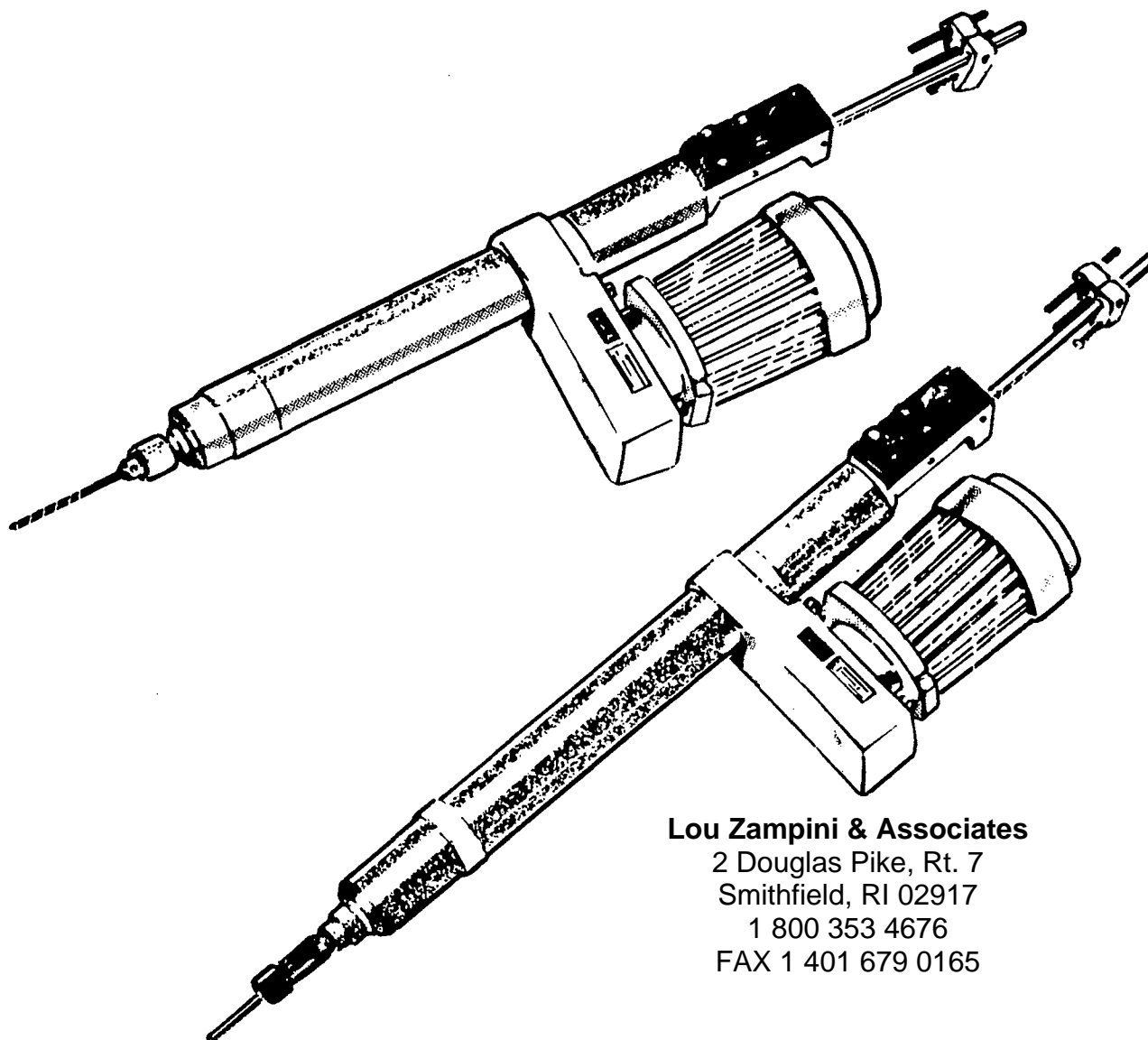


Desoutter

Auto Feed Drills and Tappers

Types	Code
AFDE40-17000	943924
AFDE40- 8400	944074
AFDE40- 5300	944154
AFDE40- 3800	944234
AFDE40- 3000	944314
AFDE40- 1800	944494
AFDE40- 1100	944574
AFDE40- 800	944654
AFDE40- 500	944734
AFDE40- 300	944814
AFTE40- 1100	944994
AFTE40- 800	945044
AFTE40- 500	945124
AFTE40- 300	945204

