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# USER INSTRUCTION

for High Vacuum Rotary Vane Pump

## W2V20



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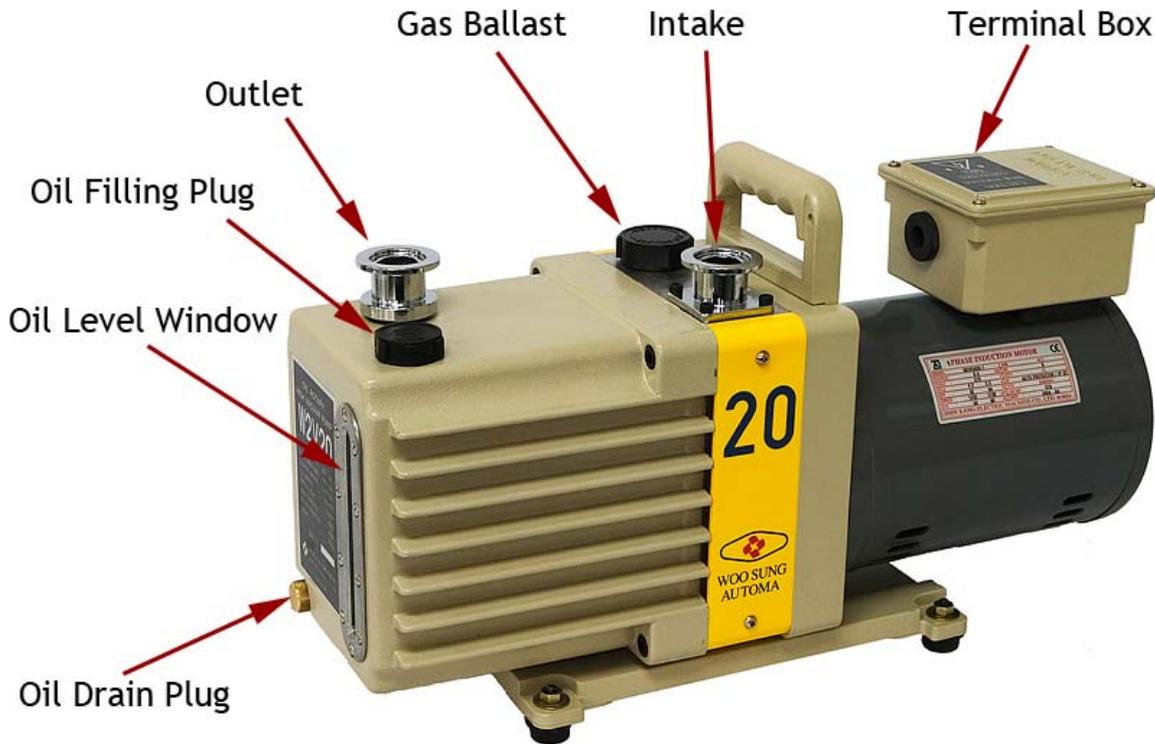


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## 1. Utility of Basic Parts and Specification



## Specification

Pumping Speed	200 ℓ/min	
Ultimate Pressure	Gas Ballast Closed	5X10 <sup>-4</sup> torr ( 6.7 X 10 <sup>-2</sup> Pa )
	Gas Ballast Open	5X10 <sup>-2</sup> torr ( 6.7 Pa )
Power Input	Standard	220VAC 1Φ 50/60Hz
	Option	220VAC/380VAC 3Φ 50/60Hz
	Customer's Request (Voltage, Frequency and Phase)	
Full Load Power	0.4 kW ( 0.5 HP )	
Motor Speed	1700 rpm	
Inlet and Outlet	Standard	NW25
	Option I	Hose Nipple(Φ12 OD, Φ16 OD, or Φ26 OD)
	Option II	Screw Nipple (3/8" Female)
Oil Capacity	600 cc ( 0.6ℓ )	
Weight	21 Kg	
Ambient Operation Temp. Range	7~40 °C	
Overall Dimension (mm)	150(W) X 434(L) X 251(H)	



## 2. Inspection

When you receive a pump, you need to check the pump is the same type you ordered.

