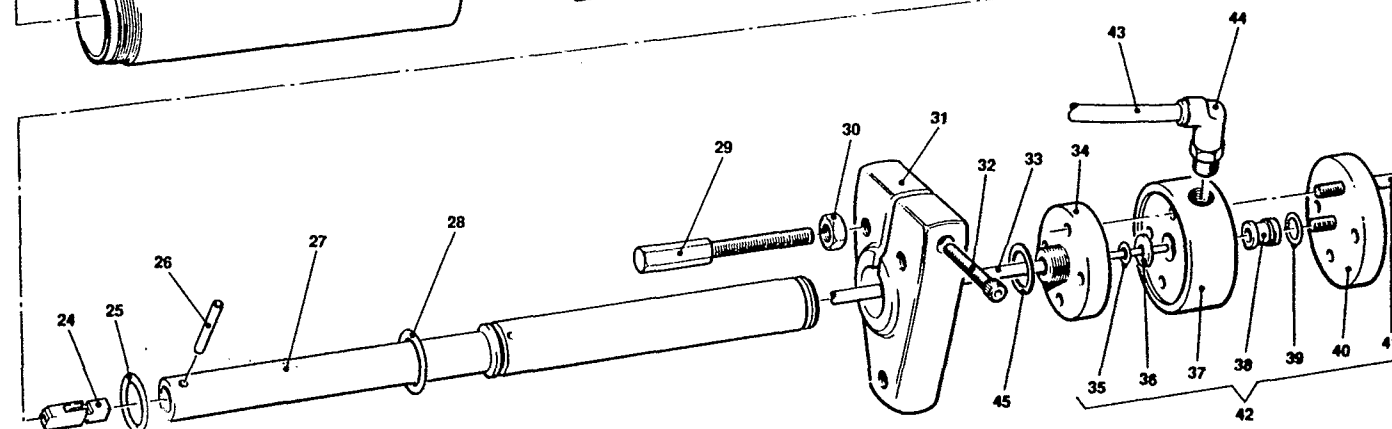
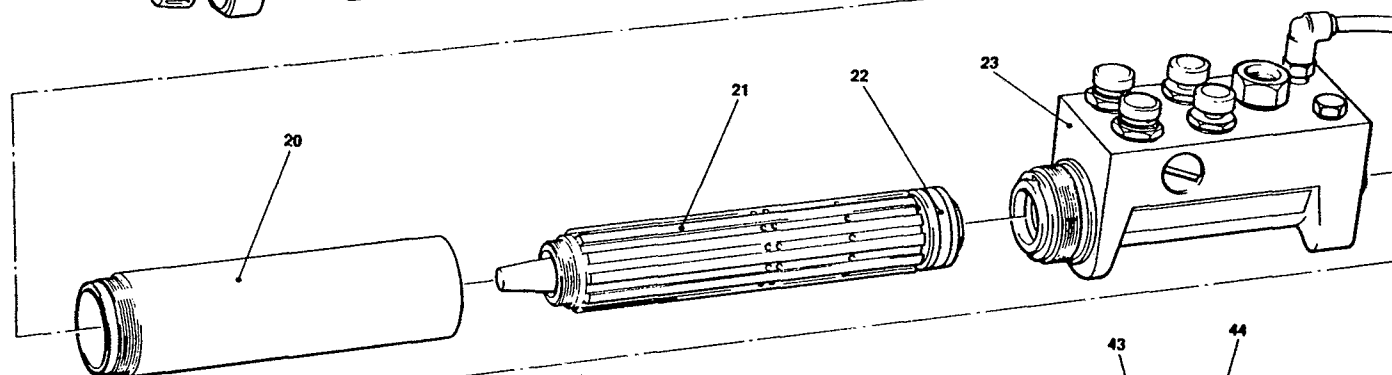
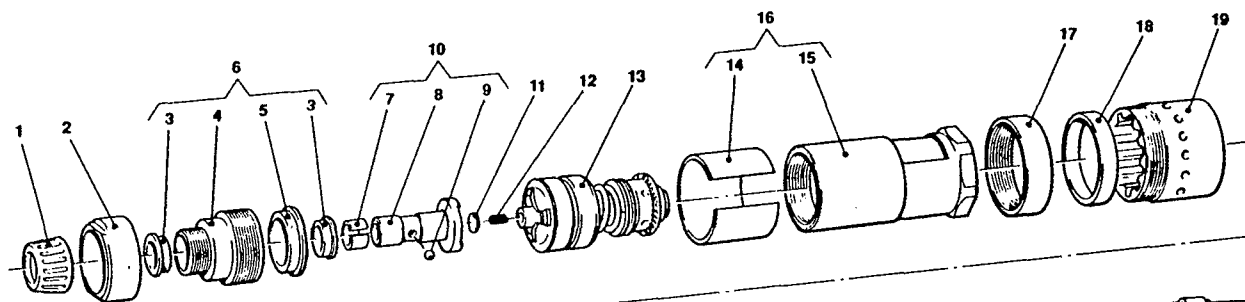


