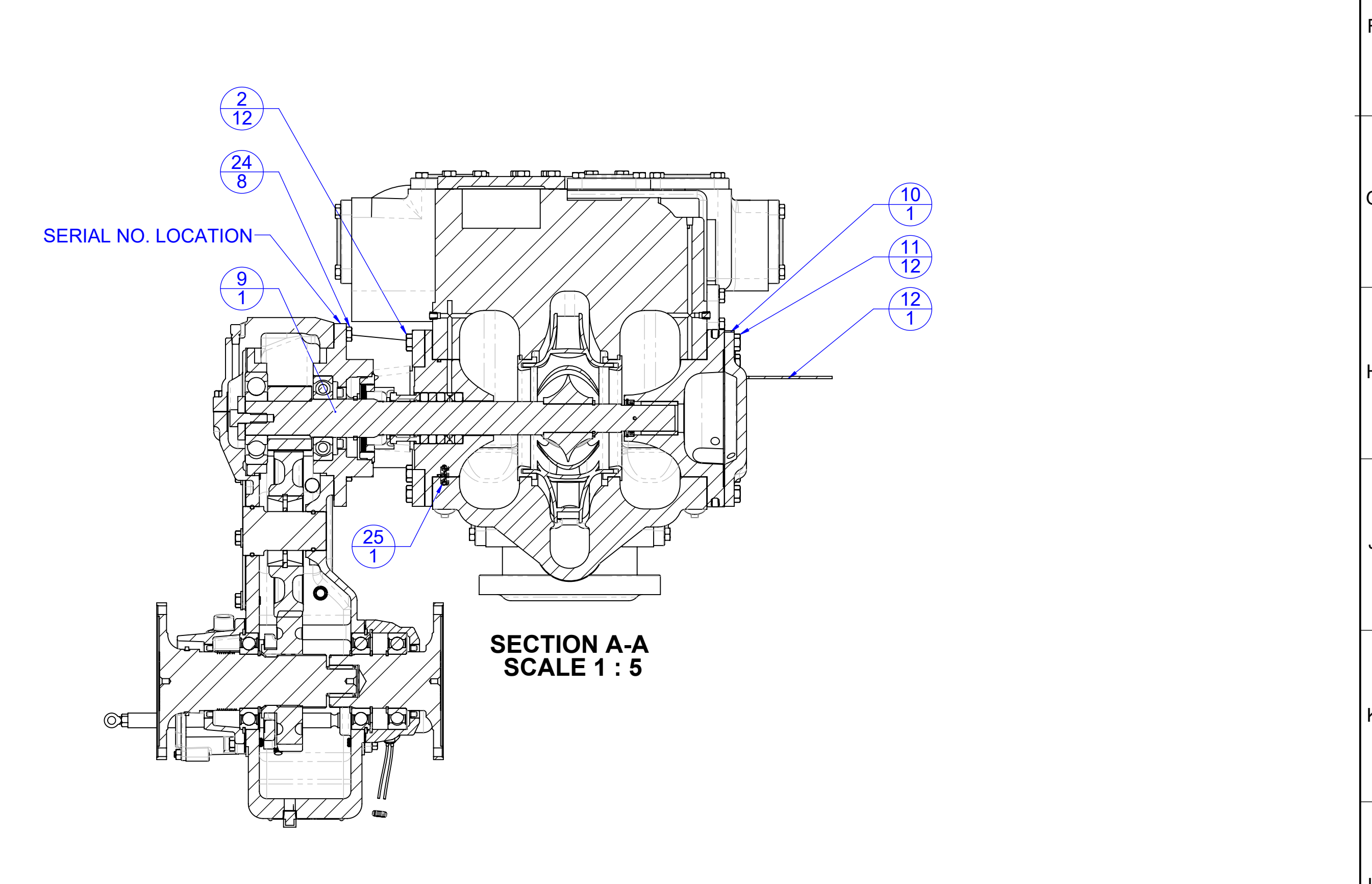
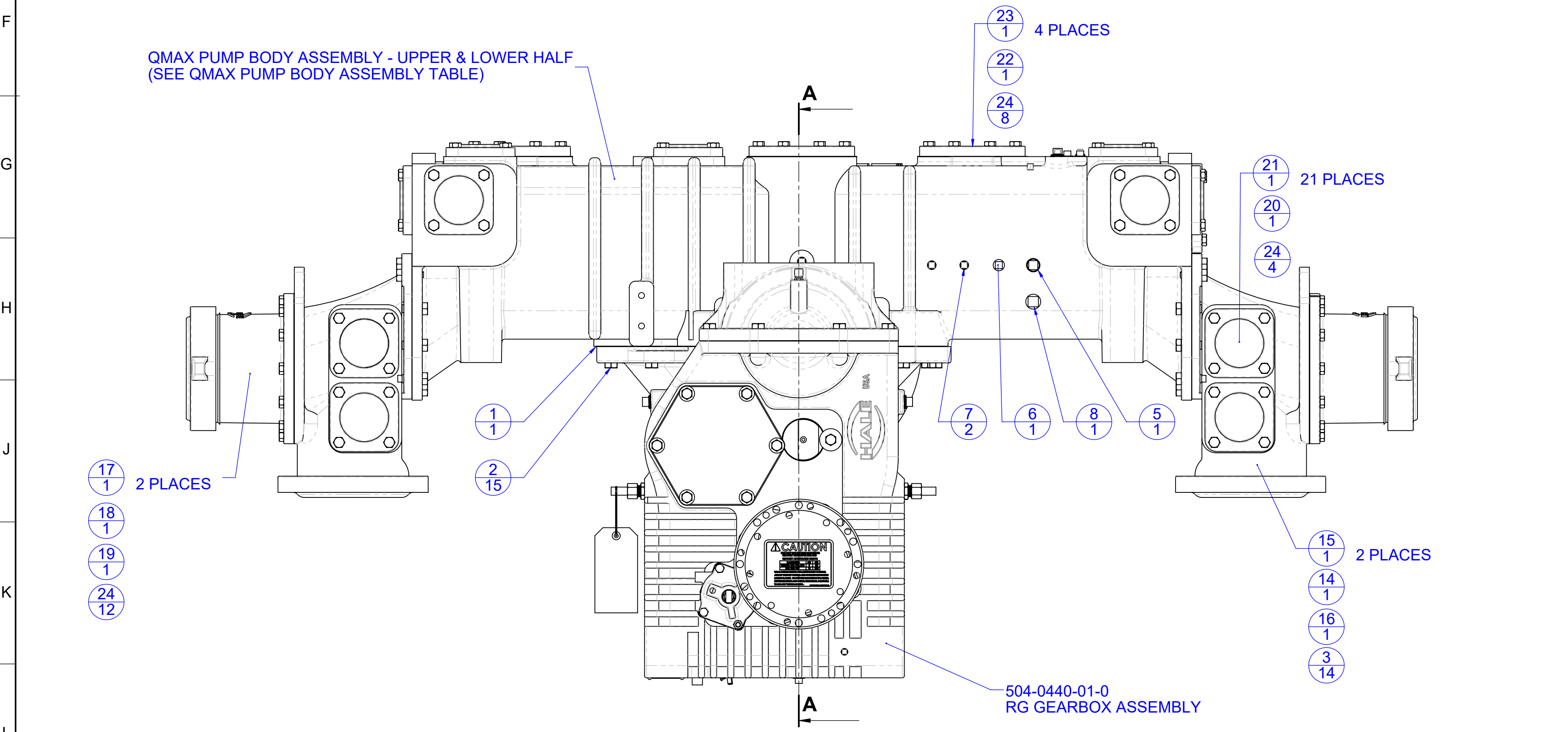
REVISIONS						
ECN	REV	ZONE	CHANGED FROM	BY	DATE	APVD
5722	F		UPDATED TO SOLIDWORKS FORMAT, ADDED CROSS-SECTION ASSEMBLIES	KTN	03FEB2022	TAM

