

INSTRUCTIONS AND REPAIR PART LIST

for

REVERSIBLE MULTI-VANE DRILLS

SIZES 33H, 33SH, 33J, 33SJ, 33J4, 33SK, 33K4,
33SM, 33M4 and 33N4
Over Serial 40,000

MULTI-VANE WOODBORERS

SIZES 33W and 33SKW
Over Serial 40,000

and

REVERSIBLE BASE-MOUNTED MULTI-VANE MOTORS

SIZES 33H51, 33J51, 33SK51 and 33SM51

LUBRICATION

After each four hours of operation, unless an air line lubricator is used, unscrew the Oil Chamber Plug (19 or 211) and fill the chamber in the Back Head (15 or 210) with Ingersoll-Rand Pneu-Lube Medium Oil No. 50 or a good quality S.A.E. 20 or 20W Motor Oil.

Weekly, or as experience dictates, insert Ingersoll-Rand Light Grease No. 28 or a good quality No. 2 Cup Grease through the Grease Fittings (16, 103 or 213). Pump 2 or 3 strokes of grease from the No. P25-228 Grease Gun into each Fitting.

Occasionally, squirt 2 or 3 drops of light oil into the oil hole in the Throttle Sleeve (63 or 236).

An air line lubricator is recommended for use with all Multi-Vane Tools.

OILER ADJUSTMENT

Hold a piece of paper close to the exhaust port and operate the Drill for about 30 seconds. If a film of oil is collected on the paper, the built-in lubricator is properly adjusted. If no oil is collected, or if an excessive amount is emitted, remove the Back Head (15 or 210) and turn either or both of the Oiler Adjusting Screws (17). Turn the Screws in to decrease the oil flow; back them out to increase the oil flow. Caution: Never back out either Screw beyond the Back Head. If sufficient oil flow is not obtained before the screw heads are flush with this face, the Oiler Felts (18) are clogged; install new Felts.

HOW TO ORDER

Order all repair parts for your Ingersoll-Rand Tool by the **NAME** and **NUMBER** shown in the Repair Part List section. **Never** use the illustration numbers which appear in the first column.

For prompt service and genuine I-R parts, place orders with the nearest Ingersoll-Rand Branch Office.

Notice: The use of other than genuine Ingersoll-Rand replacement parts may result in decreased tool performance and increased maintenance, and may, at the Company's option, invalidate all warranties.

For Parts Call Tools Renewed 800-247-3639 Fax 860-665-9821

MAINTENANCE INSTRUCTIONS

Keep the air strainer clean. Periodically, as experience dictates, unscrew the Air Strainer Body (69 or 246) from the Air Strainer Cap (66 or 244) and wash the Air Strainer Screen (67 or 243) in kerosene. Enter the prongs on the Screen Support (67 or 245) into one end of the Screen and insert the Screen, support end first, into the Body when assembling the strainer.

The external thread on the Outer Feed Screw (43) or Motor Mounting Stud (217) is left-hand; rotate the Feed Screw Cap (72) or Motor Mounting Stud Cap (218) clockwise to remove.

Do not pry the Back Head (15 or 210) from the Motor Housing (1, 200 or 202). Grasp the Oil Chamber Plug (19 or 211) in a vise and pull on the Housing if the Back Head cannot be lifted off with the fingers.

The Rotor (33) is tapped left-hand; rotate the Governor Assembly clockwise to remove.

Never clamp the Cylinder (41) in a vise. When disassembling the motor, grasp the Cylinder in one hand. Insert a small rod into the rotor bore and drive the hub on the Rotor (33) out of the Rear Rotor Bearing (36). Support the Front End Plate (39) and press the rotor front hub out of the Front Rotor Bearing (37).

Press the Rear Rotor Bearing (36), shielded side first, into the recess in the Rear End Plate (38) with an arbor that will contact only the bearing outer ring. Press on the bearing inner ring when installing this assembly on the hub of the Rotor (33).

Press the Front Rotor Bearing (37), shielded side first, onto the front hub of the Rotor (33) with a sleeve that will clear the pinion and contact only the bearing inner ring.

After installing one End Plate (38 or 39) and Rotor Bearing (36 or 37) on the rotor hub, insert a Vane (40) into each vane slot in the Rotor (33). Place the Cylinder (41) over the Rotor and against the installed End Plate being sure the Cylinder is positioned with its flatted rim toward the pinion end of the Rotor so that the flats will coincide with those on the Front End Plate (39) when the motor is assembled.

Be sure both rubber Air Port Gaskets (8) are in good condition and are positioned, lip side first, in the air port in the Motor Housing (1, 200 or 202) before installing the Multi-Vane motor in the Motor Housing.

Draw the Back Head (15 or 210) evenly against the Back Head Gasket (14) on the face of the Motor Housing (1, 200 or 202) by turning each Back Head Cap Screw (22 or 23) a little at a time until all are tight.

NOTE: The two sets of Housing Stud, Nut and Lock Washer have been replaced with two additional Back Head Short Cap Screws (22) using Copper Washers (24A).

If the Housing Studs should need replacing in an old Motor Housing (1, 200 or 202), order two Back Head Short Cap Screws R3H-57 and two Copper Washers DLC-504B.

Note the stamping "THRUST HERE" on one side of the Spindle Thrust Bearing (92). Install the Bearing unstamped side first on the spindle hub.

Remove the Throttle Body Set Screw (53) or Forward Inlet Stud Set Screw (204) from the side of the Motor Housing (1, 200 or 202) before attempting to pull the Throttle Body (55) or Forward Inlet Stud (203) from the Motor Housing.

For Drills and Motors with spur gearing:

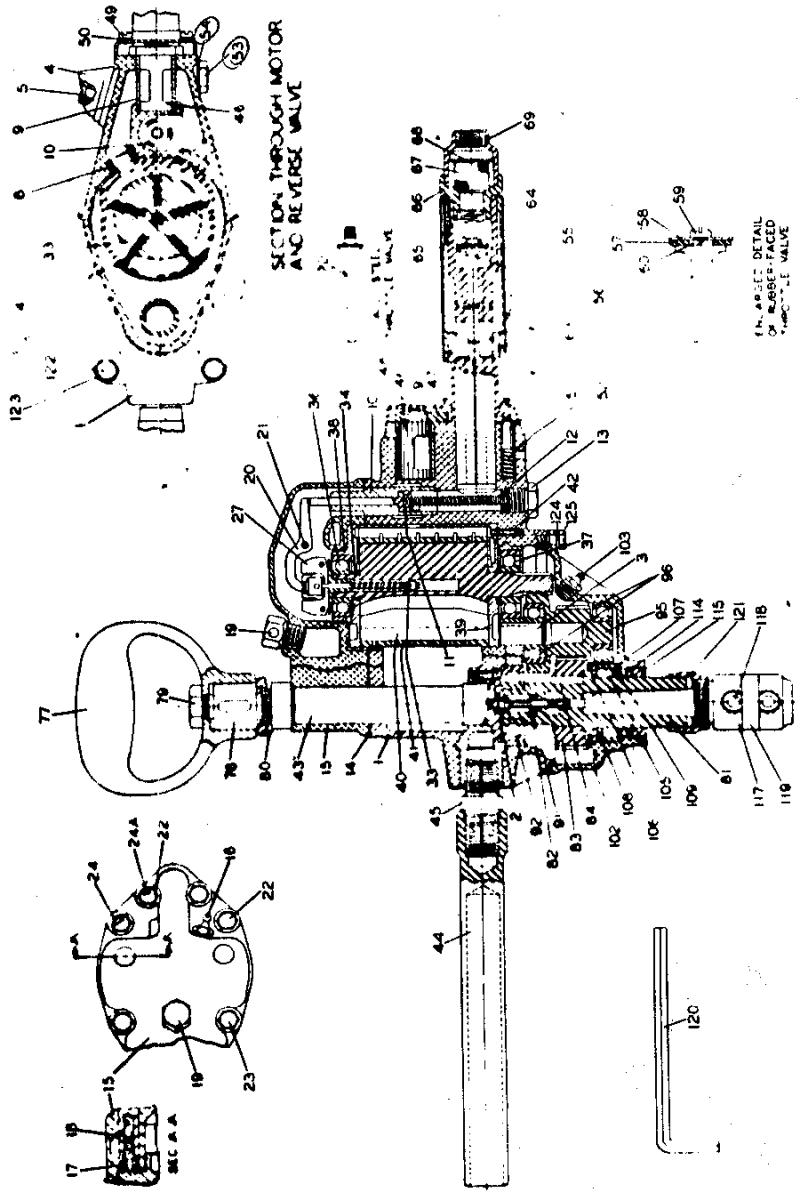
Install an Intermediate Gear Bearing (96) at each end of the Intermediate Gear (95). Mesh the small gear of the compound Intermediate Gear with the gear on the Spindle (81 or 208) and install the spindle assembly and Intermediate Gear simultaneously in either the Gear Case (102 or 212) or the Motor Housing (1, 200 or 202).

For Drills and Motors with planetary gearing:

Unscrew the three Planet Gear Frame Set Screws (86) from the Planet Gear Frame (85) before attempting to press the Spindle (81 or 208) out of the Planet Gear Frame.

Assemble the Spindle (81 or 208) and gearing in the Gear Case (102) and Gear Case Cover (113 or 214). Install this assembly as a unit on the Motor Housing (1, 200 or 202).

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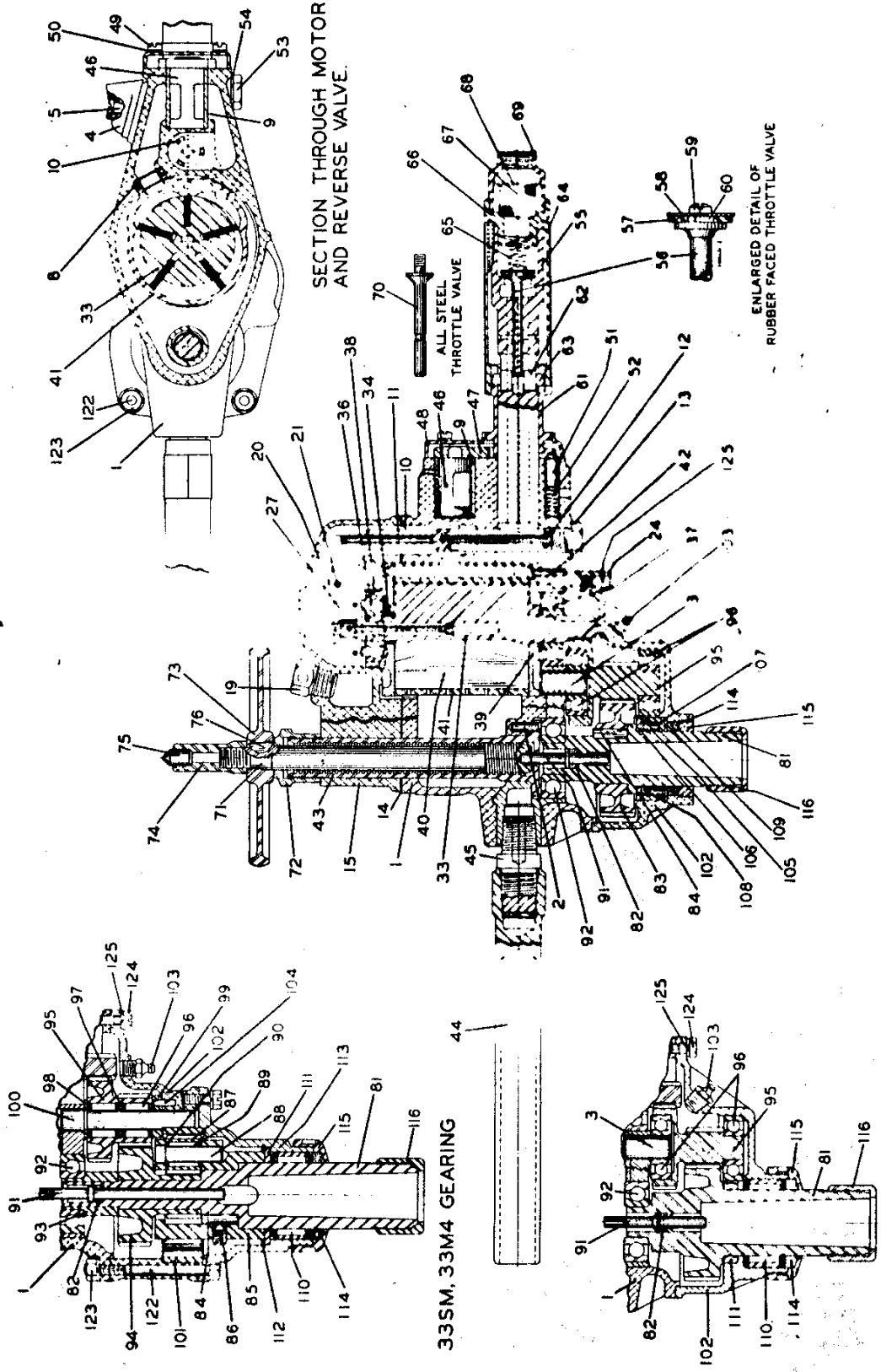
Size 33W Woodborer