Operating Instructions
Servicing Instructions
Parts List

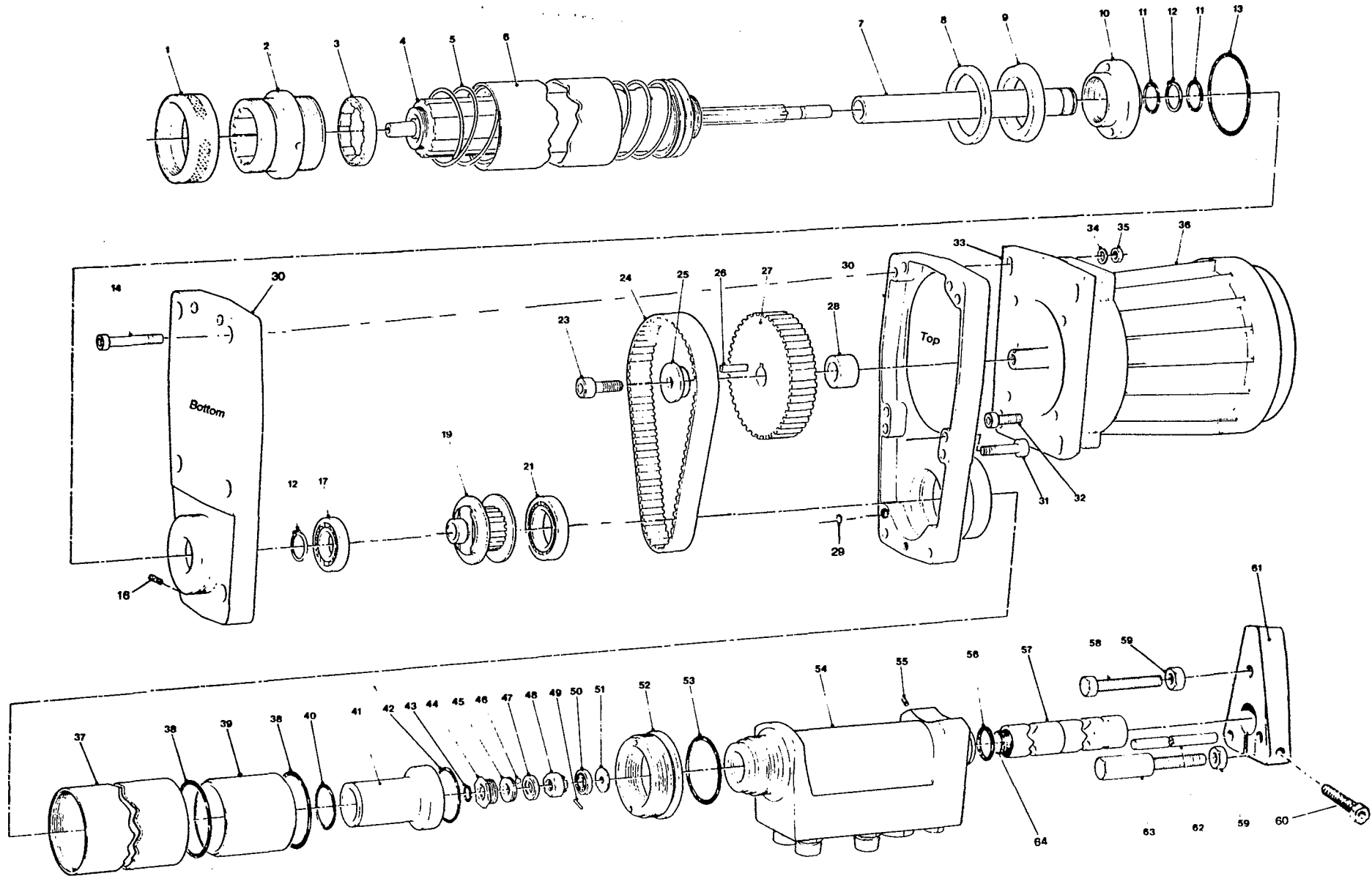


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Parts List - Main Assembly

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AFDE40
AFTE40**Servicing Instructions/Parts List – Main Assembly****AFDE40**
AFTE40

The minimum thrust for the tool:-

- (a) 500, 800, 1800, 3000 and 3800 rpm. tools – 84kg (185 lbf.).
(b) 5300 and 8400 rpm. tools – 32kg (70 lbf.).

Use the spring balance to confirm.

Fully open the advance and retract regulating screws and repeatedly press the green manual start button and cycle the tool a few times, checking that air pressure remains static.

Screw in the advance rate regulating screw to nearly closed. Press start button and at approximately mid stroke close the advance rate regulating screw. Allow motor to attain maximum free speed, then using the tachometer check that the speed is within 5% of that stated on the tool label. On completion, open advance rate regulating screw and allow tool to complete cycle.

Insert the mandrel into the chuck and using the D.T.I., bearing on the mandrel (12.7 mm (0.5 in.) from check, check that 'run out' does not exceed 0.15 mm (0.004 in.). If it is out of tolerance, tap side of chuck at high side to resettle it then recheck.

Reduce air pressure to 2.06 bar (30 lbs/in²). Press start button and adjust advance rate regulating screw so that tool advances slowly and returns. Repeat test several times observing that feed and retract action is smooth and free from jerks. Test piston control valve by alternatively pressing start button allowing tool to advance slightly then pressing stop button to retract. Movement should be smooth and without hesitation in each direction; when satisfied, stop tool in mid stroke by closing the advance rate regulating screw. Check for leaks by applying a film of oil around the valves and control buttons at their joints with the control top. When satisfied press the stop button and open the advance rate regulating screw.

Disconnect the airline and remove tool from vice and clamps. It is now ready for use.

Electric Motor

Electric motor testing and checking as necessary should be carried out by a competent electrician in accordance with the relevant section of the Health and Safety Act.

Parts List

Item No.	Part No.	Description	Qty.	Item No.	Part No.	Description	Qty.
1	286153	Thread Protecting Cap	1	*34	223183	Washer	4
2	49333	Bearing Sleeve	1	35	223203	Nut	4
3	53263	Silencer Ring	1	36	223033	Electric Motor Assembly	1
4	See later section	Gearbox Assembly Complete	1	37	222873	Outer Locking Case	1
*5	49483	Return Spring Standard	1	*38	55833	'O' Ring	2
6	50093	Outer Case	1	39	224203	Spacer	1
7	222663	Spindle Tube	1	*40	44673	'O' Ring	1
*8	157033	Lubricating Washer	1	41	261953	Inner Spacer	1
*9	257383	Piston Seal	1	*42	39913	'O' Ring	1
10	261963	Clamp Nut	1	*43	224173	Oil Seal	1
*11	37223	'O' Ring	2	44	238973	Retainer	1
*12	47553	Circlip	2	*45	224683	Thrust Washer	1
*13	50783	'O' Ring	1	*46	33393	Ball	5
14	223193	Screw	4	*47	222843	Thrust Washer	1
15	Not used.			48	222853	Nut	1
*16	260623	Air Seal	1	*49	84373	Pin	1
17	25863	Front Bearing	1	*50	33433	Bearing	1
18	Not used			*51	225543	Shim	As req'd.
19	302303	Driven Pulley, 20T, 8400 rpm only	1	52	255783	Adaptor	1
	302313	Driven Pulley, 26T, All speeds except 8400 rpm	1	53	225553	'O' Ring	1
21	222673	Rear Bearing	1	54	See later section	Control Top Assembly Complete	1
22	Not used			55	265153	Setscrew	1
23	223113	Pulley Retaining Screw	1	56	37223	'O' Ring	1
24	301973	Belt 82T - 8400 rpm	1	57	261203	Air Feed Tube	1
	302023	Belt 80T	1	58	51933	Adjusting Screw	1
	301983	Belt 78T - 5300, 1100rpm.	1	59	52473	Locknut	3
	302013	Belt 73T - 17000rpm.	1	60	78283	Clamp Screw	1
	301943	Belt 71T - 3800, 800 rpm	1	61	298863	Crosshead	1
	301953	Belt 66T - 3000, 500 rpm	1	62	15783	Crosshead Guide Rod	1
	301963	Belt 61T - 1800, 300 rpm	1	63	60923	Stroke Adjusting Screw	1
*25	302363	Washer	1	64	37243	Pressure Plug	1
*26	222883	Key	1				
27	301873	Pulley 56T - 8400rpm.	1				
	301833	Pulley 46T 5300, 1100 rpm	1				
	301883	Pulley 40T - 17000rpm.	1				
	301843	Pulley 33T 3800, 800 rpm	1				
	301853	Pulley 26T 3000, 500 rpm	1				
	301863	Pulley 16T 1800, 300 rpm	1				
28	222803	Spacer	1				
*29	157303	'O' Ring	1				
30	225103	Pulley Housing (Pair)	1				
31	223133	Pulley Housing Screw	6				
32	223113	Motor Retaining Screw	4				
33	222893	Motor Mounting Plate	1				

* Indicates normal replacement items. It is recommended that adequate stocks are held for servicing requirements.

Indicates updated parts.

Always quote tool number, serial number and spare part number when ordering spares.