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 		  				
	MATERIAL	TITLE					
	MADE FROM	QMAX SERIES PUMP WITH RG GEARBOX					
	FINISH	DRAWN	OPL	SIZE	DRAWING NUMBER		REV
COPYRIGHT © NOT TO BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY	PROJECT	APPROVED	RET	D SCALE 1:9	PL913		F SHEET 1 OF 4
		DATE	23JUL1999				



ITEM NO.	PART NUMBER	DESCRIPTION	QTY	COMMENTS
1	046-0941-00-0	PUMP BODY GASKET	1	
2	018-2016-25-0	BOLT HEX HEAD 1/2-13x1.75"LG GR8 STEEL ZINC	27	
3	018-2012-02-0	CSW HH 1/2-13 X 1.25 ZINC	28	
4	217-3001-01-0	Q-G115 PLUG RELIEF VALVE ASY	1	SEE SHEET (4)
5	217-0401-00-0	PLUG-1/2" NPT BLACK IRON	2	
6	217-0301-00-0	PLUG-3/8 NPT SQUARE HEAD	3	
7	217-0201-00-0	1/4 NPT SQUARE HEAD STEEL PLUG	11	
8	217-0501-00-0	PLUG-3/4 NPT M.I.	2	
9	IMPELLER ASSEMBLY	IMPELLER ASSEMBLY	1	SEE SHEET (3)
10	AUTO LUBE ASSEMBLY	AUTO LUBE ASSEMBLY	1	SEE SHEET (4)
11	018-2020-25-0	SCREW, HHCS, 1/2-13 X 2, GRADE 8	12	
12	159-1200-02-0	AUTO LUBE SPACER	1	
13	505-0210-00-0	ZMQ MOUNTING PLATE AND STRAIN	1	SEE SHEET (4)
14	046-0030-00-0	GASKET, SUCTION TUBE EXTENSION	2	
15	178-0063-00-0	SUCTION TUBE EXTENSION	2	
16	046-0040-00-0	GASKET 12-BOLT	2	
17	SUCTION TUBE	SUCTION TUBE	2	SEE SUCTION TUBE TABLE
18	010-0030-00-0	SUCTION TUBE STRAINER	2	
19	108345	SUCTION TUBE CAP	2	
20	142-0390-00-0	O-RING SEAL SQUARE CUT	21	
21	115-0050-00-0	115-B FLANGE-BLANK	21	
22	046-0060-00-0	GASKET	4	
23	115-0010-00-0	FLANGE, 2433 BLANK	4	
24	018-1812-25-0	SCREW, 7/16-14 X 1.25, GR8	148	
25	064-1416-12-0	07-64M-08S SPIROL PIN	1	

QMAX PUMP BODY ASSEMBLY TABLE			SUCTION TUBE TABLE	
PUMP BODY P/N	PORT P	PORT T	SIZE	SUCTION TUBE P/N
001-0870-06-0	3" OPENING - 115	CAST SOLID	6" NST X 4" LONG	007-0030-06-0
001-0870-46-0	4" OPENING - 2433	CAST SOLID	6" NST X 6" LONG	007-0030-00-0
001-0870-47-0	3" OPENING - 115	4" OPENING - 2433	6" NST X 7" LONG	007-0030-10-0
001-0870-48-0	3" OPENING - 115	6" OPENING - 2427	6" NST X 9" LONG	007-0130-00-0
001-0870-49-0	4" OPENING - 2433	4" OPENING - 2433		
001-0870-50-0	4" OPENING - 2433	6" OPENING - 2427		



