

REFERENCES

- Allred, J. K. Taking a New Direction in Factory Logistics and Material Handling. IIE Solutions (April 1996) : 21-25.
- Ballou, R. H. Business Logistics Management. NJ : Prentice-Hall Inc., 1992.
- Beiping, H. An Improved Order-Picking/Warehouse-Operating System in a Computer Service Center. Master's Thesis, Department of Engineering, Asian Institute of Technology (A.I.T.), August 1997.
- Bodin, L., Golden, B., Assad, A. and Ball, M. Routing and Scheduling of Vehicles and Crews the State of the Art. Computers and Operations Research 10 No. 2 (1983) : 63-211.
- Bowersox, D. J. and Closs, D. J. Logistical Management The Integrated Supply Chain Process. New York : McGraw-Hill, 1996.
- Chetbundhit, J. Routing and scheduling problems: A case study of gasoline distribution in greater bangkok. Master's Thesis, Department of Engineering, Asian Institute of Technology (A.I.T.), December 1990.
- Chorafas, D. N. Warehousing. London : Macmillan Press, 1974.
- Clarke, G. and Wright, J. W. Scheduling of Vehicles from a Central Depot to a Number of Delivery Points. Operations Research 12 No. 3 (1964) : 568-581.
- Cook, T. M. and Russell, R. A. Introduction to Management Science, 5th ed. NJ : Prentice Hall, 1993.
- Elsayed, E. A. and Stern, R. G. Computerized algorithms for order processing in automated warehousing systems. International Journal of Production Research 21 No. 4 (1983) : 579-586.
- Fair, M. L. and Williams, E. W., Jr. Transportation and Logistics. U.S.A.: Business Publications, 1981.
- Hall, R. W. Distance Approximations for Routing Manual Pickers in a Warehouse. IIE Transactions 25 (July 1993) : 76-87.

- Jarvis, J. M. and McDowell, E. D. Optimal Product Layout in an Order Picking Warehouse. IIE Transactions 23 No. 1 (March 1991): 93-102.
- Johnson, J. C. and Wood, D. F. Contemporary Physical Distribution & Logistics. 2nd ed. U.S.A.: Macmillan, 1984.
- Kim, K. H. A joint determination of storage locations and space requirements for correlated items in a miniload automated storage-retrieval system. International Journal of Production Research 31 No. 11 (1993): 2649-2659.
- Klibbua, V. Warehouse Design and Vehicle Routing for Distribution in Northern Thailand. Master's Thesis, Department of Engineering, Asian Institute of Technology (A.I.T.), December 1990.
- Lambert, D. M. and Stock, J. R. Strategic Logistics Management. 3rd ed. New York : McGraw-Hill, 1992.
- Phetruangrueng, P. An Efficiency Improvement of Warehousing Operations : A Case Study of Air Conditioner Warehouse. Master's Thesis, Department of Engineering, Chulalongkorn University, 1996.
- Ratliff, H. D. and Rosenthal, A. S. Order-Picking in a Rectangular Warehouse: A Solvable Case of the Traveling Salesman Problem. Operations Research 31 No. 3 (May-June 1983) : 507-521.
- Rosenwein, M. B. An Application of Cluster Analysis to the Problem of Locating Items Within a Warehouse. IIE Transactions 26 No. 1 (January 1994) : 101-103.
- Rosenwein, M. B. A comparison of heuristics for the problem of batching orders for warehouse selection. International Journal of Production Research 34 No. 3 (1996): 657-664.
- Shafer, S. M. and Meredith, J. R. Operations Management A Process Approach with Spreadsheets. New York : John Wiley & Sons, 1998.
- Sripetchdarnon, S. Vehicle Routing Model for Product Shipment. Master's Thesis, Department of Engineering, Chulalongkorn University, 1993.
- Stevenson, W. J. Production / Operations Management. 5th ed. U.S.A.: IRWIN, 1996.
- Thampitakkul, B. Plant Layout. Bangkok : Chulalongkorn University.

- Thuy, P. T. D. Improving the Layout and Operations of a Warehouse: A Case Study of the Coats Tootal Phong Phu Co., Ltd. in Vietnam. Master's Thesis, Department of Engineering, Asian Institute of Technology (A.I.T.), December 1996.
- Tompkins, J. A. and Schaffer, B. High-Performance Material Handling Trends: Preparing for the Next Century. IIE Solutions (April 1996) : 16-19.
- Tungsub, N. An Utilization Improvement of A Warehouse for Air-Conditioning Industry. Master's Thesis, Department of Engineering, Chulalongkorn University, 1995.
- Tunsirjareankun, O. A Heuristic Approach for Solving the Vehicle-Routing Problem in Solid Waste Collection in Bang Khen Area. Master's Thesis, Department of Engineering, Chulalongkorn University, 1990.
- Warman, J. Warehouse Management. London : Heinemann, 1971.
- Waters, C. D. J. Inventory Control and Management. New York : John Wiley & sons, 1992.



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



APPENDICES

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX 1

DETAILS OF ITEMS' PART NUMBERS



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

3	Pump Assy		70	COOLING FAN	
4	BODY		71	COOLING FAN	
5	COVER	VQ O/P	72	COOLING FAN	
6	PLUG		73	CASE	
7	ROTOR OUTER		74	ROTOR	
8	VALVE SUB ASSY		75	COVER	
9	SCREW		76	CASE	
10	SPRING(SMALL)		77	COVER	
11	WATER PUMP ASM		78	ROTOR	
12	BODY	VQ W/P	79	BEARING	4JA1 C/F
13	SEAL SUB ASSY		80	SHAFT(BLACK)	4JA1 C/F
14	SEAT SUB ASSY		81	SHAFT(BLUE)	4JA1 C/F
15	SEAL SUB ASSY	VQ W/P	82	BIMETAL	4JA1 C/F
16	BEARING	VQ W/P	83	BOLT STUD	4JA1 C/F
17	SPROCKET	VQ O/P	84	SCREW	4JA1 C/F
19	OIL PUMP ASM		85	NUT	4JA1 C/F
20	OIL PUMP ASM		86	WASHER SPRG	4JA1 C/F
21	GEAR SUB ASSY		88	FAN	4JA1
22	SHAFT SUB ASSY		89	GASKET	4JA1 C/F
23	BODY		90	PLATE	4JA1 C/F
24	BODY		91	VALVE SUB ASSY	4JA1 C/F
25	COVER		92	BUSH	4JA1 C/F
26	COVER		93	SILICON OIL	4JA1 C/F
27	BODY		94	RM SHAFT FLUID	
28	COVER	4JA1 O/P	95	FAN	4JA1 C/F
29	GEAR		96	SILICON OIL	
30	PINION GEAR RAW	4JA1 O/P	97	O/P ASM	
32	GEAR	4JA1 O/P	98	GEAR SUB ASSY	
33	SHAFT	4JA1 O/P	99	BODY	
35	SHAFT	4JA1 O/P	100	BODY	BD25 O/P
37	PINION GEAR	4JA1 O/P	101	BUSH (STORE)	
38	VALVE	4JA1	102	PIN STRAIGHT	
40	SPRING	4JA1 O/P	103	GEAR DRIVING	BD 25 O/P
41	SPRING SEAT	4JA1 O/P	104	SHAFT DRIVEN	BD25 O/P
42	SPLIT PIN	4JA1 O/P	105	GEAR DRIVE	BD25 O/P
43	STRAINER ASSY	4JA1 O/P	106	SHAFT DRIVE	BD25 O/P
44	STRAINER ASSY	4JA1 O/P	107	GEAR DRIVEN	BD25 O/P
45	STRAINER ASSY		108	WATER PUMP ASM	
46	BOLT	4JA1 O/P	109	WATER PUMP ASM	
47	BOLT		110	WATER PUMP ASM	
48	LOCK PIN		111	WATER PUMP ASM	
49	GAUZE(1-330)	4JA1	112	WATER PUMP ASM	
50	WATER PUMP ASM		113	WATER PUMP ASM	
51	IMPELLER SUB SEAT		114	VANE SUB SEAT	
52	BODY		115	PULLEY SUB ASSY	
53	CENTER		116	VALVE SUB O-RING	
54	BODY		117	VALVE SUB O-RING	
55	CENTER	4JA1 W/P	118	BODY	
56	IMPELLER	4JBIT	119	BODY	
57	BEARING UNIT	4JBIT	120	COVER	
58	SEAL UNIT	4JBIT	121	WHEEL	
59	THROWER	4JA1 W/P	122	BODY	TD27
60	SET SCREW	4JA1 W/P	123	COVER	TD27
61	SPRING WASHER	4JA1 W/P	124	WHEEL	
62	W/DRAIN COCK		125	BODY	BD25 W/P
63	PLUG	4JA1 D/C	127	BODY	BD25 O/P
64	NIPPLE	4JA1 D/C	128	COVER	BD25 O/P
65	RELIEF VALVE		129	WHEEL	BD25 O/P
66	BODY	4JA1 R/V	130	BODY	TD27
67	SPRING	4JA1 R/V	131	COVER	TD27
68	VALVE	4JA1 R/V	132	WHEEL	TD27
69	PLUG	4JA1 R/V	133	VANE	BD25 W/P

