

Repair Manual

# **EK 145 NK Air Ends**





Repair Manual

# **EK 145 NK Air Ends**



DL040AA - 01/2005

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# 1 Introduction

## 1.1 Foreword

- 1.1.1 These compressors are intended for compressing atmospheric air and are not suitable for compressing any other gas. They are designed and manufactured to give optimum performance, with long life and reliability.
- 1.1.2 This manual is intended for use by CompAir - approved service personnel and gives all the information necessary to dismantle and re-assemble the compressor unit safely and effectively.
- 1.1.3 Servicing facilities and the supply of genuine replacement parts are provided through a worldwide network of CompAir Distributors, backed up by the Service and Parts departments at Redditch. If replacement parts are needed, the local Distributor should be contacted in the first instance.

- 1.1.4 The information given in this manual was correct at the time of printing but modifications to parts and procedures may be made without notice which could affect the procedures described in this manual. Before undertaking any work, the user is advised to contact the local CompAir Distributor who is supplied with revised and up-dated information.
- 1.1.5 In any communication concerning the compressor it is essential to quote the MODEL and SERIAL NUMBER.

Item	Part No.	Description	Item	Part No.	Description
3	A10213374	Rotor Casing	23	A93575260	Locknut *
4	A10214774	Bearing Housing	24	A93574770	Locknut *
5	A10216274	Delivery End Cover	25	A93049170	Cylind.Screw * +
6	A10213774	Front Cover	26	A93321740	Spacer Ring *
7	A10216374	Split Spacer Ring *	27	A93321750	Spacer Ring *
8	A10216474	Split Spacer Ring *	28	A93160940	Key +
9	A93573630	Waved Washer *	31	A93015110	Hex. Head Screw *
10	A93573640	Waved Washer *	32	A10215774	Spacer Ring +
11	A93575550	Cylind.Roller Bear. *	33	A93060030	Locking Screw *
12	A93572970	Cylind.Roller Bear. *	45	A93321340	Adjusting Washer +
13	A93574550	Cylind.Roller Bear. *	46	A93061910	Locking Screw *
14	A93575530	Cylind.Roller Bear. *	47	A93189050	Sealing Ring *
15	A93574530	4-Point Bearing. *	48	A93060320	Locking Screw *
16	A93575540	4-Point Bearing. *	49	A10215374	Male Rotor
17	A93343510	Felt Ring +	50	A10215474	Female Rotor
18	A05351574	Inner Ring +	51	A93189460	Sealing Ring *
19	A93221230	Oil Seal +	52	A93060380	Locking Screw *
20	A93147410	Circlip * +	53	A93189550	Sealing Ring *
21	A93146280	Circlip *	54	A93189460	Sealing Ring *
22	A93154780	Cylind.Pin			

### Key to Figs. 1.1 and 1.2

\* Part of Air End Repair Kit Nr. A110212974.

+ Part of Air End Oil Seal Kit Nr. A1000004669.

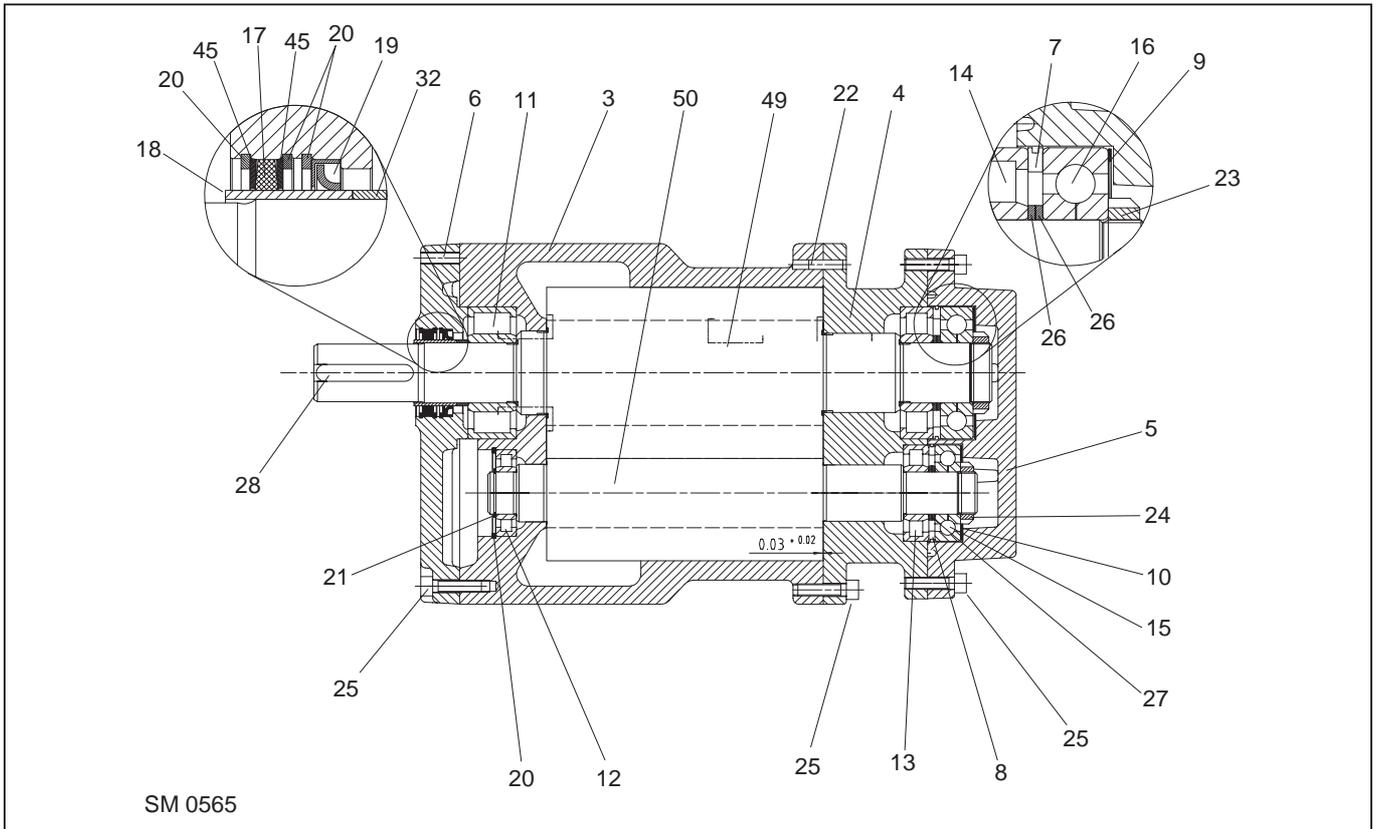


Fig 1.1 - EK 145 NK Air End - Sectional Arrangement

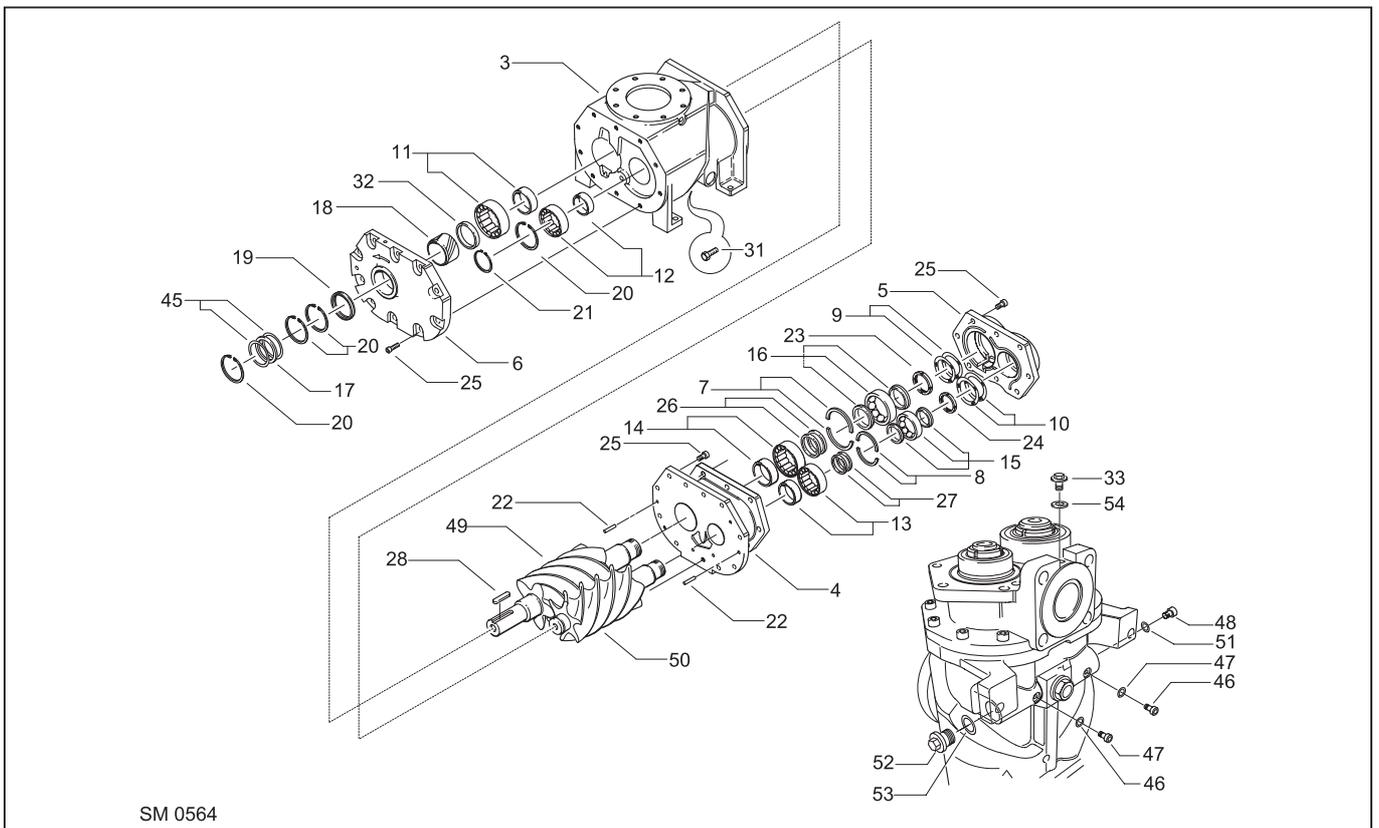


Fig 1.2 - EK 145 NK Air End - General Arrangement

## 2 Safety Procedures

### 2.1 General

- 2.1.1 Most accidents which occur during the operation and maintenance of machinery are the result of failure to observe basic safety rules or precautions. An accident can often be avoided by recognising a situation that is potentially hazardous.
- 2.1.2 When handling, operating or carrying out maintenance on the unit, personnel must use safe engineering practices and observe all relevant local health and safety requirements and regulations. The attention of users in the UK is drawn to the Health and Safety at Work Act, 1974, the Regulations of the Institution of Electrical Engineers and the Pressure Systems and Transportable Gas Container Regulations 1989.
- 2.1.3 CompAir cannot anticipate every possible circumstance which might represent a potential hazard. The **WARNINGS** in this manual are therefore not all-inclusive. If the user employs an operating procedure, an item of equipment or a method of working which is not specifically recommended by CompAir he must ensure that the unit will not be damaged or made unsafe and that there is no risk to persons or property.
- 2.1.4 The standard builds of all CompAir products are not intended for use in either explosive or potentially explosive atmospheres as defined in Directive 94/9/EC. An explosive atmosphere is a mixture with air, under atmospheric conditions, of flammable gases, vapours, hazes or dust in which, after ignition has occurred, combustion propagates to the entire unburned mixture and may cause a hazard. A potentially explosive atmosphere is an atmosphere which could become explosive due to local conditions.
- 2.1.5 Failure to observe the precautions given under 'Safety Procedures' may be considered dangerous practice or misuse of the compressor unit.

### 2.2 Warnings, Cautions and Notes

#### 2.2.1 Warnings

Warnings call attention to operations or procedures involving specific hazards which could cause injury or death and are identified by the following symbols on the unit and in the text of the manual.



WARNING: RISK OF DANGER



WARNING: RISK OF ELECTRIC SHOCK



WARNING: RISK OF HOT SURFACES



WARNING: CONSULT MANUAL



WARNING: RISK OF HIGH PRESSURE

#### 2.2.2 Cautions

Incorrect operational procedures causing possible damage to the compressor unit are identified by a '**Caution**' in the text of this manual.

#### 2.2.3 Notes

Methods to make the job easier and points which require particular attention are identified by a '**Note**' in the text of this manual.