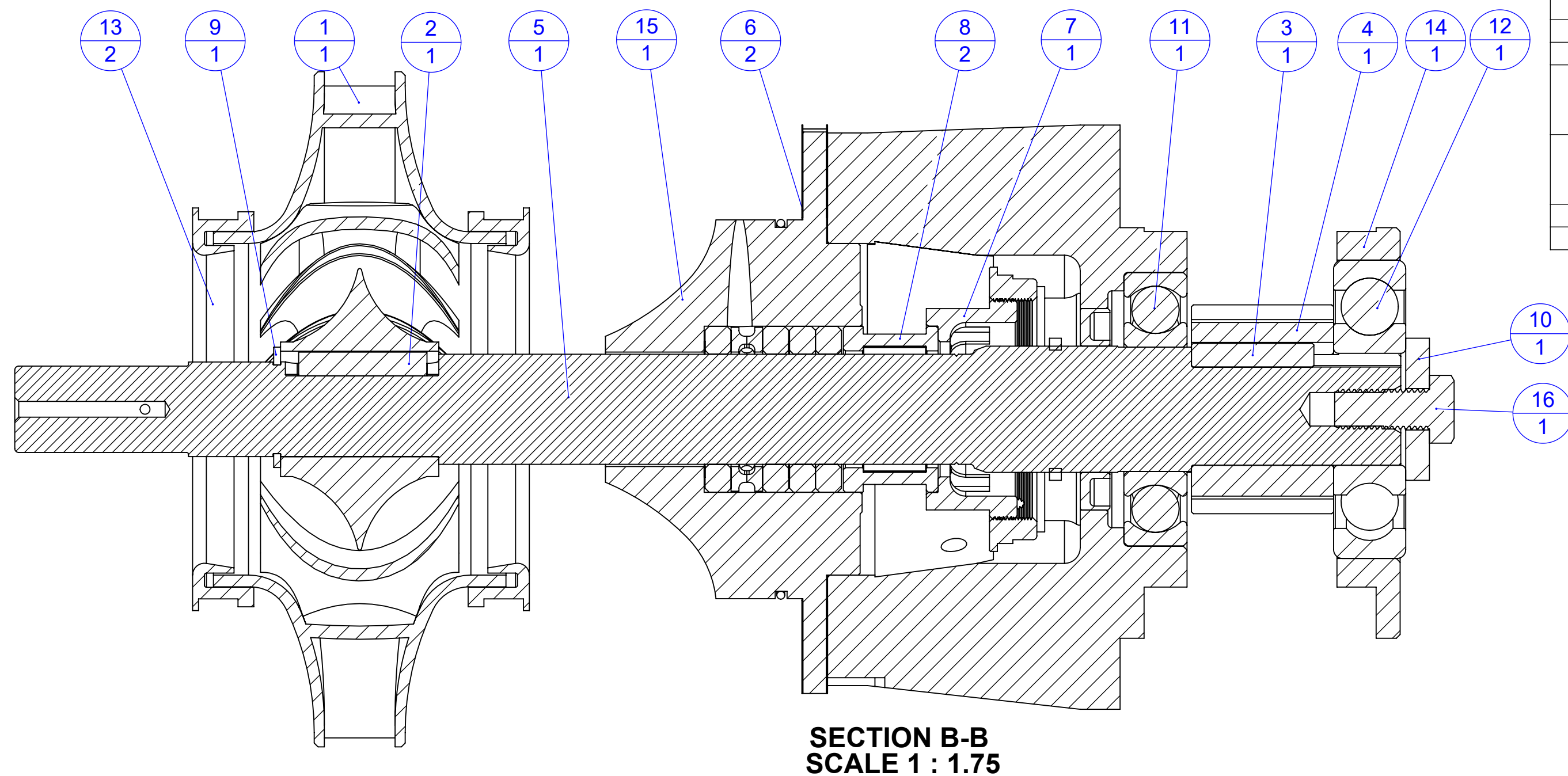
HALE TYPE QMAX SERIES PUMP ASSEMBLY (WITH RG GEARBOX)

