TROUBLE SHOOTING GUIDE
For The
W & WD 300 & 400 Series Winch

The following data is presented as an aid to locating the source of difficulty in a malfunctioning unit. It is necessary to consider the torque converter charging pump, transmission, oil cooler (if applicable) and connecting lines as a complete system when running down the source of trouble since the proper operation of any unit therein depends greatly on the condition and operations of the others. By studying the principles of operation together with data in this section, it may be possible to correct any malfunction which may occur in the system.

TROUBLE SHOOTING PROCEDURE BASICALLY CONSISTS OF TWO CLASSIFICATIONS: MECHANICAL AND HYDRAULIC.

MECHANICAL CHECKS

Prior to checking any part of the system from a hydraulic standpoint, the following mechanical checks should be made:

1. A check should be made to be sure all control lever linkage is properly connected and adjusted at all connecting points.
2. Check control levers and rods for binding or restrictions in travel that would prevent full engagement. Shift levers by hand at control valve; if full engagement cannot be obtained, difficulty may be in control valve assembly.

HYDRAULIC CHECKS

Before checking hydraulic system for pressures and rates of oil flow, it is essential that the following preliminary checks be made:

Check oil level in transmission or reservoir. This should be done with oil temperatures of 180 to 200° F. (82, 2-93, 3° C). DO NOT ATTEMPT THESE CHECKS WITH COLD OIL. To bring the oil temperature to this specification, it is necessary to either work the machine or "stall" out the converter. Where the former means is impractical, the latter means should be employed as follows:

Engage shift levers in forward and high speed and apply brakes. Accelerate engine half to three-quarter throttle.

Hold stall until desired converter outlet temperature is reached. **CAUTION:** FULL THROTTLE STALL SPEEDS FOR AN EXCESSIVE LENGTH OF TIME WILL OVERHEAT THE CONVERTER.

PROBLEM	REASON	REMEDY
The winch does not have enough power.	The oil is too low.	Add transmission oil to the correct level.
	The hydraulic pump does not work.	Replace the pump.
	There is a leak in the hoses, tubes or fittings. Air is entering the system.	Make a check of the hoses. Repair, replace or tighten them where necessary.
	The transmission suction screen is plugged.	Clean the suction screen. Determine cause.
	The input clutch discs are worn.	Replace the disc. Determine cause.
	The freespool clutch is slipping. Oil seals are leaking to the clutch discs.	Replace the oil seals and clutch discs.
	The input clutch is slipping. Pressure at the input clutch is below normal.	Make a pressure check on the transmission, if applicable. Determine the cause of low pressure and correct.
	The input clutch is slipping. The piston seals are damaged and oil does not actuate the clutch.	Replace the inner and outer piston seals.

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MAINTENANCE AND SERVICE

The instructions contained herein cover the disassembly and reassembly of the winch in a sequence that would normally be followed after the unit has been removed from the machine and is to be completely overhauled. It must also be understood that this is a basic winch with many options. Procedures in this manual cover the W and WD winch. The units are very similar to trouble shoot, disassemble, repair and reassemble.

CAUTION: Cleanliness is of extreme importance and an absolute must in the repair and overhaul of this unit. Before attempting any repairs, the exterior of the unit must be thoroughly cleaned to prevent the possibility of dirt and foreign matter entering the mechanism.

NOTE: Before disassembly of the winch, determine if the winch has counterclockwise input rotation or clockwise input rotation as viewed from the input side of the winch.

DISASSEMBLY

HOW TO REMOVE THE CABLE DRUM COVER.