For Parts Call Tools Renewed 800-247-3639 Fax 860-665-9821

ILLUS. NUMBER (Do Not Use For Ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING	ILLUS. NUMBER (Do Not Use For Ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING
1	Motor Housing for 33H, 33SH, 33J, 33S1, 33M, 33SK, 33K4, 33W and 33SKW		36	Rear Rotor Bearing (Special; purchase from Ingersoll-Rand)	R3H-22
2	Feed Screw Dowel	R3H-40A	37	Front Rotor Bearing (AFBMA No. 17BC03JP)	R3H-24
3	Intermediate Gear Bearing Stud (not used on 33SM, 33M4 or 33N4)	R33SM-40A	38	Rear End Plate	R33H-12
4	Exhaust Deflector	R3H-527	39	Front End Plate	R33H-11
5	Exhaust Deflector Screw	R3H-502	40	Vane Packet (Set of 5 Vanes)	R3H-42A-5
6	Air Port Gasket (2)	R33H-23	41	Cylinder For maximum power in counterclockwise rotation (when facing spindle end) (standard for Drills and Woodchests, special for Base-Mounted Motors)	R33H-3A
7	Reverse Valve Bushing	R33H-312		For equal power in either direction of Spindle rotation (standard for Base-Mounted Motors, special for Drills and Woodchests)	R33H51-3
8	Governor Valve Bushing	R22H-210		For maximum power in clockwise rotation (when facing spindle end) (special for Drills, Woodchests and Base Mounted Motors)	R33H-203
9	Muffler Screen	534-330		Cylinder Dowel	R3H-98A
10	Muffler Screen Retainer	R3H-429A		Outer Feed Screw	R3H-290A
11	Governor Valve	R3H-311	42	Dead Handle	TC-48
12	Governor Valve Spring	R3H-425A	43	Dead Handle Stud	TC-364
13	Governor Valve Cap	R3H-431	44	Reverse Valve	R33H-329
14	Back Head Gasket	R3H-283	45	Reverse Valve Seal	TCC-428
15	Back Head	R3H-102A	46	Sector Cover	TCC-429A
16	Grease Fitting	23-188	47	Sector Cover Shim (4)	TCC-430
17	Oil Adjusting Screw (2)	J44-71	48	Stop Pin	T05-58
18	Oil Felt (8)	J44-75	49	Stop Pin Spring	TCC-431
19	Oil Chamber Plug	P25-227	50	Throttle Body Shim (New Low Washer)	B01-11
20	Governor Lever	R41-436	51	Throttle Body Shim (New Low Washer)	TCCW-433
21	Governor Lever Pin	MP1-15A	52	Throttle Body Shim (New Low Washer)	D02-537
22	Back Head Short Cap Screw (4)	R3H-57	53		
23	Back Head Long Cap Screw (2)	R3H-66	54		
24	1/4" Lock Washer (4)	L01-67			
24A	Back Head Cap Screw Washer (2) (Copper)	DLC-504B			
27	Weight-type Governor Assembly	R3H-A424			
33	Rotor	R33H-53B			
34	Rotor Bearing Spacer	R3H-65			

* Not illustrated.

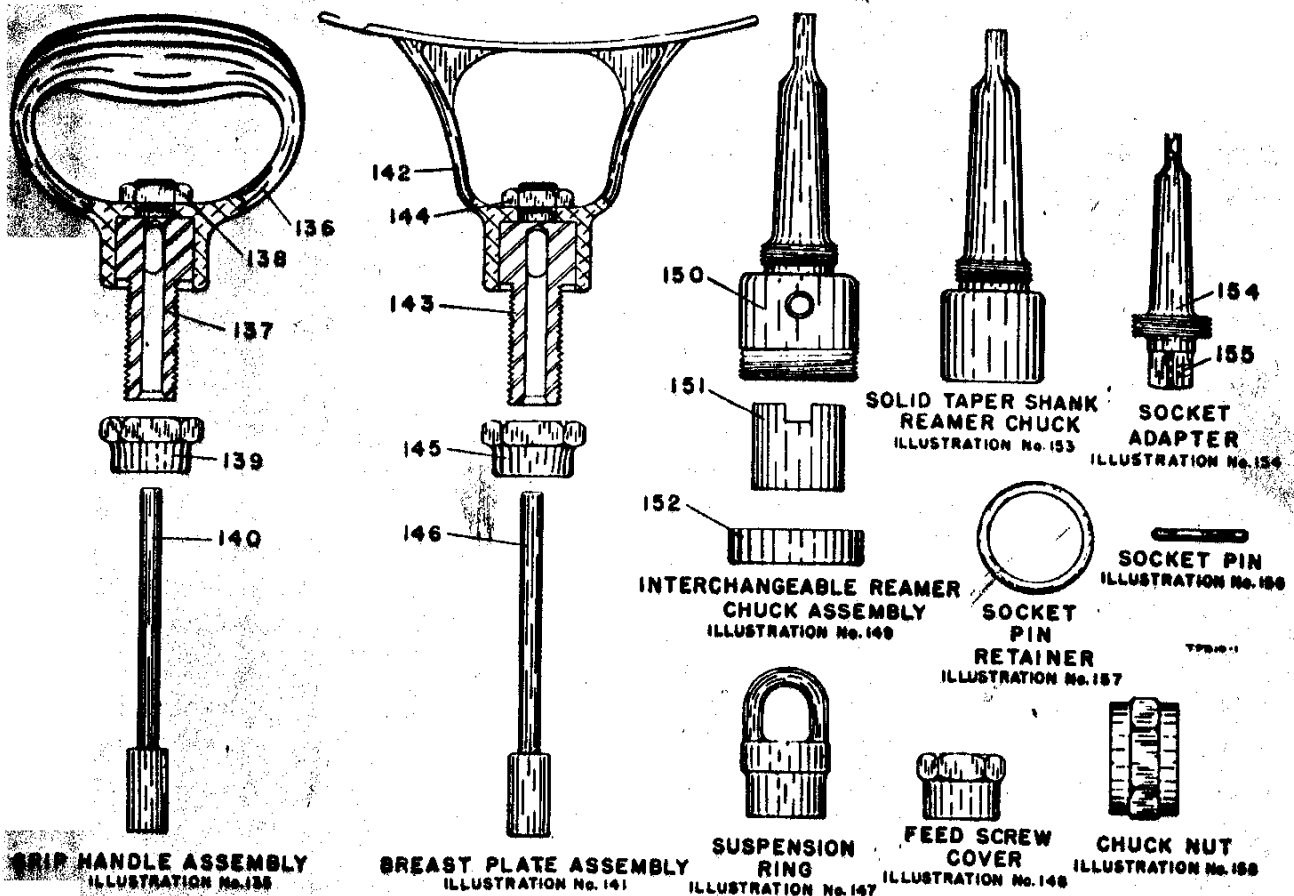
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"H", "J", "K" or "L" Gearing