134	VANE	TD27 W/P	199	BOLT HEX	
135	SEAT SUB ASSY		200	SHIM	
136	BEARING UNIT	BD25 W/P	201	ROCKER SHAFT,EXH	
137	BEARING UNIT	TD27 W/P	202	ROCKER SHAFT,INT	Z20
138	WIRE LOCK		203	SPINDLE ASSY	
139	BOLT HEX	BD25 W/P	204	BOLT	Z20
140	PULLEY	BD25 W/P	205	BOLT	Z20
141	HUB	BD25 W/P	206	ROCKER ASSY VALVE	
142	HEAT ELEMENT		207	ROCKER ASSY VALVE	KA 24
143	HEAT ELEMENT	TD27 W/P	208	COVER FRONT	
144	HEAT ELEMENT		209	COVER FRONT	
145	BEARING	BD25 W/P	210	FRONT COVER	
146	O-RING		212	COVER	
147	VALVE SUB ASSY		213	FRONT COVER	MC O/P
148	VALVE SUB ASSY	TD27 W/P	215	COVER	MC O/P
149	PLATE		216	GEAR INNER	HF O/P, MC
150	PLATE	TD27 W/P	217	GEAR OUTER	HF O/P, MC
152	PLATE		218	VALVE REG	
153	O-RING		219	SPRG REG	
154	O-RING	TD27 W/P	220	PLUG REG	
155	BOLT HEX		221	WASHER REG	
156	GUIDE RING		222	SEAL OIL	
157	SILICON OIL	BD25 W/P	223	SCREW	
158	SILICON OIL	TD27 W/P	225	PLUG WELCH	
159	SHAFT ASSY ROCKER		226	BOLT-HEX	
160	SHAFT ASSY ROCKER		227	PIN	
161	SHAFT ASSY	BD25 RS	228	PIN	
162	PLUG		229	WATER PUMP ASSY	
163	SUPT ROCKER-A	BD25 RS	230	BODY	
164	SUPT ROCKER-B		231	BODY	
165	SPRING INSIDE	BD25 RS	232	VANE	HF W/P
166	SPRING OUTER	BD25 RS	233	SEAL SUB ASSY	HF W/P
167	ROCKER VALVE	BD25 RS	234	BEARING	HF W/P
168	ROCKER VALVE	BD25 RS	235	HUB	VQ W/P
169	ROCKER VALVE		236	WATER PUMP	
170	ROCKER VALVE		237	BODY	2L-II
171	BOLT BRKT	BD25 RS	238	BODY	2L-II
172	WASHER SPRG	BD25 RS	240	SEAT PULLEY	
173	WASHER PLAN	BD25 RS	242	BOLT STUD	2L-II W/P
174	BOLT SET		244	ROTOR	2L-II W/P
175	WASHER SPRG		245	SEAL SET	2L-II W/P
176	WASHER PLAN		246	BEARING	
177	SPRG OUTSIDE		247	PIN RING	2L-II W/P
178	WASHER		248	PUMP WATER ASSY	
179	NUT	TD27 RS	249	BEARING	2L-II W/P
181	SCREW ADJ		250	SEAL SET	5L-II W/P
183	TIP		251	SEAT PULLEY	5L-II W/P
184	OIL PUMP ASM		252	FRONT CASE ASSY	
185	WATER PUMP ASM		253	CASE FRONT	
186	COVER SUB PIN		254	COVER B/S GEAR	
187	COVER SUB VALVE		255	CASE FRONT	P-CAR O/P
188	BODY	Z20 O/P	256	COVER B/S GEAR	4JA1 O/P
189	COVER	Z20	258	COVER	P-CAP O/P
190	PIN DOWEL	4G1 O/P	259	ROTOR INNER	P-CAP O/P
191	SFT SUB ASSY		260	ROTOR OUTER	P-CAP O/P
192	GEAR DRIVE		261	PLUG	P-CAP O/P
193	GASKET(Y)		262	PLUNGER	P-CAP O/P
194	GASKET(B)		263	SPRING RELIEF	P-CAP O/P
195	GASKET(G)		264	OIL SEAL	
196	VALVE REG.		265	OIL SEAL	P-CAP O/P
197	SPRING REG.		266	SCREW	P-CAP O/P
198	WASER REG.		267	PLUG TAPER	

268	PIN DOWEL		338	PIN SPLIT	
270	BALL STEEL		339	SHAFT ASSY OIL PU	
271	BOLT	P-CAP O/P	340	PUMP COMPT W/P	
272	GASKET		341	BODY SUB BRG	
273	GEAR B/S DRIVE	P-CAP O/P	342	IMPELLER SUB SEAT	
274	GEAR B/S DRIVEN	P-CAP O/P	343	SHAFT SUB ASSY	
275	SLEEVE	P-CAP O/P	344	BODY	
276	WATER PUMP ASSY		345	IMPELLER	
277	WATER PUMP ASSY		346	SHAFT	
278	BODY SUB PLUG		347	WASHER	
279	BODY	4D56 W/P	348	RING STOPPER	
280	BODY		349	BOSS	
281	HUB	P-CAP W/P	350	SEAL DUST	
282	BODY	4D56 W/P	351	SEAL COMP	
283	BODY	P-CAR W/P	352	RETAINING RING	
284	HUB	P-CAP W/P	353	BEARING BALL	
285	COVER	P-CAP W/P	354	SPACER BEARING	
286	COVER	P-CAP W/P	355	CRANCK-SHAFT(26)	
287	GASKET		356	CRANCK-SHAFT(27)	
288	GASKET	P-CAP W/P	357	CRANCK-SHAFT(30)	
289	SEAL SUB ASSY	BD25 W/P	358	CRANCK-SHAFT(32)	
290	SEAL SUB ASSY	P-CAP W/P	359	CRANCK-SHAFT(46)	
291	SEAT SUB ASSY		360	CYLINDER	AIR
292	BEARING	P-CAP W/P	361	CYLINDER (MI)	
293	PLUG	P-CAR	362	REAR HEAD	
294	PLUG WELCH		363	REAR HEAD(EX)	
295	SCREWS	P-CAP O/P	364	REAR HEAD(MI)	
296	VANE SUB ASSY		365	CRANCK-SHAFT(GMS)	
297	PUMP ASSY WATE		366	CRANCK-SHAFT(GMS)	
298	BODY SUB PLUG		367	CRANCK-SHAFT	AIR
299	ROTOR SUB SEAT		368	REAR HEAD	AIR
300	BODY		369	CYLINDER	AIR
301	BODY		370	REAR HEAD(MI)	
303	ROTOR	4G1 W/P	371	CYLINDER (MI)	
304	BEARING	4G1 W/P	372	CRANK SHAFT (MI)	
305	SEAL SET	4G1 W/P	373	OIL PUMP ASM	
306	PULLEY SEAT	4G1 W/P	374	ROTOR INNER	VQ O/P
307	PLUG TIGHT	4G1 W/P	375	ROTOR OUTER	VQ O/P
311	BEARING		378	VANE SUB ASSY	
312	SEAL SET		379	VANE	VQ W/P
313	PUMP ASSY W/P		380	OIL PUMP ASM	
314	PUMP ASSY WATER		381	BODY SUB COVER	
315	PUMP ASSY WATER		382	GEAR SUB DRIVE	
316	VANE SUB SEAT		383	GEAR SUB DRIVEN	
317	BODY		384	BODY	
318	BODY		385	COVER	
319	BODY		386	GEAR DRIVE	4M4 O/P
320	BODY		387	BALL STEEL	
321	BODY OLD		388	SPRING RELIFE	
322	BODY NEW		389	PLUG	
323	VANE -OLD	4G9 W/P	390	GEAR HEAD	4M4 O/P
326	BEARING		391	PLUG TAPER	
327	PULLEY SUB ASSY	4G9 W/P	392	SHAFT DRIVEN	4M4 O/P
328	BEARING	4G9 W/P	393	SHAFT DRIVE	4M4 O/P
329	PULLEY		394	WATER PUMP ASM	
331	BEARING		395	CASE	
332	VANE		396	CASE	
333	COVER ASSY O/P		397	IMPELLER	
334	PLUNGER PRESS CO		398	FLANGE	
335	SPRING PRESS CON		401	SEAL UNIT	
336	SHEET SPRING		402	BEARING	
337	COVER OIL PUMP		403	OIL PUMP ASM	

404	CASE		472	IMPELLER	
405	CASE		473	HUB (S)	
406	COVER	4J413W O/P	474	HUB (B)	
407	SPRING SEAT		475	GEAR OIL PUMP	
408	PLUG		476	PLUNGER	
409	SNAP SPRING		477	GEAR	
410	SCREW		478	TUBE	
411	ROTOR INNER	4J413W O/P	479	TUBE	
412	ROTOR OUTER	4J413 O/P	480	SHAFT	
413	BOLT STUD		481	GASKET	
414	SCREW		482	BODY	
415	PIN		483	ALUMINIUM (KG)	
416	SPRING		484	ALUMINIUM (KG)	
417	BOLT STUD		485	GAS (lit)	
418	WATER PUMP ASM		486	PULLEY	FORD
419	CASE		487	HUB ALTA NORTOR	FORD
420	CASE		489	STEEL	
421	SEAL UNIT	4J413W W/P	491	PLATE STARTINGMOTOR	
422	BEARING	4J413 W/P	493	GASKET	4G1
423	BEARING	Y71 W/P	495	GASKET	BD25
424	IMPELLER	4J413W O/P	496	O-RING	
425	FLANGE	4J413 W/P	497	PACKING	
426	FLANGE	Y71 W/P	498	PUMP ASSY W/P	KA 24
427	SHAFT ASSY INT.	SUZUKI	499	OIL PUMP ASSY	Z20
428	SHAFT ASSY EXT.	SUZUKI	500	SHAFT ASSY ROCKER	KA 24
429	PUMP ASSY OIL		501	SHAFT ASSY ROCKER	KA 24
430	CASE		502	RICKER ASSY VALVE	KA 24
431	CASE	4G1E O/P	503	RICKER ASSY VALVE	KA 24
432	O-RING		504	RICKER ASSY VALVE	KA 24
433	SPRING		505	ROCKER ASSY VALVE	KA 24
435	COVER	4JA13W O/P	506	COVER	
436	ROTOR INNER	4G1-E O/P	507	GASKET	
437	ROTOR OUTER	4G1-E O/P	508	SPR-REG	
438	SCREW		509	PLUG-REG	
440	OIL SEAL	4G1E O/P	510	SHAFT	
441	PUMP ASSY WATER		511	SPINDLE ASSY	Z20
442	IMPELLER SUB SEAT		514	FLANGE	
443	CASE		515	BEARING	
444	CASE		517	SEAL	
445	SEAL UNIT	4JA13W O/P	518	IMPELLER	
447	BEARING	4G1-E O/P	519	CASING	
449	FLANGE	4G1-E W/P	520	RUNNER	
450	IMPELLER	4G1-E W/P	521	SIDE COVER	
451	CASE ASSY O/P		522	CASING M/C	
452	CASE	4G9E O/P	523	RUNNER M/C	
453	CASE	4G9E O/P	524	SIDE COVER M/C	
454	COVER	JEEP	525	CASING	
455	ROTOR INNER	4G9E O/P	526	CASING M/C 125 W	
456	ROTOR OUTER	4G9E O/P	527	CASING M/C 175 W	
457	PLUGER		528	CASING M/C 275 W	
458	SPRING		529	CABLE HEAD	
459	O-RING		530	CABLE HEAD	
460	OIL SEAL		531	CABLE HEAD	
461	OIL PUMP ASM	CHRYSLER	532	CABLE HEAD	
462	OIL PUMP ASM	CHRYSLER	533	ONEWAY CAPSULE	
463	WATER PUMP ASM	CHRYSLER	534	INLET	
464	WATER PUMP ASM		535	INLET	
465	HOUSING		536	BRKT	
468	HOUSING (4.0)		537	BRKT	
469	BEARING		538	IMPELLER	JEEP
470	BEARING		539	SCREW	BD25 RS
471	SEAL	JEEP	540	SMALL PART	4G9E O/P