Please check there is any sign of loose bolts, spilt oil, and broken/loose Parts.

If you ordered accessories for vacuum system please check them in the box.

## 3. Installation

### 1) Preparation

Select a well ventilated area, free of dust.

The pump should be placed conveniently to monitor the oil level of the pump.

We recommend the pump is operated in the temperature over 7 °C.

(We use vacuum oil named 'MR-200' as our default vacuum oil and it is best performance over 7 °C.)

### 2) Fastening

The pump should be tightly fastened to the ground or to a secure object so as not to be moved by the vibration of the pump. The pump should be installed and maintained horizontally all the time.

### 3) Connection by using Terminal box

- ① Open the Cover of Terminal box. You can see there is 6 cords connected.
- ② W2V20's motor is 3 phase one. You need to connect 3 external cords to the pump.
- ③ By referencing the Terminal box cover, you can connect the pump to power.
- ④ After finishing connection please do not connect the pump to the system and check the electronic connection is proper or not. ( If the connection is wrong motor will operate opposite and you need to change the connection)

## 4. Operation

### 1) Start up

Prior to start up, make sure that the line voltage and type of connections are appropriate.

( For all 200V motors, a "Delta" connection is applied initially)

Make sure that the oil level should be within the region between "LO" and "HI" marks.

( Ideally, 3/4 toward "High from "LO")

Never operate the pump in the condition which vacuum oil is below "LO"

In case of 3 phase line operation, make sure that the direction of motor rotation is the same as indicated on the body of the pump.

### 2) Emergency Stop and Power Failure

There is no need of a particular procedure to prevent from losing vacuum in case of an emergency stop or power failure.

The oil regulator build inside pump prevents Back-Flow of oil when the pump stops.



## 5. MAINTENANCE

### 1) Random inspection

Check vacuum oil frequently. You need to check whether the oil is brownish, dirty, or contains moisture.

Also you need to check the oil level always you start up the pump.

If oil level is lowered you can add oil to proper level. (Near "HI")

If oil has poisoned by any dust or water, you need to change the entire oil.

Procedure of Oil change is like below.

- ① To change oil, let the pump cool for about 5 minutes.
- ② Drain the contaminated oil completely through the drain plug ( backside of pump ).
- ③ Close the drain plug.
- ④ Fill the new vacuum oil (MR-200) through the oil filling plug and check the oil level.

\* The pump oil temperature should be typically less than 65 °C when operating.

### 2) Periodic Serviceable Items

#### - Vacuum Oil

Usually the circumstances are very important key of oil's life so there is no exact solution when you change the oil but usually we recommend you need to change the pump's oil like below.

Application	Chang oil within (Hours)
High Vacuum in Lab environment, or system seldom exposed to the air	2,500
High Vacuum in manufacturing environment, often exposed to the air	1,200
Vacuum furnace, large gas-exhaust diffusion system, system with booster pump.	600
Vacuum drier, vacuum molding, vacuum packing	200
Vacuum distillation, low vacuum tank	120

Again, we need to mention each system has differences so it is better for user to make own oil change plan.

#### - Oil Seal and other items

WSA supports 2 kinds of repair kits for maintain W2V20.

'Minor Repair Kit for W2V20' is for normal overhaul. Pump consists of various metal and rubber component and some component need to change periodically. Please check the list of Repair kit.

'Major Repair Kit of W2V20' contains vane and other important parts of the pump. Please check the list.

Overhaul is very important for improve pump's performance and pump's life time. We recommend user need to overhaul once a year.