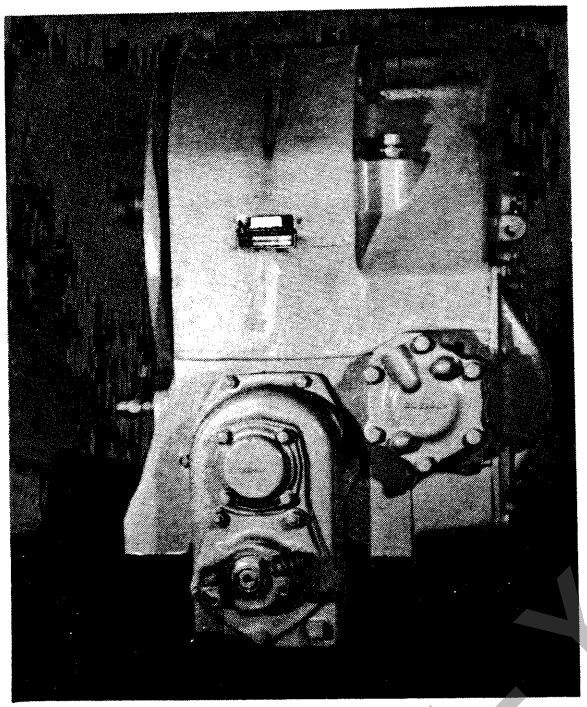


Figure 1

Input side of a WD series winch.

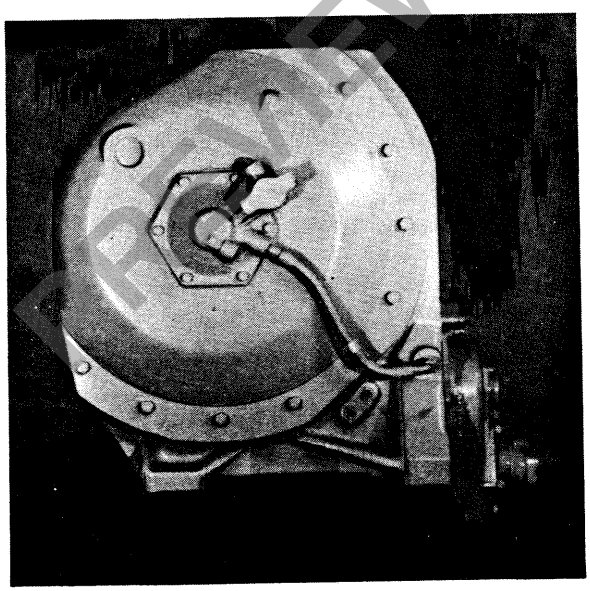


Figure 2

Winch from the right side of the machine.

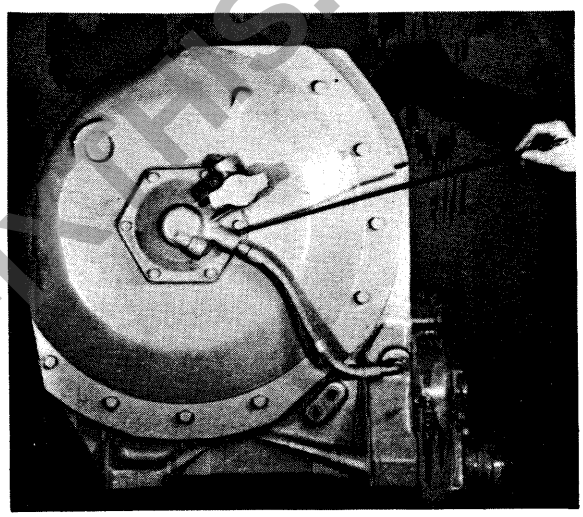


Figure 3

Remove the drain hose assembly and the bearing cap.

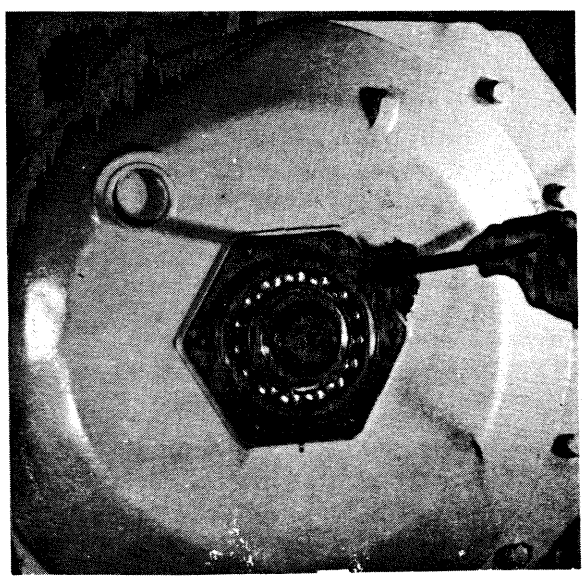
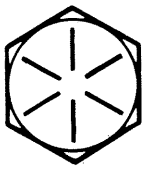


Figure 4

Remove the wear button from the cable drum cover.