ECN	REV.	ZONE	CHANGED FROM	BY	DATE	APVD
-	-	See INSTALLATION	See INSTALLATION	-	-	-

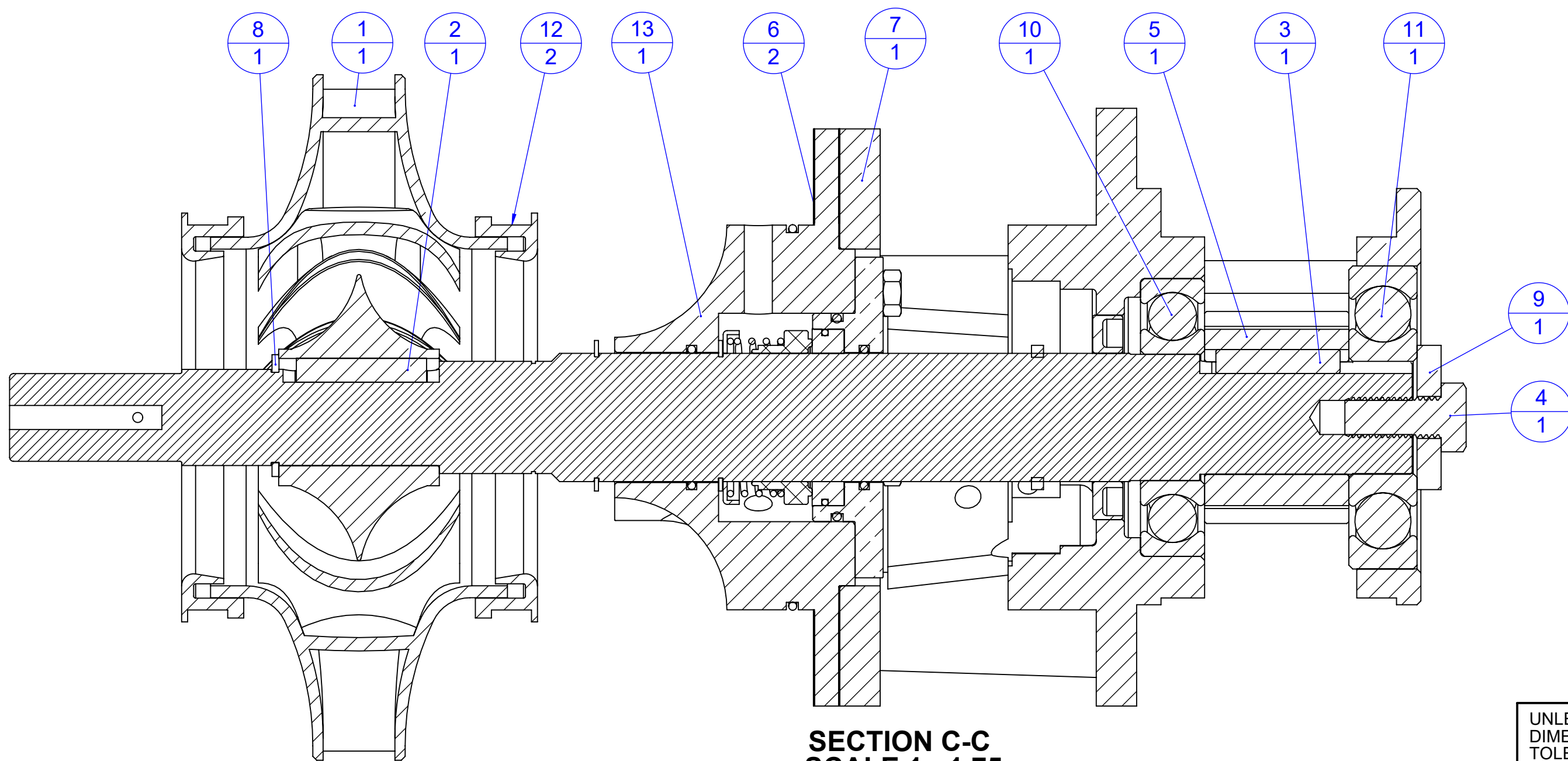
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE FOR INCHES DIMENSIONS:
X: ±0.04
X.X: ±0.02
X.XX: ±0.01
X.XXX: ±0.005
ANGLES: ±0.25°
SURFACE TEXTURE IN µm Ra
REMOVE ALL BURRS AND SHARP
EDGES, 0.01MAX

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MAKE OTHER DRAWINGS OR MACHINERY

FSG OF IDEX CORPORATION	MATERIAL	MADE FROM	FINISH	PROJECT
TITLE QMAX SERIES PUMP WITH RG GEARBOX				
DRAWN		OPL	DATE	23JUL1999
APPROVED		RET	SCALE	1:10
DRAWING NUMBER PL913				REV F SHEET 2 OF 4



PACKING GEAR TABLE		
NO. OF TEETH	GEAR PART NO.	PUMP MODEL
18	031-0920-00-0	QMAX*-23R
20	031-0930-00-0	QMAX*-21R
22	031-0940-00-0	QMAX*-19R
24	031-0950-00-0	QMAX*-17R
26	031-0960-00-0	QMAX*-15R
PACKING REAR BEARING HOUSING TABLE		
HOUSING P/N	RG GEARBOX	
062-0130-00-0	QMAX*- 23 & QMAX*- 15	
062-0140-00-0	QMAX*- 21 & QMAX*- 17	
062-0150-00-0	QMAX*- 19	
PACKING IMPELLER/CLEARANCE RING TABLE		
QMAX PART NUMBER	IMPELLER PART NUMBER	CLEARANCE RING PART NUMBER
QMAX 225/800M	016-0081-10-0	321-0371-01-0
ALL OTHERS	016-0081-00-0	321-0371-00-0



MECHANICAL SEAL GEAR TABLE		
NO. OF TEETH	GEAR PART NO.	PUMP MODEL
18	031-0920-00-0	QMAX*-23R
20	031-0930-00-0	QMAX*-21R
22	031-0940-00-0	QMAX*-19R
24	031-0950-00-0	QMAX*-17R
26	031-0960-00-0	QMAX*-15R