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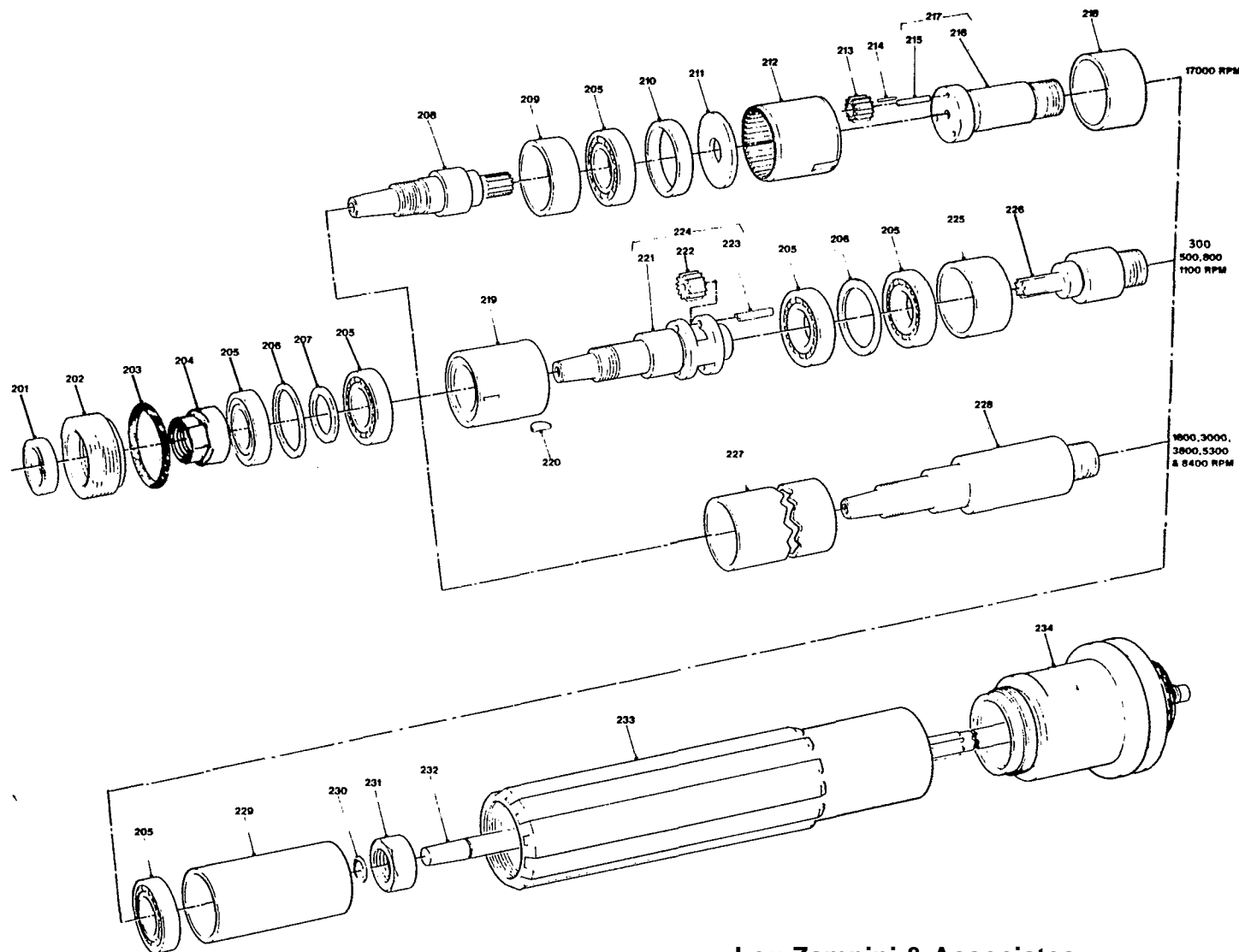
Parts List - Gear Case

Item No.	Part No.	Description	Qty.
201	209913	Rotary Shaft Seal (except 17,000 rpm)	1
202	265243	Clamp Nut	1
* 203	164453	'O' Ring	1
204	265233	Spindle Nut	1
* 205	2413	Bearing, 1100-800 rpm, 500 rpm	5
	2413	Bearing, 8400, 5300, 3800, 3000, 1850, 17,000 rpm	3
206	2633	Distance Washer - Outer (except 17,000 rpm)	1
207	49023	Distance Washer - Inner (except 17,000 rpm)	1
208	266583	Chuck Spindle	1
209	206163	Spacer	1
210	203723	Spacer	1
211	266503	Washer	1
212	266483	Gear Ring	1
213	266513	Planet Wheel, 14T	3
* 214	266643	Needle Roller	30
215	500683	Planet Pin	3
216	273073	Planet Carrier	1
217	274653	Planet Carrier Sub-Assembly	1
218	273063	Spacer	1
219	49433	Internal Gear	1
220	25568	Key	1
221	49423	Planet Cage, 1100-800 rpm	1
	49443	Planet Cage, 500 rpm	1
222	36723	Planet Wheel, 1100-800 rpm	2
	40363	Planet Wheel, 500, 300rpm	2
223	80013	Planet Pin	2
224	49413	Planet Cage Cpte 1100-800 rpm	1
	49453	Planet Cage Cpte 300 & 500 rpm.	1
225	223083	Spacer	1
226	223073	Drive Coupling, 1100-800 rpm	1
	223103	Drive Coupling, 500, 300rpm	1
227	222633	Bearing Sleeve	1
228	222623	Chuck Spindle	1
229	261983	Spacer	1
* 230	91723	Circlip	1
231	222793	Nut	1
232	222703	Drive Spindle	1
233	264453	Motor Case	1
234	261973	Piston	1

* Indicates normal replacement items. It is recommended that adequate stocks are held for servicing requirements.

Indicates updated parts.

Always quote tool number, serial number and spare part number when ordering spares.