## 2.3 Safety Precautions

- 2.3.1 When using cleaning solvents, local Health and Safety regulations must be complied with. Provide good ventilation and use suitable protection such as a breathing filter mask, safety glasses, protective apron and gloves.
- 2.3.2 Safety footwear should be compulsory in all workshops. Safety helmets must be worn if there is any risk of falling objects.
- 2.3.3 If using compressed air for cleaning purposes, ensure safety regulations are complied with and appropriate clothing and eye protection is worn.
- 2.3.4 Never direct compressed air onto your skin or at other people.
- 2.3.5 Never use compressed air to clean loose dirt from clothing.
- 2.3.6 Before releasing compressed air through a hose make sure that the free end is held securely so that it cannot whip and cause injury.
- 2.3.7 Avoid injury by using a hoist to lift heavy loads. Check that all chains, hooks, shackles and slings are in good condition and are of the correct capacity. They must be tested and approved according to local safety regulations.
- 2.3.8 Cables, chains or ropes must never be applied directly to lifting eyes. Always use an appropriate shackle or hook, properly positioned. Arrange lifting cables so that there are no sharp bends.
- 2.3.9 Use a spreader bar to avoid side loads on hooks, eyes and shackles.
- 2.3.10 When a load is on a hoist, stay clear of the danger area beneath and around it. Keep lifting acceleration and speed within safe limits and never leave a load hanging on a hoist for longer than is necessary.
- 2.3.11 A hoist should always be used to lift in a perpendicular direction. If lifting at an angle cannot be avoided take precautions to prevent the load swinging. This can be achieved by using two hoists, each lifting at not more than 30° from the vertical.
- Note:** This will reduce the safe working load capacity of the hoists.
- 2.3.12 Always use tools that are in good condition and be sure you understand how to use them properly before starting any service work. Use the correct tool for each job. Knowledge of the

proper use of tools and their limitations, coupled with common sense, can prevent many accidents.

- 2.3.13 Special service tools are available for some specific jobs and should always be used when recommended. This will save time and prevent damage to components.

## 2.4 Maintenance Precautions.

- 2.4.1 When disposing of condensate, old oil, used filter elements and other parts and waste material of any kind make sure that there is no pollution of any drain or natural water-course and that no burning of waste take place which could cause pollution of the air. Protect the environment by using only approved methods of disposal.
- 2.4.2 Use only CompAir Genuine Parts.
- 2.4.3 Bearing components must be matched with their boxed counterparts and not interchanged with other bearing assemblies.
- 2.4.4 Keep a written record of all maintenance and repair work carried out on the air end. The frequency and nature of the work required over a period can reveal adverse operating conditions which should be corrected.
- 2.4.5 Use only lubricating oils and greases approved by CompAir. Make sure that the selected lubricants comply with all relevant safety regulations, especially with regard to the risk of explosion or fire and the possibility of decomposition or the generation of hazardous gases.
- 2.4.6 Always clean up oil spills before and after maintenance work.
- 2.4.7 Make sure that all instructions concerning operation and maintenance are strictly followed and that the complete unit, with all accessories and safety devices, is kept in good running order.
- 2.4.8 Maintenance, overhaul and repair work must only be carried out by competent personnel under a qualified supervisor.
- 2.4.9 Never use a light source with an open flame to inspect any part of the unit.
- 2.4.10 Only use lint free cloth when cleaning components and ensure that hands, tools and work surfaces are clean and free from sand, grit or other abrasive particles.

2.4.11 After completion of repair or maintenance work ensure that no tools, loose items or cloth are left on or inside any part of the air end.

2.4.12 Do not use any flammable liquid to clean air pipes or any components carrying a flow of air during normal operation. If chlorinated hydrocarbon non-flammable fluids are used for cleaning, safety precautions must be taken against any toxic vapours which may be released.

2.4.13 **Do not use carbon tetrachloride**

2.4.14 Precautions must be taken when using acids, alkalis and chemical detergents for cleaning machine parts and components. These materials cause irritation and are corrosive to the skin, eyes, nose and throat. Avoid splashes and wear suitable protective clothing and goggles. Do not breath mists. Ensure that water and soap are readily available.

2.4.15 When disposing of condensate, old oil, used filter elements and other parts and waste material of any kind make sure that there is no pollution of any drain or natural water-course and that no burning of waste takes place which could cause pollution of the air. Protect the environment by using only approved methods of disposal.

## 2.5 Precautions In The Event Of Fire

2.5.1 **Use extreme caution when handling components that have been subjected to fire or very high temperatures.** Some components may contain fluoroelastomer materials which decompose under these conditions to form highly corrosive residues. Skin contact can cause painful and penetrating burns resulting in permanent skin and tissue damage.

### 3 Dismantling

**Note:** Annotation numbers in brackets in the following text refer to items detailed in Figs. 1.1 and 1.2

#### 3.1 Remove Front Cover

3.1.1 Mount the air end on a rotating assembly fixture with drive end uppermost.

**Note:** Position a drip tray under the assembly fixture to catch any oil from the air end during dismantling.

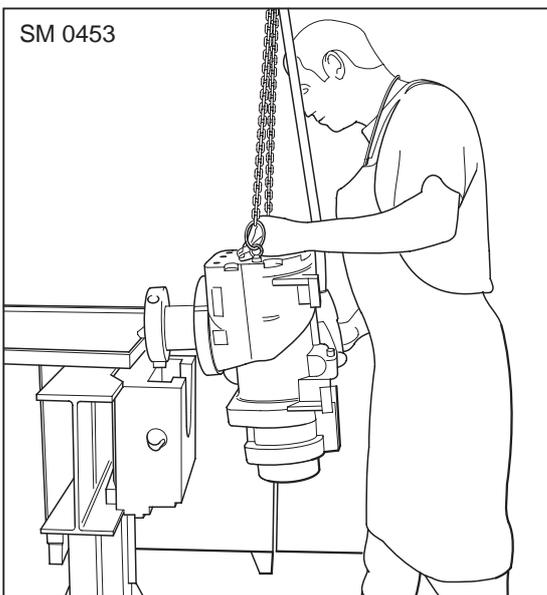


Fig 3.1 - Rotor Casing on Assembly Fixture

3.1.2 Remove the key of the drive shaft.

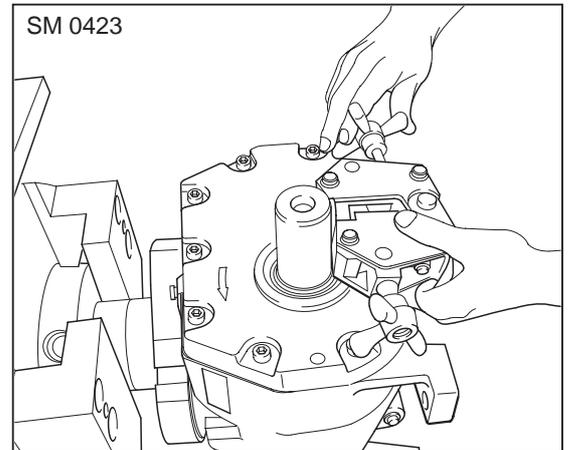


Fig 3.2 - Removing Drive Key

3.1.3 Unscrew and remove the capscrews M10x40 (25) securing the front cover (6).

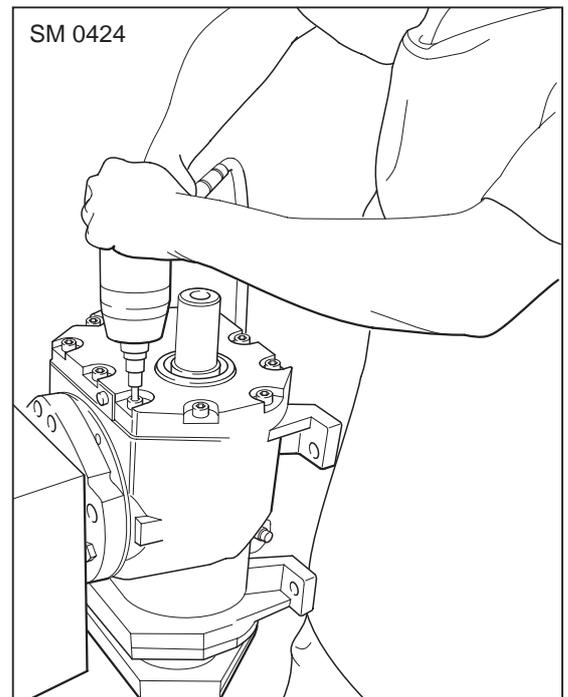
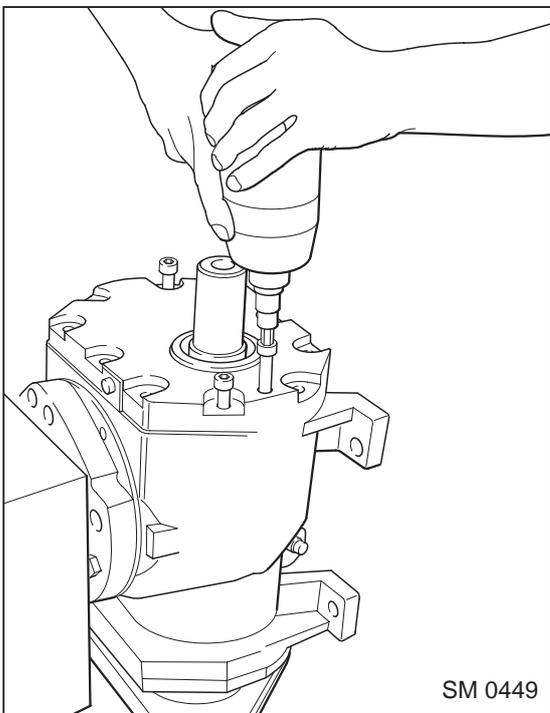


Fig 3.3 - Removing Front Cover Capscrews

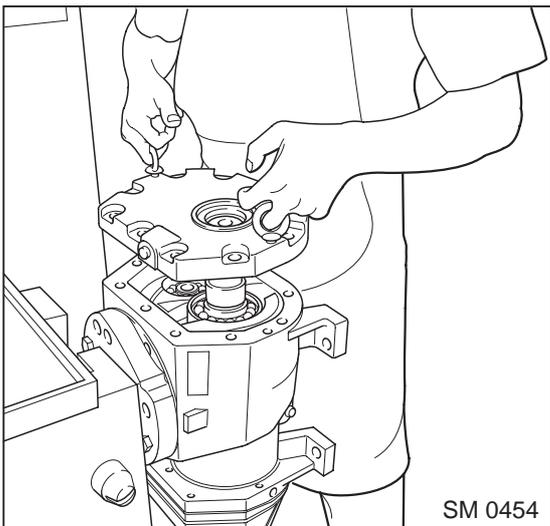
- 3.1.4 Loosen the cover (6) from rotor casing (3) with help of jacking screws (2 x M10-threaded holes).



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**Fig 3.4 - Loosening Front Cover**

- 3.1.5 Screw eye bolts into the M10 holes in the cover (6) and lift it off (if necessary, use lifting tackle.)

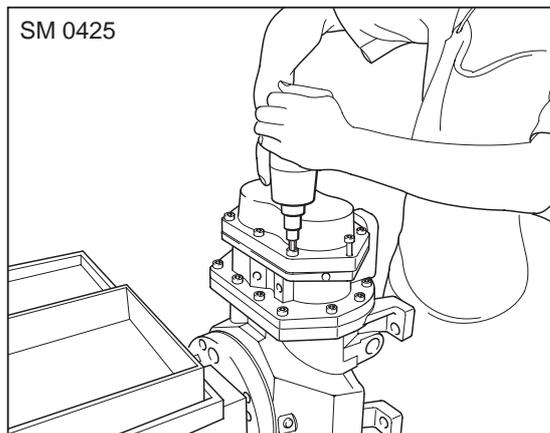


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**Fig 3.5 - Lifting Off Front Cover**

### 3.2 Remove Delivery Bearing Housing

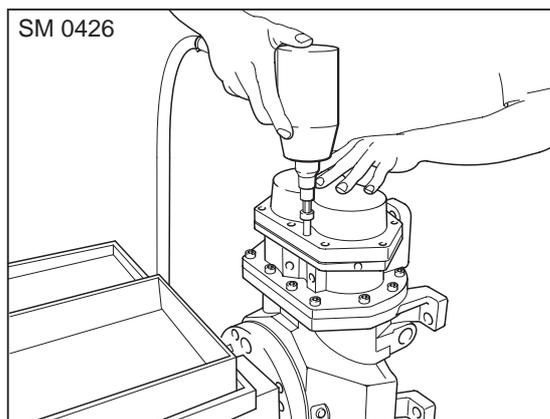
- 3.2.1 Turn the air end on the rotating fixture 180° so that the delivery end is now uppermost.
- 3.2.2 Unscrew and remove the capscrews M10x40 (25) securing the delivery end cover (5).