For Parts Call Tools Renewed 800-247-3639 Fax 860-665-9821

SPECIAL EQUIPMENT FOR DRILLS



ILLUS. NO. (Do not use for ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING		
		Sizes 33H, 33J	Sizes 33SH, 33SJ, 33SK, 33SM	Sizes 33J4, 33K4, 33M4, 33N4
135	Grip Handle Assembly	R33H-A41	R33H-A41	R33H-A41
136	Grip Handle	TA-41	TA-41	TA-41
137	Grip Handle Stud	TC-448	TC-448	TC-448
138	Grip Handle Stud Nut	B12-249	B12-249	B12-249
139	Grip Handle Nut	TC-447	TC-447	TC-447
140	Grip Handle Ejecting Pin	R3H-50	R3H-50	R3H-50
141	Breast Plate Assembly	R3H-A79	R3H-A79	R3H-A79
142	Breast Plate	TC-79	TC-79	TC-79
143	Breast Plate Stud	TC-448	TC-448	TC-448
144	Breast Plate Stud Nut	B12-249	B12-249	B12-249
145	Breast Plate Nut	TC-447	TC-447	TC-447
146	Breast Plate Ejecting Pin	R3H-50	R3H-50	R3H-50
147	Suspension Ring	TC-365	TC-365	TC-365
148	Feed Screw Cover	TC-461	TC-461	TC-461
149	Interchangeable Reamer Chuck Assembly (specify size of Bushing required)	-----	T02-A45A	T01-A45A
150	Taper Shank Reamer Chuck for Interchangeable Bushing	-----	T02-45A	T01-45A
151	Interchangeable Reamer Chuck Bushing (5/8", 11/16", 3/4", 13/16", 7/8" or 1" square drive hole as specified)	-----	T01-38	T01-38
152	Interchangeable Reamer Chuck Cap	-----	T01-54	T01-54

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GEAR CASE, GEARING AND SPINDLE (Cont'd.)

ILLUS. NO. (Do not use for ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING		
		Sizes 33H, 33SH, 33J, 33SJ, 33SK, 33W 33SKW	Sizes 33J4 33K4	Sizes 33SM 33M4 33N4
109	Spindle Bearing Bottom Plate	R3H-514	-----	-----
110	Spindle Bearing (RBC No. SJ7304 or its equivalent)	-----	R3H4-510	R3H4-510
111	Spindle Thrust Ring	-----	R3H4-80	R4H-511
112	Thrust Ring Retainer	-----	-----	R3SM-83
113	Gear Case Cover	-----	-----	R3SM-378
114	Spindle Packing (1 for 33J4, 33K4, 33SM, 33M4 and 33N4; 2 for others)	R3H-14	R3H4-14	R3H4-14
115	Spindle Packing Nut	R3H-15	R3H4-15	R3H4-15
116	Protection Nut For Size 33H, 33SH, 33J, 33SJ, 33SK or 33SM	T02-43A	-----	T02-43A
	For Size 33J4, 33K4, 33M4 or 33N4	-----	T01-43A	T01-43A
117	Wood Bit Chuck For wood bits with 1/2" dia. straight shanks (standard for Size 33W)	R33W-151-1/2	-----	-----
	For wood bits with 1/2" dia. straight shanks (standard for Size 33SKW)	R33SW-151-1/2	-----	-----
	For wood bits with 5/8" dia. straight shanks (special for Size 33SKW)	R33SW-151-5/8	-----	-----
118	Bit Chuck Set Screw (2)	R33W-150	-----	-----
* 119	Bit Chuck Set Screw Retainer	R33W-149	-----	-----
120	Bit Chuck Set Screw Wrench	K-27	-----	-----
121	Chuck Nut (for Size 33W or 33SKW)	T12-347	-----	-----
122	Gear Case Bolt (3)	R3H-103	R3H-103	R3SM-103
123	Gear Case Bolt Nut (1 for each Bolt)	T06-139	T06-139	T06-139
124	Gear Case Cap Screw (3)	R3H-68A	R3H-68A	R3H-68A
*	Gear Case Long Cap Screw	-----	-----	R3SM-126
125	1/4" Lock Washer (7 for Size 33SM, 33M4 or 33N4; 6 for others)	L01-67	L01-67	L01-67

* Not illustrated.

USE-EM-UP SPINDLES AND EXTENSION SPINDLES

Order a Use-Em-Up Spindle or an Extension Spindle by the part number shown in the table below. With the exception of the Spindle, the same parts are included in a Use-Em-Up Spindle Assembly or an Extension Spindle Assembly as in a standard Spindle Assembly.

The following table also lists the Use-Em-Up Ejector Pins that must be used with Use-Em-Up Spindles.

Extension Spindles are available for Sizes 33SH, 33J and 33SK only.

PART NAME FOR ORDERING	PART NUMBER FOR ORDERING				
	33H	33SH	33J	33SJ	33J4
Use-Em-Up Spindle Assembly	R3H-A294	R3SH-A294	R3J-A294	R3SJ-A294	-----
Use-Em-Up Spindle	R3H-294	R3SH-294	R3H-294	R3SH-294	R3J4-294
Use-Em-Up Ejecting Pin	R3H-395	R3SH-395	R3H-395	R3SH-395	R3J4-395
Extension Spindle Assembly	-----	R3SH-A327	-----	R3SJ-A327	-----
Extension Spindle	-----	R3SH-327	-----	R3SH-327	-----
	33SK	33K4	33SM	33M4 33N4	
Use-Em-Up Spindle Assembly	R3SK-A294	-----	R3SM-B294	R3M4-B294	
Use-Em-Up Spindle	R3SH-294	R3K4-294	R3SM-294	R3M4-294	
Use-Em-Up Ejecting Pin	R3SH-395	R3J4-395	R3SM-114	R3M4-395	
Extension Spindle Assembly	R3SK-A327	-----	-----	-----	
Extension Spindle	R3SH-327	-----	-----	-----	

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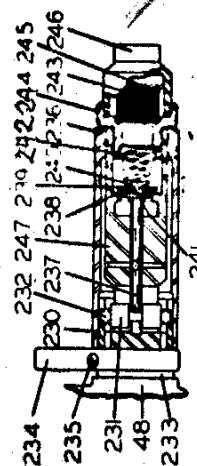
GEAR CASE, GEARING AND SPINDLE PARTS