*Desoutter*



# AFS 21

**Automatic Feed  
Screwdriver**



Type

Code  
5/16in.

Code  
1/4in.

AFS 21-550	1360634	1360554
AFS 21-900	1353184	1353004
AFS 21-1500	1353344	1353264
AFS 21-2400	1353504	1353424

**Operating Instructions  
Servicing Instructions  
Parts List**

AFS21

## Parts List - Main Assembly

ArS21

## MOTOR AND GEARBOX

## To Dismantle

As the unit has already been partly dismantled, see Main Assembly, it is only necessary to remove the air inlet cap (233), L.H. thread and front bearing housing (200), L.H. thread, then push the internal components out of the motor case (230).

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

## To Assemble

The motor complete (229): Take the rotor (225) and place the rear bearing plate (223), with grooves to rotor, into position. Press bearing (222) onto the rotor so that there is a 0.038mm (0.0015in) gap between the rotor and the rear bearing plate. Holding the rotor and rear bearing plate assembly with the gear end of the rotor uppermost, slide the cylinder (224) over the rotor.

Locate the rotor blades (226) into their slots in the rotor and lubricate. Place the front bearing plate (223) into position, with grooves to rotor.

Place this sub-assembly, gear end of rotor spigot uppermost, onto a fixture which locates only on the rotor rear spigot. Align the location slot in both bearing plates with the pin holes in the cylinder and push on the front bearing (222). Press home until the bearing bottoms on the front bearing plate BUT do not preload the bearing. Locate the rear bearing housing (227) with its spring pin onto the motor, then press on the front bearing housing (221) making sure that the spring pins are correctly loaded. Check for free rotation of the rotor. Replace end cap (228).

The gear train: Refer to the illustration to identify the components in the gearbox and their order of assembly. Grease the bearings on assembly, fit push-rod (208). Ensure that gears engage correctly and rotate freely.

Engage the gearbox with the rotor gear and push the assembly into the motor case (230). Position distance spacer (204) or (217). Fit the greased 'O' ring (232) onto the air inlet cap (233). Screw air inlet cap and from bearing housing, both L.H. thread, onto the motor case, hand tight only. The final fitment of the air inlet cap and front bearing housing is detailed in the Main Assembly.

NOTE: Although detailed elsewhere, the air inlet cap (233) MUST be tightened onto the motor case (230) FIRST, and final clamping carried out by the front bearing housing (200).