Part No.	Part Name	Mat.
541	SEAT SUB	4G9 W/P
542	SMALL PART	4G9 W/P
543	VANE SUB	P-CAP W/P
544	SMALL PART	BD25 W/P
545	GEAR DRIVING	BD25 O/P
546	SMALL PART	BD25 RS
547	BOLT BRKT	BD25 W/P
548	SMALL PART	
549	SEAL	4JA1 W/P
550	BEARING	4JA1 W/P
551	CENTER	4JA1 W/P
552	SMALL PART	4M4 O/P
553	BEARING	5L-II W/P
554	SMALL PART	Y71 O/P
555	PULLEY	QA
556	SAMPLE FOR APPROVAL	QA
557	PACKAGING	
558	BODY	4G1 W/P
559	PINION GEAR	4JA1 O/P
560	Free area	

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX 2

THE EXISTING LOCATIONS OF ITEMS



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

171	BOLT BRKT	BD25 RS	1	1	1	L
171	BOLT BRKT	BD25 RS	1	1	1	R
539	SCREW	BD25 RS	1	1	2	L
539	SCREW	BD25 RS	1	1	2	R
95	FAN	4JA1 C/F	1	1	4	L
95	FAN	4JA1 C/F	1	1	4	R
171	BOLT BRKT	BD25 RS	1	2	1	L
171	BOLT BRKT	BD25 RS	1	2	1	R
539	SCREW	BD25 RS	1	2	2	L
539	SCREW	BD25 RS	1	2	2	R
454	COVER	JEOP	1	2	3	L
471	SEAL	JEOP	1	2	3	R
95	FAN	4JA1 C/F	1	2	4	L
95	FAN	4JA1 C/F	1	2	4	R
171	BOLT BRKT	BD25 RS	1	3	1	L
171	BOLT BRKT	BD25 RS	1	3	1	R
540	SMALL PART	4G9E O/P	1	3	2	L
455	ROTOR INNER	4G9E O/P	1	3	2	R
456	ROTOR OUTER	4G9E O/P	1	3	2	R
538	IMPELLER	JEOP	1	3	3	L
95	FAN	4JA1 C/F	1	3	4	L
95	FAN	4JA1 C/F	1	3	4	R
15	SEAL SUB ASSY	VQ W/P	1	4	1	L
15	SEAL SUB ASSY	VQ W/P	1	4	1	R
305	SEAL SET	4G1 W/P	1	4	2	L
305	SEAL SET	4G1 W/P	1	4	2	R
95	FAN	4JA1 C/F	1	4	3	L
95	FAN	4JA1 C/F	1	4	3	R
15	SEAL SUB ASSY	VQ W/P	1	5	1	L
15	SEAL SUB ASSY	VQ W/P	1	5	1	R
305	SEAL SET	4G1 W/P	1	5	2	L
305	SEAL SET	4G1 W/P	1	5	2	R
95	FAN	4JA1 C/F	1	5	3	L
95	FAN	4JA1 C/F	1	5	3	R
305	SEAL SET	4G1 W/P	1	6	2	L
305	SEAL SET	4G1 W/P	1	6	2	R
95	FAN	4JA1 C/F	1	6	3	L
95	FAN	4JA1 C/F	1	6	3	R
306	PULLEY SEAT	4G1 W/P	2	1	1	L
304	BEARING	4G1 W/P	2	1	1	R
306	PULLEY SEAT	4G1 W/P	2	1	2	L
304	BEARING	4G1 W/P	2	1	2	R
307	PLUG TIGHT	4G1 W/P	2	1	3	L
305	SEAL SET	4G1 W/P	2	1	3	R
303	ROTOR	4G1 W/P	2	1	4	L
303	ROTOR	4G1 W/P	2	1	4	R
95	FAN	4JA1 C/F	2	1	5	L
95	FAN	4JA1 C/F	2	1	5	R
327	PULLEY SUB ASSY	4G9 W/P	2	2	1	L
437	ROTOR OUTER	4G1-E O/P	2	2	1	R
327	PULLEY SUB ASSY	4G9 W/P	2	2	2	L
436	ROTOR INNER	4G1-E O/P	2	2	2	R
327	PULLEY SUB ASSY	4G9 W/P	2	2	3	L

Part No	Description	Part No	QTY	QTY	QTY	QTY
542	SMALL PART	4G9 W/P	2	2	3	R
541	SEAT SUB	4G9 W/P	2	2	4	L
440	OIL SEAL	4G1E O/P	2	2	4	R
95	FAN	4JA1 C/F	2	2	5	L
95	FAN	4JA1 C/F	2	2	5	R
292	BEARING	P-CAR W/P	2	3	1	L
328	BEARING	4G9 W/P	2	3	1	R
285	COVER	P-CAR W/P	2	3	2	L
328	BEARING	4G9 W/P	2	3	2	R
286	COVER	P-CAR W/P	2	3	3	L
323	VANE -OLD	4G9 W/P	2	3	3	R
293	PLUG	P-CAR W/P	2	3	4	L
323	VANE -OLD	4G9 W/P	2	3	4	R
95	FAN	4JA1 C/F	2	3	5	L
273	GEAR B/S DRIVE	P-CAR O/P	2	4	1	L
543	VANE SUB	P-CAR W/P	2	4	1	R
274	GEAR B/S DRIVEN	P-CAR O/P	2	4	2	L
543	VANE SUB	P-CAR W/P	2	4	2	R
275	SLEEVE	P-CAR O/P	2	4	3	L
543	VANE SUB	P-CAR W/P	2	4	3	R
290	SEAL SUB ASSY	P-CAR W/P	2	4	4	L
288	GASKET	P-CAR W/P	2	4	4	R
95	FAN	4JA1 C/F	2	4	5	L
95	FAN	4JA1 C/F	2	4	5	R
259	ROTOR INNER	P-CAR O/P	2	5	1	L
271	BOLT	P-CAR O/P	2	5	1	R
259	ROTOR INNER	P-CAR O/P	2	5	2	L
295	SCREWS	P-CAR O/P	2	5	2	R
266	SCREW	P-CAR O/P	2	5	2	R
264	OIL SEAL		2	5	3	L
265	OIL SEAL	P-CAP O/P	2	5	3	R
263	SPRING RELIEF	P-CAP O/P	2	5	4	L
261	PLUG	P-CAP O/P	2	5	4	R
95	FAN	4JA1 C/F	2	5	5	L
95	FAN	4JA1 C/F	2	5	5	R
258	COVER	P-CAP O/P	2	6	1	L
260	ROTOR OUTER	P-CAP O/P	2	6	1	R
258	COVER	P-CAP O/P	2	6	2	L
260	ROTOR OUTER	P-CAP O/P	2	6	2	R
258	COVER	P-CAP O/P	2	6	3	L
262	PLUNGER	P-CAP O/P	2	6	3	R
258	COVER	P-CAP O/P	2	6	4	L
258	COVER	P-CAP O/P	2	6	4	R
95	FAN	4JA1 C/F	2	6	5	L
95	FAN	4JA1 C/F	2	6	5	R
136	BEARING UNIT	BD25 W/P	3	1	1	L
157	SILICON OIL	BD25 W/P	3	1	1	R
145	BEARING	BD25 W/P	3	1	2	L
141	HUB	BD25 W/P	3	1	2	R
289	SEAL SUB ASSY	BD25 W/P	3	1	3	L
137	BEARING UNIT	TD27 W/P	3	1	3	R
140	PULLEY	BD25 W/P	3	1	4	L
140	PULLEY	BD25 W/P	3	1	4	R

Part No.	Description	Part No.	QTY	QTY	QTY	Dir
95	FAN	4JA1 C/F	3	1	5	L
95	FAN	4JA1 C/F	3	1	5	R
104	SHAFT DRIVEN	BD25 O/P	3	2	1	L
107	GEAR DRIVEN	BD25 O/P	3	2	1	R
133	VANE	BD25 W/P	3	2	2	L
103	GEAR DRIVING	BD 25 O/P	3	2	2	R
134	VANE	TD27 W/P	3	2	3	L
545	GEAR DRIVING	BD25 O/P	3	2	3	R
544	SMALL PART	BD25 W/P	3	2	4	L
139	BOLT HEX	BD25 W/P	3	2	4	R
95	FAN	4JA1 C/F	3	2	5	L
95	FAN	4JA1 C/F	3	2	5	R
167	ROCKER VALVE	BD25 RS	3	3	1	L
168	ROCKER VALVE	BD25 RS	3	3	1	R
166	SPRING OUTER	BD25 RS	3	3	2	L
165	SPRING INSIDE	BD25 RS	3	3	2	L
547	BOLT BRKT	BD25 W/P	3	3	2	R
546	SMALL PART	BD25 RS	3	3	3	L
546	SMALL PART	BD25 RS	3	3	3	R
168	ROCKER VALVE	BD25 RS	3	3	4	L
168	ROCKER VALVE	BD25 RS	3	3	4	R
95	FAN	4JA1 C/F	3	3	5	R
161	SHAFT ASSY	BD25 RS	3	4	1	L
161	SHAFT ASSY	BD25 RS	3	4	1	R
163	SUPT ROCKER-A	BD25 RS	3	4	2	L
164	SUPT ROCKER-B		3	4	2	R
172	WASHER SPRG	BD25 RS	3	4	3	L
173	WASHER PLAN	BD25 RS	3	4	3	L
163	SUPT ROCKER-A	BD25 RS	3	4	3	R
168	ROCKER VALVE	BD25 RS	3	4	4	L
95	FAN	4JA1 C/F	3	4	5	L
95	FAN	4JA1 C/F	3	4	5	R
379	VANE	VQ W/P	3	5	1	L
235	HUB	VQ W/P	3	5	1	L
216	GEAR INNER	HF O/P, MC	3	5	1	R
217	GEAR OUTER	HF O/P, MC	3	5	1	R
234	BEARING	HF W/P	3	5	2	L
548	SMALL PART		3	5	2	R
232	VANE	HF W/P	3	5	3	L
189	COVER	Z20	3	5	3	R
233	SEAL SUB ASSY	HF W/P	3	5	4	L
548	SMALL PART		3	5	4	R
95	FAN	4JA1 C/F	3	5	5	L
95	FAN	4JA1 C/F	3	5	5	R
16	BEARING	VQ W/P	3	6	1	L
374	ROTOR INNER	VQ O/P	3	6	1	R
375	ROTOR OUTER	VQ O/P	3	6	1	R
548	SMALL PART		3	6	2	L
17	SPROCKET	VQ O/P	3	6	2	R
12	BODY	VQ W/P	3	6	3	L
548	SMALL PART		3	6	3	R
12	BODY	VQ W/P	3	6	4	L
5	COVER	VQ O/P	3	6	4	R