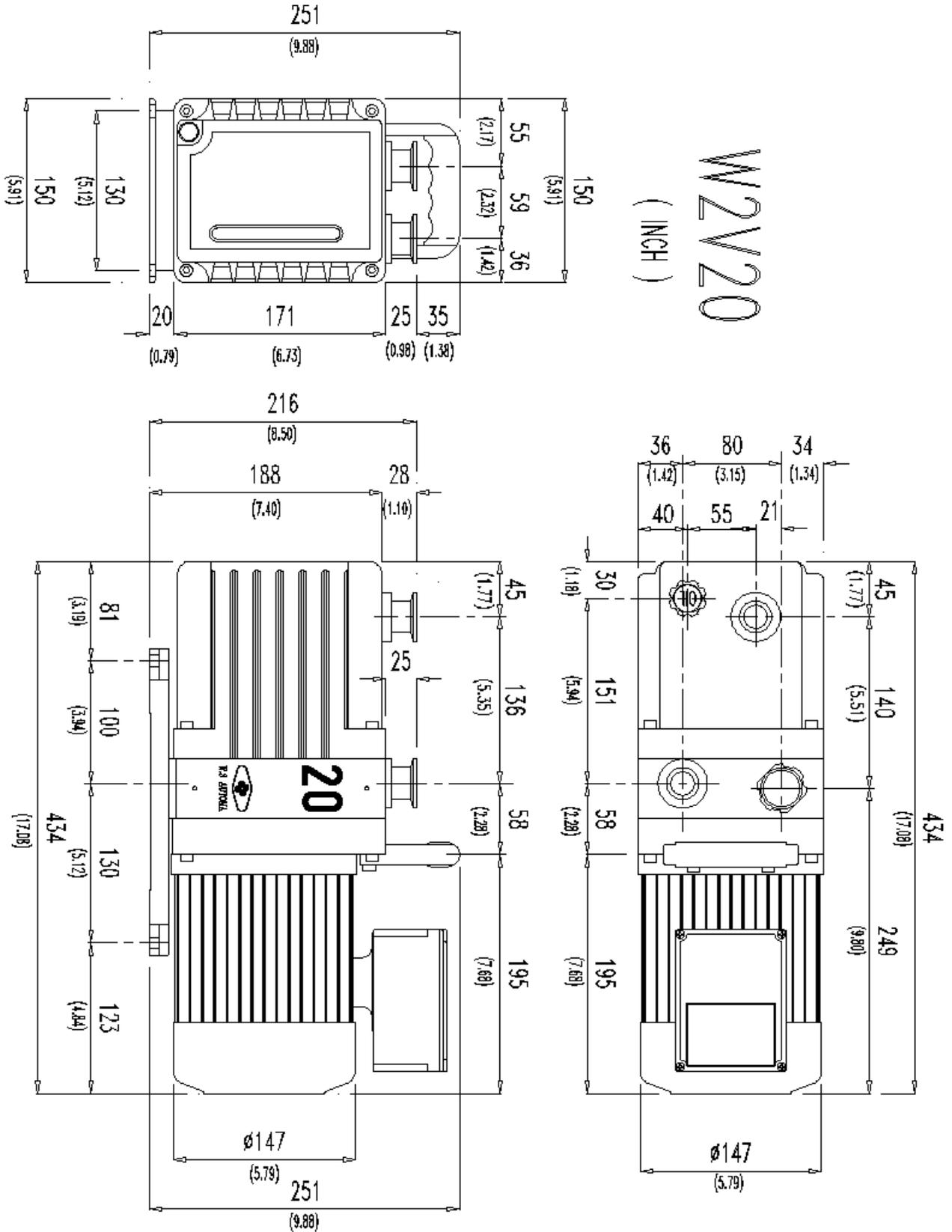


## 6. TROUBLE SHOOTING

SYMPTOM	CHECK	STEM TO TAKE
Noisy motor would not turn	Power line voltage and connections. Any foreign materials inside the pump. Motor ( Open internal circuit).	Correct voltage or connections. Remove the foreign materials, If problem with oil, change it. Replace open windings.
Noise and hot pump	Any Foreign materials inside the exhaust valve. Leakage in the system. If leakage valve is open. All the valves in the vacuum line.	Remove the foreign materials Fix the leakage. Close the valve. Close if found open.
Vacuum Drops (get worse)	Low oil level. Leakage on the device connection. Moisture content of oil. Oil regulator. If Gas Ballast is open.	Add Oil. Close the intake and recheck. Change Oil. Replace the Oil Regulator. Close the gas ballst.
Motor runs but Pump not.	Worn out coupling mechanism. Worn out key between motor and pump.	Replace coupling. Replace the key and the set screws.