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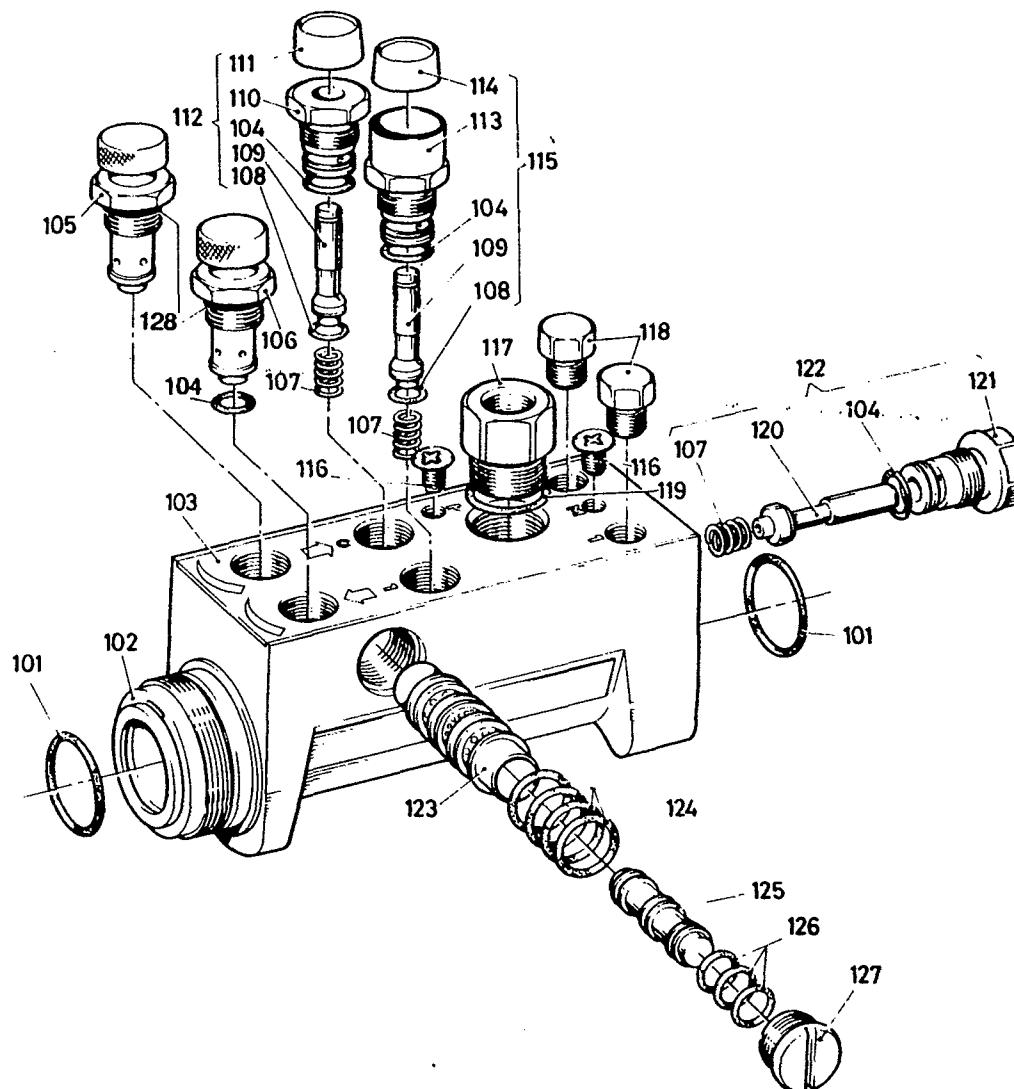
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Parts List - Control Top

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Item No.	Part No.	Description	Qty.
*101	41523	'O' Ring	2
102	255763	Control Top with Bushes	1
103	256903	Control Panel	1
#*104	40503	'O' Ring	4
105	256973	Return Valve	1
106	256933	Needle Valve	1
107	39783	Spring	3
*108	43583	'O' Ring	2
109	202773	Valve Spindle	2
110	51793	Valve Body	1
111	202833	Button - Red	1
112	203763	Stop Valve Complete	1
113	256923	Valve Body Shrouded	1
114	202843	Button - Green	1
115	256913	Start Valve Complete	1
#116	300973	Screw	2
117	42953	Inlet Adaptor - 1/4 in. BSP	1
-	47133	Inlet Adaptor - 1/4 in. NPT	1
	257043	Pressure Reducer 1/8 in. BSP	1
	257053	Pressure Reducer 1/8 in. NPT	1
118	51873	Plug	2
#*119	99853	'O' Ring	1
120	51743	Valve Spindle Complete	1
121	172013	Valve Body	1
122	172003	Stroke Control Valve	1
123	257003	Valve Bush	1
*124	43463	'O' Ring	4
125	202763	Piston Control Valve	1
*126	41513	'O' Ring	3
127	202803	End Cap	1
	256823	Control Top Complete - 1/4 in. BSP	1
	256833	Control Top Complete - 1/4 in. NPT	1
#128	54213	'O' Ring	2



* Indicates normal replacement items. It is recommended that adequate stocks are held for servicing requirements.

Indicates updated parts.

Always quote tool number, serial number and spare part number when ordering spares.

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Parts List - Chuck and Tapping Head

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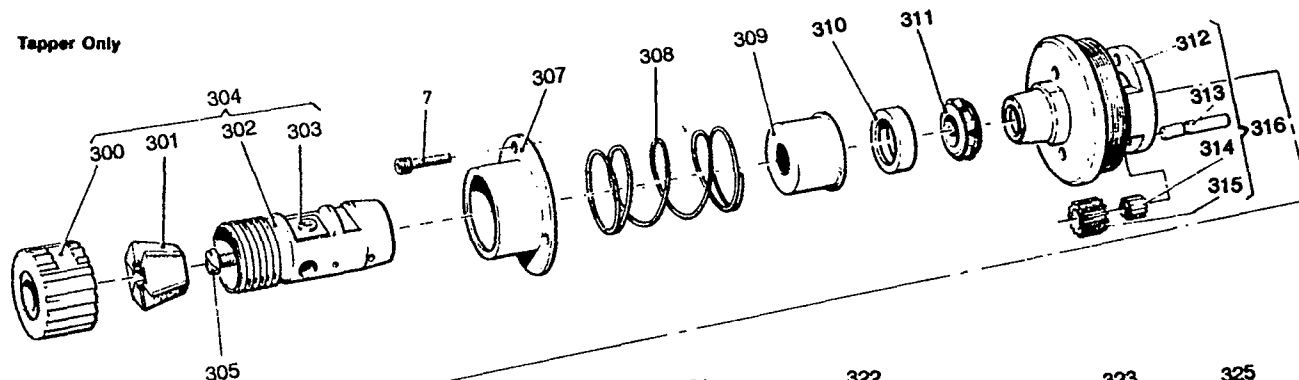
Item No.	Part No.	Description	Qty.
300	31642	Nut	1
# 301	29472	Collet 5/16in. Capacity	1
—	29482	Collet 1/4in. Capacity	1
302	31622	Body 5/16in. Capacity	1
—	31632	Body 1/4in. Capacity	1
303	31672	Jaws	1
304	29452	Tapping Chuck Assembly 5/16in. Capacity	1
—	29462	Tapping Chuck Assembly 1/4in. Capacity	1
305	79783	Screw	1
306	57003	Screw	3
307	62153	Spring Housing	1
308	62293	Spring	1
309	62143	Thrust Race Housing	1
*310	68818	Outer Race	1
*311	68828	Case and Balls	1
312	61553	End Cap	1
*313	10753	Planet Pin	2
*314	502093	Needle Bearing	2
315	1443	Planet Wheel	2
316	65123	End Cap Complete	1
317	10713	Sun Pinion	1
318	77753	Chuck Spindle	1
319	10703	Internal Gear	1
*320	263403	Circlip	1
*321	1483	Bearing	1
322	257733	Case	1
323	263703	Driving Dog	1
324	64888	Screw	1
325	263713	Drive Adaptor	1
326	263423	Tapping Head Complete	1
327	64888	Chuck Retaining Screw -17000,5300, 8400, & 3800 rpm.	1
	12233	Chuck Retaining Screw -3000, 1800, 1100, 800, 500, & 300rpm	1
328	29492	Chuck-17000, 5300, 8400, & 3800rpm.1	1
	29042	Chuck -3000, 1800, 1100, 800, 500 & 300rpm.	1
329	20182	Key - 17000, 5300, 8400, & 3800rpm.	1
	29232	Key -3000, 1800, 1100, 800, 500 & 300rpm.	1

* Indicates normal replacement items. It is recommended that adequate stocks are held for servicing requirements.