Item No.	Part No.	Description	Qty				
				27	311793	Air Feed Tube	1
				* 28	37223	'O' Ring	1
1	74088	Thread Protection Cap - 7/8in thread	1	29	60923	Stroke Adjusting Screw	1
1	77163	Thread Protection Cap - 3/4in thread (Optional for Gravity Screwfeeder)	1	30	52473	Locknut 1/4in UNF	2
2	304003	Locknut	1	31	298863	Cross Head	1
3	73798	Bearing Bush - 7/8in	2	32	78283	Screw	1
	73798	Bearing Bush - 3/4in (Optional for Gravity Screwfeeder)	1	33	311823	Rear Push Rod - 28 3/4 in long	1
4	303983	Bearing Housing - 7/8in thread	1	34	256273	Base	1
	303983	Bearing Housing - 3/4in thread (Optional for Gravity Screwfeeder)	1	* 35	221973	'O' Ring	1
5	304013	Thrust Bearing	1	36	256263	Washer	1
6	304023	Bearing Housing Complete - 7/8in thread	1	37	256253	Valve Body	1
	304033	Bearing Housing Complete - 3/4in thread (Optional for Gravity Screwfeeder)	1	38	256283	Valve	1
7	86058	Spring Ring	1	* 39	43493	'O' Ring	1
8	296643	Bit Holder - 5/16in Hex	1	40	256243	Cover Plate	1
9	72408	Ball	1	41	236263	Screw	4
10	298043	Bit Holder Complete - 5/16in Hex	1	42	256233	Rear Valve Complete	1
11	304043	Disc	1	43	62862	Nylon Tubing (4mm)	
12	304483	Spring	1	44	62482	Elbow (4mm) - 1/8in BSP	2
13	296713	One Shot Clutch Assembly (Red Spring) - 1500rpm	1	45	76643	Shim (Used only if a guard is fitted)	A/R
	297023	One Shot Clutch Assembly (Green Spring) - 900rpm	1			Accessory Kit (Supplied)	
14	161253	Spring Ring	1		29932	Clutch Key	1
15	303973	Clutch Case	1		17843	Hex. Key for Item (53)	1
16	304533	Clutch Case Complete	1		53153	Hex. Key for Item (62)	1
17	302413	Thread Protection Cap	1		68138	Spanner for Item (50)	1
18	200843	Silencer Felt	1		268263	Spanner for Item (49)	1
19	302423	Spline Nose	1	* Indicates normal replacement items. It is recommended that adequate stocks are held for servicing requirements.			
20	303873	Outer Case	1	# Indicates updated parts.			
21	311853	Motor & Gearbox Complete - 2400rpm	1	Always quote tool number, serial number and spare part number when ordering spares.			
-	311834	Motor & Gearbox Complete - 1500rpm	1				
-	311833	Motor & Gearbox Complete - 900rpm	1				
-	314073	Motor & Gearbox Complete - 550rpm	1				
22	292513	Piston Seal	1				
23	302483	Control Top Complete 1/4in BSP	1				