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**Fig 3.6 - Loosening Delivery End Cover**

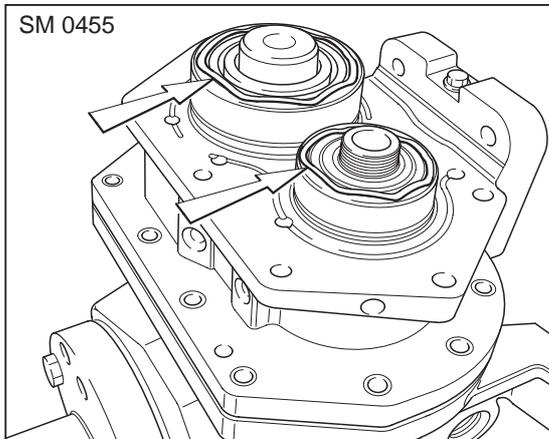
- 3.2.3 Loosen the cover (5) from bearing housing (4) with help of jacking screws (2 x M10 threaded holes).
- 3.2.4 Screw eye bolts into the M10 holes in the delivery end cover (5) and lift it off with the aid of lifting tackle.



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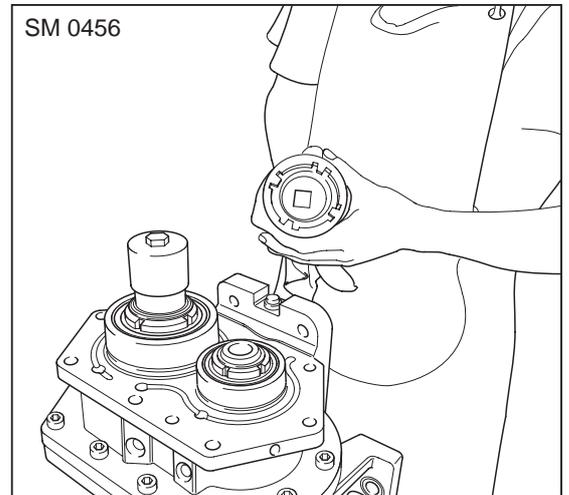
**Fig 3.7 - Removing Delivery End Cover**

3.2.5 Remove the waved spring washers (9) and (10).



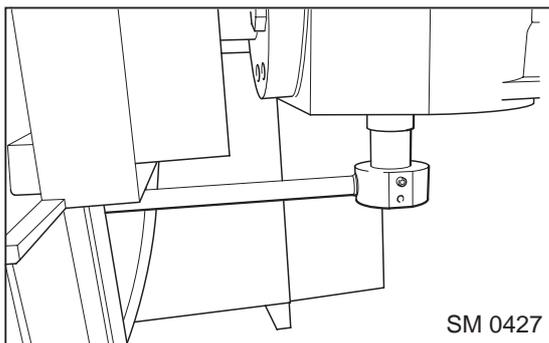
**Fig 3.8 - Waved Spring Washers**

3.2.7 Install the guide bush (for locknut spanner) into the centre tapping of the male rotor.



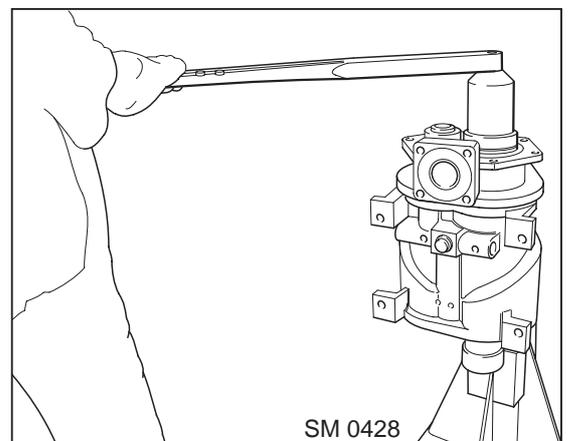
**Fig 3.10 - Fitting Guide Bush for Locknut Spanner on Male Shaft**

3.2.6 Fit the shaft locking tool on the drive end of the male rotor shaft.



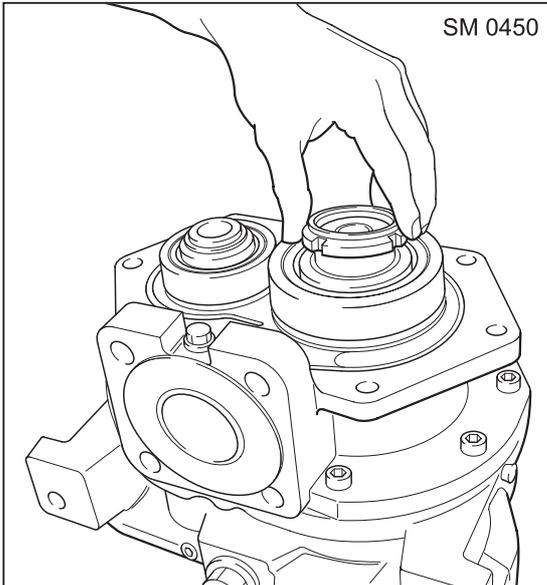
**Fig 3.9 - Shaft Locking Tool**

3.2.8 Loosen the shaft locknut (23) on the male rotor using a special locknut spanner.



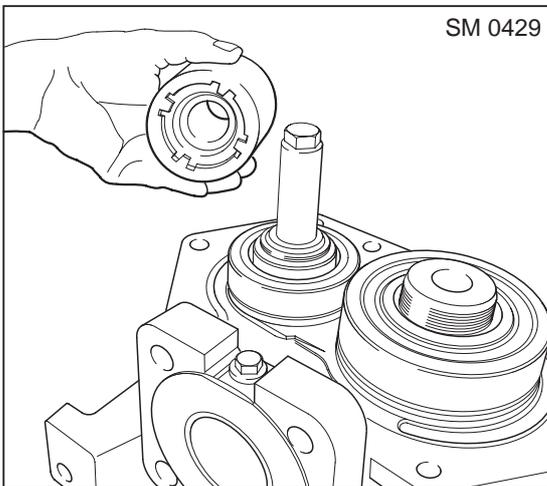
**Fig 3.11 - Loosening Male Shaft Locknut**

3.2.9 Unscrew and remove the locknut.



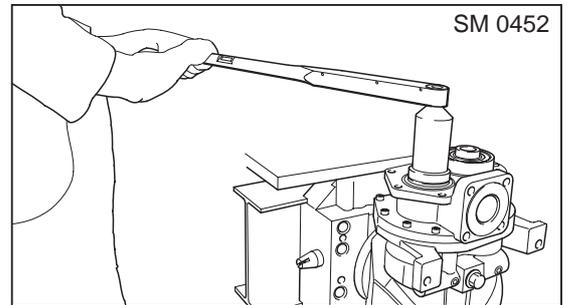
**Fig 3.12 - Removing Locknut from Male Shaft**

3.2.10 Install the guide bush (for locknut spanner) into the centre tapping of the female rotor.



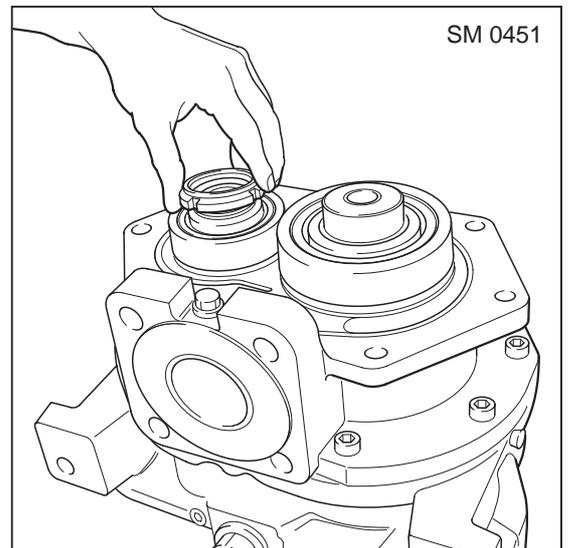
**Fig 3.13 - Fitting Guide Bush for Locknut Spanner on Female Shaft**

3.2.11 Loosen the shaft locknut (24) on the female rotor using a special locknut spanner.



**Fig 3.14 - Loosening Female Shaft Locknut**

3.2.12 Unscrew and remove the locknut.



**Fig 3.15 - Removing Locknut from Female Shaft**

3.2.13 Remove the shaft locking tool.

3.2.14 Unscrew and remove the capscrews M10 x 40 (25) securing the bearing housing, using a special spanner (only the capscrews at the side).

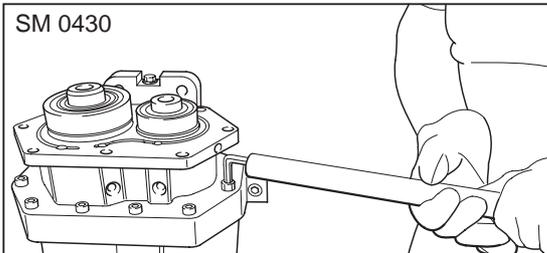


Fig 3.16 - Removing Side Capscrews

3.2.15 Unscrew and remove the rest of the capscrews M10x40 (25) securing the bearing housing.

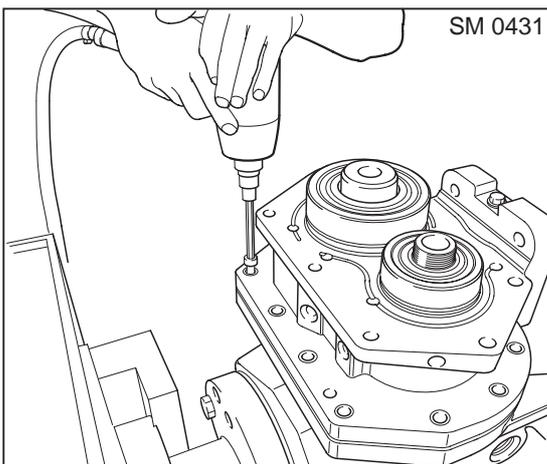


Fig 3.17 - Removing Remaining Capscrews

3.2.16 Unscrew and remove the one hexagon head screw M10 x 30 (31) below the outlet.



**Caution:** Do not forget to do this.

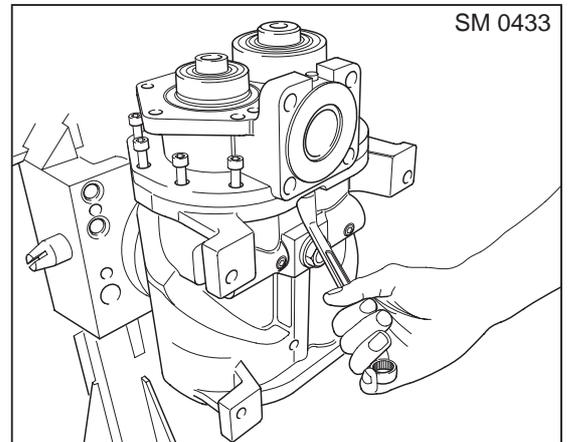


Fig 3.18 - Removing Hexagon Head Screw

3.2.17 Loosen the bearing housing (4) from rotor casing (3) with help of jacking screws (2 x M10 threaded holes).

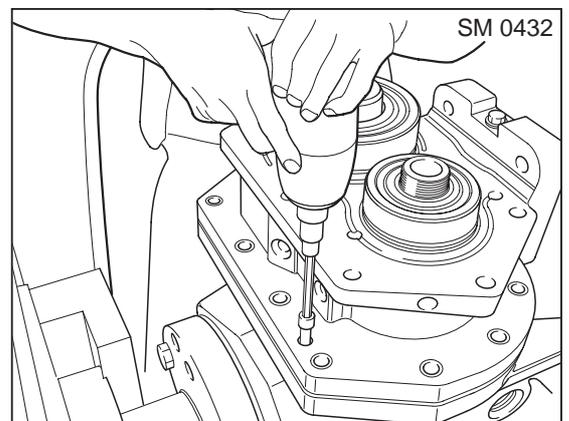
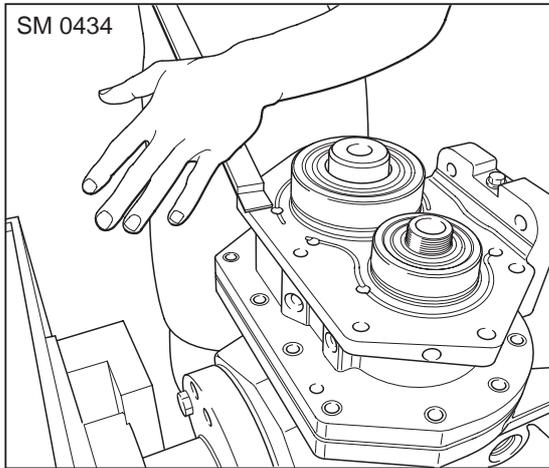


Fig 3.19 - Loosening Bearing Housing

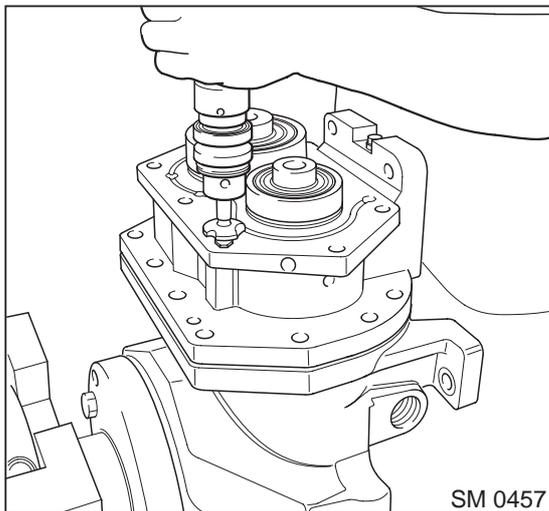
- 3.2.18 Thoroughly clean the face of the delivery bearing housing (4) and remove any residual Loctite using a plain scraper, an oilstone and degreaser spray.