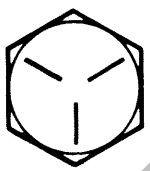
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GRADE 8

TORQUE SPECIFICATIONS

	Dry Type Threads			Lubricated or Plated Type Threads		
COARSE THREADS	lbf. ft.	kgm f/m	N.M.	lbf.ft.	kgm f/m	N.M.
1/4" - 20	11 - 12	1.5	15 - 16	8 - 10	1	11 - 13
5/16" - 18	20 - 28	3 - 4	27 - 38	26 - 30	3.5 - 4	35 - 40
3/8" - 16	44 - 48	6 - 6.5	60 - 65	33 - 36	4.5 - 5	45 - 49
7/16" - 14	70 - 77	10 - 11	95 - 104	52 - 57	7 - 8	71 - 77
1/2" - 13	106 - 117	14 - 16	144 - 158	80 - 88	11 - 12	109 - 119
9/16" - 12	153 - 168	21 - 23	208 - 228	115 - 127	16 - 18	156 - 172
5/8" - 11	212 - 233	29 - 32	288 - 316	159 - 175	22 - 24	216 - 237
3/4" - 10	376 - 414	52 - 57	510 - 561	282 - 310	39 - 43	393 - 420
7/8" - 9	606 - 667	84 - 92	822 - 904	455 - 501	63 - 69	617 - 679
1" - 8	909 - 1000	126 - 138	1233 - 1355	682 - 750	94 - 104	925 - 1016
1-1/8" - 7	1288 - 1417	178 - 196	1746 - 1921	966 - 1062	135 - 146	1310 - 1441
1-1/4" - 7	1817 - 1999	251 - 277	2464 - 2710	136 - 1496	188 - 207	1844 - 2027
FINE THREADS						
1/4" - 28	13 - 14	2	18 - 19	10 - 13	1 - 2	14 - 17
5/16: - 24	23 - 28	2 - 4	31 - 38	18 - 25	2.5 - 3.5	25 - 33
3/8" - 24	49 - 54	7 - 7.5	67 - 73	37 - 41	5 - 5.5	50 - 55
7/16" - 20	78 - 86	11 - 12	106 - 116	58 - 64	8 - 9	79 - 86
1/2" - 20	120 - 132	16 - 18	163 - 179	90 - 99	12.5 - 13.5	122 - 134
9/16" - 18	171 - 188	24 - 26	232 - 255	128 - 141	18 - 19	174 - 191
5/8" - 18	240 - 264	33 - 36	326 - 258	180 - 198	25 - 27	244 - 268
3/4" - 16	420 - 262	58 - 64	570 - 626	315 - 247	44 - 48	427 - 470
7/8" - 14	668 - 735	92 - 102	906 - 996	501 - 550	69 - 76	679 - 745
1" - 12	995 - 1096	137 - 150	1359 - 1486	746 - 821	103 - 113	1012 - 1613
1-1/8" - 12	1445 - 1590	200 - 220	1960 - 2155	1083 - 1191	150 - 165	1469 - 1613
1-1/4" - 12	2012 - 2213	278 - 305	2728 - 2997	1509 - 1660	208 - 229	2046 - 2250