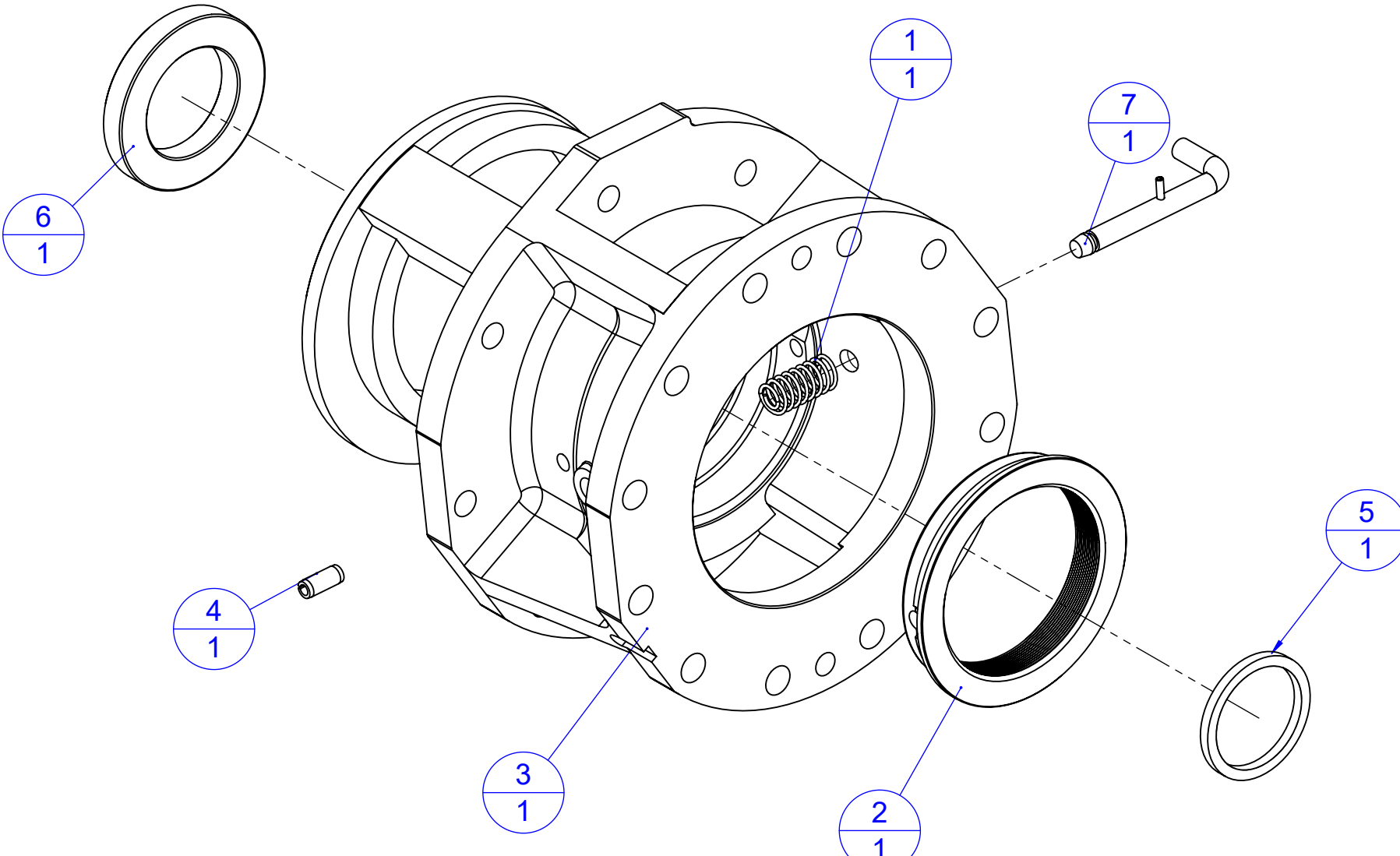
MECHANICAL SEAL REAR BEARING HOUSING TABLE		
HOUSING P/N	RG GEARBOX	
062-0130-00-0	QMAX*- 23 & QMAX*- 15	
062-0140-00-0	QMAX*- 21 & QMAX*- 17	
062-0150-00-0	QMAX*- 19	

MECHANICAL SEAL IMPELLER/CLEARANCE RING TABLE		
QMAX PART NUMBER	IMPELLER PART NUMBER	CLEARANCE RING PART NUMBER
QMAX 225/800M	016-0081-10-0	321-0371-01-0
ALL OTHERS	016-0081-00-0	321-0371-00-0

FSG OF  IDEX CORPORATION		  					
MATERIAL		TITLE QMAX SERIES PUMP WITH RG GEARBOX					
MADE FROM							
FINISH		DRAWN	OPL	SIZE D	DRAWING NUMBER PL913	REV F	
PROJECT		APPROVED	RET				SCALE 1:2
		DATE	23JUL1999				