Indicates updated parts.

Always quote tool number, serial number and spare part number when ordering spares.

Tapper Only



NOTE:

Item 326 comprises of Items 306 to 325.

SERVICING

Tools

Service Tool Part No. 14963

Spanner Part No. 56383

Wedges Part No. 75983 — Removing item 304

Separating item 319

from item 323

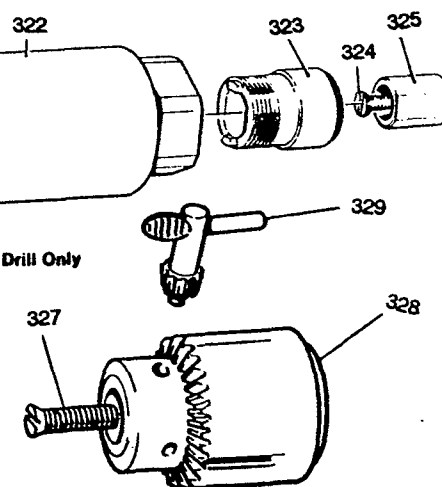
All other tools required will be found in a normal workshop.

TO DISMANTLE

Remove screw (305) and using the wedges detach the tapping chuck assembly (304)

Unscrew the tapping head complete (326) from the front of the tool and clamp the tapping head by its flats in a vice. Unscrew the three screws (306) enabling the spring housing (307), spring (308), thrust race housing (309) outer race (310) and case and balls (311) to be removed.

Drill Only



Unscrew the end cap complete (316) and remove with the chuck spindle (318) and the sun pinion (317)

Engage service tool 14963 with internal gear (319) and use spanner 56383 to unscrew whilst restraining the drive dog (323)

The remainder of the dismantling follows normal engineering practice with reference to the illustration.

TO ASSEMBLE

Reverse the dismantling instructions.

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Operating Instructions

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REQUIREMENTS

Air Supply – Main

A water free and filtered air supply is required, at a pressure of 6 bar (87 lbf/in²), with a flow of 28 litre (1 cu.ft.) per 25 strokes; controlled by a pressure regulator selected from the Desoutter Air Line Service Equipment Catalogue.

Air Supply – Remote

The basic requirements are as above but the pressure must be at least 2.7 bar (40 lbf/in²) and the flow requirement when signalling is 0.47 l/s (1 cu.ft./min). The signal duration should be kept to the minimum to reduce air consumption.

Electricity Supply

The motor must be connected to a three phase supply in accordance with the VOLTAGE CHART and provided with a starter fitted with an overload protection.

Voltage Chart—3 Phase

Recommended Starter Crabtree BD Range	Voltage V	Frequency Hz	Motor Connections Links	Overload Setting
20101/EB	220 to 240	50	Delta	1.4 to 1.6 Amps
20101/EB	220 to 264	60	Delta	1.4 to 1.6 Amps
20101/DJ	360 to 440	50	Star	0.8 to 1.0 Amps
20101/EH 440/480 60 Hz coil	380 to 480	60	Star	0.6 to 0.8 Amps

Connecting the Electrical Supply

- WARNING:** (1) ENSURE THE SUPPLY IS OFF BEFORE MAKING CONNECTIONS.
(2) STAR AND DELTA CONNECTIONS ARE TO BE STRICTLY IN ACCORDANCE WITH THE SUPPLY VOLTAGE GIVEN IN THE CHART. ANY DEVIATION FROM THE CHART WILL RESULT IN DAMAGE TO THE MOTOR.

Determine the supply voltage and refer to the voltage chart for motor connection details.

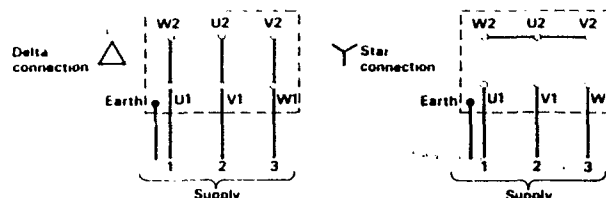
For Y (star) connection, couple terminal W2 to U2 and U2 to V2.

For Δ (delta) connection, couple terminals W2 to U1, U2 to V1 and V2 to W1.

In both methods the motor will be direct on line connected.

NOTE: The terminals are fitted with a 4mm pozidrive screws and the connecting links are connected between the screws. The earth connection is a 4 mm pozidrive screw for which a suitable screwdriver will be required.

IMPORTANT: Do not remove or loosen the bottom nut on the terminals.



For all voltages: The supply cable (min. cable rating: armoured flexible 1.0 mm conductors) is connected to the motor terminals U1, V1, W1 and earth, which are in the terminal box (see diagram). A suitable cable clamp should be fitted; the terminal box is provided with four (19mm diameter) "KNOCK - OUTS".

The Electric Motor

The motor is a totally enclosed, fan-cooled three-phase squirrel cage, Class F insulation. Looking at the fan end of the motor the rotation should be clockwise. If the rotation is opposite, inter-change connections U1 and V1 to correct the rotation.

Lubrication

Correct lubrication is vital for maximum performance of the tool and a miniature airline lubricator selected from the Desoutter Air Line Service Equipment Catalogue should be fitted into the system down stream of the filter.

Desoutter recommend the use of an ISO Viscosity Classified Oil, grade number ISO VG 15, in the lubricator.

Accessories

GUARDS: IT IS RECOMMENDED THAT SUITABLE GUARDS ARE SELECTED, FOR CHUCK AND CONTROL TOP LOCATION, FROM THE DESOUTTER ACCESSORIES CATALOGUE.

Mounting Clamps:- A range of clamps, bases and columns are available. Full details obtained from Desoutter.

Hydraulic Check Unit (H.C.U.): The tool will function satisfactorily, when drilling a blind hole at the set feed rate. Should it be required to break through the material and possibly through into another hole, feed acceleration will occur with possible drill breakage. To obviate this, the fitment of an H.C.U. is strongly recommended. Request information from Desoutter.

Peck Feed Kits:- The Desoutter Peck Feed Drill System should be used when the depth of the hole to be drilled is five or more times the hole diameter. This helps clear drill chips and avoids excessive overheating of drill bit. Hole size accuracy can be improved and drill bit run-out can be kept to the minimum. Request information from Desoutter.