ILLUS. NUMBER (Do not use for ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING		
		Sizes 33H, 33SH, 33J, 33SJ, 33SK, 33W 33SKW	Sizes 33J4 33K4	Sizes 33SM 33M4 33N4
	Spindle Assembly			
	For Size 33H or 33W	R3H-A108	-----	-----
	For Size 33SH	R3SH-A108	-----	-----
	For Size 33J	R3J-A108	-----	-----
	For Size 33SJ	R3SJ-A108	-----	-----
	For Size 33SK or 33SKW	R3SK-A108	-----	-----
	For Size 33SM	-----	-----	R3SM-B108
	For Size 33M4 or 33N4	-----	-----	R3M4-B108
81	Spindle			
	For Size 33H, 33J, 33W, 33J4 or 33SM	R3H-108	R3J4-108	R3SM-108
	For Size 33SH, 33SJ, 33SK, 33K4, 33SKW, 33M4 or 33N4	R3SH-108	R3K4-108	R3M4-108
82	Ejecting Pin Packing	R3H-408	R3H4-408	R3SM-408
83	Spindle Gear			
	For Size 33H, 33SH or 33W	R33W-9A	-----	-----
	For Size 33J or 33SJ	R3J-9	-----	-----
	For Size 33SK or 33SKW	R3SK-9	-----	-----
84	Spindle Gear Key or Planet Gear Frame Key	TB-410	-----	R3SM-410
	Planet Gear Frame Assembly	-----	-----	R3SM-A367
85	Planet Gear Frame	-----	-----	R3SM-367
86	Planet Gear Frame Set Screw (3)	-----	-----	R3SM-574
87	Planet Gear (3)	-----	-----	533-652
88	Planet Gear Shaft (3)	-----	-----	R3SM-191
89	Planet Gear Roller (54)	-----	-----	533-654
90	Roller Retaining Plate (6)	-----	-----	533-655
91	Drill Ejecting Pin			
	For Size 33H, 33J, 33W, 33J4, 33K4, 33SM, 33M4 or 33N4	R3H-114	R3H4-114	R3SM-114
	For Size 33SH, 33SJ, 33SK or 33SKW	R3SH-114	-----	-----
92	Spindle Thrust Bearing (AFBMA No. 208H03)	D04-366	D04-366	D04-366
93	Spindle Thrust Bearing Spacer	-----	-----	R3SM-100
94	Spindle Gear			
	For Size 33SM or 33M4	-----	-----	R3SM-9
	For Size 33N4	-----	-----	R33N-9
95	Intermediate Gear			
	For Size 33H, 33SH, 33W, 33SW or 33M4	R33W-82A	-----	R3SM-82
	For Size 33J, 33SJ or 33J4	R3J-82A	R3J-82A	-----
	For Size 33SK, 33K4 or 33SKW	R3SK-82A	R3SK-82A	-----
	For Size 33N4	-----	-----	R33N-82
96	Intermediate Gear Bearing			
	(AFBMA No. 15BC03) (2)	TB-394	TB-394	-----
	(Hyatt No. 93112 or its equivalent) (2) (For 33SM or 33M4)	-----	-----	R3SM-501
	(Bantam No. U-155-Q) (for 33N4) (56)	-----	-----	R2N-152
97	Intermediate Gear Bearing Spacer			
	For Size 33SM or 33M4	-----	-----	R3SM-573
	For Size 33N4 (3)	-----	-----	R33N-573
98	Intermediate Gear Thrust Washer	-----	-----	R3SM-498
99	Intermediate Gear Thrust Plate	-----	-----	R3SM-570
100	Intermediate Gear Shaft	-----	-----	R3SM-502
101	Internal Gear	-----	-----	R3SM-406
102	Gear Case			
	Grease Fitting	RM3H-37A	RM3H4-37A	R3SM-37
	Thrust Plate Dowel	23-188	23-188	23-188
104	Spindle Bearing Race	R3H-510	-----	R4-265
105	Spindle Bearing Top Plate	R3H-511	-----	-----
106	Spindle Bearing Roller (16)	R3H-512	-----	-----
107	Spindle Bearing Cage	R3H-513	-----	-----

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★	Roll Throttle Assembly ▲ Manual-Closing Self-Closing	R33H-A409 R33H-AS18	66	Air Strainer Assembly	R4H-AS65
† 55	Throttle Body	R33H-409	67	Air Strainer Cap	R4H-566
□ 56	Rubber-Faced Throttle Valve	R4H-402	68	Air Strainer Screen	R3H-61
57	Throttle Valve Face	R4H-159	69	Air Strainer Screen Support	R3H-567
58	Throttle Valve Face Cap	R4H-157	70	Air Strainer Body	R3H-565
59	Throttle Valve Face Retaining Screw	R4-158	71	All-Steel Throttle Valve	R4H-302
60	Retaining Screw Lock Washer	H54U-352	72	Feed Screw Assembly	R3H-A291
61	Throttle Sector ▲ For manual-closing throttle For self-closing throttle	TCC-427A TCC-437A	73	Feed Screw	R3H-291
62	Throttle Valve Lift Pin	TCC-306A	74	Feed Handle	TC-2
63	Lift Pin Roller (2)	TAA-426	75	Feed Handle Lock Nut	TC-388A
64	Throttle Sleeve	R33H-360	76	Feed Screw Center	TC-244
65	Throttle Valve Spring ▲ For manual-closing throttle For self-closing throttle	T01-308 TAA-418	77	Feed Handle Key	TC-18
			78	Grip Handle Assembly (for Sizes 33W and 33SKW)	R33W-A41
			79	Grip Handle	TA-41
			80	Grip Handle Stud	TC-448
				Grip Handle Stud Nut	B12-249
				Grip Handle Nut	TC-447

★ Roll Throttle for all sizes except size 33N4.
 † If ordered as a replacement for a Throttle Body equipped with an All-Steel Throttle Valve, also order the Rubber-Faced Throttle Valve (illustrated part 56).
 □ The All-Steel Valve is discontinued.
 ▲ Cannot be used as a replacement for the All-Steel Throttle Valve.
 ▲ In compliance with the Williams-Steiger Occupational Safety and Health Act, Manual-Closing Throttle Assemblies and parts used exclusively for Manual-Closing Throttle will be furnished only on international orders.