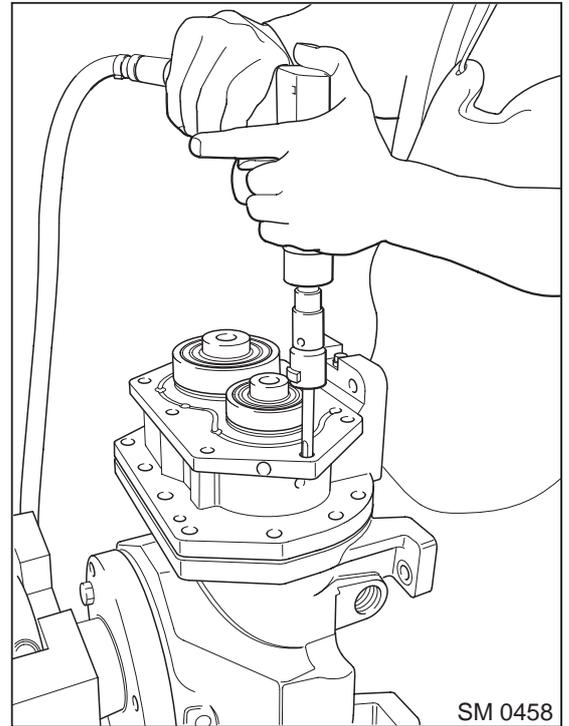
**Fig 3.20 - Cleaning Face of Bearing Housing**

- 3.2.19 Counterbore all holes to remove any burrs, then run a tap down the tapped holes (M10) in the face to clean up the threads.

**Note:** This is a necessary preparation for fitting the hydraulic press fixture (see next step).

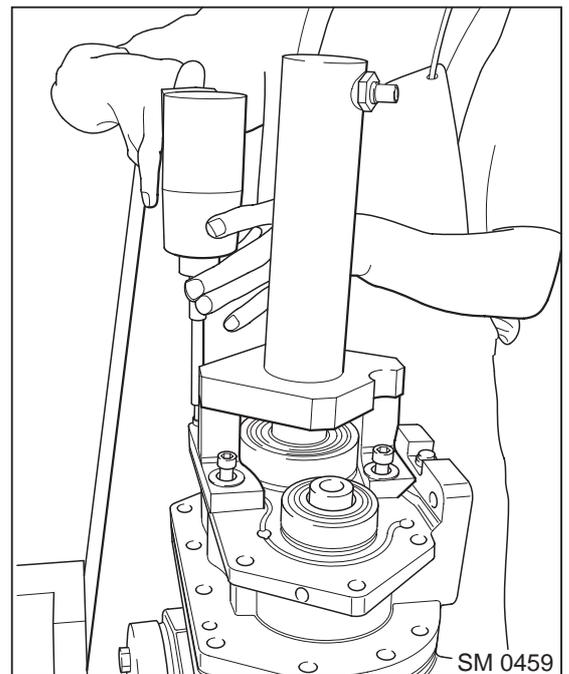


**Fig 3.21 - Counterboring Tapped Holes**



**Fig 3.22 - Cleaning Out Tapped Holes**

- 3.2.20 Assemble the hydraulic press fixture on the male rotor side as shown. Use 4 securing bolts (M10).



**Fig 3.23 - Assembling Hydraulic Press Fixture**

3.2.21 Press the male rotor (49) out of the delivery end bearing housing using the hydraulic press.

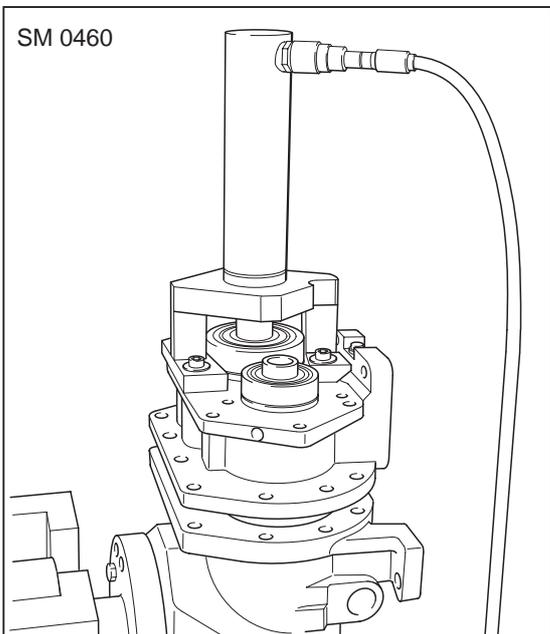


Fig 3.24 - Pressing Out Male Rotor



**Caution:** Place wooden blocks underneath the bearing housing which will have lifted while using the hydraulic press.

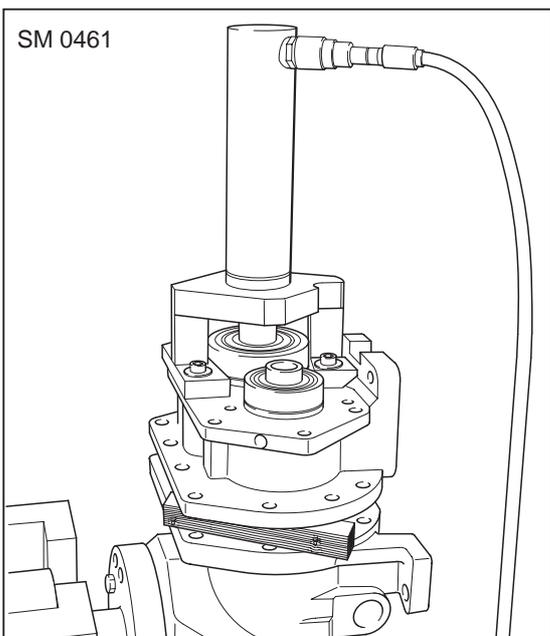


Fig 3.25 - Wooden Supporting Blocks In Place

3.2.22 Lift off the pressed-out 4-point bearing (16).

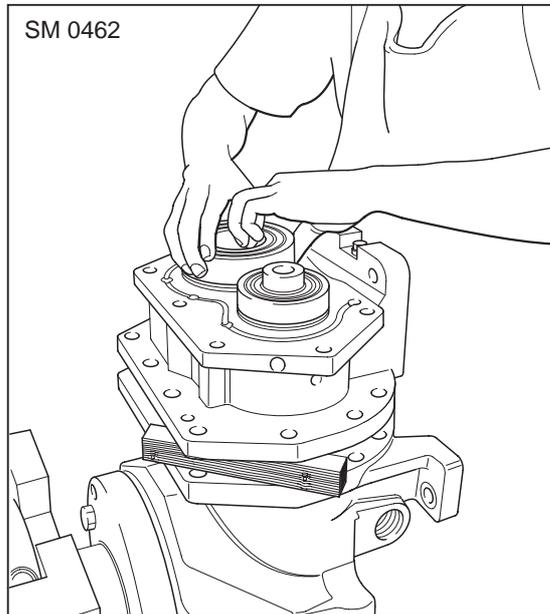


Fig 3.26 - Removing Pressed-Out Bearing

3.2.23 Now assemble the hydraulic press fixture on the female rotor side. Use 4 securing bolts (M10).

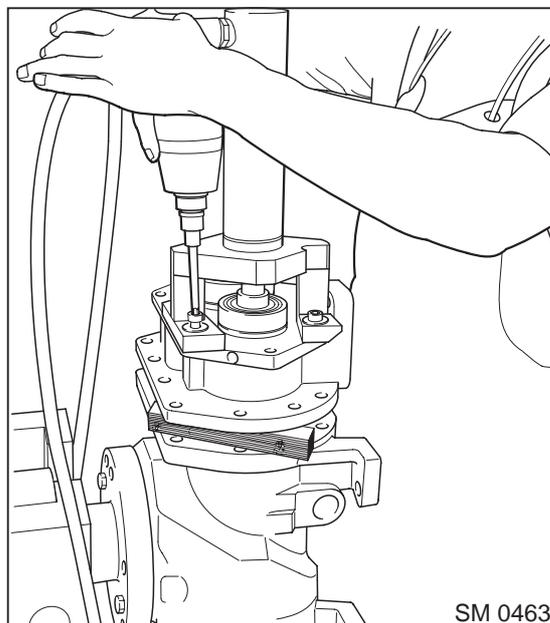
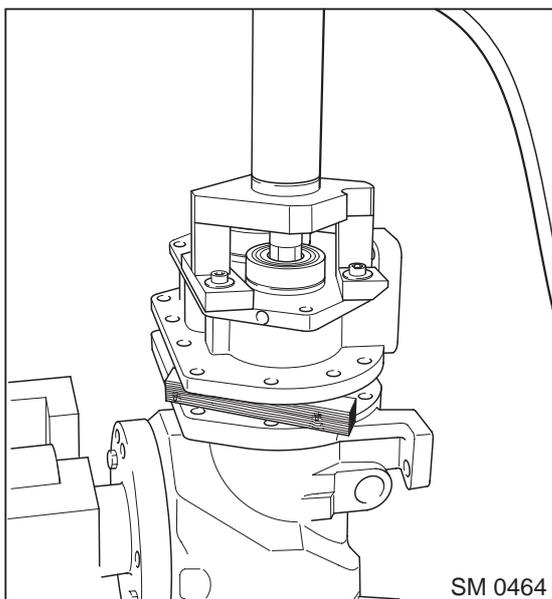


Fig 3.27 - Hydraulic Press Fixture

- 3.2.24 Using the hydraulic press, press the female rotor (50) out of the delivery end bearing housing.

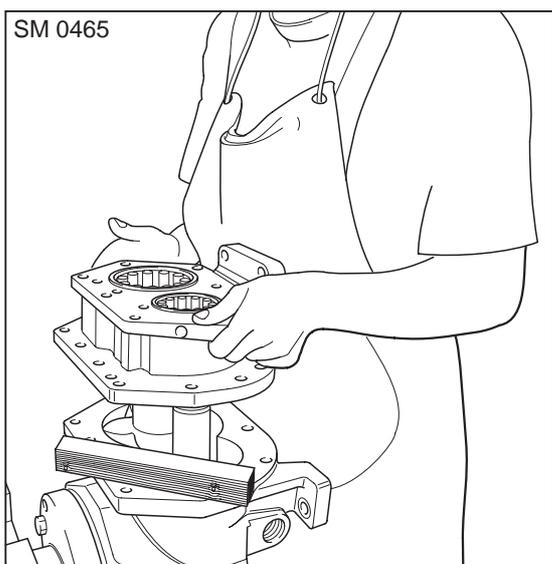
**Note:** Install a pad between the hydraulic cylinder and the end of the female rotor shaft.