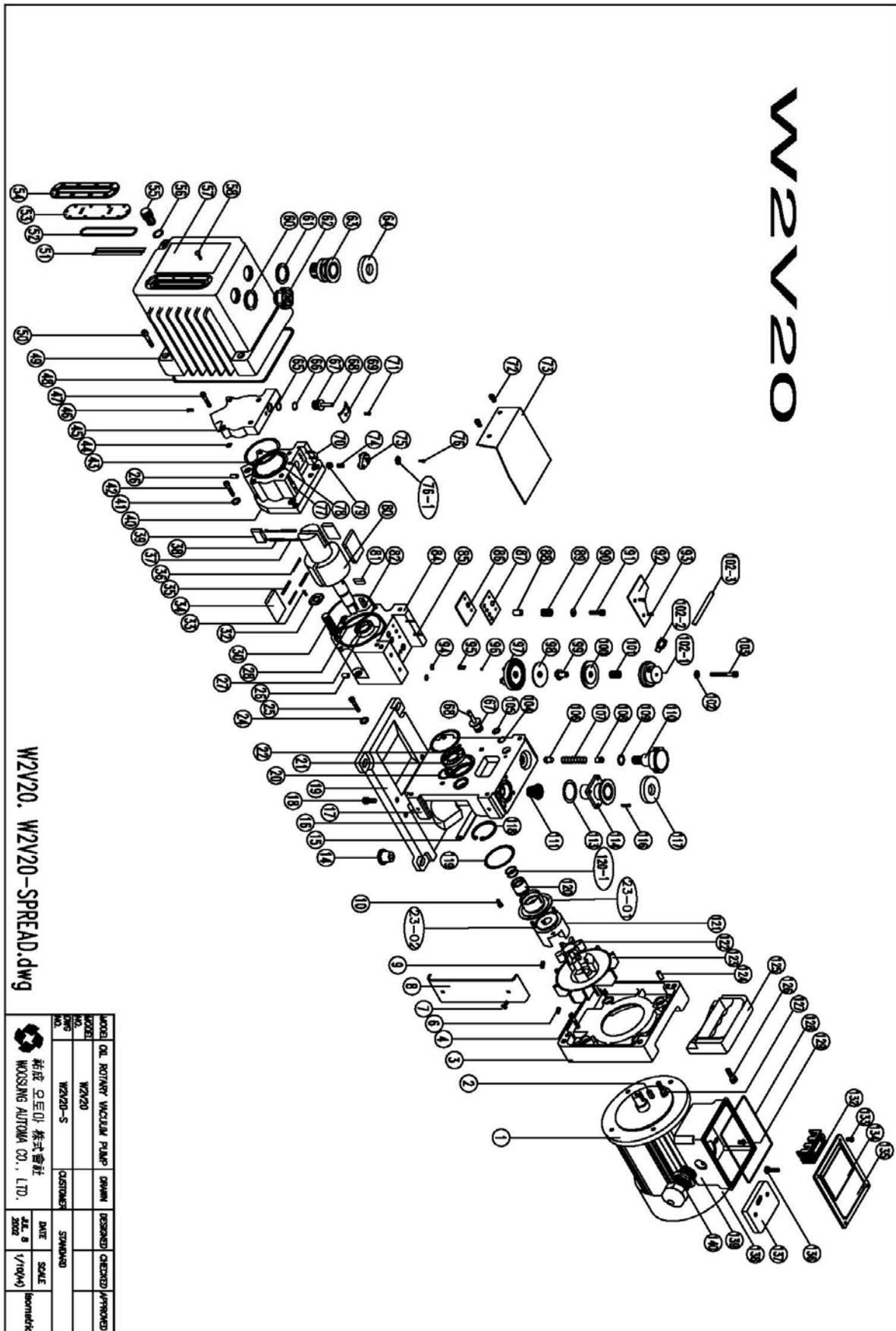


### 7. Dimension of W2V20





### 8. Development Figure





## 9. Bill of Material

### BOM of W2V20

2007/02/09

(Standard Type:W2V20)