Multi-spindle Drilling and Tapping Attachments:- A series of 2, 3, 4 and 5 spindle drilling and tapping heads are available. Full details available from Desoutter.

OPERATING

Control Top (See Fig. (1))

The control top (1) contains all the control functions and signal originations for external control.

The controls and locations are identified below and detailed in the Drilling Operation.

- Location 2:** 'P' port tapped M5, signal point for peck feed circuit.
3: 'O' port tapped 1/8in. BSP, receives external signal to return the feed to start position.
4: Stroke Control Valve.
5: 'M' port tapped M5, signal produced when the motor is running is used for sequence control. The signal will commence after the tool has advanced 6.5mm (¼in.) and cut 6.5mm (¼in.) before the tool returns to rest. Using a suitable pressure switch this signal can be used to start and stop the electric motor.

NOTE: Refer the Contactor manufacturer for motor switching control.

- 6:** '1' port tapped 1/8in. BSP, receives external signal to start the tool cycle.
7: Main air inlet port, tapped 1/8 in or ¼ in. BSP or NPT.
8: Manual Start Button - Green.
9: Manual Stop Button - Red.
10: Advance Rate Regulating Screw.
11: Retract Rate Regulating Screw (Tapper only).

NOTE: The 'M' port is intended for the operation of pilot valves. It must not be used as a source of air supply for other uses.

Mounting the Tool

The tool must be clamped only in the area indicated on the outer case.

The drill must be at least 6 mm (0.25in.) above the work piece.

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Operating/ Servicing Instructions

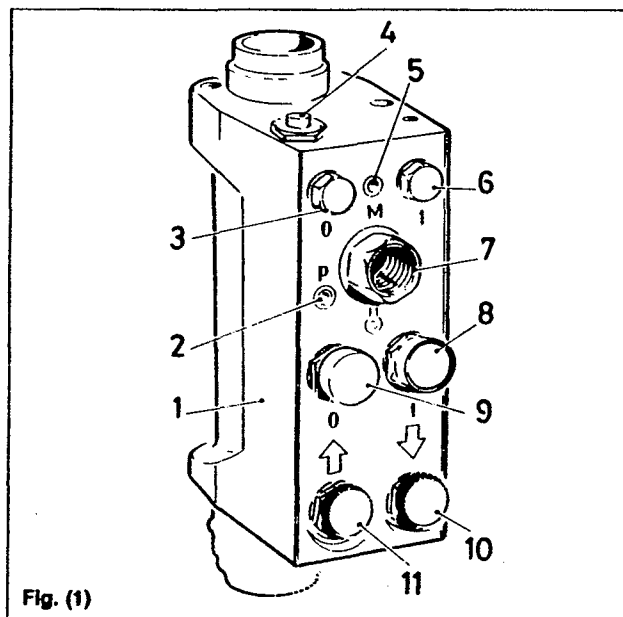
AFDE40
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Fig. (1)

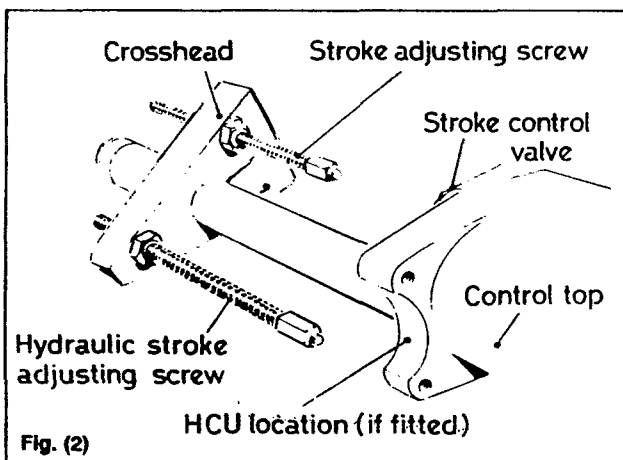


Fig. (2)

- WARNING:** (1) ALWAYS DISCONNECT TOOL FROM THE POWER SUPPLY BEFORE ATTEMPTING ANY REPLACEMENT, ADJUSTMENT, SERVICING OR DISMANTLING.
- (2) ENSURE THAT NO LOOSE ARTICLES OF CLOTHING OR CLEANING MATERIAL CAN BE CAUGHT BY THE ROTATING PARTS OF THE TOOL.
- (3) ALWAYS ALLOW THE TOOL TO STOP BEFORE REMOVING WORK OR RESTING TOOL.
- (4) ENSURE THAT WORK PIECE IS SECURELY CLAMPED BEFORE COMMENCEMENT OF OPERATION - CLEAR ALL LOOSE ITEMS FROM VICINITY.

SETTING DRILLING OPERATION (See Fig. (1) & Fig. (2))

NOTE: This setting details a unit with a H.C.U., reference to the H.C.U. should be ignored when setting the standard tool.

Set the gap between the stroke control valve and the stroke adjusting screw to equal the depth of drilling required PLUS the distance the drill bit is above the work piece.

Unscrew the hydraulic stroke adjusting screw away from the H.C.U. and adjust the resistance within the H.C.U. to the minimum position.

Fully open the retract rate regulating screw.

Close the advance rate regulating screw.

Connect the air supply and press the manual start button.

Nothing will happen until the advance rate regulating screw is slowly opened, then the drill will gradually advance and approximately 6 mm (0.25in.) from start of advance the drill bit will rotate.

Close the advance rate regulating screw approximately 1.0 mm (0.040in.) before the stroke adjusting screw contacts the stroke control valve.

Set the hydraulic stroke adjusting screw to contact the H.C.U. and lock in position.

Unscrew the advance rate regulating screw; the tool will advance, under the control of the H.C.U. until the stroke control valve is contacted by the stroke adjusting screw at this point the tool will return to the start position and stop.

Carry out a set of trial drillings to determine the ideal advance and H.C.U. settings. Stalling on 'break-through' indicates that the H.C.U. is coming into operation too late or the advance rate is too fast.

SETTING TAPPING OPERATION

NOTE 1: It is important that the advance rate of the tool is set to match the pitch of the thread which is to be tapped. An incorrect advance rate will result in a deformed thread, this will be more noticeable in plastics or light alloy materials.

2: The retract rate should be set to withdraw the tap at a slightly faster rate than it advanced, this will insure a clean withdrawal.

Mount the tool, with the selected tap securely retained in the chuck, above a test block to carry out sample tapping operations.

The end of the tap **MUST** be at least 14 mm (9/16in.) above the test block, to allow for the tapping head reversing engagement travel. Set the gap between the adjusting screw and the retract valve to equal the tapping depth PLUS the distance the tap is above the work piece.

Set the advance rate adjustment screw 1 turn open and the retract rate adjustment screw 1½ turns open.