GRADE 5

TORQUE SPECIFICATIONS

	Dry Type Threads			Lubricated or Plated Type Threads		
COARSE THREADS	lbf.ft.	kgm f/m	N. M.	lbf.ft	kgm f/m	N. M.
1/4" - 20	7 - 8	1	10 - 11	8 - 10	1	11 - 13
5/16" - 18	14 - 18	2 - 2.5	19 - 24	10 - 15	1 - 2	13 - 20
3/8" - 16	31 - 34	4 - 4.5	42 - 46	23 - 25	3 - 4	31 - 34
7/16" - 14	49 - 54	7 - 8	66 - 73	37 - 41	5 - 6	50 - 55
1/2" - 13	75 - 83	10 - 11	102 - 112	57 - 63	8 - 9	77 - 85
9/16" - 12	109 - 120	15 - 16	148 - 162	82 - 90	12 - 13	111 - 122
5/8" - 11	150 - 165	21 - 23	204 - 223	113 - 124	16 - 17	152 - 168
3/4" - 10	266 - 293	37 - 40	360 - 397	200 - 220	28 - 30	271 - 298
7/8" - 9	394 - 433	54 - 60	535 - 586	296 - 326	41 - 45	402 - 441
1" - 8	591 - 649	82 - 90	802 - 879	443 - 489	61 - 67	601 - 663
1-1/8" - 7	794 - 873	110 - 121	1077 - 1183	596 - 656	82 - 90	808 - 889
1-1/4" - 7	1120 - 1232	155 - 170	1519 - 1670	840 - 924	116 - 128	1139 - 1252

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WINCH CABLE DRUM DRIVE SHAFT AND CLUTCH
W AND WD 311 AND 400 SERIES WINCHES

Item	Description	Qty.
201	Tag, warning	1
202	Screw, mounting, tag	2
203	Set Screw	1
204	Spring, lock, adjusting bolt	1
205	Lock, bolt, adjusting	1
206	Wear, button, free spool spring	1
207	Spring, adjusting free spool, bolt	1
208	Bolt, adjusting, free spool	1
209	Bolt, mounting, bearing cup	6
210	Lkwshr., mounting, bearing cup	6
211	Cap, bearing, clutch release support	1
212	Gasket, clutch release support bearing cap	1
213	Ring, piston drum release support	1
214	Ring, retaining, bearing	1
215	Bearing, cable drum support	1
216	Plug, housing	1
217	Bolt, mtg., cable drum cover	10
218	Lkwshr., mtg., cable drum cover	10
219	Cover, cable drum	1
220	Seal, oil, cable drum cover	1
221	Sleeve, wear (See Item 225)	1
222	Split ring, clutch shaft support	2
223	Bolt, mtg., cable drum to support	8
224	Lkwshr, mtg., cable drum to support	8
225	Support, cable drum (Incl. 221)	1
226	Spring, clutch drive - outer	6
227	Spring, clutch drive - inner	6
228	Piston, drum release clutch	1
229	Seal, clutch shaft & release plate	1
230	O-Ring, piston	2
231	Seal, drum release support	2
232	Plug, pipe, clutch shaft	1
233	Clutch shaft & release plate assy (Incl.232)	1
234	Plug, piston bore	1
235	O-Ring, piston bore plug	1
236	Ring, retaining, piston bore plug	1
237	Bolt, mtg., cable drum to hub	8
238	Lkwshr, mtg., cable drum to hub	8
239	Sleeve, wear, cable drum hub support	1
240	Support, cable drum hub (Incl.239)	1
241	Drum, cable	1
242	Seal, oil, drum hub bearing retainer	1
243	Hub & washer assy	1
244	Ring, retaining, clutch hub	1
245	Disc, clutch - outer	18
245A	Disc, clutch - outer	19
246	Spring, separator, free spool clutch	12
247	Disc, clutch - inner	16
247A	Disc, clutch - inner	18
248	Bolt, mtg., cable drum support	8
249	Lkwshr, mtg., cable drum support	8
250	Seal, oil, drum hub	1
251	Ring, snap, bearing	1
252	Bearing, hub, cable drum	1
253	Support, cable drum	1
254	O-Ring, cable drum	1
255	Ring, snap, cable drum support	1
256	Shaft, cable drum support	1
257	Bearing, drive shaft front	1
258	Gear, cable drum drive	1
259	Bearing, drive shaft rear	1
260	Ring, retaining, front bearing	1
261	Drain hose assy.	1
262	Adapter, drain hose	2
263	Case, winch	1
263A†	Nameplate	1
263B†	Screw, nameplate	2
264	Ring, locating, rear bearing	1
265	Gasket, cable drum drive shaft cover	1
266	Tube, drive shaft oil	1
267	Plug, pipe, cable drum drive shaft cover	1
268	Cover, cable drum drive shaft	1
269	Lkwshr, mtg., drive shaft cover	6
270	Bolt, mtg., drive shaft cover	6
271	Nut, hex 3/8", steel, unf.	2
272	Lkwshr, 3/8"	2
273	Stud, 3/8" x 1-9/16"	2
274	Retainer, cable, 400 Series	1
275	Screw, countersunk head, 400 Series	2
276	Plug, check	1
277	Lkwshr, 1/4"	2