NO	SPEC NO,	DESCRIPTION	STANDARD	Q`T
1	W2V0001	MOTOR	3 Φ 400W 200/380V 50/60	1
2	W2V0002	KEY	5X5X15R	1
3	W2V0003	MOTOR PLATE	DIECAST	1
4	W2V0004	MOTOR PLATE FIXING BOLT	M6X15	4
5	W2V0006	COUPLING FAN FIXING BOLT	M5X10(SET SCREW)	1
6	W2V0007	SIDE COVER FIXING BOLT	M4X8	4
7	W2V0008	SIDE COVER(WOOSUNG)	ABS	2
8	W2V0009	COUPLING FIXING BOLT	M5X6(SET SCREW)	1
9	W2V0010	SUCTION PAD FIXING BOLT	M4X8	2
10	W2V0014	BASE RUBBER	NBR	4
11	W2V0015	SUCTION PAD STRAP	PRESS	1
12	W2V0016	OIL SUCTION PAD	FELT	1
13	W2V0017	MAIN PLATE(BADY)	DIECAST	1
14	W2V0018	BASE PLAT MOUNTING BOLT	M6X15	4
15	W2V0019	BASE PLATE	DIECAST	1
16	W2V0020	O-RING	P-20	1
17	W2V0021	OIL SEAL(VITON)	22X32X7	1
18	W2V0022	O-RING	G-45	1
19	W2V0023-01	SEAL HOUSING	DIECAST	1
20	W2V0023-02	HOUSING FIXING BOLT	M4X10(PLATE)	3
21	W2V0024	SPRING WASHER	Φ 6	3
22	W2V0025	1 <sup>ST</sup> STATOR FIXING BOLT	M6X25	3
23	W2V0026	COCKING PIN	Φ 6.1X7.4	3
24	W2V0027	OIL SETL(VITON)	25X35X7	1
25	W2V0028	O-RING	S-80	1
26	W2V0030	OIL STRAINER	Φ 13X50X24#	1
27	W2V0032	OIL FILTER FIXTURE	DIECAST	1
28	W2V0033	OIL STRAINER FIXING BOLT	M4*10	2
29	W2V0034	1 <sup>ST</sup> STAGE BLADE	32X42X6T	2
30	W2V0035	1 <sup>ST</sup> STAGE BLADE SPRING	Φ 1.8X33X0.5	2
31	W2V0036	1 <sup>ST</sup> STAGE SPRING GUIDE	Φ 1.8X26	2
32	W2V0037	2 <sup>ND</sup> STAGE SPRING GUIDE	Φ 1.8X26	2
33	W2V0038	2 <sup>ND</sup> STAGE BLADE SPRING	Φ 1.8X30X0.5	2



34	W2V0039	2 <sup>ND</sup> STAGE BLADE	18X25X6T	2
35	W2V0040	2 <sup>ND</sup> STAGE STATOR	FC-25	1
36	W2V0041	2 <sup>ND</sup> SPRING WASHER	Φ 6	5
37	W2V0042	2 <sup>ND</sup> STAGE STATOR FIXING BOLT	M6X25	5
38	W2V0043	O-RING	G-45	1
39	W2V0044	O-RING	P-6	1
40	W2V0045	END PLATE	FC-25	1
41	W2V0046	COCKING PIN	2.9X3.3X6	1
42	W2V0047	END PLATE FIXING BOLT	M6*20	4
43	W2V0048	O-RING	AN-166	1
44	W2V0049	OIL BOX	DIECAST	1
45	W2V0050	OIL BOX ASSY FIXING BOLT	M6*35	4
46	W2V0051	OIL LEVEL PLATE	10X95X0.2T	1
47	W2V0052	O-RING	S-75	1
48	W2V0053	OIL LEVEL WINDOW	34X122X3	1
49	W2V0054	OIL LEVEL BACK PLATE	DIECAST	1
50	W2V0055	OIL DRAIN PLUG	M-10	1
51	W2V0056	O-RING	AN-109	1
52	W2V0057	NAME PLATE	STICKER	1
53	W2V0058	OIL LEVEL BACK PLATE FIXING BOLT	M3.5X11(+)	10
54	W2V0060	O-RING	Φ 20XΦ 30X2.5T	1
55	W2V0061	O-RING	Φ 20XΦ 30X2.6T	1
56	W2V0062	OIL FILLING PLUG	M-24	1
57	W2V0063	EXHAUST ASSEMBLY	NW-25	1
58	W2V0064	EXHAUST ASSEMBLY CAP	NW-25(CAP)	1
59	W2V0065	O-RING	AN-109	1
60	W2V0066	O-RING	P-10A	1
61	W2V0067	G/B NIPPLE	BRASS	2
62	W2V0068	TUBE	Φ 4.8	1
63	W2V0069	GAS BALLAST CLAMP	PRESS	2
64	W2V0070	ROLL PIN	Φ 3X20	2
65	W2V0071	GAS BALLAST FIXING BOLT	M4X12	2
66	W2V0072	DISCHARGE BAFFLE FIXING BOLT	M5X8	2
67	W2V0073	DISCHARGE BAFFLE	100X156X1	1
68	W2V0074	2 <sup>ND</sup> VALVE SPRING	Φ 0.5X7.3X8.3X17	1
69	W2V0075	SPRING SUPPORT	DIECAST	1
70	W2V0076	SPRING SUPPORT FIXING BOLT	M5X20	1
71	W2V0076-01	TWIST WASHER	Φ 5	1