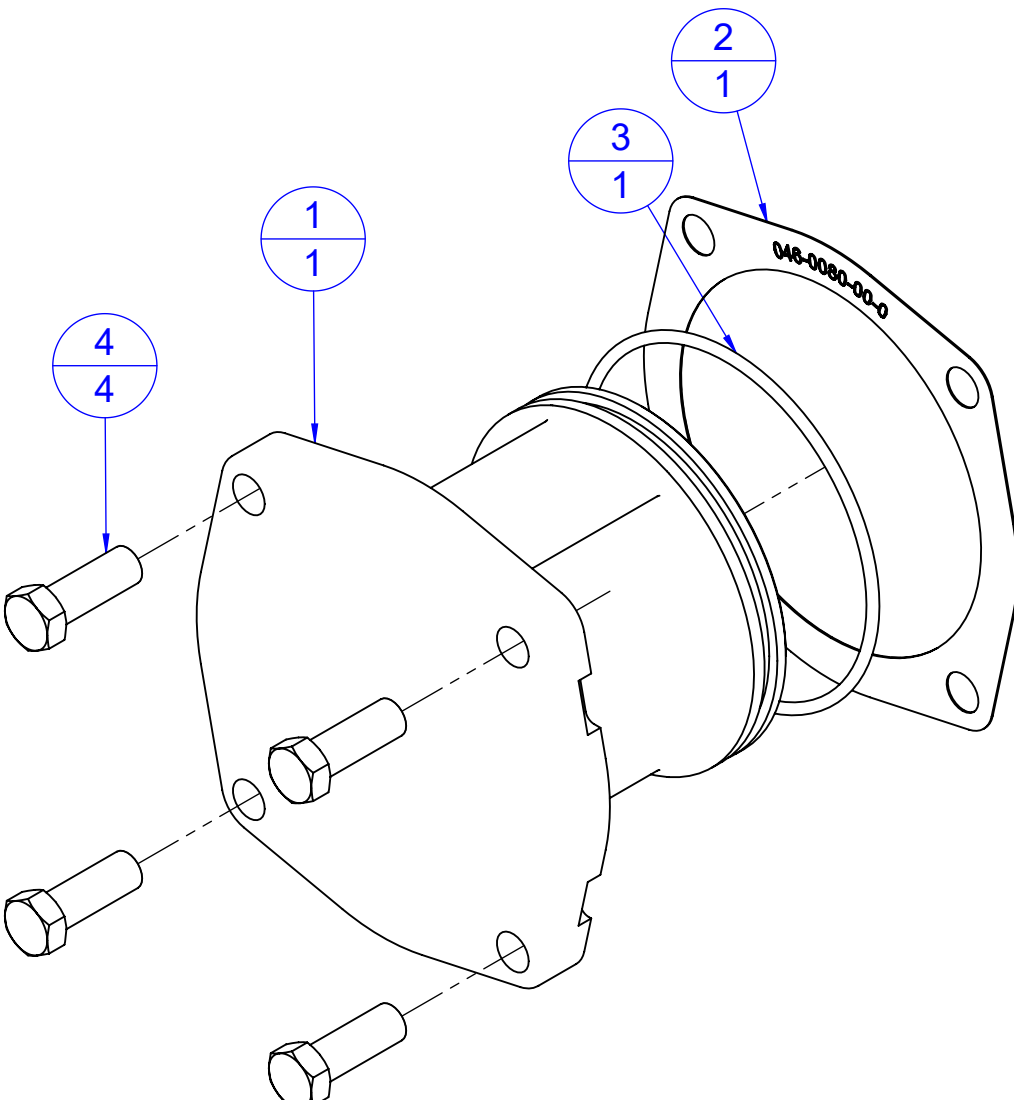
REV F
SHEET 3 OF 4

ITEM NO.	PART NUMBER	DESCRIPTION	Default /QTY.	COMMENTS
1	042-0010-00-0	SPRING	1	
2	048-0230-00-0	SLEEVE	1	
3	REAR BEARING HOUSING	REAR BEARING HOUSING	1	SEE REAR BEARING HOUSING TABLE
4	064-1016-01-0	05-64-08CS SPRING PIN	1	
5	142-0010-00-0	SLINGER	1	
6	296-2050-00-0	ZM-296 OIL SEAL	1	
7	564-0010-00-0	PACKING GLAND LOCKING PIN	1	



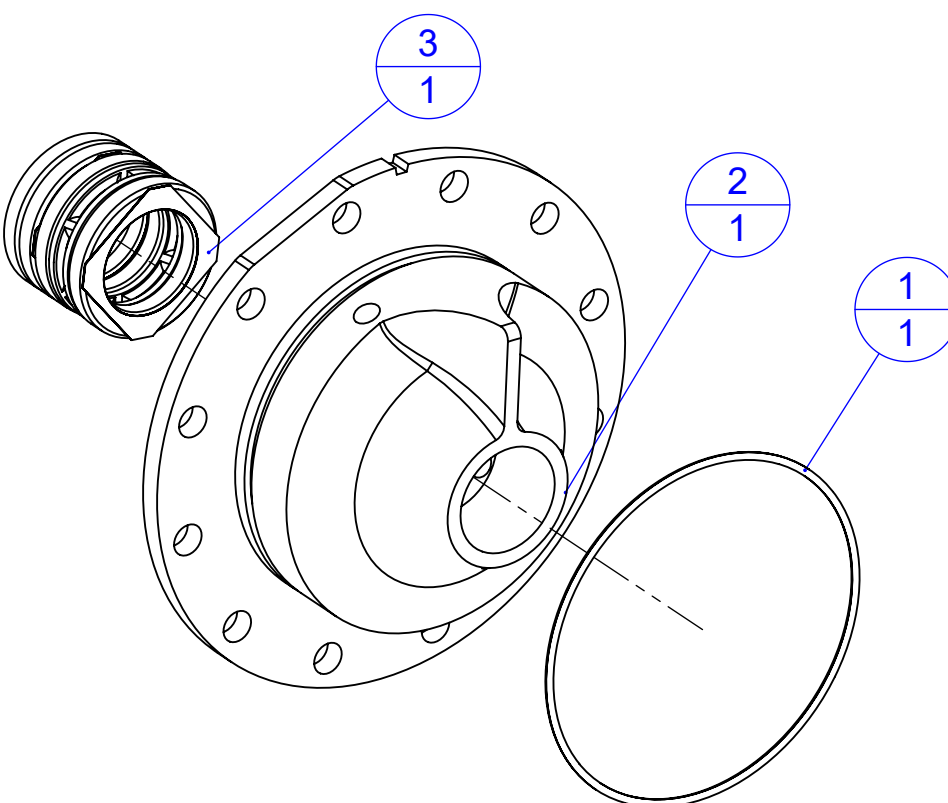
REAR BEARING HOUSING ASSEMBLY (PACKING)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	217-3001-00-0	RELIEF VALVE PLUG	1
2	046-0080-00-0	RELIEF VALVE GASKET	1
3	040-2420-00-0	40-4N400 SEAL RING	1
4	018-1812-25-0	SCREW, 7/16-14 X 1.25, GR8	4



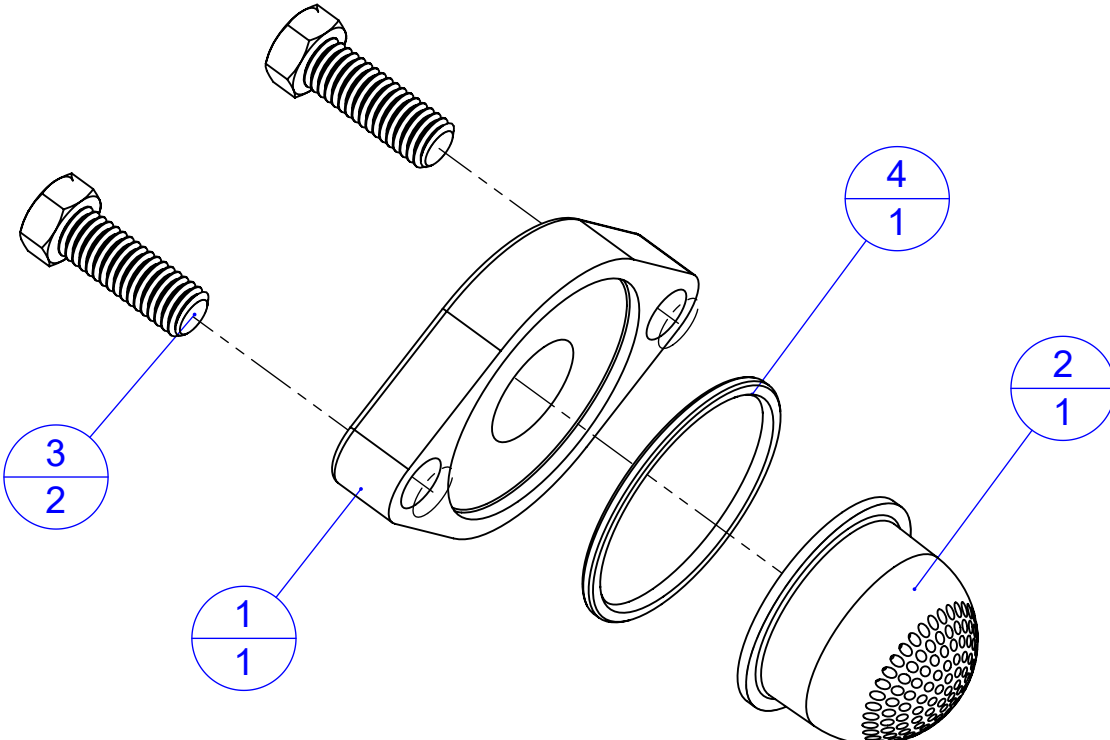
RELIEF VALVE COVER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	040-2550-00-0	RING SEAL	1
2	062-0120-00-0	PACKING HOUSING MACHINED	1
3	296-0030-10-0	PACKING KIT	1