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

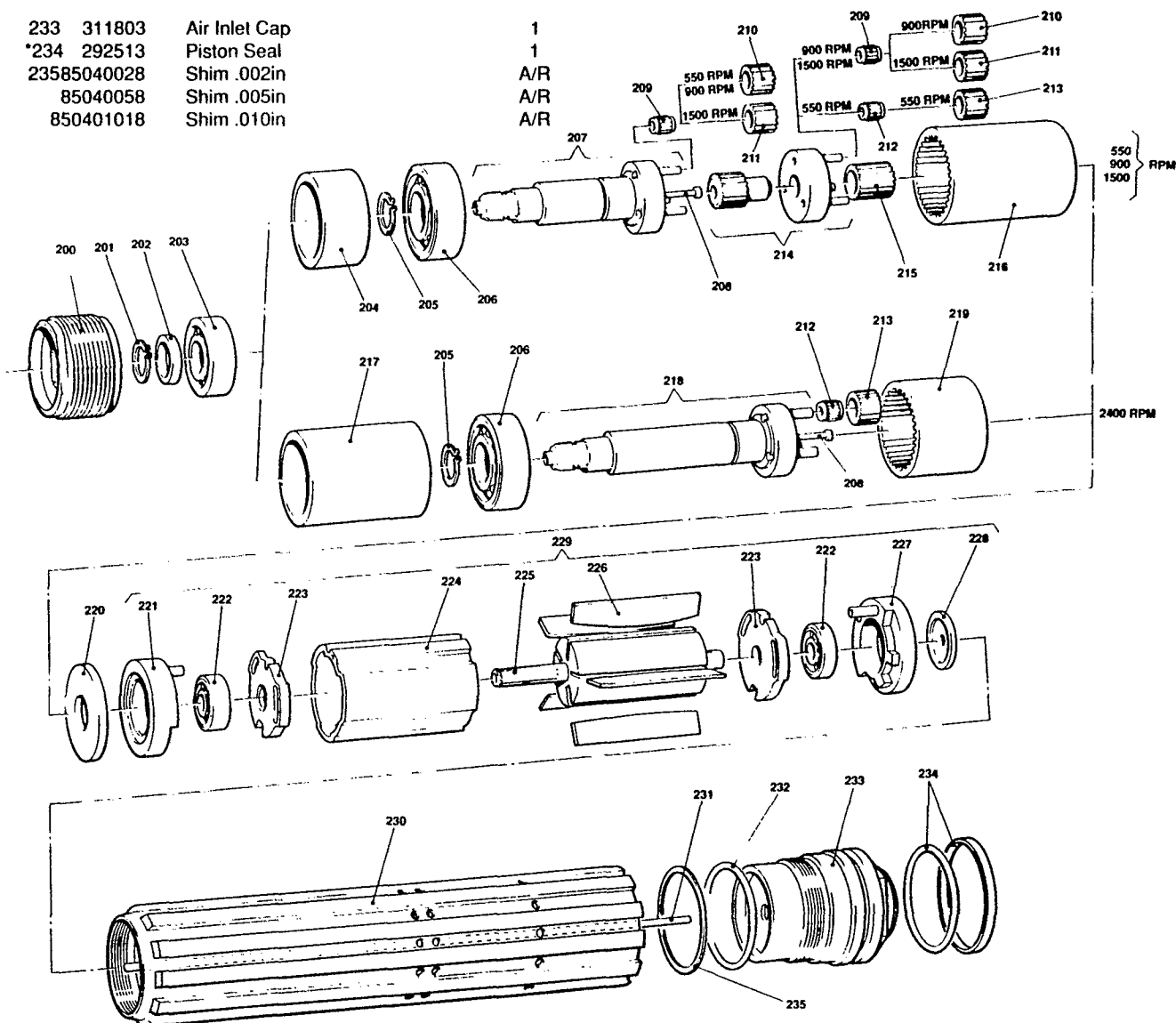
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## Parts List - Motor &amp; Gearbox

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Item No.	Part No.	Description	Qty
	200	237743 Front Bearing Housing	1
	201	42353 Circlip	1
	202	237333 Distance Collar	1
	203	178543 Bearing	1
	204	312313 Distance Spacer	1
	205	314593 Circlip	1
	206	2413 Bearing	1
	207	312263 Final Planet Carrier Complete - 550, 990rpm	1
	-	312243 Final Planet Carrier Complete - 1500rpm	1
	208	301533 Push Rod	1
	209	298893 Caged Needle Assembly - 500rpm	3
	-	298893 Caged Needle Assembly - 900, 1500rpm	6
	210	299093 Planet Wheel - 550rpm	3
	-	299093 Planet Wheel - 900rpm	6
	211	299073 Planet Wheel - 1500rpm	6
	212	251663 Caged Needle Assembly - 550rpm	3
	-	251663 Caged Needle Assembly - 2400rpm	3
	213	299113 Planet Wheel - 550rpm	3
	-	299113 Planet Wheel - 2400rpm	3
	214	306663 Planet Carrier Sub-Assembly - 550rpm	1
	-	306653 Planet Carrier Sub-Assembly - 900rpm	1
	-	306643 Planet Carrier Sub-Assembly - 1500rpm	1
	215	306543 Pinion - 900rpm	1
	-	306553 Pinion - 1500rpm	1
	216	306823 Gear Ring	1
	217	312303 Distance Spacer	1
	218	313333 Final Planet Carrier Sub-Assembly - 2400rpm	1
	219	306313 Gear Ring - 2400rpm	1
	220	306303 Washer	1
	221	304683 Front Bearing Housing and Pin	1
	222	33433 Bearing	2
	223	254873 Bearing Plate	2
	224	254853 Cylinder	1
	225	306523 Rotor 900rpm, 1500rpm	1
	-	306533 Rotor 550rpm, 2400rpm	1
	226	36613 Rotor Blade	5
	227	254913 Rear Bearing Housing	1
	228	270493 End Cap	1
	229	312193 Motor Complete 550, 2400rpm	1
	-	312183 Motor Complete 900rpm	1
	-	312173 Motor Complete 1500rpm	1
	230	312233 Motor Gear Case	1
	231	311903 Push Rod	1
	232	203423 'O' Ring	1