† not illustrated

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PROBLEM	REASON	REMEDY
The winch will not pull in the load. Winch operation is slow or uneven.	The clutch oil pressure is low.	Make a pressure check on the transmission, if applicable. Determine the cause of low pressure and correct.
	The hoses are not correctly installed.	Make a check of all hoses and connections.
	There is a malfunction in the control valve.	Make a check of the control valve.
	The pinion sprag is installed backwards.	Remove the sprag, reverse it and install it.
	The discs for the free spool clutch are worn.	Replace the clutch discs.
	The free spool clutch is slipping. Oil seals are leaking oil to the clutch discs.	Replace the oil seals and clutch discs. Discs must be clean and dry to function properly.
	The pinion brake will not disengage.	Make a check of the piston, guide pins and brake disc. Repair or replace parts as necessary.
	The discs for the free spool clutch are installed without the correct shim.	Make a check for the correct shim dimensions. Install the correct shims.
The winch will not hold a load.	The free spool clutch is slipping. The clutch discs are worn.	Replace the clutch discs.
	The free spool clutch is slipping. The oil seals are leaking oil to the clutch discs.	Replace the oil seals and clutch discs. Discs must be clean and dry to function properly.
	The control valve linkage is damaged, worn or incorrectly installed.	Repair or replace the linkage as necessary.
	The hoses from the control valve to the winch are incorrectly installed.	See that the hoses are correctly installed.
	The cable is slipping and will not wind onto the drum.	The ferrule is not fastened to the drum correctly. Install the ferrule in the drum.
	The pinion sprag does not hold.	Remove any foreign matter from the sprag. See if the sprag is assembled correctly.
The winch will not operate in the free spool position.	There is a leak or restriction in the hose to the free spool clutch.	Make a check for leaks or restructions in the hose.
	There is damage or wear to the piston shaft seals in the free spool clutch.	Replace the seals.
	The handle for adjusting free spool tension is too tight.	See if the wear button is in good condition and free. Adjust the handle.

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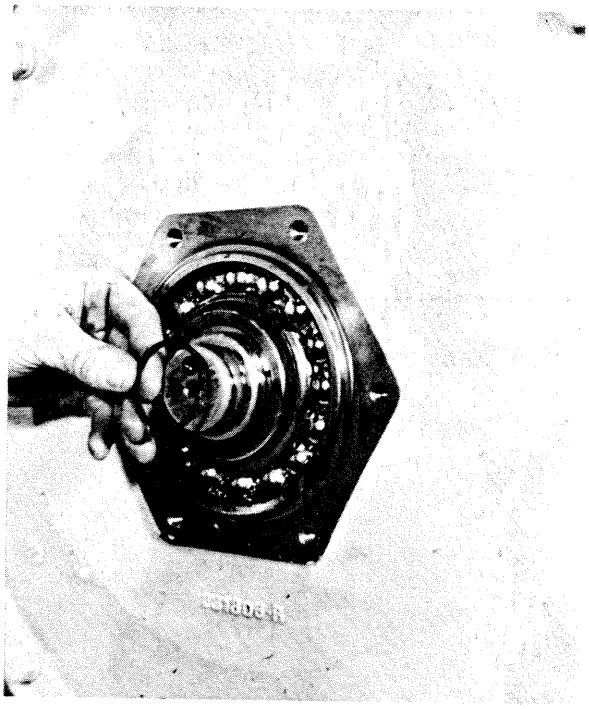


Figure 5

Remove the lock type oil sealing ring from shaft.