SELF-CLOSING ROLL THROTTLE FOR SIZE 33N4 REVERSIBLE DRILL

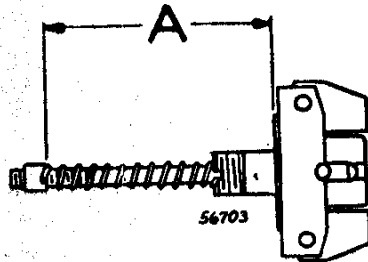
ILLUS. NO. (Do not use for ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING	ILLUS. NO. (Do not use for ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING
230	Throttle Assembly	R33P5-B518	239	Throttle Valve Face Cap	R4H-157
231	Throttle Cam	R4H-317	240	Throttle Valve Face Retaining Screw	R4-158
232	Throttle Valve Lift Pin	R4H-306	241	Retaining Screw Lock Washer	H54U-352
233	Throttle Valve Lift Pin Roller (2)	TAA-426	242	Throttle Valve Spring	TAA-418
234	Throttle Sector	R33P5-1487	243	Air Strainer Assembly	R4H-AS65
235	Reverse Lever	R55H-314	244	Air Strainer Screen	R3H-61
236	Reverse Lever Set Screw (2)	R2J-561	245	Air Strainer Cap	R4H-566
237	Throttle Sleeve	R4H-305		Air Strainer Screen Support	R3H-567

SPECIAL EQUIPMENT FOR DRILLS (Cont'd.)

ILLUS. NO. (Do not use for ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING		
		Sizes 33H, 33J	Sizes 33SH, 33SJ, 33SK, 33SM	Sizes 33J4, 33K4, 33M4, 33N4
153	Solid Taper Shank Reamer Chuck (5/8", 3/4", 7/8" or 1" square drive hole as specified)	-----	T02-255A	T01-255A
154	Socket Adapter No. 2 Morse Taper to 1/2" square drive No. 3 Morse Taper to 3/4" square drive No. 4 Morse Taper to 1" square drive	R3H-214 ----- -----	----- R4J-214 -----	----- R40-214 -----
155	Socket Retainer (consists of plunger, spring and washer)	S04-816	W54-215	34U-215A
156	Socket Pin	-----	R4-103	34U-216
157	Socket Pin Retainer	T17-347	T17-347	T01-347
158	Chuck Nut	-----	-----	-----
*	Male Hose Nipple 3/4" hose to 1/2" male pipe 1/2" hose to 1/2" male pipe	A01-46 D02-455	A03-46 D02-455	A03-46 D02-455

* Not illustrated.

GOVERNOR ADJUSTMENT



A = 1-29/32" For Drills and Motors with Standard Throttle.

A = 2-1/32" For Motors with Remote Control.

NOTE: The Governor Assembly used in the Drills and Motors is identified by the code number "27" etched on the governor body.

When installing a new Governor, thread the adjusting nut onto the stem to the proper dimension "A" as shown. This will usually result in the correct governed free speed of the Spindle. However, this is only an approximate setting and, after checking with a tachometer, further adjustment may be necessary. Screw the adjusting nut further onto the stem to increase the speed; back it off to decrease the speed.

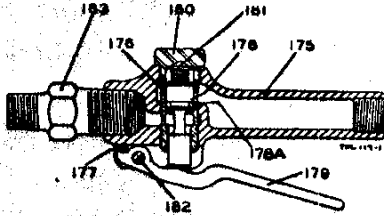
The Correct governed free speed of the various sizes at the Spindle is:

Size	Spindle Free Speed at 90 psi Air Pressure, R.P.M.
33H, 33SH, 33W, 33HS1	800
33J, 33SJ, 33J4, 33JS1	450
33SK, 33K4, 33SKW, 33KS1	300
33SM, 33M4, 33SM1	185
33N4	135

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SIZE 33SM54 DRILL WITH WATER ATTACHMENT FOR EARTH WORK

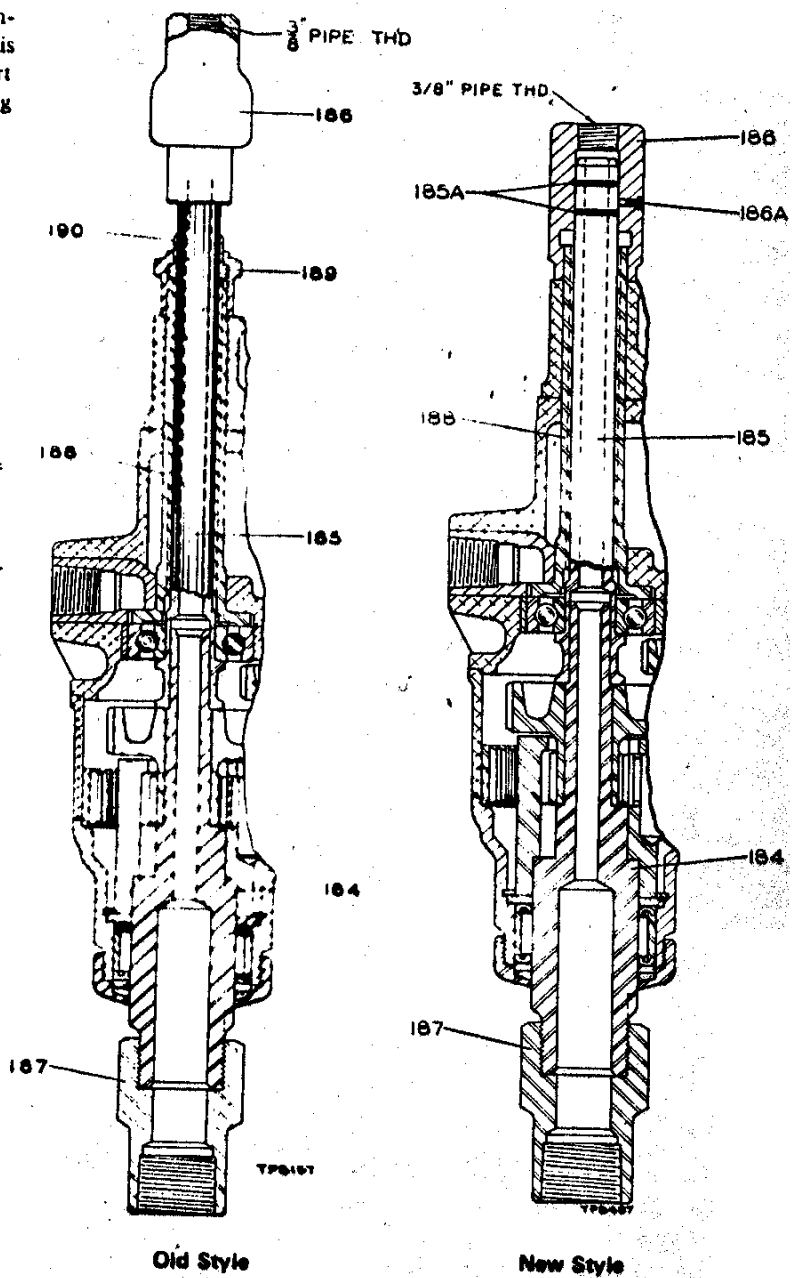
Parts used only in Size 33SM54 Drill with Water Attachment are listed below; order any other part for this Tool by the Part Name and Part Number shown in the part list for the standard Size 33SM Drill with Manual-Closing Roll Throttle Assembly.



