



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	120-001-006	887 HOUSING, MACHINED
2	1	120-005-008	887 ROTOR ASSEMBLY
3	2	120-004-001	GASKET 887 ENDPLATE
4	1	120-003-009	887 ENDPATE (W NON DRIVE / CCW DRIVE), MACHINED
5	1	120-003-008	887 ENDPATE (CW DRIVE / CCW NON DRIVE), MACHINED
6	2	120-009-004	SEAL SLEEVE 887
8	1	120-019-001	BEARING BALL 887 DRIVE END
9	1	120-019-002	BEARING ROLLER 887 NON DRIVE END
10	2	120-006-002	WASHER WAVE, 887
11	2	120-055-001	GASKET 887 BEARING COVER
12	1	120-054-006	COVER BRNGS DRIVE END 887
14	1	120-054-005	COVER BRNGS NON DRIVE END 887
17	1	120-097-002	GASKET 887 BALLAST MANIFOLD
18	1	120-090-009	BALLAST MANIFOLD 887
21	5	120-059	PLUG BRASS HEX HEAD 0.25" NPT
23	2	120-039-004	GASKET 887 INTAKE/EXHAUST
24	1	120-320-009	HOUSING FILTER 887
25	1	120-039-005	GASKET 887 FILTER HOUSING/4-WAY
26	1	120-316-001	FILTER PILOT 887
27	1	120-064-030	O-RING SQUARE VITON 436
30	2	120-045-005	887 EXHAUST CHECK WAVE SPRING
31	1	120-041-004	CHECK VALVE 887
32	1	120-067-009	HOUSING 4-WAY VALVE 887
35	1	123-000-003	OIL PUMP 4 PORT BIDIRECTIONAL
36	1	320-LF8	DRIVE TAB
37	1	320-R31	GASKET, OIL PUMP
40	1	120-062-009	PLUG 887 MACHINED
41	1	120-065-009	TOWER 887 MACHINED
43	1	120-045	4-WAY FV SPRING (COMPRESSED)
45	1	412-060-009	HANDLE 4310 ENCLOSED
49	1	120-060-002	GRIP, HANDLE W/ LOGO
50	1	120-314-003	887 INTAKE FILTER ASSEMBLY
51	1	120-310-001	COVER, FILTER 607/866
54	4	120-312-002	KNOB, 5/16-18UNC
56	2	320-408-016	FITTING STR-3 MJIC X 1/8 MNPT
58	6	123-408-014	BANJO BOLT 1/8" BSPP
59	12	123-013-001	WASHER 3/8" SEALING NBR
61	1	120-074-002	FAN SHROULD 860/607 PRO
66	2	120-077-001	SHROULD SUPPORT PLATE 887
67	1	320-409-005	P-CLIP, 1/4" HOSE W/ 3/8" HOLE, VINYL CUSHION
70	1	120-070-001	TIN LOWER ROLLED 887
71	1	120-071-001	TIN UPPER ROLLED 887
72	1	120-006	KEY, 3/8" X3/8" X 2
73	1	120-076	KEY, 3/8" X 3/8" X 1"
74	1	120-084-003	FAN ASSY CW 887
75	1	120-073-E	FAN COVER 407/866 E-COAT
81	1	120-079-005	GUARD, OIL PUMP 407
84	2	120-068	ORING, 2-252 VITON
85	2	120-064-017	O-RING, 2-216 VITON
86	1	120-064-004	O-RING, 2-265 VITON
87	1	120-645-001	LOCK NUT 887
89	7	120-007-887	VANE 887

ITEM	QTY	PART NUMBER	DESCRIPTION
95	2	120-053-506	SEAL, 45 X 62 X 8 VITON
96	4	120-018-001	SEAL, 70 X 85 X 08A VITON SGL LIP
97	1	412-020-003	WASHER, CUP 4-WAY
106	1	280-355-134	887 LIFTING HANDLE
107	1	120-064-032	O-RING 2-230 VITON
108	1	124-360-001	IN-LINE BALLAST SILENCER - 887
110	1	120-097-003	GASKET BALLAST VALVE LOWER
111	1	120-095-100	CHECK VALVE ASSEMBLY VAC OPERATED
112	2	120-063-506	FLANGE, 4" NPT
113	2	120-064-506	ORING, 2-158 SILICONE
122	1	320-408-017	FITTING ELBOW -3 MJIC X 1/8 MNPT
124	1	280-355-135	BALLAST VALVE PUMP BRACKET