95	FAN	4JA1 C/F	3	6	5	L
95	FAN	4JA1 C/F	3	6	5	R
83	BOLT STUD	4JA1 C/F	4	1	1	L
84	SCREW	4JA1 C/F	4	1	1	L
80	SHAFT(BLACK)	4JA1 C/F	4	1	1	R
85	NUT	4JA1 C/F	4	1	2	L
86	WASHER SPRG	4JA1 C/F	4	1	2	L
81	SHAFT(BLUE)	4JA1 C/F	4	1	2	R
91	VALVE SUB ASSY	4JA1 C/F	4	1	3	L
89	GASKET	4JA1 C/F	4	1	3	L
80	SHAFT(BLACK)	4JA1 C/F	4	1	3	R
82	BIMETAL	4JA1 C/F	4	1	4	L
92	BUSH	4JA1 C/F	4	1	4	L
80	SHAFT(BLACK)	4JA1 C/F	4	1	4	R
95	FAN	4JA1 C/F	4	1	5	L
95	FAN	4JA1 C/F	4	1	5	R
93	SILICON OIL	4JA1 C/F	4	2	1	L
93	SILICON OIL	4JA1 C/F	4	2	1	R
66	BODY	4JA1 R/V	4	2	2	L
79	BEARING	4JA1 C/F	4	2	2	R
66	BODY	4JA1 R/V	4	2	3	L
90	PLATE	4JA1 C/F	4	2	3	R
66	BODY	4JA1 R/V	4	2	4	L
90	PLATE	4JA1 C/F	4	2	4	R
95	FAN	4JA1 C/F	4	2	5	L
95	FAN	4JA1 C/F	4	2	5	R
550	BEARING	4JA1 W/P	4	3	1	L
63	PLUG	4JA1 D/C	4	3	1	R
64	NIPPLE	4JA1 D/C	4	3	1	R
67	SPRING	4JA1 R/V	4	3	2	R
69	PLUG	4JA1 R/V	4	3	2	R
549	SEAL	4JA1 W/P	4	3	3	L
68	VALVE	4JA1 R/V	4	3	3	R
549	SEAL	4JA1 W/P	4	3	4	L
68	VALVE	4JA1 R/V	4	3	4	R
95	FAN	4JA1 C/F	4	3	5	L
43	STRAINER ASSY	4JA1 O/P	4	4	1	L
59	THROWER	4JA1 W/P	4	4	1	R
60	SET SCREW	4JA1 W/P	4	4	1	R
46	BOLT	4JA1 O/P	4	4	2	L
61	SPRING WASHER	4JA1 W/P	4	4	2	R
43	STRAINER ASSY	4JA1 O/P	4	4	3	L
549	SEAL	4JA1 W/P	4	4	3	R
44	STRAINER ASSY	4JA1 O/P	4	4	4	L
44	STRAINER ASSY	4JA1 O/P	4	4	4	R
95	FAN	4JA1 C/F	4	4	5	L
95	FAN	4JA1 C/F	4	4	5	R
41	SPRING SEAT	4JA1 O/P	4	5	1	L
40	SPRING	4JA1 O/P	4	5	1	L
38	VALVE	4JA1	4	5	1	R
42	SPLIT PIN	4JA1 O/P	4	5	1	R
37	PINION GEAR	4JA1 O/P	4	5	2	L
46	BOLT	4JA1 O/P	4	5	2	R

Part No.	Part Name	Code	Row	Column	Row	Dir
37	PINION GEAR	4JA1 O/P	4	5	3	L
46	BOLT	4JA1 O/P	4	5	3	R
551	CENTER	4JA1 W/P	4	5	4	L
49	GAUZE(1=330)	4JA1	4	5	4	R
95	FAN	4JA1 C/F	4	5	5	L
95	FAN	4JA1 C/F	4	5	5	R
56	IMPELLER	4JB1T	4	6	1	L
57	BEARING UNIT	4JB1T	4	6	1	R
58	SEAL UNIT	4JB1T	4	6	2	L
57	BEARING UNIT	4JB1T	4	6	2	R
552	SMALL PART	4M4 O/P	4	6	3	L
552	SMALL PART	4M4 O/P	4	6	3	R
390	GEAR HEAD	4M4 O/P	4	6	4	L
390	GEAR HEAD	4M4 O/P	4	6	4	R
95	FAN	4JA1 C/F	4	6	5	L
95	FAN	4JA1 C/F	4	6	5	R
251	SEAT PULLEY	5L-II W/P	5	1	1	L
244	ROTOR	2L-II W/P	5	1	1	R
251	SEAT PULLEY	5L-II W/P	5	1	2	L
244	ROTOR	2L-II W/P	5	1	2	R
250	SEAL SET	5L-II W/P	5	1	3	L
245	SEAL SET	2L-II W/P	5	1	3	R
247	PIN RING	2L-II W/P	5	1	4	L
245	SEAL SET	2L-II W/P	5	1	4	R
95	FAN	4JA1 C/F	5	1	5	L
95	FAN	4JA1 C/F	5	1	5	R
553	BEARING	5L-II W/P	5	2	1	L
183	TIP		5	2	1	R
249	BEARING	2L-II W/P	5	2	2	L
183	TIP		5	2	2	R
242	BOLT STUD	2L-II W/P	5	2	3	L
179	NUT	TD27 RS	5	2	3	R
242	BOLT STUD	2L-II W/P	5	2	4	L
179	NUT	TD27 RS	5	2	4	R
95	FAN	4JA1 C/F	5	2	5	L
95	FAN	4JA1 C/F	5	2	5	R
423	BEARING	Y71 W/P	5	3	1	L
426	FLANGE	Y71 W/P	5	3	1	L
425	FLANGE	4J413 W/P	5	3	1	R
422	BEARING	4J413 W/P	5	3	1	R
424	IMPELLER	4J413W O/P	5	3	2	R
424	IMPELLER	4J413W O/P	5	3	3	R
421	SEAL UNIT	4J413W W/P	5	3	4	R
95	FAN	4JA1 C/F	5	3	5	R
412	ROTOR OUTER	4J413 O/P	5	4	1	L
435	COVER	4JA13W O/P	5	4	1	R
411	ROTOR INNER	4J413W O/P	5	4	2	L
435	COVER	4JA13W O/P	5	4	2	R
406	COVER	4J413W O/P	5	4	3	L
435	COVER	4JA13W O/P	5	4	3	R
554	SMALL PART	Y71 O/P	5	4	4	L
435	COVER	4JA13W O/P	5	4	4	R
95	FAN	4JA1 C/F	5	4	5	L

Part No	Description	Part No	QTY	QTY	QTY	Side
95	FAN	4JA1 C/F	5	4	5	R
447	BEARING	4G1-E O/P	5	5	1	L
188	BODY	Z20 O/P	5	5	1	R
449	FLANGE	4G1-E W/P	5	5	2	L
188	BODY	Z20 O/P	5	5	2	R
450	IMPELLER	4G1-E W/P	5	5	3	L
188	BODY	Z20 O/P	5	5	3	R
445	SEAL UNIT	4JA13W O/P	5	5	4	L
188	BODY	Z20 O/P	5	5	4	R
95	FAN	4JA1 C/F	5	5	5	L
95	FAN	4JA1 C/F	5	5	5	R
150	PLATE	TD27 W/P	5	6	1	L
158	SILICON OIL	TD27 W/P	5	6	1	R
154	O-RING	TD27 W/P	5	6	2	L
143	HEAT ELEMENT	TD27 W/P	5	6	2	L
148	VALVE SUB ASSY	TD27 W/P	5	6	2	R
148	VALVE SUB ASSY	TD27 W/P	5	6	3	L
148	VALVE SUB ASSY	TD27 W/P	5	6	3	R
148	VALVE SUB ASSY	TD27 W/P	5	6	4	L
148	VALVE SUB ASSY	TD27 W/P	5	6	4	R
95	FAN	4JA1 C/F	5	6	5	L
95	FAN	4JA1 C/F	5	6	5	R
95	FAN	4JA1 C/F	6	1	5	L
95	FAN	4JA1 C/F	6	1	5	R
95	FAN	4JA1 C/F	6	2	5	L
95	FAN	4JA1 C/F	6	2	5	R
95	FAN	4JA1 C/F	6	3	5	L
95	FAN	4JA1 C/F	6	4	5	L
95	FAN	4JA1 C/F	6	4	5	R
95	FAN	4JA1 C/F	6	5	5	L
95	FAN	4JA1 C/F	6	5	5	R
95	FAN	4JA1 C/F	6	6	5	L
95	FAN	4JA1 C/F	6	6	5	R
486	PULLEY	FORD	7	2	1	L
486	PULLEY	FORD	7	2	1	R
486	PULLEY	FORD	7	2	2	L
487	HUB ALTANORTOR	FORD	7	2	2	R
463	WATER PUMP ASM	CHRYSLER	7	3	2	L
462	OIL PUMP ASM	CHRYSLER	7	3	2	R
461	OIL PUMP ASM	CHRYSLER	7	3	3	L
462	OIL PUMP ASM	CHRYSLER	7	3	3	R
461	OIL PUMP ASM	CHRYSLER	7	3	4	L
461	OIL PUMP ASM	CHRYSLER	7	3	4	R
501	SHAFT ASSY ROCKER	KA 24	7	4	1	L
501	SHAFT ASSY ROCKER	KA 24	7	4	1	R
503	RICKER ASSY VALVE	KA 24	7	4	2	L
504	RICKER ASSY VALVE	KA 24	7	4	2	R
505	ROCKER ASSY VALVE	KA 24	7	4	3	L
502	RICKER ASSY VALVE	KA 24	7	4	3	R
205	BOLT	Z20	7	4	4	L
205	BOLT	Z20	7	4	4	R
511	SPINDLE ASSY	Z20	7	4	5	L
500	SHAFT ASSY ROCKER	KA 24	7	5	1	L