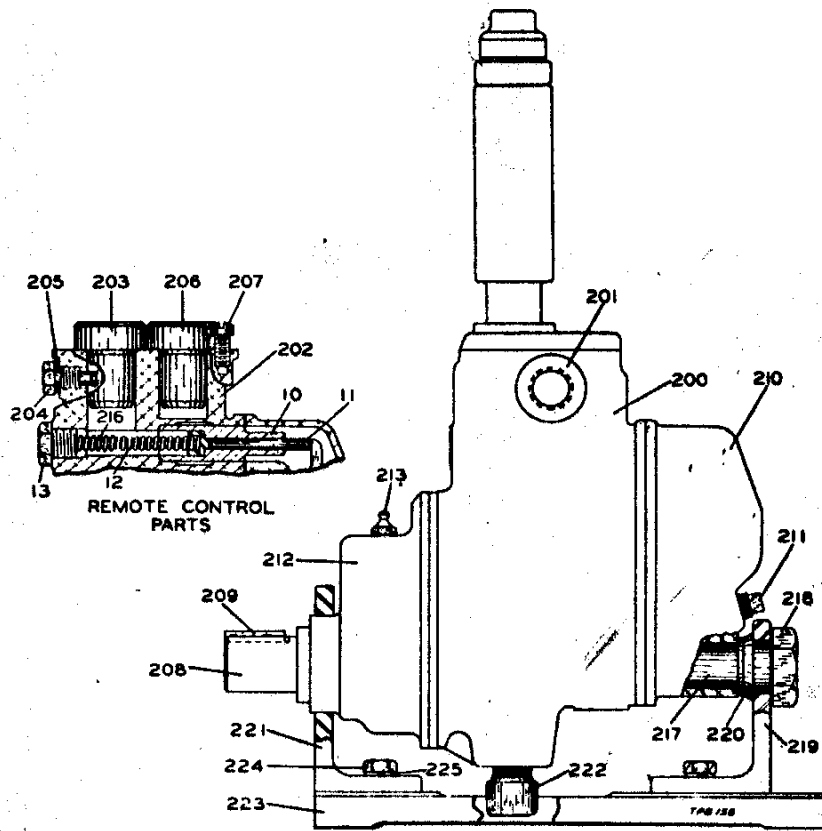
LEVER THROTTLE FOR DRILLS WITH WATER ATTACHMENT

ILLUS. NO. (Do not use for ordering)	PART NAME FOR ORDERING Parts indented after an item are included with that item	PART NUMBER FOR ORDERING
	Lever Throttle Assembly	R33SM54-A160
175	Lever Throttle Body	33SR-160
176	Lever Throttle Valve	
	Bushing	33SR-162S
177	Throttle Lever Stop Pin	13SR-265
178	Lever Throttle Valve	33SR-161
178A	Throttle Valve Face	435-159
179	Throttle Lever	33SR-163
180	Lever Throttle Valve Cap	33SR-164
181	Lever Throttle Valve Spring	12SR-262
182	Throttle Lever Pin	13SR-264
183	Lever Throttle Connector	TCC-334
184	Water Attachment Spindle	R33SM54-708
185	Spindle Water Tube	
	Old Style	R33SM54-709
	New Style	R33SM54-A809
185A	Water Tube Seal (2)	03062643
186	Swivel Joint	
	Old Style	R33SM54-712
	New Style	R33SM54-A812
186A	Grease Fitting	DOF9-879
187	Auger Adapter (1" pipe tap)	R33SM54-713-1
188	Water Tube Sleeve	R33SM54-790
189	Water Tube Sleeve Cap	R33SM54-792
190	Cap Bushing	R33SM54-793
	Stop Cock	N16-12

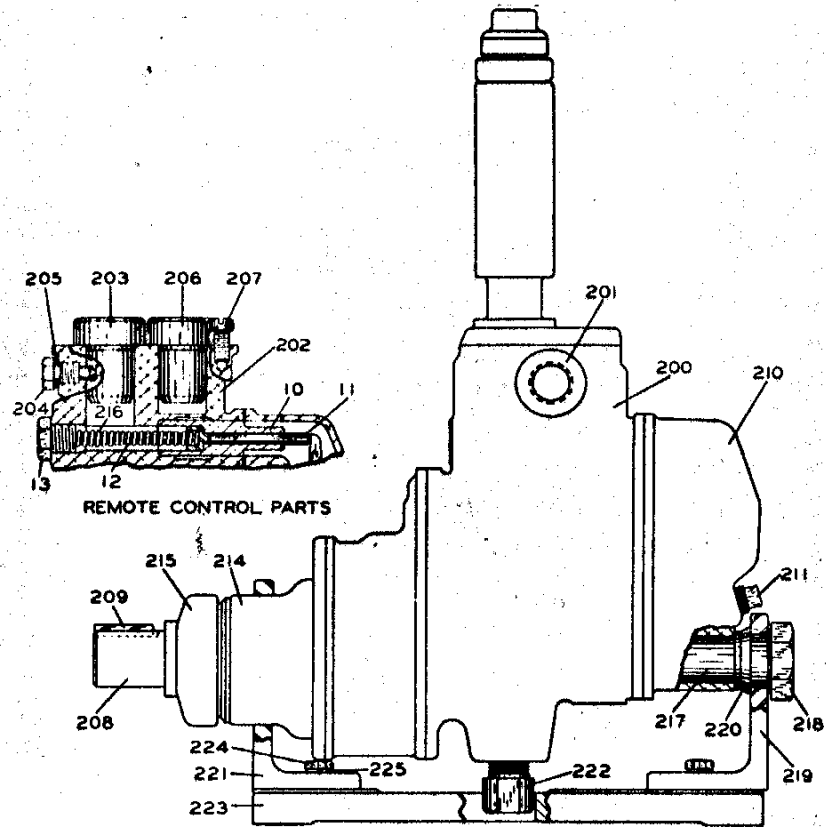
Not illustrated.
Used only on New Style Water Attachment.
The new style Spindle Water Tube (185) and Swivel Joint (186) can be used in combination to replace the old style Spindle Water Tube and Swivel Joint. However, one new style part cannot be used in conjunction with the old style part.



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Size 33H51, 33J51 or 33SK51 Base-Mounted Motor



Size 33SM51 Base-Mounted Motor

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BASE-MOUNTED MULTI-VANE MOTORS

Ingersoll-Rand Base-Mounted Multi-Vane Motors Sizes 33H51, 33J51, 33SK51 and 33SM51 are essentially Sizes 33H, 33J, 33SK and 33SM Multi-Vane Drills with certain parts omitted for mounting purposes and with Spindles changed to round, keyed shafts. Parts used only on Base-Mounted Motors are illustrated in the accompanying view. The balance of parts are illustrated in the sectional view of Drills on page 4.