SM 0464

**Fig 3.28 - Pressing Out Female Rotor**

- 3.2.25 Dismantle the hydraulic press fixture and lift off the pressed-out 4-point bearing (15).
- 3.2.26 Screw two M10 eye bolts into the bearing housing and lift it off. If necessary, use lifting tackle.

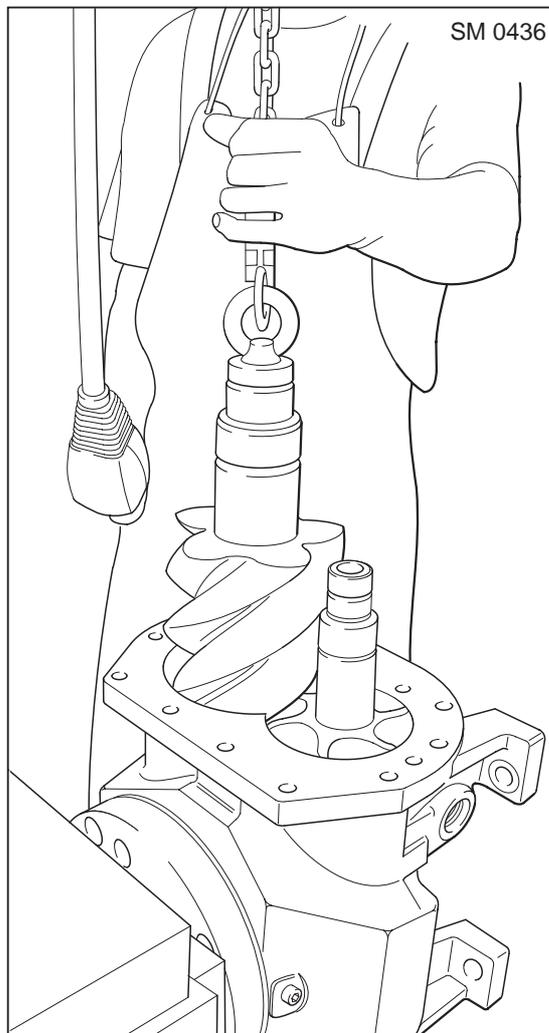


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**Fig 3.29 - Lifting Off Delivery Bearing Housing**

### 3.3 Remove Rotors From Casing

- 3.3.1 Screw an eye bolt into the centre tapping of the male rotor (49) and lift it carefully out of the rotor casing.



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**Fig 3.30 - Lifting Out Male Rotor**

- 3.3.2 Do the same with the female rotor (50). If necessary, screw an eye bolt into the centre tapping of the female rotor and lift it carefully out of the rotor casing.

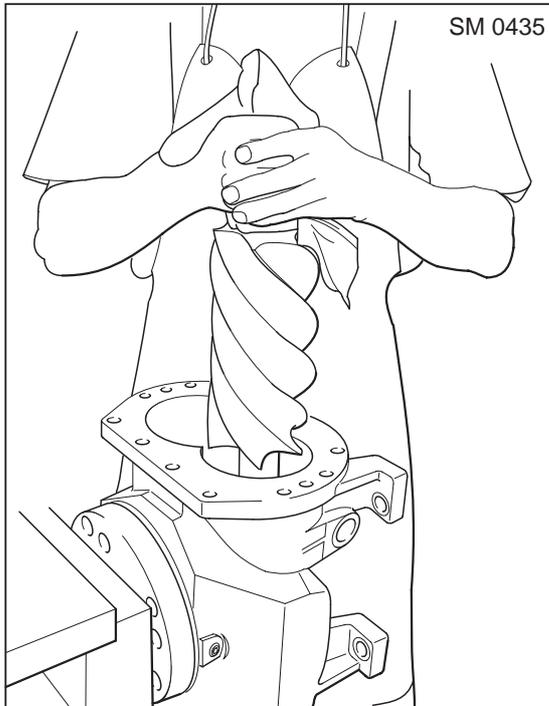


Fig 3.31 - Lifting Out Female Rotor

- 3.3.3 Pull spacer rings (26) and (27) off the delivery ends of both rotors.

**Note:** These rings (26) and (27) could be used again after cleaning.

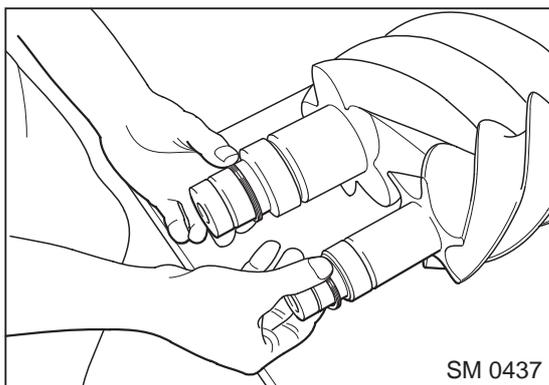


Fig 3.32 - Removing Spacer Rings

### 3.4 Remove Dowel Pins

- 3.4.1 Remove the two dowel pins 8m6x28 (22) from the rotor housing using a special tool.

**OR:**

if the dowel pins remain in the bearing housing, go to section 3.4.2

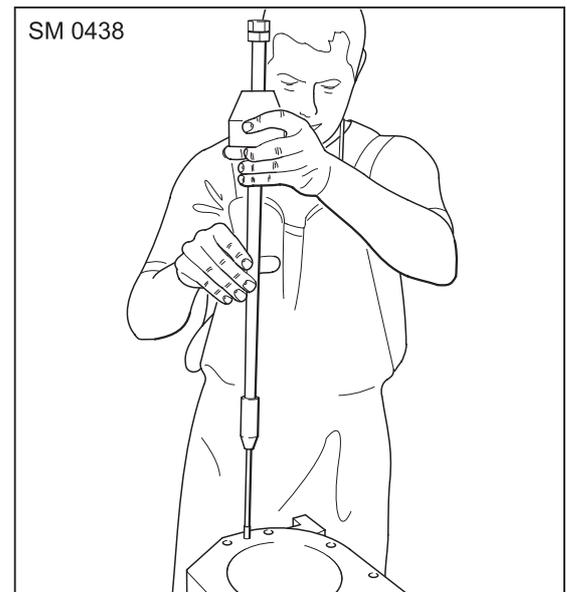


Fig 3.33 - Extracting Dowel Pins

- 3.4.2 Carefully drive the two dowel pins 8m6x28 (22) out of the bearing housing using a hammer and drift (see also previous paragraph).

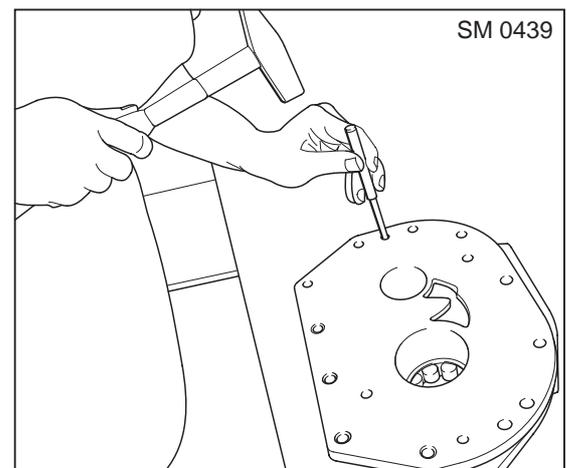
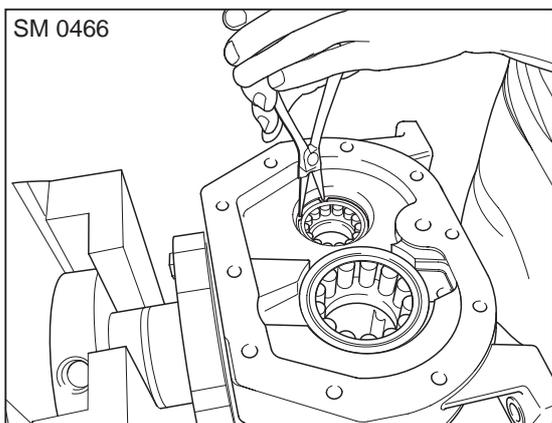


Fig 3.34 - Driving Out Dowel Pins

#### 3.5 Remove Inlet End Bearings

3.5.1 Turn the air end on the rotating fixture through 180° so that the inlet end is uppermost again.

3.5.2 Remove the circlip (20) retaining the bearing on the female rotor side.

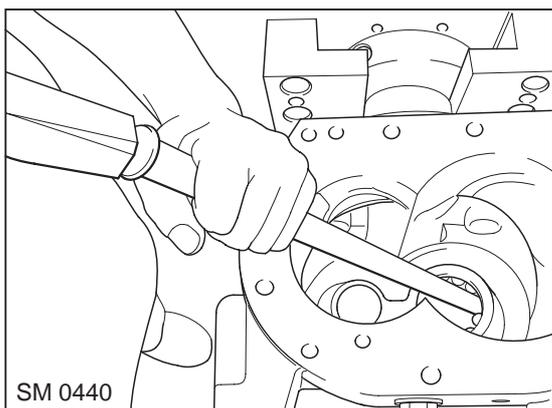


**Fig 3.35 - Removing Retaining Circlip - Female Inlet Bearing**

3.5.3 Turn the air end on the rotating fixture through 180° again.

3.5.4 Use a brass drift to drive out the cylindrical roller bearings out of the rotor casing.

**⚠ Caution:** Be careful not to damage the rotor casing bores.



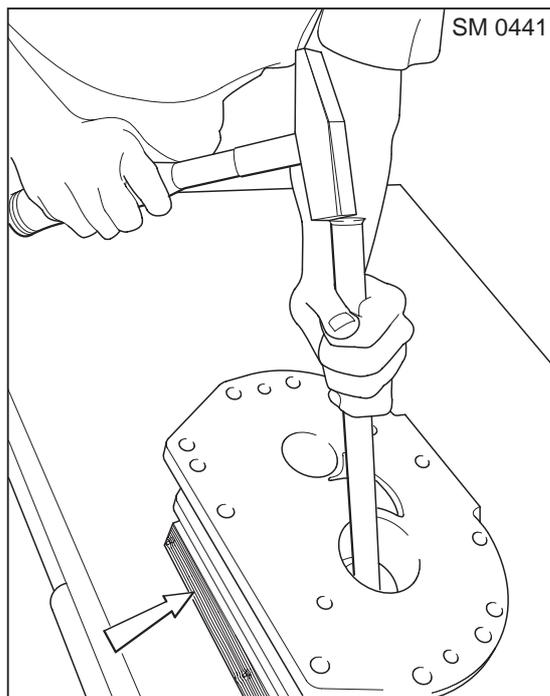
**Fig 3.36 - Driving Out Cylindrical Roller Bearings**

#### 3.6 Remove Delivery End Bearings

3.6.1 Place wooden blocks underneath the delivery end bearing housing.

3.6.2 Use a brass drift to drive out the cylindrical roller bearings out of the bearing housing (4).

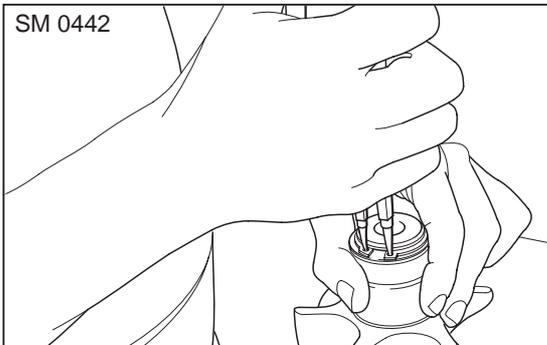
**⚠ Caution:** Be careful not to damage the bearing housing bores.



**Fig 3.37 - Removing Bearings From Delivery Bearing Housing**

### 3.7 Remove Bearing Inner Rings From Rotors

- 3.7.1 Firstly, remove circlip (21) from the inlet end of the female rotor shaft.