Carry out a trial tapping operation and inspect the finished thread form, adjust as necessary the advance/retract screws and repeat until information in NOTES 1 and 2 are satisfied.

SERVICING REQUIREMENTS**General Notes**

Replace as necessary all 'O' rings, seals and bearings.

Use the following lubricants as indicated:-

Oil - ISO VG 15 or equivalent.

Grease - Rocol BG 581-2 (for bearings)

Grease - Duckhams Q5618 or equivalent.

Silicon Grease - Molykote 33, for 'O' rings.

The majority of threads in this tool are right hand (R.H.) but some left hand (L.H.) threads will be found. All L.H. threads will be noted in the text.

Servicing Tools

In addition to the normal range of workshop tools the following will be required:

Part No.	Description	Qty.
224113	Belt Tension Adjusting Tool	1
59213	Clamp Blocks (pair)	1
75938	Wedges (pair)	1
#172863	'C' Spanner	1
178993	Spanner for End Cap	1
#268753	Spanner	1

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Servicing Instructions

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204943	Hexagonal Key 5 mm A/F	1
204973	Hexagonal Key 3 mm A/F	1
	Ring Spanner 10 mm A/F	1
69773	Hexagonal Key 1/4 in. A/F	1
# 16613	Spanner O.J. 18 mm A/F	1
225423	Pulley Clamp Blocks (pair)	1
# 18583	Spanner O.J. 5/8 in. A/F (for item 204)	1
204903	Hexagon Key for Item 1B	1
59233	Gearcase Spanner	1
60063	Clamp Nut Spanner	1

Refer to the Parts Lists for illustrations and item references.

Cleaning

Required: Tank to immerse components.
Good quality clean paraffin.

Soak the components in the tank ensuring full immersion, agitate the component to ensure that any air passages are flushed through. After soaking, remove from the tank and thoroughly dry. Blow through any air passages to remove all moisture. Keep all cleaned components in an airtight container until required.

GENERAL ASSEMBLY**To Dismantle**

Remove any guard fitted to the tool. Using clamp blocks clamp the tool vertically, motor uppermost, in a bench vice. Remove the four screws (14), nuts (35) and washers (34) securing the motor. Remove the motor complete with mounting plate (33). If it is necessary to remove the pulley (27), remove screw (23) and washer (25), remove the pulley leaving the key (26) in position unless it is to be renewed. To remove spacer (28), key (26) must first be removed.

Slacken the crosshead clamping screw (60) and slide the cross-head assembly from the air feed tube. Remove the crosshead guide rod (62).

Turn the tool to the horizontal position.

Using 'C' spanner unscrew the outer locking case (37), (L.H.). Withdraw the control top (54) complete with adaptor (52), spacer (39) and outer locking case. Unscrew the outer locking case from the control top and push out the spacer (39). Remove the inner spacer (41). Remove and discard the 'O' rings (38), (40) and (42).

Unscrew the retainer (44) L.H. from the air feed tube, taking care not to strain the drive spindle. Simultaneously while unscrewing the retainer draw the air feed tube away, keep the retainer hard against the thrust washer (45). When the air feed tube is clear release the

retainer and catch the five balls (46). Discard the balls. Remove and discard the bearing (50) and shim (51), if fitted, from inside the air feed tube. Remove the tool from the vice and lay it on a clean workbench. Remove pin (49) from the drive spindle and discard, care must be taken not to damage the spindle. Unscrew the nut (48) and remove thrust washers (45) and (47) and also the retainer. Remove oil seal (43) from the retainer. Discard thrust washers (45) and (47) and oil seal (43).

Remove the chuck or taper as fitted.

Replace the tool in the vice with the motor mounting orifice uppermost.

Remove the six pulley housing screws (31), remove the pulley housing (30). Remove and discard the small 'O' ring (29). Remove the belt (24). Withdraw the driven pulley assembly complete with bearings.

To dismantle driven pulley assembly (19)

Using vice or press and suitable block, push both bearings (21) and (17) off the pulley.

Dismantle continued:-

Using a 'C' spanner slowly unscrew sleeve (2), ABOUT THREE TURNS.

CAUTION: This sleeve supports the return spring (5) and is loaded to approximately 6.8Kg (15lb), exercise extreme care when removing.

Continue slowly unscrewing. As soon as the sleeve is clear of the outer case (6) allow the spring to expand.

Remove the sleeve and spring complete with silencer ring (3) and protective cap (1). Remove the gearbox assembly (4). Unscrew the bottom pulley housing (30) from the outer case (6). Remove 'O' ring (13) and discard.

Remove outer case from vice and clamps. Remove the circlip (12) from the inside (belt side) of the bottom pulley housing. Remove the spindle tube (7) and the second circlip (12). Remove and discard 'O' rings (11). Remove clamp nut (10), piston seal (9) and lubricating washer (8). Discard piston seal and lubricating washer.

NOTE: Dismantling the control top and gearbox assembly are detailed later in the text.

To Assemble

NOTE: It is recommended that all 'O' rings are renewed on assembly.

Fit new washer (8) to the appropriate gearbox piston. Lubricate piston seal (9) with grease and fit it to the clamp nut (10). Screw clamp nut onto the gearbox piston and tighten with a spanner. Coat 'O' rings (11) with grease and assembly to the bore of the bottom pulley housing (30) and the other to the bore of the clamp nut. Fit a circlip (12) to the lower groove of the spindle tube (7), coat the tube with grease and insert into the pulley bore from the bottom until the circlip bottoms against the flange. Fit the second circlip (12) to the top spindle tube groove, securing the tube firmly in the housing.

Protect the machined surfaces of the bottom pulley housing and clamp in a vice with its driven pulley housing clear. Carefully enter the gearbox's splined drive shaft into the spindle tube and push the gearbox in so that the clamp nut seats in the pulley recess. Coat 'O' ring (13) with grease and fit it to the pulley housing. Screw outer case (6) onto the pulley housing and tighten as far as possible. Grease return spring (5) and insert into the outer case. Fit silencer ring (3) into the bearing sleeve (2) and fit the bearing to the outer case.

CAUTION: The bearing sleeve (2) supports and tensions the return spring at a loading of approximately 6.8Kg (15lb). Exercise extreme care when fitting the sleeve.

Fit clamps 59213 to the outer case and reclamp in a vice, horizontal.

Assemble driven pulley (19)

Pack bearings (17) and (21) with grease and press on to the pulley.

Fit the appropriate assembled pulley on to the gearbox drive spindle. Fit the appropriate belt (24) over assembled pulley. Coat 'O' ring (29) with grease and fit to the top pulley housing (30). Carefully fit the top pulley housing, ensure that bearing (21) is correctly seated. Secure the top pulley housing using six screws (31).