Parts not included in the following list for Base-Mounted Motors are the same as corresponding parts of Drills. Order them by the part names and part numbers stated for Drills in the part list on pages 5 and 6.

I. I. U.S. NO. (Do not use for ordering)	PART NAME FOR ORDERING Parts Indented After An Item Are Included With That Item	PART NUMBER FOR ORDERING	
		Sizes 33H51, 33J51, 33SK51	Size 33SM51
200	Motor Housing for Roll Throttle	R33H51-40	R33SM51-40
201	Exhaust Bushing (also includes illustrated parts 2, 8 (2), 9 and 10; illustrated part 3 also included for Size 33H51, 33J51 or 33SK51)	R33H51-439	R33H51-439
202	Motor Housing for Remote Control	R33H51-RC40	R33SM51-RC40
203	Forward Inlet Stud	R22H-471	R22H-471
204	Forward Inlet Stud Lock Screw	TCCW-493	TCCW-493
205	7/16" Lock Washer	D02-537	D02-537
206	Reverse Inlet Stud	R33H-472	R33H-472
207	Reverse Inlet Stud Lock Screw (Also includes illustrated parts 2, 8 (2), 10 and 201; illustrated part 3 also included for Size 33H51, 33J51 or 33SK51)	T05-44	T05-44
	Spindle Assembly		
	For Size 33H51	R3H51-A8	-----
	For Size 33J51	R3J51-A8	-----
	For Size 33SK51	R3SK51-A8	-----
	For Size 33SM51	-----	R33SM51-B8
208	Spindle (Also includes illustrated parts 83 and 84 for Size 33H51, 33J51, or 33SK51; illustrated parts 84, 85, 86 (3), 87 (3), 88 (3), 89 (54) and (6) 90 for Size 33SM51)	R3H51-8	R33SM51-8
209	Spindle Key	R40-610	R40-610
210	Back Head	R3H-102A	R3H-102A
211	Oil Chamber Plug (Also includes illustrated parts 16, 17 (2), 18 (8), 20 and 21)	T1SE-368	T1SE-368
212	Gear Case	R3H51-37	-----
213	Grease Fitting	23-188	-----
214	Gear Case Cover	-----	R33SM51-378
215	Spindle Packing Nut	-----	R44SM51-15
216	Governor Valve Auxiliary Spring (used only in Motors with Remote Control)	P35-431	P35-431
217	Motor Mounting Stud	R33SM51-290	R33SM51-290
218	Motor Mounting Stud Cap	R33SM51-461	R33SM51-461
219	Rear Mounted Bracket	R33SM51-304	R33SM51-304
220	Rear Mounted Bracket Spacer	R33SM51-277	R33SM51-277
221	Front Mounting Bracket	R3H51-303	R33SM51-303
222	Motor Housing Anchor	R33SM51-364	R33SM51-364
223	Motor Mounting Base	R22N51-564A	R22N51-564A
224	Base Cap Screw (4)	D02-506	D02-506
225	Base Cap Screw Lock Washer (4)	D02-321	D02-321

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MAINTENANCE TOOLS

Tool Number For Ordering	Tool Name For Ordering	Operation
R3H-26	Packing Nut Spanner Wrench	Tightening or loosening the Spindle Packing Nut (115), (for Sizes 33H, 33SH, 33J, 33SJ, 33SK, 33H51, 33J51, and 33SK51).
T1SE-59	Packing Nut Spanner Wrench	Tightening or loosening the Spindle Packing Nut (115 or 215), (for Sizes 33J4, 33K4, 33M4, 33SM, 33SM51 and 33SM54).
P25-228	Grease Gun	Inserting grease into the Back Head (15 or 210) and Gear Case (102 or 212).
501-243	Double-End "Boxocket" Wrench (7/16" and 1/2" hexagon wrench openings)	Tightening or loosening the Cap Screws and Nuts that retain the Back Head (15 or 210), Gear Case (102 or 212) and Gear Case Cover (113 or 214).
T01-371	Throttle Valve Puller and Lapping Tool	Removing the All-Steel Throttle Valve (70) from the Throttle Body. Also used as a tool for lapping the All-Steel Throttle Valve to the valve seat in the Throttle Body.
R33H-446	Reverse Valve Bushing Reamer	Reaming the Reverse Valve Bushing (9) to size after pressing it into the Motor Housing (1 to 200).
4U-478	Planet Gear Frame Set Screw Wrench (5/32" hexagon)	Tightening or loosening the Planet Gear Frame Set Screws (86) in the Planet Gear Frame (85).
23132	Throttle Valve Seat Reamer	Smoothing the seat in the Throttle Body for the All-Steel Throttle Valve (70).
26123	Governor Valve Bushing Reamer	Reaming the Governor Valve Bushing (10) to size after pressing it into the Motor Housing (1, 200 or 202).
29259	Throttle Body Puller	Removing the Throttle Body (55) from the Motor Housing (1 or 200).
29743	Reverse Valve Bushing Puller	Removing the Reverse Valve Bushing (9) from the Motor Housing (1 or 200).
68493	Air Inlet Stud Puller	Removing the Inlet Studs (203 and 206) from the Motor Housing (202) for Remote Control.

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UNIT ASSEMBLIES

UNIT NAME FOR ORDERING	UNIT NUMBER FOR ORDERING
Case Case Unit	
for 33SH	33SH-U37
for 33SJ	33SJ-U37
for 33SK	33SK-U37
for 33SM	33SM-U37
for 33M4	33M4-U37
for 33W	33W-U37
for 33SKW	33SKW-U37
for 33H51	33H51-U37
for 33J51	33J51-U37
for 33SK51	33SK51-U37
for 33SM51	33SM51-U37
Motor Housing Unit	
for 33SH	33SH-U40
for 33SJ	33SJ-U40
for 33SK	33SK-U40
for 33SM	33SM-U40
for 33M4	33M4-U40
for 33W	33W-U40
for 33SKW	33SKW-U40
for 33H51	33H51-U40
for 33J51	33J51-U40
for 33SK51	33SK51-U40
for 33SM51	33SM51-U40
Motor Unit	
for all Size 33 Drills	33H-U53
for all Size 33 Base-Mounted Motors	33H51-U53
Rock Head Unit	
for all Size 33 Drills	33H-U102
for all Size 33 Base-Mounted Motors	33H51-U102
Feed Screw Unit (for 33SH, 33SJ, 33SK, 33SM and 33M4)	33H-U291
Grip Handle Unit (for 33W and 33SKW)	33W-U41
Mounting Base Unit (for 33H51, 33J51, 33SK51 and 33SM51)	33H51-U564

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