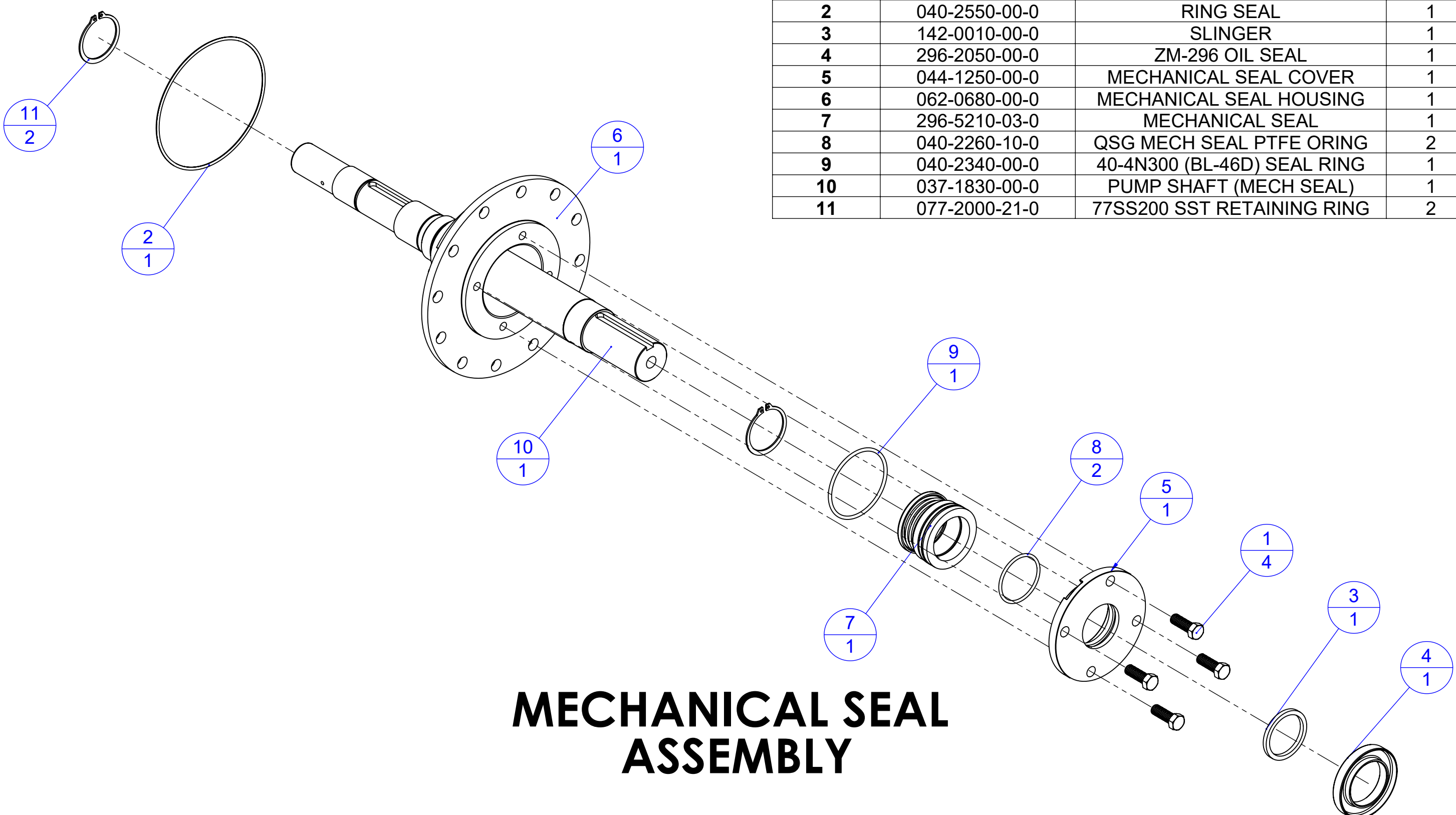
PACKING HOUSING

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	005-0010-00-0	PRIMING VALVE FLANGE	1
2	010-0040-00-0	PRIMING VALVE STRAINER (ZMQ-329H)	1
3	018-1812-25-0	SCREW, 7/16-14 X 1.25, GR8	2
4	040-2260-00-0	O-RING (40-4N200)	1