Figure 6

Remove the snap ring that holds the bearing.

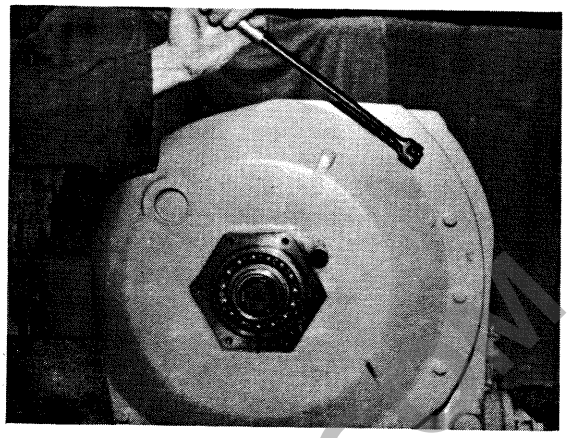


Figure 7

Remove the capscrews that hold the cable drum cover. Use a pry bar to pull the cover 3/8" (9.4 mm) away from the winch housing.

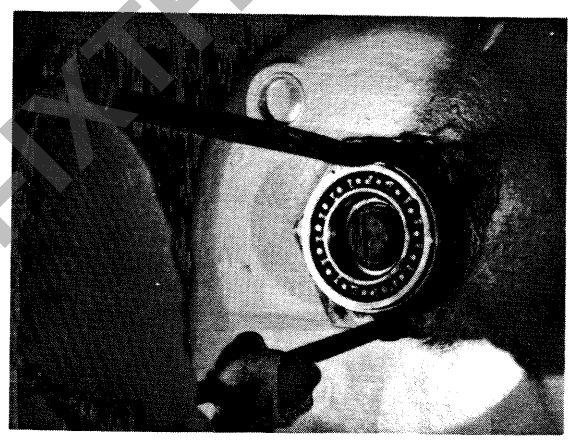


Figure 8

Give support to the cable drum with a hoist and chain or cable. Push the cover back in place so you can see the snap ring around the bearing. Remove the bearing with two pry bars or a bearing puller tool.

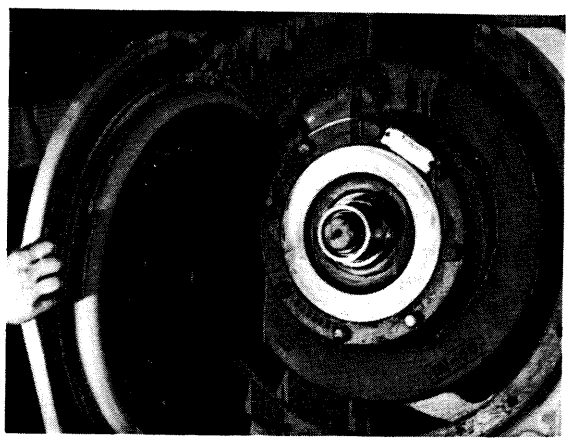
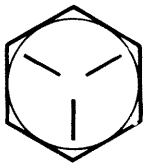


Figure 9

Remove the cable drum cover.

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GRADE 5

TORQUE SPECIFICATIONS

FINE	Dry Type Threads			Lubricated or Plated Type Threads		
THREADS	lbf. ft.	kgm f/m	N.M.	lbf.ft.	kgm f/m	N.M.
1/4" - 28	9 - 10	1	12 - 13	9 - 10	1	12 - 13
5/16" - 24	17 - 22	2 - 3	23 - 29	16 - 20	2 - 3	21 - 27
3/8" - 24	35 - 39	4 - 5	48 - 53	26 - 29	3 - 4	35 - 39
7/16" - 20	55 - 61	7 - 8	75 - 83	41 - 45	5 - 6	56 - 61
1/2" - 20	85 - 94	12 - 13	116 - 127	64 - 70	9 - 10	87 - 95
9/16" - 18	121 - 133	17 - 18	164 - 180	91 - 100	12 - 13	124 - 135
5/8" - 18	170 - 187	23 - 26	231 - 253	128 - 141	18 - 19	174 - 191
3/4" - 16	297 - 327	41 - 45	403 - 443	223 - 245	31 - 33	303 - 332
7/8" - 14	434 - 477	60 - 66	589 - 646	326 - 359	45 - 49	442 - 486
1" - 12	646 - 711	89 - 98	876 - 712	484 - 534	66 - 73	657 - 724
1-1/8"	891 - 980	123 - 135	1208 - 1328	668 - 735	92 - 101	906 - 996
1-1/4" - 12	1240 - 1364	171 - 189	1682 - 1849	931 - 1024	129 - 132	1262 - 1387