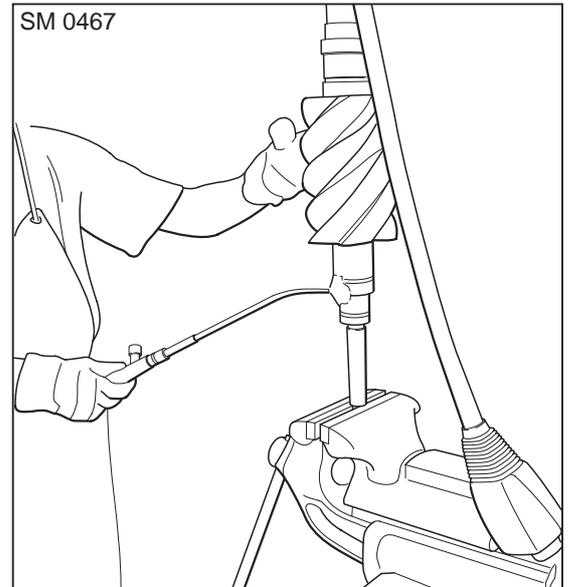
**Fig. 3.38 - Removing Circlip from Female Rotor**

- 3.7.2 Set up a rotor guide pin held in vise jaws. This will be used to help with even rotation of the rotors during heating of the inner rings.
- 3.7.3 Remove bearing inner rings from rotor shafts. Hold a guide pin between vise jaws as shown. Suspend each rotor from a crane and lower the centre tapping over the guide pin. Warm the inner rings evenly until they drop off.

**Note:** Turn the rotor continually to avoid overheating.

  **Warning:**

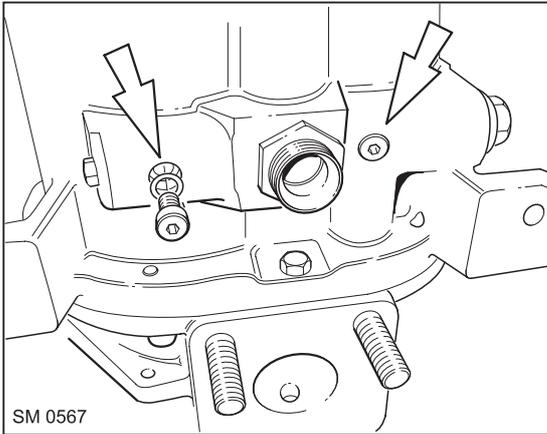
- (i) Ensure the existing legal safety instructions covering working with welding sets are complied with.
- (ii) Use safety clothing, safety gloves and safety glasses.



**Fig 3.39 - Heating Bearing Inner Rings**

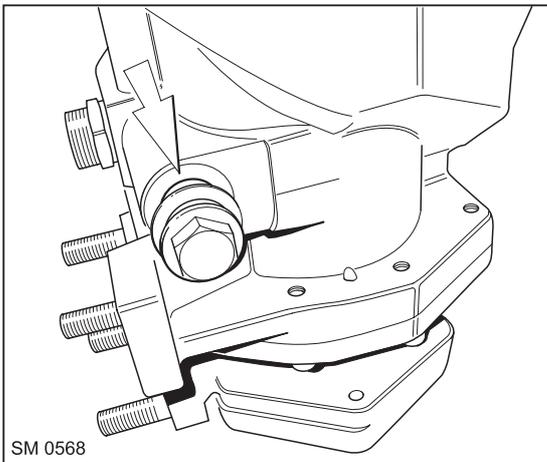
#### 3.8 Remove Threaded Plugs

3.8.1 Remove both threaded plugs G  $\frac{1}{8}$ " (46) and their copper sealing rings (47) beneath the air end.



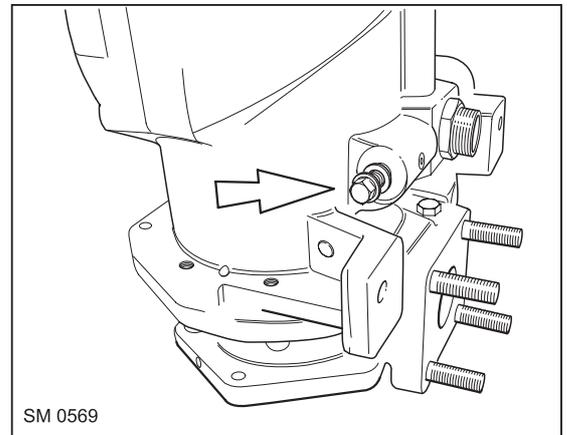
**Fig. 3.40 - Removing G  $\frac{1}{8}$ " Plugs and Seals**

3.8.2 Remove threaded plug G1" (52) and its copper sealing ring (47) from the air end.



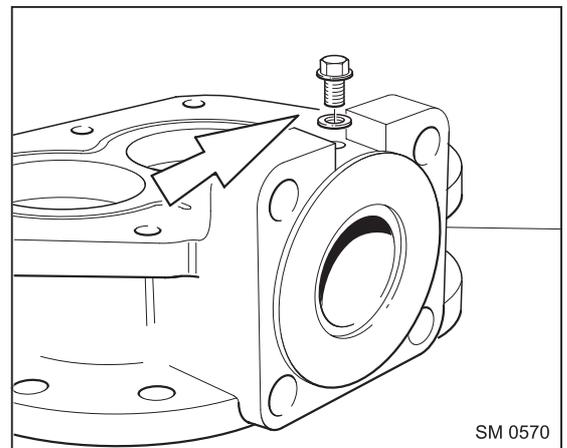
**Fig. 3.41 - Removing G 1" Plug and Seal**

3.8.3 Remove threaded plug G  $\frac{1}{4}$ " (48) and its copper sealing ring (51) from the air end.



**Fig. 3.42 - Removing G  $\frac{1}{4}$ " Plug and Seal**

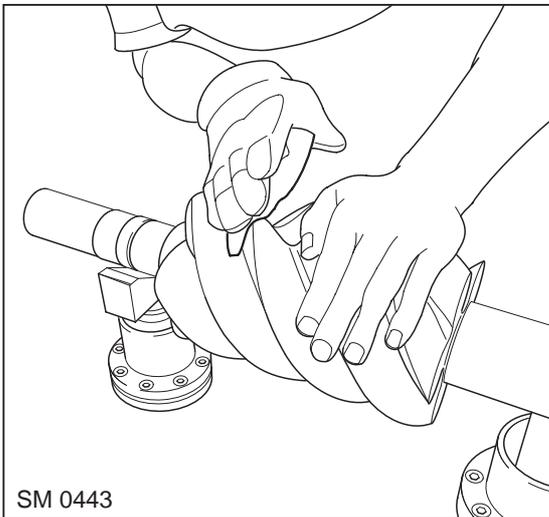
3.8.4 If fitted, remove the threaded plug M14 (33) and its copper sealing ring (54) from the discharge flange of the air end (this plug is fitted when a compressor temperature probe is not installed).



**Fig. 3.43 - Removing M14 Plug and Seal**

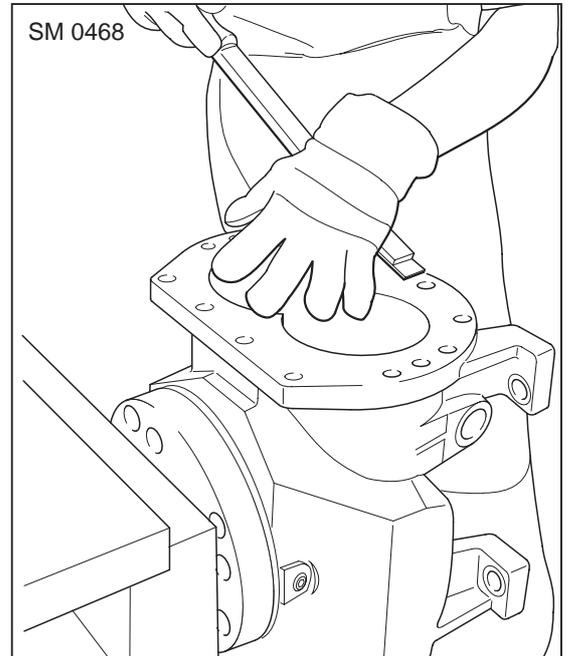
**3.9 Clean and Polish Rotors and Rotor Casing**

- 3.9.1 Support the rotor on vee blocks.
- 3.9.2 Carefully remove any carbon deposits from the rotor profiles using a very fine cleaning pad.
- 3.9.3 Polish out any marks from small foreign particles on the rotors.
- 3.9.4 Use a very fine cleaning pad to polish the shaft ends.
- 3.9.5 Finally, clean the rotor carefully, using a degreaser spray.



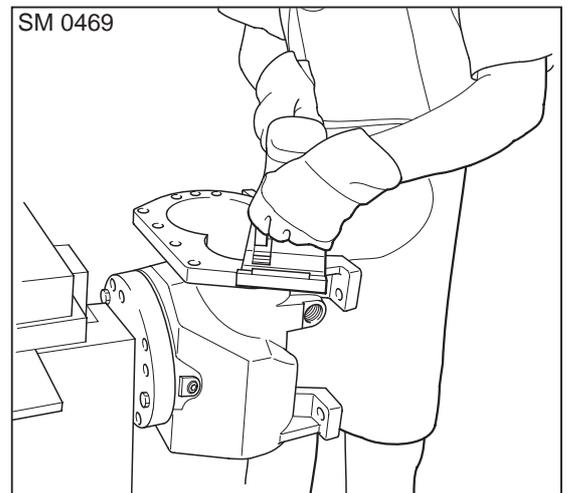
**Fig 3.44 - Polishing Rotors**

- 3.9.6 Clean the delivery end face of the rotor casing (3) and remove any residual LOCTITE using a plain scraper.



**Fig 3.45 - Cleaning Delivery End Face**

- 3.9.7 Polish the face using an orbital grinder.

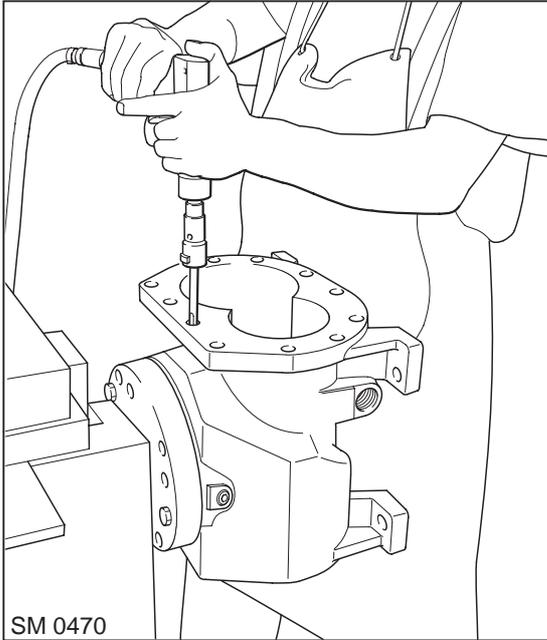


**Fig 3.46 - Polishing Delivery End Face**

- 3.9.8 Do the same for the inlet end face.

3.9.9 Counterbore all M10 threaded holes to remove any burrs and run a tap down the tapped holes (M10) in the face to clean up the threads.

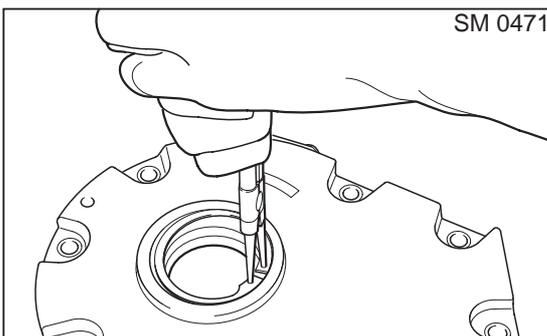
3.9.10 Do the same also for all threaded holes in the face on the opposite side of the rotor casing.