233	311803	Air Inlet Cap	1
*234	292513	Piston Seal	1
	23585040028	Shim .002in	
	85040058	Shim .005in	
	850401018	Shim .010in	



\* 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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Printed in England. 12.91

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## Operating Instructions

AFS21

### REQUIREMENTS

#### Air Supply - Main

A water free and filtered air supply is required, at a pressure of 6 bar (87 lbf/in<sup>2</sup>), with a flow rate of 8 l/s (20 cu.ft./min); controlled by a pressure regulator selected from the Desoutter Air Line Service Equipment Catalogue.

#### Air Supply - Remote Control

The basic requirements are as above but the pressure must be at least 2.7 bar (40 lbf/in<sup>2</sup>) and the flow rate of 0.47 l/s (1 cu.ft./min) when signalling. The signal duration should be kept to the minimum to reduce air consumption.

#### Lubrication

Correct lubrication is vital for the maximum performance of the tool and an air line lubricator 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

**Mounting Clamps:-** A range of clamps, base and columns are available. Full details will be found in the AFS leaflet.

**Guards:-** If guards are fitted, shims (45) are supplied as accessories to orientate the rear valve complete.

**Screwdriver bits/Sockets:-** A complete range of fittings are available. See the Desoutter Accessories Catalogue.

### OPERATING

#### Control Top (See Fig.(1))

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

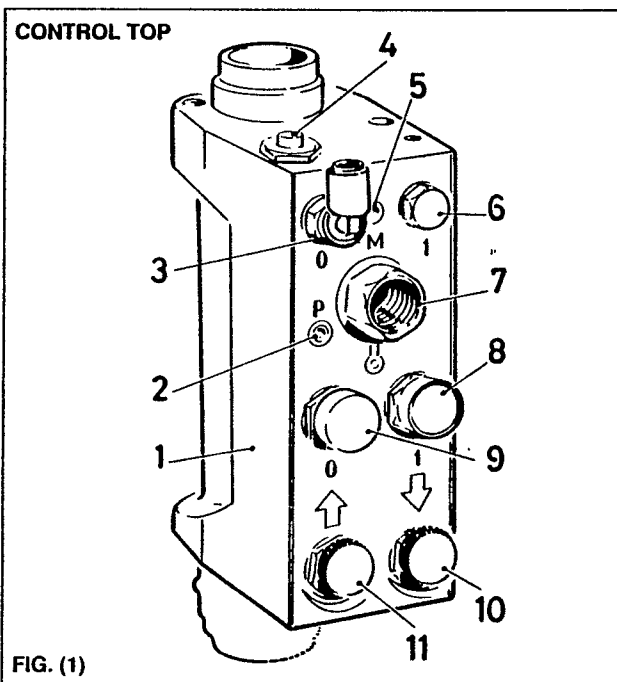


FIG. (1)