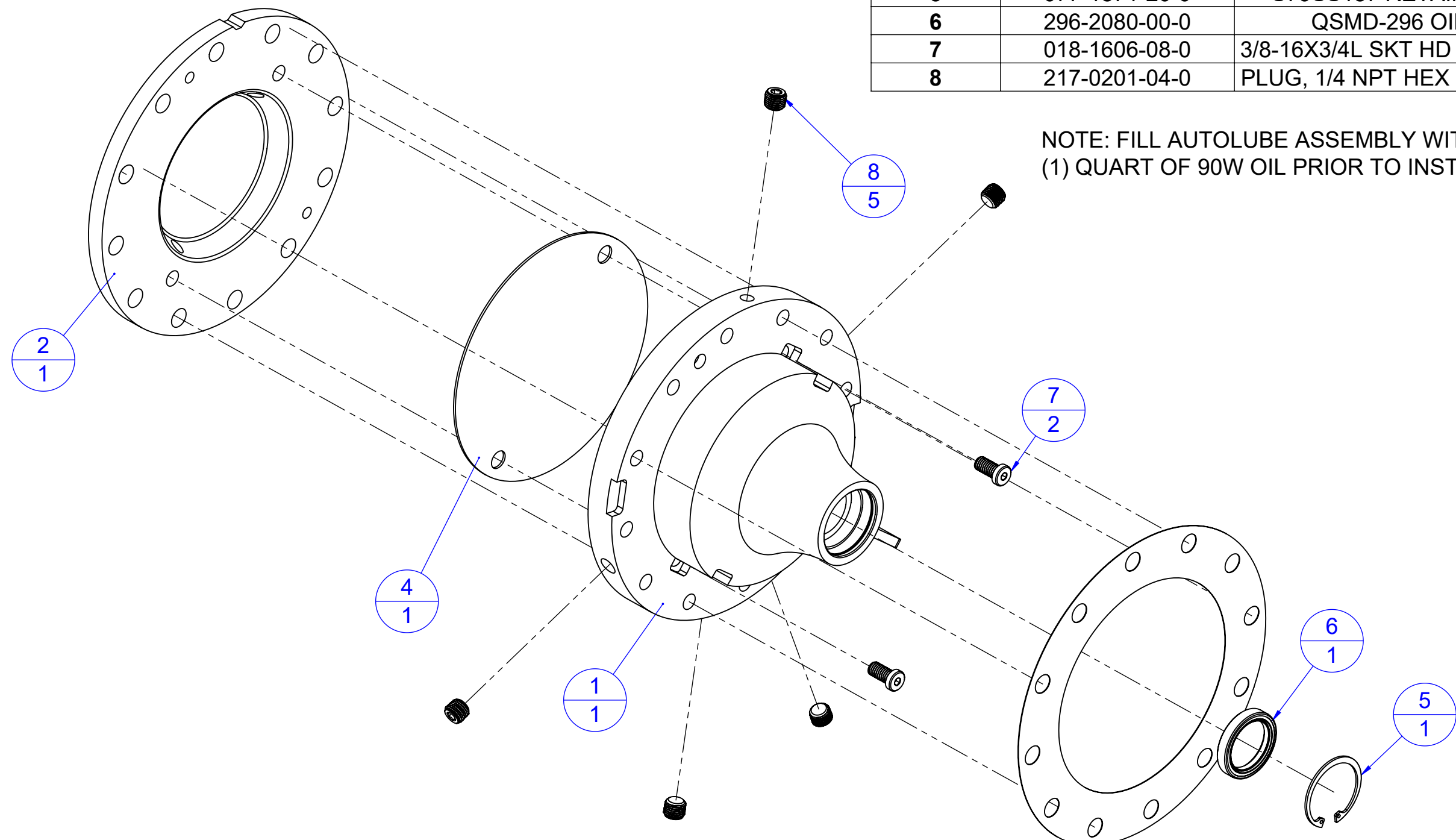
PRIMER MOUNTING PLATE AND STRAINER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	018-1812-25-0	SCREW, 7/16-14 X 1.25, GR8	4
2	040-2550-00-0	RING SEAL	1
3	142-0010-00-0	SLINGER	1
4	296-2050-00-0	ZM-296 OIL SEAL	1
5	044-1250-00-0	MECHANICAL SEAL COVER	1
6	062-0680-00-0	MECHANICAL SEAL HOUSING	1
7	296-5210-03-0	MECHANICAL SEAL	1
8	040-2260-10-0	QSG MECH SEAL PTFE ORING	2
9	040-2340-00-0	40-4N300 (BL-46D) SEAL RING	1
10	037-1830-00-0	PUMP SHAFT (MECH SEAL)	1
11	077-2000-21-0	77SS200 SST RETAINING RING	2



MECHANICAL SEAL ASSEMBLY

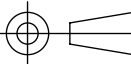
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	562-0090-02-0	QSMFU FRT BRG HSG ASY	1
2	044-0280-00-0	QSM-167 COVER-FR.BRG.	1
3	046-0220-00-0	FRONT BRG. HOUSING GASKET	1
4	046-5170-00-0	DIAPHRAM	1
5	077-1871-20-0	S79SS187 RETAINING RING	1
6	296-2080-00-0	QSM-296 OIL SEAL	1
7	018-1606-08-0	3/8-16X3/4L SKT HD SCRWS GRD 5	2
8	217-0201-04-0	PLUG, 1/4 NPT HEX HEAD BRASS	5



NOTE: FILL AUTOLUBE ASSEMBLY WITH APPROXIMATELY (1) QUART OF 90W OIL PRIOR TO INSTALLATION.

AUTOLUBE ASSEMBLY

COMPLIANCE NOTE:
10 CFR 754.6 These items are certified by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein described. They may not be re-exported, transferred, or otherwise disposed of to any other country or to any person other than the authorized consignee or end-user(s) without the prior approval of the U.S. Government or as otherwise authorized by U.S. law and regulations. The term "authorized" includes agents, resellers, and end-users who obtain the items from the U.S. Government or its authorized agents, and may not be re-exported or disposed of without the express written permission of the U.S. Government.

PROJECTION:


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		TITLE QMAX SERIES PUMP WITH RG GEARBOX	
MATERIAL		DRAWN	OPL
MADE FROM		APPROVED	RET
FINISH		DATE	23JUL1999
PROJECT		SIZE D	DRAWING NUMBER PL913
		SCALE 1:2	REV F SHEET 4 OF 4