72	W2V0077	TAPPER PIN	Φ 7X40	2
73	W2V0078	NUT	M6	2
74	W2V0079	2 <sup>ND</sup> STAGE VALVE	Φ 14.5X7	1
75	W2V0080	ROTOR ASSEMBLT	FCD-64	1
76	W2V0081	OIL PUMP BLADE	6X8X21	1
77	W2V0082	KEY	5X5X18	1
78	W2V0084	1 <sup>ST</sup> STAGE STATOR	FC-25	1
79	W2V0085	1 <sup>ST</sup> VALVE GUIDE PIN(ROLL PIN)	Φ 3X20	2
80	W2V0086	1 <sup>ST</sup> VALVE	35X43X2T	1
81	W2V0087	1 <sup>ST</sup> VALVE BACK PLATE	35X43X1.2T	1
82	W2V0088	1 <sup>ST</sup> VALVE SPACER	Φ 8X13	1
83	W2V0089	1 <sup>ST</sup> VALVE SPRING	Φ 9X11X15.5X0.5	1
84	W2V0090	WASHER	Φ 5	1
85	W2V0091	1 <sup>ST</sup> VALVE FIXING BOLT	M5X22	1
86	W2V0092	1 <sup>ST</sup> VALVE OIL BAFFLE	52X66X1.2T	1
87	W2V0093	1 <sup>ST</sup> VALVE OIL BAFFLE FIXING BOLT	M4X8	2
88	W2V0094	O-RING	P-6	2
89	W2V0095	CHECK VALVE SEAT	Φ 5.7X10	1
90	W2V0096	DISTRIBUTER BALL	Φ 4	1
91	W2V0097	DISTRIBUTER BODY	DLECAST	1
92	W2V0098	DISTRIBUTER VALVE	Φ 45	1
93	W2V0099	DISTRIBUTER SPACER	DICAST	1
94	W2V0100	DISTRIBUTER WEIGHT	Φ 44X4.7T	1
95	W2V0101	DISTRIBUTER WEIGHT SPRING	Φ 0.6X9.5X10X17	1
96	W2V0102-01	DISTRIBUTER CAP	AL	1
97	W2V0102-02	NIPPLE	Φ 8	1
98	W2V0102-03	HOSE	Φ 8	1
99	W2V0103	DISTRIBUTER WASHER FIXING BOLT	M5X50	1
100	W2V0104	O-RING	AN-109	1
101	W2V0105	O-RING	P-10A	1
102	W2V0106	G/B PIN	4.5X6.2X11.5	1
103	W2V0107	GAS BALLST SPRING	Φ 4.5X Φ 6.3X33X0.9	1
104	W2V0108	GAS BALLAST SPRING PIN	4.5X6.2X11.5	1
105	W2V0109	O-RING	P-10A	1
106	W2V0110	GAS BALLST KNOB	Φ 40	1
107	W2V0111	STRAINER	0.2X32#X23	1
108	W2V0113	O-RING	P-30	1
109	W2V0114	INTAKE FLANGE	NW-25	1