Fit new bearing (50) to the air feed tube ensuring that it seats hard up against its outer race. Fit new oil seal (43), steel shell first, to retainer (44) and assemble it to the drive spindle. Assemble new thrust washers (45) and (47) to drive spindle then screw on nut (48). Reposition the tool vertically in the vice. Insert two new

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balls (46) between the thrust washers, 180 degrees apart, push up the retainer to hold the thrust washers and balls against the nut (48). Sight the balls between the thrust washers, the balls should be central in the shaft groove, adjust as necessary by turning nut (48). Align the slots in the nut with the shaft pin hole. Release the retainer and remove the balls. Remove the tool from the vice and lay it on a bench. Insert pin (49), drive in pin so that the protrusion each side is equal. Position the clamps and clamp the tool vertical in the vice.

Assemble five balls (46) to their seatings between the thrust washers and hold them in position with the retainer (44) L.H. Insert the assembly into the air feed assembly and while keeping the pressure on the thrust washers, screw in the retainer as tight as possible by hand. Hold the air feed tube flats with a spanner and with a 30 mm A/F spanner tighten the retainer. Re-position the tool horizontal.

Set a dial test indicator against the end of the air feed tube, apply pressure to the air feed tube taking up all play between air feed tube and drive spindle, then set the gauge to zero. Restrain drive spindle and check the movement between drive spindle and air feed tube. This should be between 0.025 mm (0.001 in.) and 0.08 mm (0.003 in.). If it exceeds 0.05 mm (0.002 in.), note the exact amount, which will be the shim thickness required. If the movement is incorrect unscrew air feed tube assembly and catch the balls (46) when free from thrust washers. Remove the air feed tube and withdraw bearing (50) from the bore. Fit a shim or shims (51) of the required valve and immediately refit the bearings (50) ensuring that the outer race is hard up against the shim.

Turn tool vertical in the vice.

Grease the two 'O' rings (40) and (42) and fit to inner spacer (41). Fit spacer in its recess in the top pulley housing. Grease two 'O' rings (38) and assemble one at each end of spacer (39) and insert into the outer locking case (37). Fit the assembled outer case to the top pulley housing and screw on, L.H., ensure that spacer (39) contacts the pulley housing. Coat 'O' ring (56) with grease and fit to the air feed tube. Coat the air feed tube lightly with grease and slide the control top (54) complete with adaptor (52) over the air tube until its thread contacts the outer locking case. Hold the locking case with a 'O' spanner screw in control top until it locks. Remove tool from vice and clamps and hold the tool with top of air feed tube against a firm surface and apply force against spring pressure to check that full stroke can be obtained manually.

Refit tool in clamps and vice, and clamp it vertical. Fit cross-head complete with adjusting screw (58) stroke adjusting screw (63) and their locknuts (59), tighten clamp screw (60).

Assemble spacer (28) over motor spindle then fit key (26). Fit appropriate pulley (27) to motor spindle, ensure that key

and keyway are lined up, secure using screw (23) and washer (25). Carefully fit the motor assembly, ensure that the top pulley picks up the belt correctly. Refer to 'Belt Tensioning' and proceed as detailed. After tensioning, Test Tool as detailed in Section

CONTROL TOP

To Dismantle

Unscrew and remove inlet adaptor (117), with any customer fitted connection. Unscrew end cap (127) exposing valve bush (123) and piston control valve (125). Using a thin wire hook pull out the valve bush with the piston control valve. Separate the valve from the bush and discard all 'O' rings.

The remainder of the dismantling is obvious with reference to the illustration. It is suggested that as each valve is removed it is placed in a container and identified for future use.

To Assemble

Assemble 'O' rings (126) to piston control valve then slide valve into the control valve bush (123). Fit 'O' rings (124) to valve bush and carefully fit the bush/valve assembly into the control top. Screw in end cap (127) and tighten to a torque of 10.8 to 13.5 Nm (8 to 10 lbf ft).

Refer to the illustration for locating the remaining valves and components noting the following points:

Position a spring (107) on the spigot of each button assembly (112 & 115) and stroke control valve (122) before assembly into control top.

Tighten all valves and plugs to a torque of 8.5 to 9.0 Nm (75 to 80 lbf in.).

Tighten inlet adaptor (117) to a torque of 31.0 to 36.0 Nm (23 to 27 lbf ft).

Ensure ' ' at 'O' rings (101) are greased before placing in their housings in control top bore. Place assembled control top in an airtight container until required, see General Assembly for details.

GEARBOX ASSEMBLY

To Dismantle

As the unit has already been partly dismantled, see General Assembly, it is only necessary to remove the piston (234) and the clamp nut (202) then push the internal components out of the motor case (233).

The gearbox assemblies can be dismantled using normal workshop practise when removing bearings from spigots. Identify your gearbox in the illustration and refer to it for order of dismantling.

NOTE: Spindle Nut (204) has a R.H. thread all other threads in this area are L.H.

To Assemble

Refer to the illustration to identify the components in the gearbox and order of assembly. Grease the bearings and gears on assembly. Tighten spindle nut (204) to a torque of 8.4 to 9.0 Nm (75 to 80 lbf in.).

Belt Tensioning

Fit clamp blocks to tool and clamp the tool vertical in vice with motor uppermost and pulley housing outward. Loosen the four motor clamping screws using a ring spanner on nut and a hexagon key on screw head.

Hold belt adjusting tool and push the knurled knob to top of slot away from location pins. Engage the knurled knobs threaded spindle with threaded hole in end of motor plate. Screw in spindle to motor plate until locations are aligned with the two mating holes at the bottom of the lower pulley housing. Push the adjuster up to engage the locating pins in the housing holes. Continue to turn the knurled knob and at the same time, rotate the chuck until the locking pin engages with tool lug preventing any further rotation of knob. Fully tighten the four motor clamping screws to lock motor in position. Push the belt adjusting tool downwards to disengage the locating pins and unscrew and remove the adjusting tool. Remove the tool from vice and clamps.

Changing the Drive Belt

NOTE: Refer to General Assembly for dismantling procedures.

Assemble the tool in a clamp and clamp horizontally in a bench vice. Remove the motor and the complete crosshead. Remove the top pulley housing by releasing the six screws. Remove the old belt, check that the new belt is the correct replacement. Fit the belt to the housing ensuring that it seats on the driven pulley.

Turn the tool in the vice so that it is vertical. Refit all removed parts, refer to General Assembly. Refer to Belt Tensioning and tension the belt as detailed.

TESTING AFTER ASSEMBLY

Required:

Hand Tachometer with a scale range to suit tool
Dial Test Indicator (D.T.I.) on stand
Mandrel— 51mm (2in.) long by 6.5mm (0.25) dia.
Spring Balance — capable of reading over 90kg (198.5lb)

Operation Test

Fit clamp blocks to the tool and clamp in a vice with the tool horizontally and control buttons uppermost. If used fit H.C.U. to provide thrust resistance. Set a gap of 40 mm (1.5 in.) between the stroke control valve and the stroke adjusting screw. Insert a few drops of oil into the air inlet and connect up the airline.