500	SHAFT ASSY ROCKER	KA 24	7	5	1	R
498	PUMP ASSY W/P	KA 24	7	5	2	L
498	PUMP ASSY W/P	KA 24	7	5	2	R
498	PUMP ASSY W/P	KA 24	7	5	3	L
498	PUMP ASSY W/P	KA 24	7	5	3	R
499	OIL PUMP ASSY	Z20	7	5	4	L
499	OIL PUMP ASSY	Z20	7	5	4	R
427	SHAFT ASSY INT.	SUZUKI	7	5	5	L
428	SHAFT ASSY EXT.	SUZUKI	7	5	5	R
204	BOLT	Z20	7	6	1	L
204	BOLT	Z20	7	6	1	R
207	ROCKER ASSY VALVE	KA 24	7	6	2	L
207	ROCKER ASSY VALVE	KA 24	7	6	2	R
207	ROCKER ASSY VALVE	KA 24	7	6	3	L
207	ROCKER ASSY VALVE	KA 24	7	6	3	R
202	ROCKER SHAFT,INT	Z20	7	6	4	L
202	ROCKER SHAFT,INT	Z20	7	6	4	R
496	O-RING		8	1	2	L
497	PACKING		8	1	2	L
493	GASKET	4G1	8	1	2	R
495	GASKET	BD25	8	1	2	R
555	PULLEY	QA	8	2	1	L
88	FAN	4JA1	8	2	1	R
555	PULLEY	QA	8	2	2	L
88	FAN	4JA1	8	2	2	R
555	PULLEY	QA	8	2	3	L
556	SAMPLE FOR APPROVAL	QA	8	2	4	L
556	SAMPLE FOR APPROVAL	QA	8	2	5	L
367	CRANCK-SHAFT	AIR	11	1	1	R
367	CRANCK-SHAFT	AIR	11	1	1	L
32	GEAR	4JA1 O/P	11	1	2	R
32	GEAR	4JA1 O/P	11	1	2	L
35	SHAFT	4JA1 O/P	11	1	3	R
33	SHAFT	4JA1 O/P	11	1	3	L
35	SHAFT	4JA1 O/P	11	1	4	R
33	SHAFT	4JA1 O/P	11	1	4	L
558	BODY	4G1 W/P	11	1	5	R
558	BODY	4G1 W/P	11	1	5	L
369	CYLINDER	AIR	11	2	1	R
360	CYLINDER	AIR	11	2	1	L
106	SHAFT DRIVE	BD25 O/P	11	2	2	R
105	GEAR DRIVE	BD25 O/P	11	2	2	L
125	BODY	BD25 W/P	11	2	3	R
125	BODY	BD25 W/P	11	2	3	L
125	BODY	BD25 W/P	11	2	4	R
125	BODY	BD25 W/P	11	2	4	L
558	BODY	4G1 W/P	11	2	5	R
558	BODY	4G1 W/P	11	2	5	L
368	REAR HEAD	AIR	11	3	1	R
368	REAR HEAD	AIR	11	3	1	L
129	WHEEL	BD25 O/P	11	3	2	R
127	BODY	BD25 O/P	11	3	3	R
128	COVER	BD25 O/P	11	3	3	L

190	PIN DOWEL	4G1 O/P	11	3	3	L
125	BODY	BD25 W/P	11	3	4	R
125	BODY	BD25 W/P	11	3	4	L
558	BODY	4G1 W/P	11	3	5	R
558	BODY	4G1 W/P	11	3	5	L
55	CENTER	4JA1 W/P	11	4	1	R
55	CENTER	4JA1 W/P	11	4	1	L
393	SHAFT DRIVE	4M4 O/P	11	4	2	R
392	SHAFT DRIVEN	4M4 O/P	11	4	2	L
132	WHEEL	TD27	11	4	3	R
386	GEAR DRIVE	4M4 O/P	11	4	3	L
132	WHEEL	TD27	11	4	4	R
132	WHEEL	TD27	11	4	4	L
558	BODY	4G1 W/P	11	4	5	R
558	BODY	4G1 W/P	11	4	5	L
30	PINION GEAR RAW	4JA1 O/P	11	5	1	R
30	PINION GEAR RAW	4JA1 O/P	11	5	1	L
130	BODY	TD27	11	5	2	R
130	BODY	TD27	11	5	2	L
130	BODY	TD27	11	5	3	R
130	BODY	TD27	11	5	3	L
130	BODY	TD27	11	5	4	R
130	BODY	TD27	11	5	4	L
558	BODY	4G1 W/P	11	5	5	R
558	BODY	4G1 W/P	11	5	5	L
284	HUB	P-CAP W/P	11	6	1	R
281	HUB	P-CAP W/P	11	6	1	L
131	COVER	TD27	11	6	2	R
131	COVER	TD27	11	6	2	L
131	COVER	TD27	11	6	3	R
131	COVER	TD27	11	6	3	L
131	COVER	TD27	11	6	4	R
131	COVER	TD27	11	6	4	L
558	BODY	4G1 W/P	11	6	5	R
558	BODY	4G1 W/P	11	6	5	L
279	BODY	4D56 W/P	12	1	1	R
279	BODY	4D56 W/P	12	1	1	L
238	BODY	2L-II	12	1	2	R
238	BODY	2L-II	12	1	3	L
237	BODY	2L-II	12	1	3	R
453	CASE	4G9E O/P	12	1	4	L
453	CASE	4G9E O/P	12	1	4	R
282	BODY	4D56 W/P	12	2	1	L
282	BODY	4D56 W/P	12	2	1	R
28	COVER	4JA1 O/P	12	2	2	L
256	COVER B/S GEAR	4JA1 O/P	12	2	2	R
100	BODY	BD25 O/P	12	2	3	L
215	COVER	MC O/P	12	2	3	R
453	CASE	4G9E O/P	12	2	4	L
453	CASE	4G9E O/P	12	2	4	R
255	CASE FRONT	P-CAR O/P	12	3	1	L
255	CASE FRONT	P-CAR O/P	12	3	1	R
255	CASE FRONT	P-CAR O/P	12	3	2	L

Part No.	Part Name	Model	Qty	Unit	Qty	Unit
255	CASE FRONT	P-CAR O/P	12		3	R
453	CASE	4G9E O/P	12		3	L
453	CASE	4G9E O/P	12		3	R
283	BODY	P-CAR W/P	12		4	L
283	BODY	P-CAR W/P	12		4	R
283	BODY	P-CAR W/P	12		4	L
283	BODY	P-CAR W/P	12		4	R
452	CASE	4G9E O/P	12		4	L
452	CASE	4G9E O/P	12		4	R
213	FRONT COVER	MC O/P	12		5	L
431	CASE	4G1E O/P	12		5	R
213	FRONT COVER	MC O/P	12		5	L
431	CASE	4G1E O/P	12		5	R
452	CASE	4G9E O/P	12		5	L
452	CASE	4G9E O/P	12		5	R
123	COVER	TD27	12		6	L
122	BODY	TD27	12		6	R
123	COVER	TD27	12		6	L
122	BODY	TD27	12		6	R
559	PINION GEAR	4JA1 O/P	12		6	L
559	PINION GEAR	4JA1 O/P	12		6	R
452	CASE	4G9E O/P	12		6	L
452	CASE	4G9E O/P	12		6	R

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX 3**THE PROPOSED LOCATIONS**

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

217	GEAR OUTER	HF O/P, MC	1	1	1	L
216	GEAR INNER	HF O/P, MC	1	1	1	L
218	VALVE REG		1	1	1	R
219	SPRG REG		1	1	1	R
220	PLUG REG		1	1	1	R
221	WASHER REG		1	1	1	R
222	SEAL OIL		1	1	1	R
223	SCREW		1	1	1	R
225	PLUG WELCH		1	1	1	R
226	BOLT-HEX		1	1	1	R
227	PIN		1	1	1	R
228	PIN		1	1	1	R
232	VANE	HF W/P	1	1	2	L
234	BEARING	HF W/P	1	1	2	R
233	SEAL SUB ASSY	HF W/P	1	1	3	L
560	SMALL PART	HF W/P	1	1	3	R
95	FAN	4JA1 C/F	1	1	4	L
95	FAN	4JA1 C/F	1	1	4	R
455	ROTOR INNER	4G9E O/P	1	2	1	L
456	ROTOR OUTER	4G9E O/P	1	2	1	L
540	SMALL PART	4G9E O/P	1	2	1	R
552	SMALL PART	4M4 O/P	1	2	2	L
552	SMALL PART	4M4 O/P	1	2	2	R
2	SMALL PART	VQ	1	2	3	L
2	SMALL PART	VQ	1	2	3	R
95	FAN	4JA1 C/F	1	2	4	L
95	FAN	4JA1 C/F	1	2	4	R
379	VANE	VQ W/P	1	3	1	L
16	BEARING	VQ W/P	1	3	1	R
17	SPROCKET	VQ O/P	1	3	2	L
12	BODY	VQ W/P	1	3	2	R
12	BODY	VQ W/P	1	3	3	L
95	FAN	4JA1 C/F	1	3	3	R
95	FAN	4JA1 C/F	1	3	4	L
15	SEAL SUB ASSY	VQ W/P	1	4	1	L
15	SEAL SUB ASSY	VQ W/P	1	4	1	R
15	SEAL SUB ASSY	VQ W/P	1	4	2	L
15	SEAL SUB ASSY	VQ W/P	1	4	2	R
95	FAN	4JA1 C/F	1	4	3	L
95	FAN	4JA1 C/F	1	4	3	R
374	ROTOR INNER	VQ O/P	1	5	1	L
5	COVER	VQ O/P	1	5	2	L
95	FAN	4JA1 C/F	1	5	3	L
95	FAN	4JA1 C/F	1	5	3	R
95	FAN	4JA1 C/F	1	6	3	L
95	FAN	4JA1 C/F	1	6	3	R
244	ROTOR	2L-II W/P	2	1	1	L
244	ROTOR	2L-II W/P	2	1	1	R
246	BEARING		2	1	2	L
247	PIN RING	2L-II W/P	2	1	2	R
245	SEAL SET	2L-II W/P	2	1	3	L
245	SEAL SET	2L-II W/P	2	1	3	R
242	BOLT STUD	2L-II W/P	2	1	4	L
242	BOLT STUD	2L-II W/P	2	1	4	R

Part No	Part Name	Model	Qty	Unit	Cost	Side
95	FAN	4JA1 C/F	2	1	5	L
95	FAN	4JA1 C/F	2	1	5	R
152	PLATE		2	2	1	L
158	SILICON OIL	TD27 W/P	2	2	1	R
144	HEAT ELEMENT		2	2	2	L
154	O-RING	TD27 W/P	2	2	2	L
156	GUIDE RING		2	2	2	L
137	BEARING UNIT	TD27 W/P	2	2	2	R
134	VANE	TD27 W/P	2	2	3	L
148	VALVE SUB ASSY	TD27 W/P	2	2	3	R
148	VALVE SUB ASSY	TD27 W/P	2	2	4	L
148	VALVE SUB ASSY	TD27 W/P	2	2	4	R
95	FAN	4JA1 C/F	2	2	5	L
95	FAN	4JA1 C/F	2	2	5	R
169	ROCKER VALVE		2	3	1	L
170	ROCKER VALVE		2	3	1	L
183	TIP		2	3	1	R
183	TIP		2	3	2	L
181	SCREW ADJ		2	3	2	R
148	VALVE SUB ASSY	TD27 W/P	2	3	3	L
148	VALVE SUB ASSY	TD27 W/P	2	3	3	R
179	NUT	TD27 RS	2	3	4	L
179	NUT	TD27 RS	2	3	4	R
95	FAN	4JA1 C/F	2	3	5	L
95	FAN	4JA1 C/F	2	4	1	L
95	FAN	4JA1 C/F	2	4	5	L
95	FAN	4JA1 C/F	2	4	5	R
95	FAN	4JA1 C/F	2	5	5	L
95	FAN	4JA1 C/F	2	5	5	R
95	FAN	4JA1 C/F	2	6	5	L
95	FAN	4JA1 C/F	2	6	5	R
157	SILICON OIL	BD25 W/P	3	1	1	L
136	BEARING UNIT	BD25 W/P	3	1	1	R
133	VANE	BD25 W/P	3	1	2	L
141	HUB	BD25 W/P	3	1	2	R
289	SEAL SUB ASSY	BD25 W/P	3	1	3	L
140	PULLEY	BD25 W/P	3	1	3	R
139	BOLT HEX	BD25 W/P	3	1	4	L
140	PULLEY	BD25 W/P	3	1	4	R
95	FAN	4JA1 C/F	3	1	5	L
95	FAN	4JA1 C/F	3	1	5	R
145	BEARING	BD25 W/P	3	2	1	L
544	SMALL PART	BD25 W/P	3	2	1	R
165	SPRING INSIDE	BD25 RS	3	2	2	L
166	SPRING OUTER	BD25 RS	3	2	2	L
164	SUPT ROCKER-B		3	2	2	R
163	SUPT ROCKER-A	BD25 RS	3	2	3	L
546	SMALL PART	BD25 RS	3	2	3	R
167	ROCKER VALVE	BD25 RS	3	2	4	L
167	ROCKER VALVE	BD25 RS	3	2	4	R
95	FAN	4JA1 C/F	3	2	5	L
95	FAN	4JA1 C/F	3	2	5	R
171	BOLT BRKT	BD25 RS	3	3	1	L
171	BOLT BRKT	BD25 RS	3	3	1	R