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110	W2V0116	INTAKE FLANGE FIXING BOLT	M4X12	4
111	W2V0117	INTAKE FLANGE CAP	NW-25(CAP)	1
112	W2V0118	SNAP RING	R-40	1
113	W2V0119	O-RING	G-35	1
114	W2V0120	SEAL BUSHING	Φ 22X20	1
115	W2V0120-01	ORING	S-18	2
116	W2V0121	COUPLING	DIECAST	1
117	W2V0122	COUPLING JOINT	NBR	1
118	W2V0123	FAN	DIECAST	1
119	W2V0124	MOTOR PLATE GUIDE PIN	Φ 6X13	2
120	W2V0125	HANDLE	DIECAST	1
121	W2V0126	HANDLE FIXING BOLT	M6X20	2
122	W2V0127	MOTOR BODY FIXING BOLT	M6X35	4
123	W2V0128	O-RING	AN-048	1
124	W2V0129	TERMINAL BOX FIXING BOLT	M5X15(+)	2
125	W2V0132	3P TERMINAL	3P/20A	1
126	W2V0133	COVER FIXING BOLT	M4X8(+)	4
127	W2V0134	NAME PLATE	STICKER	1
128	W2V0135	TERMINAL BOX COVER	DIECAST	1
129	W2V0136	3P TERMINAL FIXING BOLT	M4X12(+)	2
130	W2V0137	TERMINAL BOX BUTTOM RUBBER	RUBBER	1
131	W2V0138	ROTATION MARK	STICKER	1
132	W2V0139	TERMINAL BOX	DIECAST	1
133	W2V0140	POWER CORD PROTECTOR	ABS	1



10. Service Kits

W2V20 Service KIT

Code #	Description	Q'ty	Standard	Remarks
W2V0016	OIL SUCTION FELT	1	FELT	Minor and Major
W2V0020	O-RING	1	P-20	Minor and Major
W2V0021	OIL SEAL(Viton)	1	22X32X7	Minor and Major
W2V0022	O-RING	1	G-45	Minor and Major
W2V0027	OIL SEAL(Viton)	1	25X35X7	Minor and Major
W2V0028	O-RING	1	S-80	Minor and Major
W2V0043	O-RING	1	G-45	Minor and Major
W2V0044	O-RING	1	P-6	Minor and Major
W2V0048	O-RING	1	AN-166	Minor and Major
W2V0052	O-RING	1	S-75	Minor and Major
W2V0079	2 <sup>ND</sup> STAGE VALVE	1	Φ14.5X7	Minor and Major
W2V0086	1 <sup>ST</sup> VALVE	1	35X43X2T	Minor and Major
W2V0094	O-RING	2	P-6	Minor and Major
W2V0098	DISTRIBUTOR VALVE	1	Φ45	Minor and Major
W2V0104	O-RING	1	AN-109	Minor and Major
W2V0113	O-RING	1	P-30	Minor and Major
W2V0119	O-RING	1	G-35	Minor and Major
W2V0120-1	O-RING	2	S-18	Minor and Major
<i>Until Here for Minor Kit</i>				
W2V0034	1 <sup>ST</sup> STAGE BLADE	2	32X42X6T	Major Only
W2V0035	1 <sup>ST</sup> STAGE BLADE SPRING	2	Φ1.8X33X0.5	Major Only
W2V0036	1 <sup>ST</sup> STAGE SPRING GUIDE	2	Φ1.8x26	Major Only
W2V0037	2 <sup>ND</sup> STAGE BLADE GUIDE	2	Φ1.8x26	Major Only
W2V0038	2 <sup>ND</sup> STAGE BLADE SPRING	2	Φ1.8X30X0.5	Major Only
W2V0039	2 <sup>ND</sup> STAGE BLADE	2	18X25X6T	Major Only
W2V0074	2 <sup>ND</sup> VALVE SPRING	2	Φ0.5X7.3X8.3X17	Major Only
W2V0081	OIL PUMP BLADE	1	6X8X21	Major Only
W2V0120	SEAL BUSHING	1	Φ22X20	Major Only
<i>Total for Major Kit</i>				



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