**Fig 3.47 - Cleaning Out Threaded Holes**

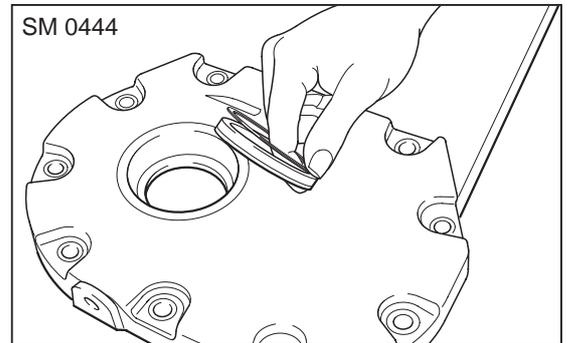
### 3.10 Dismantle Shaft Oil Seal

3.10.1 Remove the outer circlip (20).



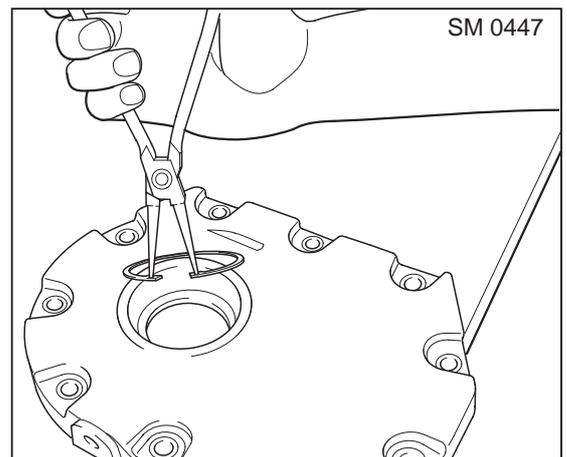
**Fig 3.48 - Removing Outer Circlip**

3.10.2 Take out the felt ring (17) and both adjusting washers (45).



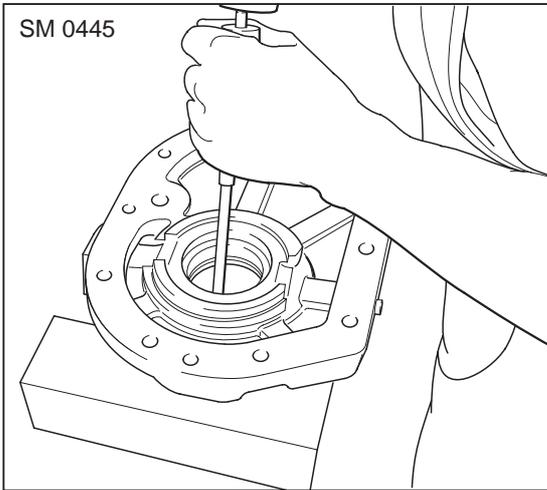
**Fig 3.49 - Removing Felt Ring and Adjusting Washers**

3.10.3 Remove both of the remaining circlips (20).



**Fig 3.50 - Removing Circlips**

- 3.10.4 Support the front cover (6) on wooden blocks as shown. Use a hammer and drift to drive the lip seal ring (19) out of the cover.

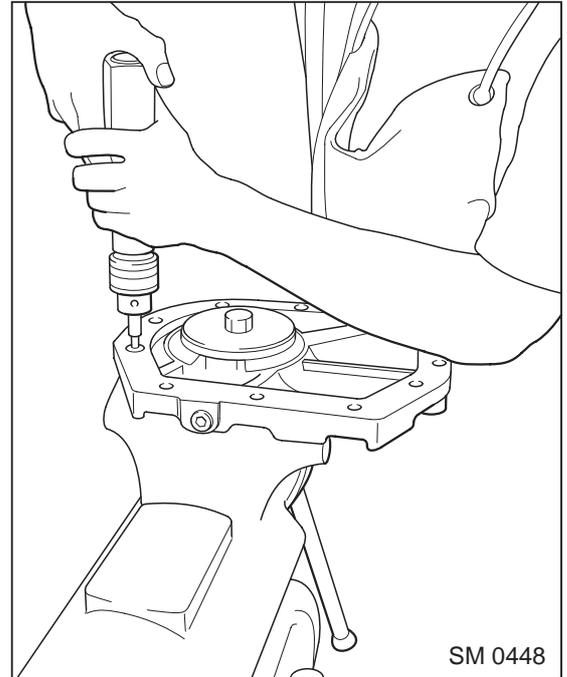


**Fig 3.51 - Removing Lip Seal**

- 3.10.5 Mount the front cover (6) on a vise.

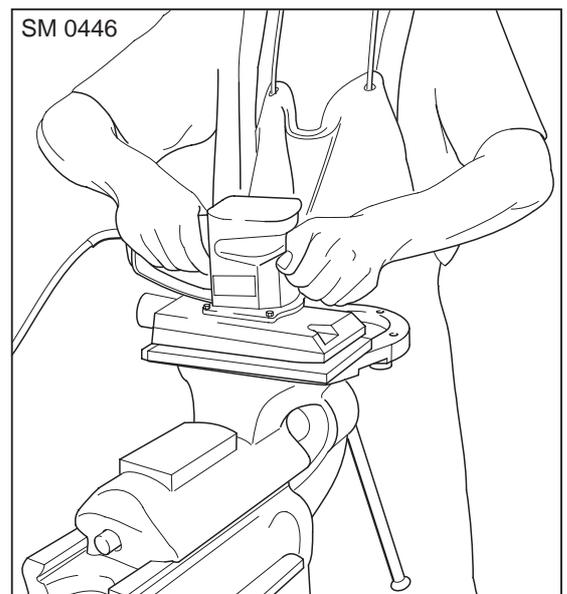
- (a) Ensure all oilways are clear.
- (b) Run a tap down the tapped holes (2 x M10 for jacking screws) in the face of the front cover to clean up the threads.
- (c) Counterbore all holes to remove any burrs.

- (d) Thoroughly clean the face of the front cover (6) and remove any residual Loctite using a plain scraper, an oilstone and degreaser spray.



**Fig 3.52 - Cleaning Face of Front Cover**

- 3.10.6 Finally, polish the face using an orbital sander.



**Fig 3.53 - Polishing Face of Front Cover**

### 3.11 Repair Kit

- 3.11.1 After completing the dismantling of the air end, all parts must be cleaned thoroughly.
- 3.11.2 For refurbishment of the EK 145 NK air end, use only the genuine repair kit from CompAir (Part No. of the repair kit : A10212974). Details of the kit are given at the back of this publication.

## 4 Assembly - Delivery End

### 4.1 Fit Threaded Plugs

4.1.1 Fit two new threaded plugs G 1/8" (46) complete with new copper sealing rings (47) beneath the air end.

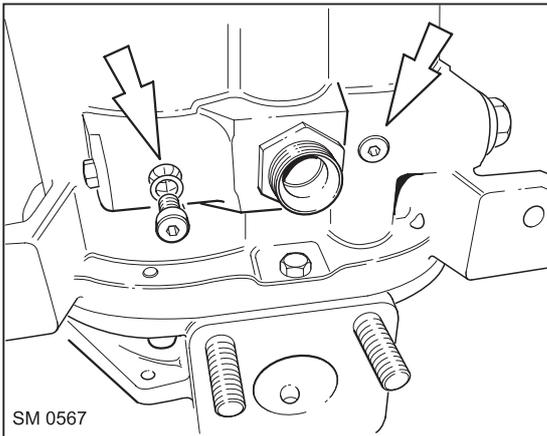


Fig. 4.1 - Fitting New G 1/8" Plugs and Seals

4.1.2 Fit a new threaded plug G 1" (52) and new copper sealing ring (47) to the air end.

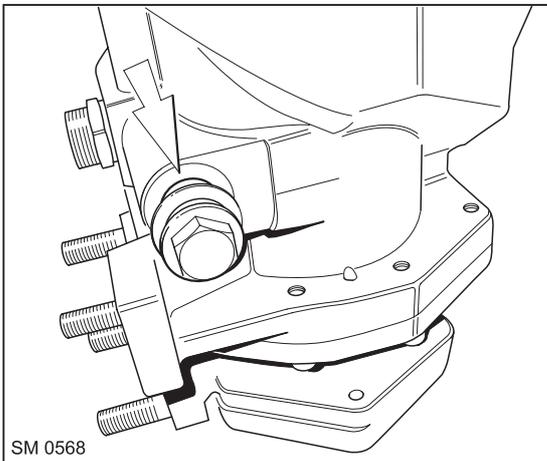


Fig. 4.2 - Fitting New G 1" Plug and Seal

4.1.3 Fit a new threaded plug G 1/4" (48) complete with a new copper sealing ring (51) to the air end.

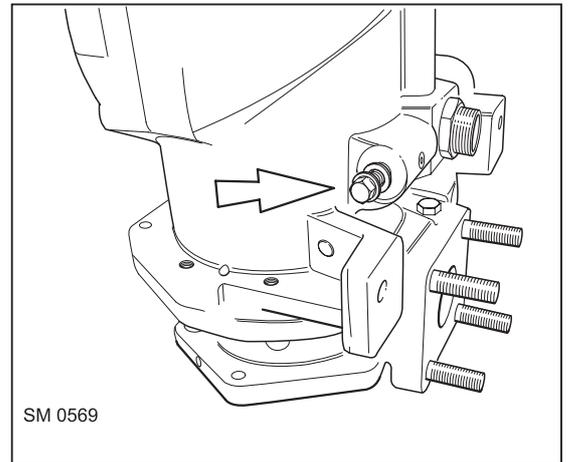


Fig. 4.3 - Fitting New G 1/4" Plug and Seal

4.1.4 If a compressor temperature probe is not installed, fit a new threaded plug M14 (33) and new copper sealing ring (54) to the discharge flange of the air end.

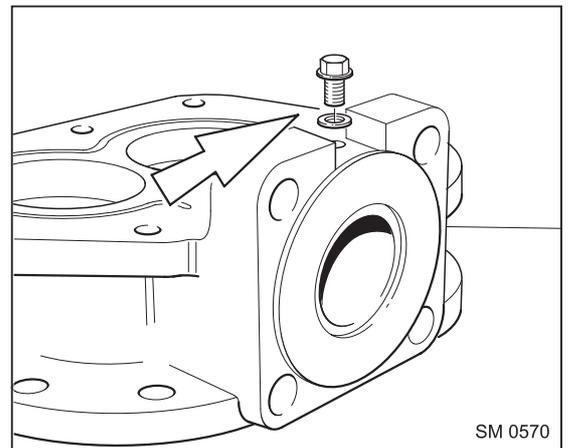
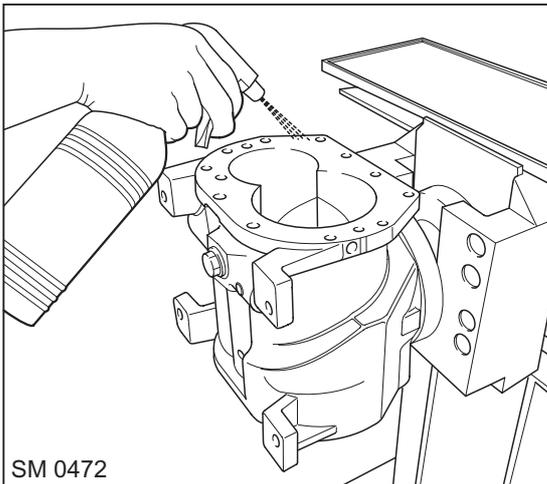


Fig. 4.4 - Fitting New M14 Plug and Seal

### 4.2 Rotors

4.2.1 Mount the rotor casing (3) on a rotating assembly fixture with delivery end uppermost.

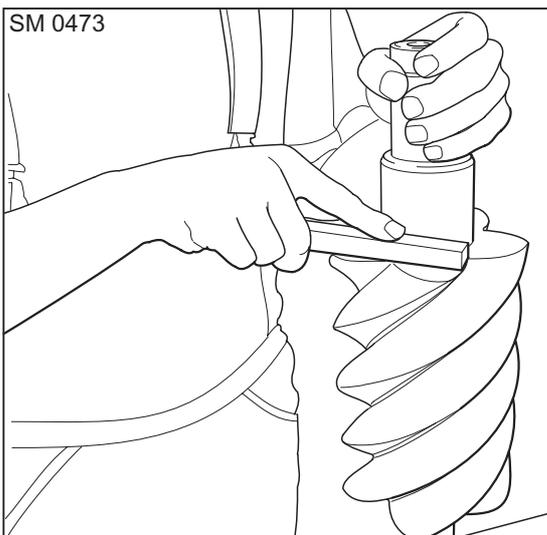
4.2.2 Polish the flange face of the rotor housing using an oilstone and clean it using a degreaser spray.



**Fig 4.5 - Cleaning Delivery End Face**

4.2.3 Remove any burrs on the delivery end face of the male rotor (49) with an oilstone (to allow correct delivery end clearance adjustment).

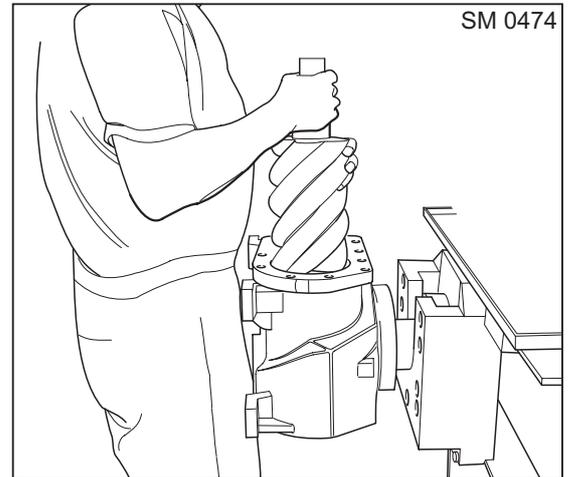
4.2.4 Carefully clean the rotor using a degreaser spray.