ITEM	QTY	PART NUMBER	DESCRIPTION
126	1	120-097-006	GASKET BALLAST VALVE TOP
127	1	280-355-136	BALLAST VALVE MOUNTING BRACKET
128	1	120-099-506-4	BALLAST FILTER ASSEMBLY, REMOTE
130	1	320-407-028	OIL LINE -3 SST 90 DEG JIC TO FEMALE JIC
131	1	400-026-887	EXTERNAL RETAINING RING, 887
133	1	120-220	THERMOMETER, 50- 400 DEG, 2" FACE, 2.5" STEM, 1/4" - 18NPT

ITEM	QTY	PART NUMBER	DESCRIPTION
134	1	320-407-029	OIL LINE -3 SST 90 DEG JIC TO BANJO 3/7.125"
135	1	320-407-030	OIL LINE -3 SST BANJO TO BANJO 32.00"
136	1	320-407-031	OIL LINE -3 SST BANJO TO BANJO 11.50"
137	1	320-407-032	OIL LINE -3 SST FEMALE JIC TO BANJO 8.5"
138	1	120-105	TAG, LARGE, NVE SERIAL NUMBER
141	1	120-100-050	DECAL, 887 CHALLENGER HD
150	1	120-107	TAG, SERIAL NUMBER, BRASS
151	1	120-101-003	DECAL CW ROTATION ARROW
152	2	120-100-012	DECAL CLEAN FILTER REGULARLY YELLOW
159	1	120-102	VALVE, DRAIN 1/8" NPT

ITEM	QTY	PART NUMBER	DESCRIPTION
201	1	320-082-001	OIL TANK, 50T, W/LOGO
202	1	320-407-003	OIL LINE, BLK 1/4" ID 30R7
203	2	416-025-1WC	CLAMP, WORM, 250" dia
204	1	310-LP6	HOSE BARB, 1/4 TO 1/4NPT STRT
205	1	320-083-010	FILTER FITTING, OIL TANK 1/4 NPT
206	1	320-083-009	OIL TANK FILTER, 100 MESH
207	1	320-R102-6IN	OIL LINE, 3/8" X 1/4" ID X 6" LG
208	1	320-083-002	CAP, OIL TANK, BLACK 2 1/4"

NOTES:

- ALL FASTENERS ARE GRADE 8 UNLESS OTHERWISE SPECIFIED.
- BRASS COMPRESSION FITTING ASSEMBLY INSTRUCTIONS: FIRST TIME-FINGER TIGHT PLUS ONE WRENCH TURN. REMAKE INSTRUCTIONS: FINGER TIGHT PLUS 1/16 TURN. APPROX. 8 REMAKES ARE POSSIBLE WITH THIS SETUP.
- WRAP ALL PIPE THREAD FITTINGS AND THREADS REQUIRING SEALING WITH TEFLON TAPE, 3 WRAPS MINIMUM.
- APPLY SEALANT TO BOTH SIDES OF OIL PUMP GASKET BEFORE ASSEMBLY. USE EITHER LOCITITE AVIATION GASKET SEALANT #30517, PERMATEX AVIATION FORM A GASKET #80019 OR EQUIVALENT.
- ASSEMBLE UPSIDE DOWN USING 0.007" SHIM TO SET AIR GAP.
- BRUSH A LIBERAL AMOUNT OF ISO 150 TURBO OIL TO THE VANES BEFORE INSERTING INTO ROTOR SLOTS.
- NON-DRIVE BEARING INNER RACE AND SEAL SLEEVE ASSEMBLY: HEAT INNER RACE AND SEAL SLEEVE TO 260 F THROUGHOUT ON BEARING HOT PLATE. DO NOT EXCEED 260 F AS BEARING DAMAGE MAY OCCUR. BE SURE ROTOR IS COOLED TO ROOM TEMPERATURE BEFORE ATTEMPTING ASSEMBLY OF RACE OR SLEEVE.
- APPLY HEAVY GREASE TO O-RING GROOVE TO ASSIST IN RETAINING THE O-RING DURING ASSEMBLY TO THE VALVE BODY.
- VERIFY ASSEMBLY OF PLUG INTO MANIFOLD IN THE ORIENTATION AS SHOWN.
- ORIENT VALVE HANDLE IN LINE WITH PUMP AXIS (FACING NON-DRIVE SIDE) WHEN THE PLUG IS IN VACUUM.
- DO NOT SLIDE HANDLE GRIP OVER HANDLE. FIRMLY ATTACH TO THE HANDLE USING MASKING TAPE OR ZIP TIE. THIS ALLOWS OEM TO ORIENT THE GRIP ACCORDING TO END USE.
- PAINT PUMP GLOSS BLACK AFTER ALLOWING TO COOL, AND AFTER CLEANING OFF ALL OILS/DIRT. USE PPG ACR-100 ACRYLIC LACQUER OR EQUIVALENT AND PROCESS PER MANUFACTURERS REQUIREMENTS WITH THE EXCEPTION OF PRIMING METAL. EXCEPTION TO PRIMING IS VENDOR APPROVED. MASK OFF 2-3 INCHES OF OIL LINE AT THE OIL PUMP END OF PUMP BEFORE PAINTING. ALSO PLACE MASKING PLUGS IN INLET AND OUTLET FLANGES, MASK OFF SHAFT, OIL PUMP INLET, DIESEL FLUSH INLET, AND THERMOMETER FACES.
- PERFORMANCE TEST PUMP ACCORDING TO THE PROCEDURE OUTLINED IN THE DOCUMENT: SPREADSHEET1(R)-PUMP TEST PROCEDURES.XLS UNDER TAB PUMP TEST NEW. USE STANDARDS SHOWN UNDER TAB "STANDARDS". NO BLANKS SPACES ARE ALLOWED ON THE TEST FORM. THE FOLLOWING PERFORMANCE REQUIREMENTS MUST BE MET.

MINIMUM VACUUM: 27.0 IN HG
 MAXIMUM EXHAUST TEMP: 380°F
 OIL USAGE: 10-14 OZ/HR (10.7 TO 8.5 HRS/GAL)
 PRESSURE TEST: NO LEAKS AT 20 PSI
 VACUUM RUN TEST: 35 MINUTES @ 24 IN HG
 PRESSURE RUN TEST: 5 MINUTES AT 5 PSI BACK PRESSURE

- EACH PUMP TO BE SUPPLIED WITH 200 SERIES COMPONENTS LISTED IN ACCESSORIES TABLE. BAG COMPONENTS AND ATTACH TO HANDLE.
- FIRMLY ATTACH KEY TO SHAFT USING MASKING TAPE.
- LOCATE -D (CW) AND -S (CCW) ENDPATE ON HOUSING SO THAT SHAFT ROTATION MATCHES ENDPATE ROTATION WHEN VIEWING BEARING SIDE OF ENDPATE.
- SPRAY BOTH SIDES OF ENDPATE GASKETS WITH PERMATEX SPRAY-A-GASKET HIGH TEMP SEALANT (#80697) OR EQUIV.
- DETAIL PUMP WITH NOTED COMPONENTS AFTER PUMP HAS BEEN PAINTED.
- FOR FS MODELS, OIL LINE PART #137 (320-407-032) IS REPLACED WITH OIL LINE 320-407-022
- OIL LINE FITTING LOCATIONS SHOWN ON NEXT SHEET