161	SHAFT ASSY	BD25 RS	3	3	2	L
161	SHAFT ASSY	BD25 RS	3	3	2	R
168	ROCKER VALVE	BD25 RS	3	3	3	L
103	GEAR DRIVING	BD 25 O/P	3	3	3	R
168	ROCKER VALVE	BD25 RS	3	3	4	L
168	ROCKER VALVE	BD25 RS	3	3	4	R
95	FAN	4JA1 C/F	3	3	5	R
171	BOLT BRKT	BD25 RS	3	4	1	L
171	BOLT BRKT	BD25 RS	3	4	1	R
104	SHAFT DRIVEN	BD25 O/P	3	4	2	L
107	GEAR DRIVEN	BD25 O/P	3	4	2	R
103	GEAR DRIVING	BD 25 O/P	3	4	3	L
95	FAN	4JA1 C/F	3	4	5	L
95	FAN	4JA1 C/F	3	4	5	R
171	BOLT BRKT	BD25 RS	3	5	1	L
171	BOLT BRKT	BD25 RS	3	5	1	R
423	BEARING	Y71 W/P	3	5	2	L
426	FLANGE	Y71 W/P	3	5	2	R
424	IMPELLER	4J413W O/P	3	5	3	L
424	IMPELLER	4J413W O/P	3	5	3	R
554	SMALL PART	Y71 O/P	3	5	4	L
95	FAN	4JA1 C/F	3	5	5	L
95	FAN	4JA1 C/F	3	5	5	R
95	FAN	4JA1 C/F	3	6	5	L
95	FAN	4JA1 C/F	3	6	5	R
273	GEAR B/S DRIVE	P-CAP O/P	4	1	1	L
274	GEAR B/S DRIVEN	P-CAP O/P	4	1	1	R
271	BOLT	P-CAP O/P	4	1	2	L
272	GASKET		4	1	2	L
266	SCREW	P-CAP O/P	4	1	2	R
275	SLEEVE	P-CAP O/P	4	1	3	L
262	PLUNGER	P-CAP O/P	4	1	3	R
265	OIL SEAL	P-CAP O/P	4	1	4	L
261	PLUG	P-CAP O/P	4	1	4	R
95	FAN	4JA1 C/F	4	1	5	L
95	FAN	4JA1 C/F	4	1	5	R
259	ROTOR INNER	P-CAP O/P	4	2	1	L
260	ROTOR OUTER	P-CAP O/P	4	2	1	R
259	ROTOR INNER	P-CAP O/P	4	2	2	L
260	ROTOR OUTER	P-CAP O/P	4	2	2	R
264	OIL SEAL		4	2	3	L
258	COVER	P-CAP O/P	4	2	3	R
258	COVER	P-CAP O/P	4	2	4	L
263	SPRING RELIEF	P-CAP O/P	4	2	4	R
95	FAN	4JA1 C/F	4	2	5	L
95	FAN	4JA1 C/F	4	2	5	R
258	COVER	P-CAP O/P	4	3	1	L
292	BEARING	P-CAP W/P	4	3	1	R
258	COVER	P-CAP O/P	4	3	2	L
295	SCREWS	P-CAP O/P	4	3	2	R
258	COVER	P-CAP O/P	4	3	3	L
286	COVER	P-CAP W/P	4	3	3	R
288	GASKET	P-CAP W/P	4	3	4	L
290	SEAL SUB ASSY	P-CAP W/P	4	3	4	R

Part No.	Part Name	Qty	Unit	Material	Location	Side
95	FAN	4JA1 C/F	4	3	5	L
38	VALVE	4JA1	4	4	1	L
40	SPRING	4JA1 O/P	4	4	1	R
41	SPRING SEAT	4JA1 O/P	4	4	1	R
285	COVER	P-CAP W/P	4	4	2	L
293	PLUG	P-CAR	4	4	2	R
43	STRAINER ASSY	4JA1 O/P	4	4	3	L
43	STRAINER ASSY	4JA1 O/P	4	4	3	R
49	GAUZE(1=330)	4JA1	4	4	4	L
44	STRAINER ASSY	4JA1 O/P	4	4	4	R
95	FAN	4JA1 C/F	4	4	5	L
95	FAN	4JA1 C/F	4	4	5	R
42	SPLIT PIN	4JA1 O/P	4	5	1	L
47	BOLT		4	5	1	R
46	BOLT	4JA1 O/P	4	5	2	L
37	PINION GEAR	4JA1 O/P	4	5	2	R
46	BOLT	4JA1 O/P	4	5	3	L
37	PINION GEAR	4JA1 O/P	4	5	3	R
44	STRAINER ASSY	4JA1 O/P	4	5	4	L
95	FAN	4JA1 C/F	4	5	5	L
95	FAN	4JA1 C/F	4	5	5	R
63	PLUG	4JA1 D/C	4	6	1	L
64	NIPPLE	4JA1 D/C	4	6	1	L
553	BEARING	5L-II W/P	4	6	1	R
251	SEAT PULLEY	5L-II W/P	4	6	2	L
251	SEAT PULLEY	5L-II W/P	4	6	2	R
250	SEAL SET	5L-II W/P	4	6	3	L
95	FAN	4JA1 C/F	4	6	5	L
95	FAN	4JA1 C/F	4	6	5	R
79	BEARING	4JA1 C/F	5	1	1	L
83	BOLT STUD	4JA1 C/F	5	1	1	R
80	SHAFT(BLACK)	4JA1 C/F	5	1	2	L
81	SHAFT(BLUE)	4JA1 C/F	5	1	2	R
80	SHAFT(BLACK)	4JA1 C/F	5	1	3	L
89	GASKET	4JA1 C/F	5	1	3	R
80	SHAFT(BLACK)	4JA1 C/F	5	1	4	L
92	BUSH	4JA1 C/F	5	1	4	R
88	FAN	4JA1	5	1	5	L
88	FAN	4JA1	5	1	5	R
84	SCREW	4JA1 C/F	5	2	1	L
93	SILICON OIL	4JA1 C/F	5	2	1	R
96	SILICON OIL		5	2	1	R
85	NUT	4JA1 C/F	5	2	2	L
86	WASHER SPRG	4JA1 C/F	5	2	2	R
91	VALVE SUB ASSY	4JA1 C/F	5	2	3	L
82	BIMETAL	4JA1 C/F	5	2	3	R
90	PLATE	4JA1 C/F	5	2	4	L
90	PLATE	4JA1 C/F	5	2	4	R
88	FAN	4JA1	5	2	5	L
88	FAN	4JA1	5	2	5	R
305	SEAL SET	4G1 W/P	5	3	1	L
305	SEAL SET	4G1 W/P	5	3	1	R
305	SEAL SET	4G1 W/P	5	3	2	L
305	SEAL SET	4G1 W/P	5	3	2	R

Part No.	Description	Material	QTY	QTY	QTY	Dir
303	ROTOR	4G1 W/P	5	3	3	L
307	PLUG TIGHT	4G1 W/P	5	3	3	R
88	FAN	4JA1	5	3	5	R
305	SEAL SET	4G1 W/P	5	4	1	L
305	SEAL SET	4G1 W/P	5	4	1	R
305	SEAL SET	4G1 W/P	5	4	2	L
304	BEARING	4G1 W/P	5	4	2	R
549	SEAL	4JA1 W/P	5	4	3	L
549	SEAL	4JA1 W/P	5	4	3	R
549	SEAL	4JA1 W/P	5	4	4	L
88	FAN	4JA1	5	4	5	L
88	FAN	4JA1	5	4	5	R
306	PULLEY SEAT	4G1 W/P	5	5	1	L
306	PULLEY SEAT	4G1 W/P	5	5	1	R
59	THROWER	4JA1 W/P	5	5	2	L
56	IMPELLER	4JBIT	5	5	2	R
68	VALVE	4JA1 R/V	5	5	3	L
66	BODY	4JA1 R/V	5	5	3	R
68	VALVE	4JA1 R/V	5	5	4	L
66	BODY	4JA1 R/V	5	5	4	R
88	FAN	4JA1	5	5	5	L
88	FAN	4JA1	5	5	5	R
58	SEAL UNIT	4JBIT	5	6	1	L
61	SPRING WASHER	4JA1 W/P	5	6	1	R
60	SET SCREW	4JA1 W/P	5	6	2	L
67	SPRING	4JA1 R/V	5	6	2	R
69	PLUG	4JA1 R/V	5	6	2	R
	Fifo		6	1	1	L
	Fifo		6	1	1	R
	Fifo		6	1	2	L
	Fifo		6	1	2	R
132	WHEEL	TD27	6	1	3	L
132	WHEEL	TD27	6	1	3	R
132	WHEEL	TD27	6	1	4	L
131	COVER	TD27	6	1	4	R
88	FAN	4JA1	6	1	5	L
88	FAN	4JA1	6	1	5	R
	Fifo		6	2	1	L
	Fifo		6	2	1	R
	Fifo		6	2	2	L
	Fifo		6	2	2	R
131	COVER	TD27	6	2	3	L
131	COVER	TD27	6	2	3	R
131	COVER	TD27	6	2	4	L
131	COVER	TD27	6	2	4	R
88	FAN	4JA1	6	2	5	L
88	FAN	4JA1	6	2	5	R
130	BODY	TD27	6	3	1	L
130	BODY	TD27	6	3	1	R
130	BODY	TD27	6	3	2	L
130	BODY	TD27	6	3	2	R
130	BODY	TD27	6	3	3	L
130	BODY	TD27	6	3	3	R
130	BODY	TD27	6	3	4	L