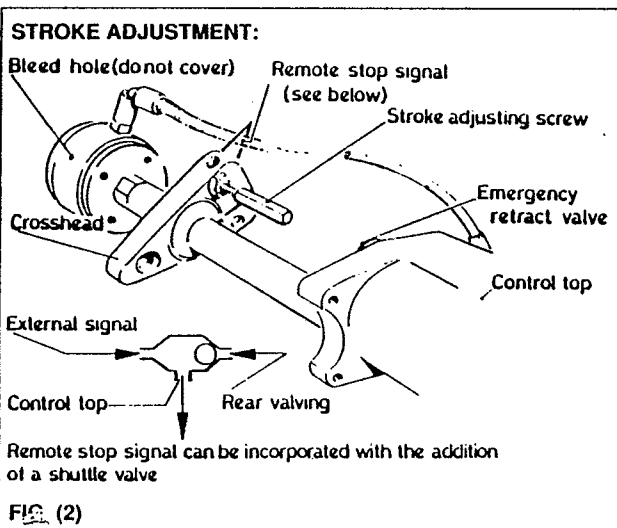


FIG. (2)

- Location 1:- Control Top  
 2:- 'P' port.  
 3:- 'O' port, tapped 1/8in BSP, receives internal signal to return the tool to start position.  
 4:- Emergency Retract Valve  
 5:- 'M' port tapped M5, signal produced when the motor is running, used for sequence control. By sensing this signal it can be determined that the tool cycle has commenced/finished.  
 6:- 'I' port tapped 1/8in BSP, receives external signal to start the tool cycle.  
 7:- Main air inlet port, tapped 1/4in BSP or NPT.  
 8:- Manual Start Button - Green.  
 9:- Manual Stop Button - Red.  
 10:- Advance Rate Regulating Screw.  
 11:- Retract Rate Regulating Screw.

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 screwdriver bit/socket must be at least 6mm (0.25in) above the work place.

WARNING: (1) Do not dismantle any part of the tool until the Dismantling and Assembly Instructions have been read and the sequence understood.

(2) Always disconnect the tool from the power supply before attempting any replacement, adjustment, servicing or dismantling.

(3) Ensure that no loose articles of clothing or cleaning material can be caught by the rotating parts of the tool.

(4) Always allow the tool to stop before removing work or resting the tool.

(5) Ensure that work piece is securely clamped before commencement of operation.

(6) Clear all loose items from vicinity.

(2)



AFS21

## Operating/Serviceing Instructions

ArS21

## INITIAL OPERATION

Mount the tool so that the drive end is 65mm (2.5in) above any obstruction.

Set a gap of 45mm (1.75in) between the emergency retract valve and the stroke adjusting screw. See Fig. (2).

Fully open the advance and retract rate regulating screws.

Connect the air supply.

Press the manual start button - green.

The drive end of the tool will advance until the stroke adjusting screw contacts the emergency retract valve, at this point the tool will retract to the start position.

Fully close the advance regulating screw.

Disconnect the air supply.

Rotate the clutch spring ring (14) and using the key supplied decrease the torque output to the minimum. (See Fig. (3)) below.

## CLUTCH ADJUSTMENT:

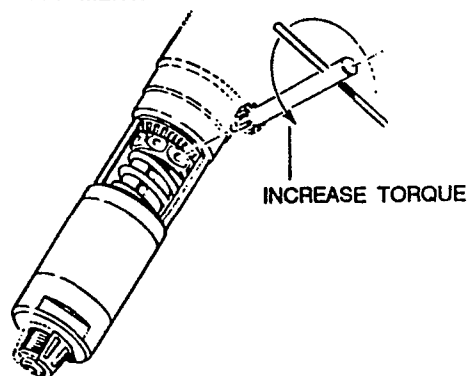


FIG. (3)

Place a trial fastening application in front of the tool.

Connect the air supply.

Press the manual start button.

Slowly open the advance rate regulating screw so that the tool advance is consistent with the thread pitch of the fixing. The screwdriver bit/socket starts to rotate as internal engagement is taken up just after the fixing is contacted.