ITEM	QTY	PART NUMBER	DESCRIPTION	TORQUE
301	8	HHCS - 5/16-18 UNC X 1.25	HEX HEAD CAP SCREW - 5/16-18 UNC X 1.25	18 FT-LBS
302	32	LW - 5/16	LOCK WASHER, 5/16"	N.A.
303	8	HHCS - 3/8-16 UNC X 2.50	HEX HEAD CAP SCREW - 3/8-16 UNC X 2.50	33 FT-LBS
304	38	LW - 3/8	LOCK WASHER, 3/8"	N.A.
305	16	HHCS - 3/8-16 UNC X 1.75	Hex Bolt - UNC (Regular Thread - Inch)	33 FT-LBS
306	2	SHCS - 5/16-18 UNC X 1.75	SOCKET HEAD CAP SCREW 5/16-18 UNC X 1.75	24 FT-LBS
307	2	SHCS - 5, 16-18 UNC X 2.25	SOCKET HEAD CAP SCREW 5/16-18 UNC X 2.25	24 FT-LBS
308	4	SS - 5, 16-18 UNC X 2.00	HEXAGON SOCKET SET SCREW 5/16-18 UNC X 2.00 SS	18 FT-LBS
309	4	NVLOCK NUT - 5/16 UNC	NVLOCK NUT - 5/16 UNC	12 FT-LBS
310	2	SHCS 1/4-20 UNC X 0.625	SOCKET HEAD CAP SCREW 1/4-20 UNC X 0.625	N.A.
311	2	LW - 1/4	LOCK WASHER, 1/4"	N.A.
312	1	HHCS 3/8-16 UNC - 0.875	HEX HEAD CAP SCREW - 3/8-16 UNC X 0.875	33 FT-LBS
313	9	FW - 3/8	FLAT WASHER, 3/8"	N.A.
314	4	HSSS - 5/16-18 UNC X 1.75	HEXAGON SOCKET SET SCREW - 5/16-18 UNC X 1.75	24 FT-LBS
315	4	HHCS - 3/8-16 UNC X 2.00	HEX HEAD CAP SCREW - 3/8-16 UNC X 2.00	33 FT-LBS
316	8	LW - 1/2	LOCK WASHER, 1/2"	N.A.
317	4	HHCS - 1/2-13 UNC - 1.75	HEX HEAD CAP SCREW - 1/2-13 UNC - 1.75	70 FT-LBS
318	10	HHCS - 3/8-16 UNC X 0.75	HEX HEAD CAP SCREW - 3/8-16 UNC X 0.75	33 FT-LBS
319	4	HHCS - 1/2-13 UNC X 1.25	HEX HEAD CAP SCREW - 1/2-13 UNC X 1.25	70 FT-LBS
322	9	TAPSCR - 1/4-14 X 0.75	HEX HEAD SELF TAPPING SCREW 1/4-14	N.A.
323	4	HHCS - 3/8-16 UNC X 1.125	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.125	33 FT-LBS
324	8	HHCS - 5/16-18 UNC - 1.50	HEX HEAD CAP SCREW - 5/16-18 UNC - 1.50	18 FT-LBS
325	4	HHCS - 5/16-18 UNC X 1	HEX HEAD CAP SCREW - 5/16-18 UNC x 1	18 FT-LBS
326	4	HHCS - 5/16-18 UNC X 0.875"	HEX HEAD CAP SCREW - 5/16-18 UNC X 0.875	18 FT-LBS
327	4	RV T 1, 8 D X 1 - BL	BLIND RIVET, 1/8 DIA X 1/8 GRIP, ALUM	N.A.
328	4	HHCS - 3/8-16 UNC X 1.00	HEX HEAD CAP SCREW - 3/8-16 UNC X 1.00	33 FT-LBS

CAD FILE LOCATION: I:\Engineering\CAD - Production\103-887-FD & FS.dwg

SHEET SIZE: D

APPROX. WT.

TOLERANCES UNLESS OTHERWISE SPECIFIED

One place (X) ±1
 Two places (XX) ±0.01
 Three places (XXX) ±0.005
 Angles ±1°
 Fractional (X/X) ±1/16

All machined surfaces 125 RMS max. Remove all burrs and sharp edges. CAD drawing - NO manual changes. All dimensions in inches unless specified.

NVE National Vacuum Equipment, Inc.
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PART NAME: CHALLENGER 887 CW & CCW, FAN

MATERIAL: SEE BOM

DRAWN BY: MSG CHECKED BY:

SCALE: 1:4 DATE:

SHEET 1 of 3 PART NO: 103-887-FD & FS

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REV	DATE	DESCRIPTION	ECN	APPROVED	ZONE
A	2/17/2017	CREATED PRINT	2388	MSG	-
B	11/9/2017	REPLACED P/N 120-103 TO P/N 120-102 REMOVED BUSHING	2435	MSG	-