Part No.	Part Name	Model	Row	Column	Qty	Dir
131	COVER	TD27	6	3	4	R
88	FAN	4JA1	6	3	5	L
1	Free area		6	4	1	L
1	Free area		6	4	1	R
1	Free area		6	4	2	L
1	Free area		6	4	2	R
453	CASE	4G9E O/P	6	4	3	L
453	CASE	4G9E O/P	6	4	3	R
453	CASE	4G9E O/P	6	4	4	L
453	CASE	4G9E O/P	6	4	4	R
88	FAN	4JA1	6	4	5	L
88	FAN	4JA1	6	4	5	R
1	Free area		6	5	1	L
1	Free area		6	5	1	R
1	Free area		6	5	2	L
1	Free area		6	5	2	R
453	CASE	4G9E O/P	6	5	3	L
453	CASE	4G9E O/P	6	5	3	R
453	CASE	4G9E O/P	6	5	4	L
453	CASE	4G9E O/P	6	5	4	R
88	FAN	4JA1	6	5	5	L
88	FAN	4JA1	6	5	5	R
1	Free area		6	6	1	L
1	Free area		6	6	1	R
1	Free area		6	6	2	L
1	Free area		6	6	2	R
451	CASE ASSY O/P		6	6	3	L
451	CASE ASSY O/P		6	6	3	R
451	CASE ASSY O/P		6	6	4	L
451	CASE ASSY O/P		6	6	4	R
451	CASE ASSY O/P		6	6	5	L
451	CASE ASSY O/P		6	6	5	R
	Fifo		7	1	1	L
	Fifo		7	1	1	R
	Fifo		7	1	2	L
	Fifo		7	1	2	R
386	GEAR DRIVE	4M4 O/P	7	1	3	L
392	SHAFT DRIVEN	4M4 O/P	7	1	3	R
106	SHAFT DRIVE	BD25 O/P	7	1	4	L
128	COVER	BD25 O/P	7	1	4	R
	Fifo		7	2	1	L
	Fifo		7	2	1	R
	Fifo		7	2	2	L
	Fifo		7	2	2	R
393	SHAFT DRIVE	4M4 O/P	7	2	3	L
125	BODY	BD25 W/P	7	2	3	R
125	BODY	BD25 W/P	7	2	4	L
125	BODY	BD25 W/P	7	2	4	R
125	BODY	BD25 W/P	7	2	5	L
125	BODY	BD25 W/P	7	2	5	R
283	BODY	P-CAR W/P	7	3	1	L
283	BODY	P-CAR W/P	7	3	1	R
283	BODY	P-CAR W/P	7	3	2	L
283	BODY	P-CAR W/P	7	3	2	R

Part No.	Part Name	Code	Plc.	Column	Row	DIR.
256	COVER B/S GEAR	4JA1 O/P	7	3	3	L
267	PLUG TAPER		7	3	3	L
268	PIN DOWEL		7	3	3	L
270	BALL STEEL		7	3	3	L
271	BOLT	P-CAP O/P	7	3	3	R
78	ROTOR		7	3	4	L
76	CASE		7	3	4	L
77	COVER		7	3	4	L
100	BODY	BD25 O/P	7	3	4	R
127	BODY	BD25 O/P	7	3	5	L
129	WHEEL	BD25 O/P	7	3	5	R
255	CASE FRONT	P-CAR O/P	7	4	1	L
255	CASE FRONT	P-CAR O/P	7	4	1	R
255	CASE FRONT	P-CAR O/P	7	4	2	L
255	CASE FRONT	P-CAR O/P	7	4	2	R
284	HUB	P-CAP W/P	7	4	3	L
284	HUB	P-CAP W/P	7	4	3	R
33	SHAFT	4JA1 O/P	7	4	4	L
33	SHAFT	4JA1 O/P	7	4	4	R
35	SHAFT	4JA1 O/P	7	4	5	L
35	SHAFT	4JA1 O/P	7	4	5	R
55	CENTER	4JA1 W/P	7	5	1	L
55	CENTER	4JA1 W/P	7	5	1	R
25	COVER		7	5	2	L
32	GEAR	4JA1 O/P	7	5	2	R
32	GEAR	4JA1 O/P	7	5	3	L
282	BODY	4D56 W/P	7	5	3	R
453	CASE	4G9E O/P	7	5	4	L
453	CASE	4G9E O/P	7	5	4	R
453	CASE	4G9E O/P	7	5	5	L
453	CASE	4G9E O/P	7	5	5	R
279	BODY	4D56 W/P	7	6	1	L
430	CASE		7	6	1	R
279	BODY	4D56 W/P	7	6	2	L
431	CASE	4G1E O/P	7	6	2	R
282	BODY	4D56 W/P	7	6	3	L
105	GEAR DRIVE	BD25 O/P	7	6	3	R
368	REAR HEAD	AIR	8	1	1	L
368	REAR HEAD	AIR	8	1	1	R
367	CRANCK-SHAFT	AIR	8	1	2	L
367	CRANCK-SHAFT	AIR	8	1	2	R
237	BODY	2L-II	8	1	3	L
237	BODY	2L-II	8	1	3	R
558	BODY	4G1 W/P	8	1	4	L
558	BODY	4G1 W/P	8	1	4	R
558	BODY	4G1 W/P	8	1	5	L
558	BODY	4G1 W/P	8	1	5	R
369	CYLINDER	AIR	8	2	1	L
369	CYLINDER	AIR	8	2	1	R
213	FRONT COVER	MC O/P	8	2	2	L
215	COVER	MC O/P	8	2	2	R
210	FRONT COVER		8	2	3	L
238	BODY	2L-II	8	2	3	R
497	PACKING		8	2	4	L

Part No	Part Name	Model	Qty	Column	Qty	L/R
497	PACKING		8	2	4	R
497	PACKING		8	2	5	L
497	PACKING		8	2	5	R
497	PACKING		8	3	1	L
497	PACKING		8	3	1	R
497	PACKING		8	3	2	L
497	PACKING		8	3	2	R
497	PACKING		8	3	3	L
497	PACKING		8	3	3	R
497	PACKING		8	3	4	L
497	PACKING		8	3	4	R
497	PACKING		8	3	5	L
497	PACKING		8	4	1	L
497	PACKING		8	4	1	R
497	PACKING		8	4	2	L
497	PACKING		8	4	2	R
497	PACKING		8	4	3	L
497	PACKING		8	4	3	R
497	PACKING		8	4	4	L
497	PACKING		8	4	4	R
497	PACKING		8	4	5	L
497	PACKING		8	4	5	R
497	PACKING		8	5	1	L
497	PACKING		8	5	1	R
497	PACKING		8	5	2	L
497	PACKING		8	5	2	R
497	PACKING		8	5	3	L
497	PACKING		8	5	3	R
327	PULLEY SUB ASSY	4G9 W/P	11	1	1	R
327	PULLEY SUB ASSY	4G9 W/P	11	1	1	L
327	PULLEY SUB ASSY	4G9 W/P	11	1	2	R
14	SEAT SUB ASSY		11	1	2	L
289	SEAL SUB ASSY	BD25 W/P	11	1	3	R
323	VANE -OLD	4G9 W/P	11	1	3	L
323	VANE -OLD	4G9 W/P	11	1	4	R
328	BEARING	4G9 W/P	11	2	1	R
328	BEARING	4G9 W/P	11	2	1	L
449	FLANGE	4G1-E W/P	11	2	2	R
445	SEAL UNIT	4JA13W O/P	11	2	2	L
450	IMPELLER	4G1-E W/P	11	2	3	R
542	SMALL PART	4G9 W/P	11	2	3	L
436	ROTOR INNER	4G1-E O/P	11	3	1	R
437	ROTOR OUTER	4G1-E O/P	11	3	1	L
261	PLUG	P-CAP O/P	11	3	2	R
440	OIL SEAL	4G1E O/P	11	3	2	L
438	SCREW		11	3	3	R
433	SPRING		11	3	3	L
432	O-RING		11	3	4	R

APPENDIX 4**DETAILS OF ITEMS FROM VARIOUS SUPPLIERS**

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Supplier	Part No	Part Name	Model	R/P	Column	Row	L/R
ADS	210	FRONT COVER	MC O/P	8	2	3	L
ADS	210	FRONT COVER	MC O/P	8	2	2	L
AP	426	FLANGE	Y71 W/P	3	5	2	R
AP	66	BODY	4JA1 R/V	5	5	4	R
AP	66	BODY	4JA1 R/V	5	5	3	R
AP	306	PULLEY SEAT	4G1 W/P	5	5	1	R
AP	306	PULLEY SEAT	4G1 W/P	5	5	1	L
AP	449	FLANGE	4G1-E W/P	11	2	2	R
ASA	255	CASE FRONT	P-CAR O/P	7	4	2	R
ASA	451	CASE ASSY O/P		6	6	4	L
ASA	255	CASE FRONT	P-CAR O/P	7	4	1	L
ASA	255	CASE FRONT	P-CAR O/P	7	4	1	R
ASA	255	CASE FRONT	P-CAR O/P	7	4	2	L
ASA	451	CASE ASSY O/P		6	6	3	R
ASA	451	CASE ASSY O/P		6	6	4	R
ASA	451	CASE ASSY O/P		6	6	3	L
ASA	451	CASE ASSY O/P		6	6	5	L
ASA	431	CASE	4G1E O/P	7	6	2	R
ASA	283	BODY	P-CAR W/P	7	3	2	R
ASA	451	CASE ASSY O/P		6	6	5	R
ASA	283	BODY	P-CAR W/P	7	3	2	L
ASA	283	BODY	P-CAR W/P	7	3	1	R
ASA	283	BODY	P-CAR W/P	7	3	1	L
BEW	161	SHAFT ASSY	BD25 RS	3	3	2	L
BEW	161	SHAFT ASSY	BD25 RS	3	3	2	R
BTA	285	COVER	P-CAP W/P	4	4	2	L
BTA	43	STRAINER ASSY	4JA1 O/P	4	4	3	R
BTA	43	STRAINER ASSY	4JA1 O/P	4	4	3	L
CMM	80	SHAFT(BLACK)	4JA1 C/F	5	1	3	L
CMM	81	SHAFT(BLUE)	4JA1 C/F	5	1	2	R
CMM	80	SHAFT(BLACK)	4JA1 C/F	5	1	2	L
CMM	80	SHAFT(BLACK)	4JA1 C/F	5	1	4	L
DM	259	ROTOR INNER	P-CAP O/P	4	2	1	L
DM	327	PULLEY SUB ASSY	4G9 W/P	11	1	2	R
DM	327	PULLEY SUB ASSY	4G9 W/P	11	1	1	L
DM	327	PULLEY SUB ASSY	4G9 W/P	11	1	1	R
DM	260	ROTOR OUTER	P-CAP O/P	4	2	1	R
DM	259	ROTOR INNER	P-CAP O/P	4	2	2	L
DM	260	ROTOR OUTER	P-CAP O/P	4	2	2	R
DM	436	ROTOR INNER	4G1-E O/P	11	3	1	R
DM	437	ROTOR OUTER	4G1-E O/P	11	3	1	L
ICC	367	CRANCK-SHAFT	AIR	8	1	2	R
ICC	368	REAR HEAD	AIR	8	1	1	R
ICC	369	CYLINDER	AIR	8	2	1	R
ICC	369	CYLINDER	AIR	8	2	1	L
ICC	367	CRANCK-SHAFT	AIR	8	1	2	L
ICC	368	REAR HEAD	AIR	8	1	1	L
IFC	284	HUB	P-CAP W/P	7	4	3	R
IFC	284	HUB	P-CAP W/P	7	4	3	L
ITO	64	NIPPLE	4JA1 D/C	4	6	1	L
ITO	106	SHAFT DRIVE	BD25 O/P	7	1	4	L
ITO	63	PLUG	4JA1 D/C	4	6	1	L
ITO	69	PLUG	4JA1 R/V	5	6	2	R