NOTE (1) As the clutch has been set on the minimum setting the tool will return to the start position before the fixing is at the required torque. Repeat the above operation adjusting the clutch, in stages, until the correct position is obtained.

(2) In normal operation the tool will advance and tighten a fastener into a component, then at the required torque retract to the start position. Should the fastener be missing, for any reason, the emergency retract valve, triggered by the stroke adjusting screw will be activated. The emergency retract valve MUST be set to operate AFTER the normal retract position and BEFORE the bit/socket contacts the component surface.

When the above adjustments have been carried out the tool is ready to be put into service.

## SERVICING REQUIREMENTS

## General Notes

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

Use the following lubricants as indicated:

Oil - ISO Viscosity Classified - ISO VG 15, for motors.  
Grease - Duckhams Type Q5618, for gears, bearings and springs.  
Silicone Grease - Molykote 33, for 'O' rings and seals.

The majority of threads in this tool are right hand (R.H.) but some left hand (L.H.) threads will be found in the motor/gearbox and clutch case areas. All L.H. threads will be noted in the text.

The bearings in the motor have a retainer that holds the balls in place; when assembled the blank face of the retainers MUST face each other across the rotor.

For general servicing the splined nose (19) and the outer case (20) should be treated as a single item.

## Servicing Tools

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

Part No.	Description	Qty
207703	Clamp Block - Motor Case (Pair)	1
207713	Clamp Block - Outer Case (Pair)	1
-	Seal Expander - (Item 234)	1

The following torque values must be used:

Item No.	Description	Torque	Thread
1	Thread Protection Cap	Hand Tight	L.H.
2	Locknut to Bearing Housing (4)	20.40 to 24.00 Nm (15.00 to 18.00 lbf/ft)	R.H.
6	Bearing Housing to Clutch Case (15)	Adjustable to take any play in the clutch	L.H.
15	Clutch Case to Bearing Housing (4)	27.00 to 30.00 Nm (20.00 to 22.00 lbf/ft)	L.H.
19	Spline Nose to Outer Case (20)	54.00 to 61.00 Nm (40.00 to 45.00 lbf/ft)	R.H.
20	Outer Case to Control Top (23)	54.00 to 61.00 Nm (40.00 to 45.00 lbf/ft)	R.H.
42	Rear Valve, Complete to Air Feed Tube (27)	Hand Tight	R.H.
117	Inlet Adaptor	31.00 to 36.00 Nm (23.00 to 27.00 lbf/ft)	
127	End Cap	10.80 to 13.50 Nm (8.00 to 10.00 lbf/ft)	
200	Front Bearing Housing to Motor Case (230)	27.00 to 30.00 Nm (20.00 to 22.00 lbf/ft)	L.H.
230	Motor Case to Air Inlet Cap (233)	27.00 to 30.00 Nm (20.00 to 22.00 lbf/ft)	L.H.

## Cleaning

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

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

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## Servicing Instructions

AFS21

## MAIN ASSEMBLY

## To Dismantle

Disconnect the nylon tube (43) and remove the rear valve complete (42) by unscrewing the base (34) from the air feed tube (27). Withdraw the rear push rod (33), then slacken the crosshead clamping screw (32) and slide the crosshead assembly from the air feed tube.

Mount the outer case (20) between clamp blocks 207713 and clamp firmly into a vice. Using a suitable tool, unscrew the control top (23) and slide it off the air feed tube. Unscrew and remove the clutch case complete (16), L.H. thread, from the motor case. Unscrew locknut (2), R.H. thread, and clutch case (15), L.H. thread, from bearing housing (4) and withdraw items (6) to (13). Unscrew thread protection cap (17) from spline nose (19) and remove silencer felt (18). Remove the outer case from the vice and withdraw the motor, with air feed tube attached.