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WINCH CABLE DRUM DRIVE SHAFT AND CLUTCH
MODEL W AND WD 300 SERIES

Item	Description	Qty.
201	Tag, warning	1
202	Screw, mounting, tag	2
203	Screw, set	1
204	Spring, lock, adjusting bolt	1
205	Lock, bolt, adjusting	1
206	Wear, button, free spool spring	1
207	Spring, adjusting free spool, bolt	1
208	Bolt, adjusting, free spool	1
209	Bolt, mounting, bearing cap	6
210	Lkwshr., mounting, bearing cap	6
211	Cap, bearing, clutch release support	1
212	Gasket, clutch release support bearing cap	1
213	Ring, piston drum release support	1
214	Ring, retaining, bearing	1
215	Bearing, cable drum support	1
216	Plug, cover, cable drum	1
217	Bolt, mtg., cable drum cover	15
218	Lkwshr., mtg., cable drum cover	15
219	Cover, cable drum	1
220	Seal, oil, cable drum cover	1
221	Sleeve, wear, cable drum support	1
222	Split ring, clutch shaft support	2
223	Bolt, mtg., cable drum support	8
224	Lkwshr, mtg., cable drum support	8
225	Support, cable drum (Incl. 221)	1
226	Spring, clutch drive - outer	6
227	Spring, clutch drive - inner	6
228	Piston, drum release clutch	1
229	Seal, clutch shaft & release plate	1
230	O-Ring, piston	2
231	Seal, drum release support	2
232	Plug, pipe, clutch shaft	1
233	Clutch shaft & release plate (Incl.231)	1
234	Plug, piston bore	1
235	O-Ring, piston bore plug	1
236	Ring, retaining, piston bore plug	1
237	Bolt, mtg., cable drum to hub	8
238	Lkwshr, mtg., cable drum to hub	8
239	Sleeve, wear, cable drum hub support	1
239	Sleeve, wear, cable drum hub support	1
240	Support, cable drum hub (Incl.236)	1
241	Drum, cable	1
242	Seal, oil, drum hub bearing retainer	1
243	Hub & washer assy	1
244	Ring, retaining, clutch hub	1
245	Disc, clutch - outer	14
246	Disc, clutch - inner	11
247	Bolt, mtg., cable drum support	8
248	Lkwshr, mtg., cable drum support	8
249	Seal, oil, drum hub	1
250	Ring, snap, bearing	1
251	Bearing, hub, cable drum	1
252	Support, cable drum	1
253	O-Ring, cable drum support	1
254	Ring, snap, cable drum support	1
255	Shaft, cable drum support	1
256	Bearing, drive shaft - front	1
257	Gear, cable drum drive	1
258	Bearing, drive shaft - rear	1
259	Ring, retaining, front bearing	1
260	Drain hose assy.	1
261	Adapter, drain hose	1
262	Case, winch	1
262A	†Nameplate	1
262B	†Screw, mounting nameplate	2
263	Ring, locating, rear bearing	1
264	Gasket, cable drum drive shaft cover	1
265	Tube, drive shaft oil	1
266	Plug, pipe, cable drum shaft cover	1
267	Cover, cable drum drive shaft	1
268	Lkwshr, mtg., drive shaft cover	6
269	Bolt, mtg., drive shaft cover	6
270		
271	Nut, hex 3/8", steel, nf	2
272	Lockwasher, 3/8"	2
273	Stud	2
274		
275		
276	Plug, check	1

† not illustrated

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