Supplier	Part No	Part Name	Material	QTY	QTY	QTY	DIR
ITO	33	SHAFT	4JA1 O/P	7	4	4	L
ITO	33	SHAFT	4JA1 O/P	7	4	4	R
ITO	35	SHAFT	4JA1 O/P	7	4	5	L
ITO	35	SHAFT	4JA1 O/P	7	4	5	R
JBT	169	ROCKER VALVE		2	3	1	L
JBT	164	SUPT ROCKER-B		3	2	2	R
JBT	163	SUPT ROCKER-A	BD25 RS	3	2	3	L
JBT	170	ROCKER VALVE		2	3	1	L
KOYO	304	BEARING	4G1 W/P	5	4	2	R
KOYO	328	BEARING	4G9 W/P	11	2	1	R
KOYO	246	BEARING		2	1	2	L
KOYO	553	BEARING	5L-II W/P	4	6	1	R
KOYO	423	BEARING	Y71 W/P	3	5	2	L
KOYO	328	BEARING	4G9 W/P	11	2	1	L
KTH	323	VANE -OLD	4G9 W/P	11	1	3	L
KTH	133	VANE	BD25 W/P	3	1	2	L
KTH	141	HUB	BD25 W/P	3	1	2	R
KTH	251	SEAT PULLEY	5L-II W/P	4	6	2	R
KTH	251	SEAT PULLEY	5L-II W/P	4	6	2	L
KTH	323	VANE -OLD	4G9 W/P	11	1	4	R
KTH	56	IMPELLER	4JBIT	5	5	2	R
KTH	450	IMPELLER	4G1-E W/P	11	2	3	R
KTH	134	VANE	TD27 W/P	2	2	3	L
KTH	244	ROTOR	2L-II W/P	2	1	1	L
KTH	232	VANE	HF W/P	1	1	2	L
KTH	244	ROTOR	2L-II W/P	2	1	1	R
KTH	303	ROTOR	4G1 W/P	5	3	3	L
MSC	275	SLEEVE	P-CAP O/P	4	1	3	L
NHK	263	SPRING RELIEF	P-CAP O/P	4	2	4	R
NHK	40	SPRING	4JA1 O/P	4	4	1	R
NHK	67	SPRING	4JA1 R/V	5	6	2	R
NHK	166	SPRING OUTER	BD25 RS	3	2	2	L
NHK	165	SPRING INSIDE	BD25 RS	3	2	2	L
NHKG	272	GASKET		4	1	2	L
NSK	234	BEARING	HF W/P	1	1	2	R
NSK	79	BEARING	4JA1 C/F	5	1	1	L
NSK	137	BEARING UNIT	TD27 W/P	2	2	2	R
NSK	136	BEARING UNIT	BD25 W/P	3	1	1	R
NSK	145	BEARING	BD25 W/P	3	2	1	L
NSK	292	BEARING	P-CAP W/P	4	3	1	R
NSO	549	SEAL	4JA1 W/P	5	4	3	R
NSO	549	SEAL	4JA1 W/P	5	4	4	L
NSO	549	SEAL	4JA1 W/P	5	4	3	L
NSO	445	SEAL UNIT	4JA13W O/P	11	2	2	L
NSO	58	SEAL UNIT	4JBIT	5	6	1	L
P&SON	125	BODY	BD25 W/P	7	2	4	L
P&SON	125	BODY	BD25 W/P	7	2	3	R
P&SON	125	BODY	BD25 W/P	7	2	5	R
P&SON	125	BODY	BD25 W/P	7	2	4	R
P&SON	125	BODY	BD25 W/P	7	2	5	L
PCR	89	GASKET	4JA1 C/F	5	1	3	R
PR2	59	THROWER	4JA1 W/P	5	5	2	L
SGT	225	PLUG WELCH		1	1	1	R

SGT	152	PLATE		2	2	1	L
SGT	307	PLUG TIGHT	4G1 W/P	5	3	3	R
SGT	286	COVER	P-CAP W/P	4	3	3	R
SGT	140	PULLEY	BD25 W/P	3	1	4	R
SGT	293	PLUG	P-CAR	4	4	2	R
SGT	90	PLATE	4JA1 C/F	5	2	4	L
SGT	90	PLATE	4JA1 C/F	5	2	4	R
SGT	140	PULLEY	BD25 W/P	3	1	3	R
SMEC	103	GEAR DRIVING	BD 25 O/P	3	3	3	R
SMEC	273	GEAR B/S DRIVE	P-CAP O/P	4	1	1	L
SMEC	105	GEAR DRIVE	BD25 O/P	7	6	3	R
SMEC	103	GEAR DRIVING	BD 25 O/P	3	4	3	L
SMEC	37	PINION GEAR	4JA1 O/P	4	5	2	R
SMEC	274	GEAR B/S DRIVEN	P-CAP O/P	4	1	1	R
SMEC	37	PINION GEAR	4JA1 O/P	4	5	3	R
SMTE	32	GEAR	4JA1 O/P	7	5	3	L
SMTE	32	GEAR	4JA1 O/P	7	5	2	R
SNF	55	CENTER	4JA1 W/P	7	5	1	L
SNF	55	CENTER	4JA1 W/P	7	5	1	R
SSI	288	GASKET	P-CAP W/P	4	3	4	L
SW	41	SPRING SEAT	4JA1 O/P	4	4	1	R
TAC	271	BOLT	P-CAP O/P	4	1	2	L
TAC	271	BOLT	P-CAP O/P	7	3	3	R
TAP	130	BODY	TD27	6	3	1	L
TAP	130	BODY	TD27	6	3	2	L
TAP	130	BODY	TD27	6	3	1	R
TAP	131	COVER	TD27	6	2	4	R
TAP	131	COVER	TD27	6	2	4	L
TAP	131	COVER	TD27	6	2	3	R
TAP	131	COVER	TD27	6	2	3	L
TAP	131	COVER	TD27	6	1	4	R
TAP	132	WHEEL	TD27	6	1	4	L
TAP	132	WHEEL	TD27	6	1	3	L
TAP	217	GEAR OUTER	HF O/P, MC	1	1	1	L
TAP	132	WHEEL	TD27	6	1	3	R
TAP	179	NUT	TD27 RS	2	3	4	R
TAP	183	TIP		2	3	1	R
TAP	130	BODY	TD27	6	3	3	L
TAP	78	ROTOR		7	3	4	L
TAP	130	BODY	TD27	6	3	2	R
TAP	77	COVER		7	3	4	L
TAP	127	BODY	BD25 O/P	7	3	5	L
TAP	179	NUT	TD27 RS	2	3	4	L
TAP	183	TIP		2	3	2	L
TAP	168	ROCKER VALVE	BD25 RS	3	3	4	R
TAP	168	ROCKER VALVE	BD25 RS	3	3	4	L
TAP	168	ROCKER VALVE	BD25 RS	3	3	3	L
TAP	167	ROCKER VALVE	BD25 RS	3	2	4	R
TAP	167	ROCKER VALVE	BD25 RS	3	2	4	L
TAP	128	COVER	BD25 O/P	7	1	4	R
TAP	76	CASE		7	3	4	L
TAP	129	WHEEL	BD25 O/P	7	3	5	R
TAP	130	BODY	TD27	6	3	3	R

TAP	130	BODY	TD27	6	3	4	L
TAP	131	COVER	TD27	6	3	4	R
TAP	181	SCREW ADJ		2	3	2	R
TAP	216	GEAR INNER	HF O/P, MC	1	1	1	L
TEP	25	COVER		7	5	2	L
TEP	256	COVER B/S GEAR	4JA1 O/P	7	3	3	L
TEP	258	COVER	P-CAP O/P	4	3	3	L
TEP	258	COVER	P-CAP O/P	4	3	2	L
TEP	258	COVER	P-CAP O/P	4	3	1	L
TEP	258	COVER	P-CAP O/P	4	2	3	R
TEP	237	BODY	2L-II	8	1	3	L
TEP	237	BODY	2L-II	8	1	3	R
TEP	558	BODY	4G1 W/P	8	1	4	L
TEP	558	BODY	4G1 W/P	8	1	4	R
TEP	215	COVER	MC O/P	8	2	2	R
TEP	258	COVER	P-CAP O/P	4	2	4	L
TEP	100	BODY	BD25 O/P	7	3	4	R
TEP	558	BODY	4G1 W/P	8	1	5	L
TEP	558	BODY	4G1 W/P	8	1	5	R
TSS	46	BOLT	4JA1 O/P	4	5	2	L
TSS	266	SCREW	P-CAP O/P	4	1	2	R
TSS	438	SCREW		11	3	3	R
TSS	438	SCREW		11	3	3	R
TSS	295	SCREWS	P-CAP O/P	4	3	2	R
TSS	47	BOLT		4	5	1	R
TSS	46	BOLT	4JA1 O/P	4	5	3	L
TSS	266	SCREW	P-CAP O/P	4	1	2	R
TSS	60	SET SCREW	4JA1 W/P	5	6	2	L

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BIOGRAPHY

Teerapoj Charojrochkul was born on the 15th February 1977 in Bangkok. He obtained his B.Eng. from Chulalongkorn University (Industrial Engineering) in 1997. He then pursues a further study in a Master Degree course at the Regional Centre for Manufacturing Systems Engineering, Faculty of Engineering, Chulalongkorn University.



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