Mount the splined motor case (230) between clamp blocks 207703 and clamp firmly in a vice. Slacken front bearing housing (200), L.H. thread, and air inlet cap (233), L.H. thread. Remove from the vice and by hand unscrew the motor case, complete with internal components, from the air inlet cap. This leaves the air feed tube (27) and the air inlet valve (24) attached to the air inlet cap (233) by the location pin (26). Remove the 'O' ring (232) and the location pin from the air inlet cap and pull the air feed tube with air inlet valve from the air inlet cap. Retain the air inlet valve (24) for future use. Temporarily replace the air inlet cap on the motor case.

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

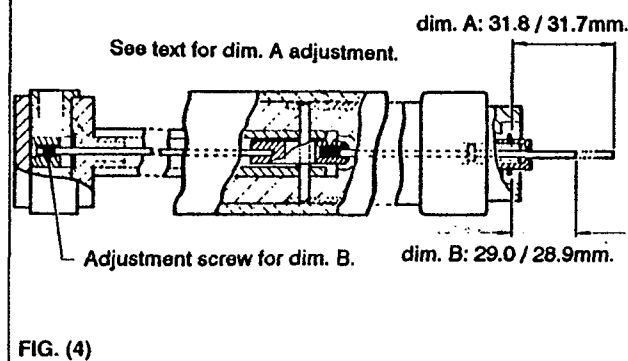
It will be necessary to cut the piston seal (22) to remove it from the motor.

## To Assemble

Take the motor and gear box complete (21) and unscrew by hand the air inlet cap (233), L.H. thread. Ensure that 'O' ring (232) is greased and located in the air inlet cap. Replace the air inlet cap and tighten to the specified torque, L.H. thread. Tighten the front bearing housing (200), L.H. thread, to the specified torque. Fit piston seal (22) onto the air inlet cap using the seal expander.

Fit push rod (231) into the motor through the air inlet cap.

## PUSH ROD ADJUSTMENT:



Position the air inlet valve (24) on the push rod and push fully forward into the air inlet cap. The protrusion of the push rod should be 31.8/31.7mm from the front of clip (201) on planet carrier complete (207), see Fig (4) dim. A. To obtain dim. A, add or subtract shims (235) to reposition the motor and gearbox complete.

Insert air feed tube into the air inlet cap. Align the holes in the air feed tube and the air inlet cap with the slot in the air valve and fit the location pin (26). Insert the motor and gearbox complete (21) into the outer case (20).

Check that the internal bore 'O' rings in control top assembly (23) are in position and covered in grease. Slide control top over the air feed tube and screw it to the outer case to the specified torque.

Fit crosshead assembly (31) to the air feed tube and align the stroke adjusting screw (29) with the emergency retract valve (122).

Feed the push rod (33) into the air feed tube and locate in the air inlet valve. Assemble the rear valve complete (42) and screw the base (34) onto the air feed tube, hand tight.

With the rear valve complete (42) in position an adjustment of the push rod setting is required. Push the front push rod (208) back until the valve (38) butts against the cover plate (40). The push rod protrusion should be 29.0/28.9mm, see Fig (4) dim. B.

If an adjustment is necessary, remove the three screws (41) and slacken the fourth screw to allow the cover plate to slide away. Adjust screw on valve body (37) as necessary. After adjustment replace screws 40, 41 and elbow 44, and nylon tube (43).

Replace silencer felt (18) in the spline nose and screw on the thread protection cap (17). Screw the clutch case complete (16) onto the motor and gearbox complete (21) to the specified torque. Insert the one shot clutch assembly (13), spring (12) and disc (11).

Make up sub-assemblies (6) and (10) and place into the appropriate locations. Screw the bearing housing complete (6) onto the clutch case (15), L.H. thread, until all the end play in the one shot clutch assembly is removed. Secure with locknut (2) to the specified torque. Replace the thread protection cap (1).

## 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 (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 specified torque.

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 emergency retract 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 specified torque.

Ensure that '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 Main Assembly for details.

(4)