**Fig 4.6 - Polishing Delivery End Face of Male Rotor**

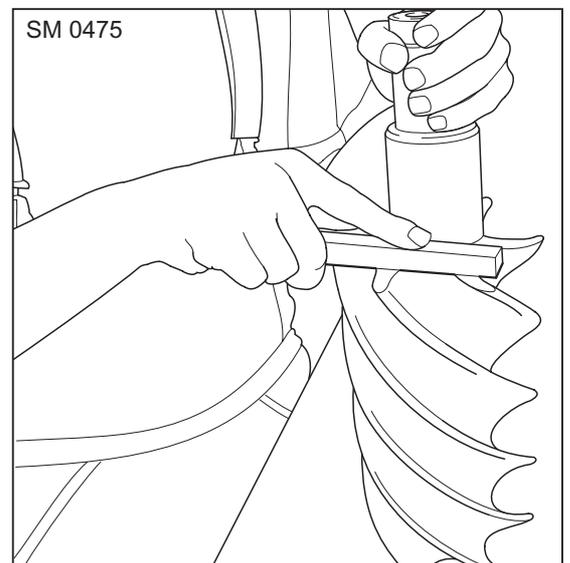
4.2.5 Carefully lower the male rotor (49) into the casing.

If necessary, screw an eye bolt into the centre tapping of the male rotor and lower it carefully with a crane into the casing.



**Fig 4.7 - Lowering Male Rotor Into Position**

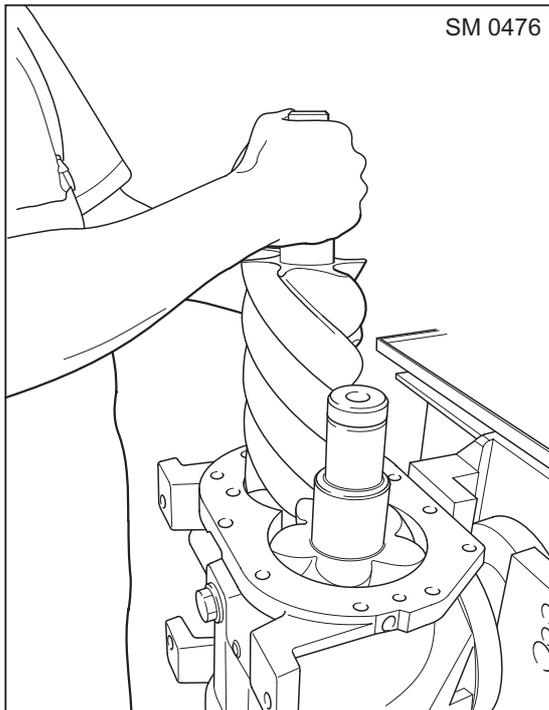
4.2.6 In the same way, clean and degrease the female rotor (50) and remove any burrs from the delivery end face.



**Fig 4.8 - Polishing Delivery End Face of Female Rotor**

- 4.2.7 Carefully lower the female rotor into the rotor casing. Be aware that the rotor will turn as it engages with the male rotor. If necessary, screw an eye bolt into the centre tapping of the female rotor and lower it carefully with a crane into the casing.

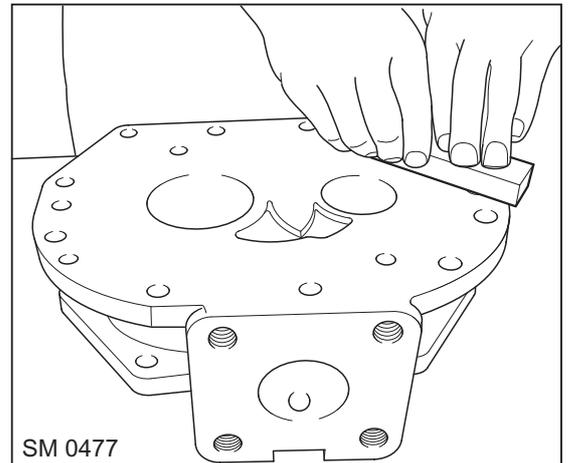
**⚠ Caution:** Be careful not to damage the profile of the rotors.



**Fig 4.9 - Lowering Female Rotor Into Position**

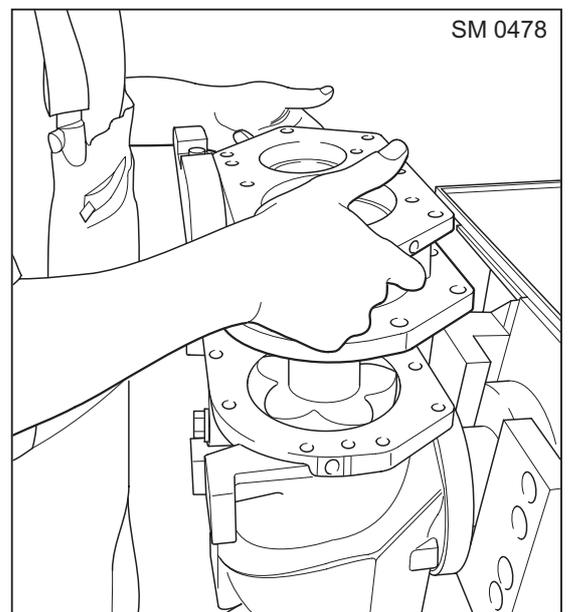
### 4.3 Delivery End Bearings

- 4.3.1 Polish the delivery end face of the bearing housing (4) using an oilstone.
- 4.3.2 Degrease and clean the face of the bearing housing.



**Fig 4.10 - Polishing Face of Delivery Bearing Housing**

- 4.3.3 Carefully lower the bearing housing (4) into position on the rotor casing (3). If necessary screw two eyebolts into the bearing housing and attach lifting tackle.



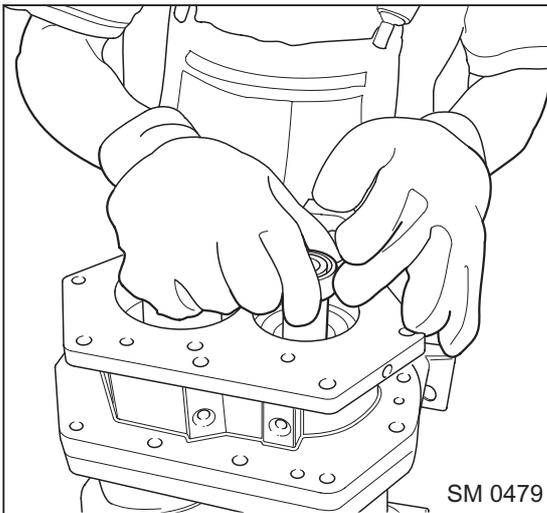
**Fig 4.11 - Lowering Delivery Bearing Housing Into Position**

4.3.4 Heat the inner rings of the delivery end cylindrical roller bearings (14) and (13) to a temperature of 120°C to max. 125°C (257°F) using an oven or induction heater.

  **Warning:** Hot components. Use safety gloves.

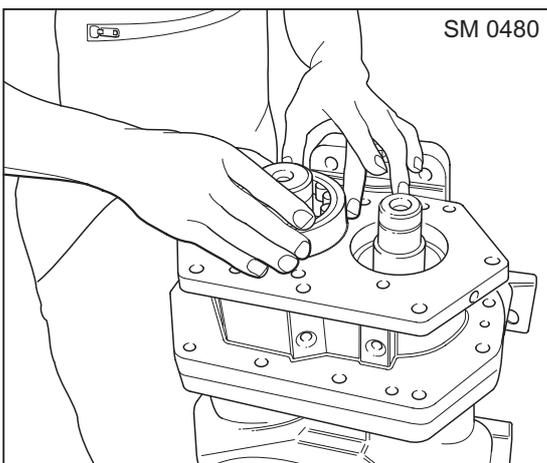
4.3.5 Carefully slide the inner rings onto male and female rotor shafts, ensuring they are tight against their respective shoulders.

4.3.6 Let the inner rings cool down for 5 minutes minimum.



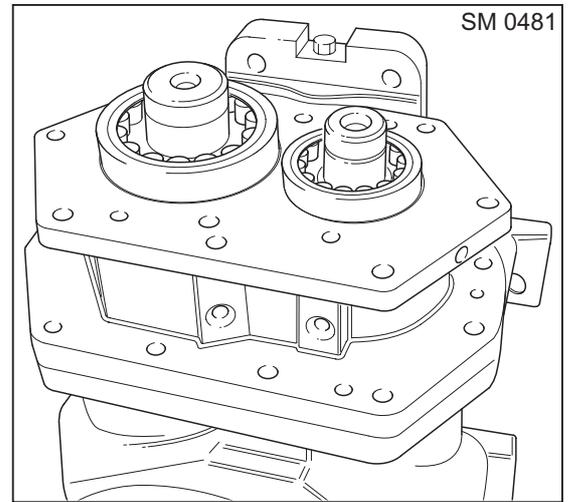
**Fig 4.12 - Fitting Bearing Inner Rings**

4.3.7 Position the cylindrical roller bearing (14) onto the male rotor shaft.



**Fig 4.13 - Positioning Bearing On Male Shaft**

4.3.8 Position the cylindrical roller bearing (13) onto the female rotor shaft.

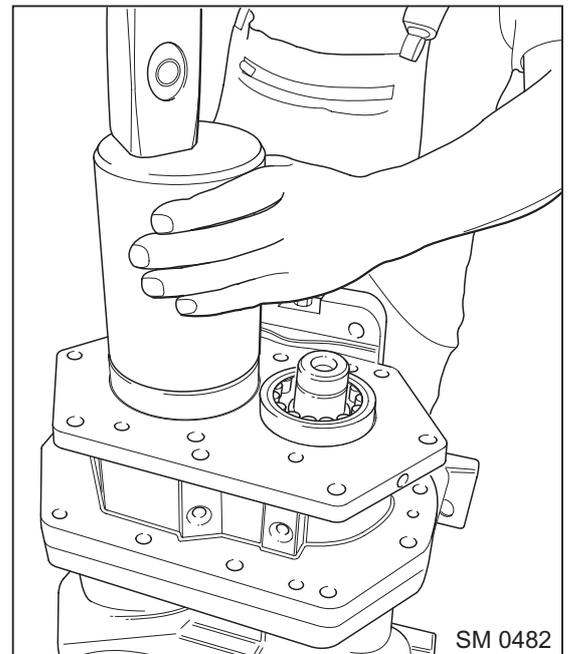


**Fig 4.14 - Bearings In Position**

4.3.9 Using a suitable drift, carefully drive the bearing (14) into the bearing housing. Ensure the outer ring sits firmly against the shoulder of the bearing housing.

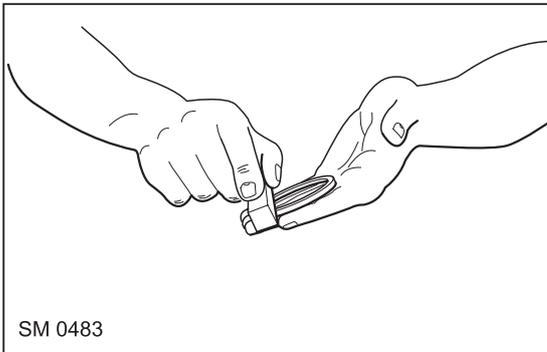
 **Caution:** Do not damage the rolling elements or bearing races.

4.3.10 Do the same for the cylindrical roller bearing (13) on the female rotor side.



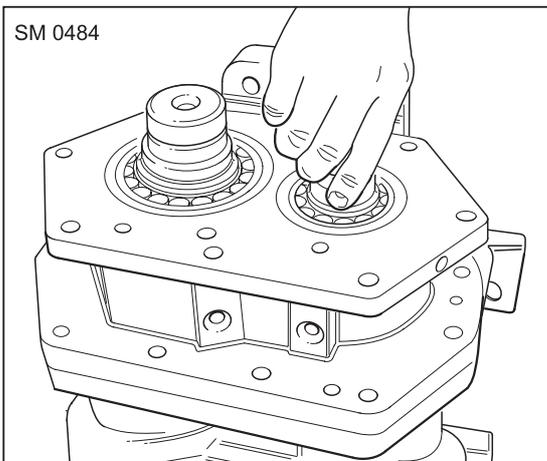
**Fig 4.15 - Fitting Delivery End Bearings**

- 4.3.11 Polish the two spacer rings 50x62x3 (26) of the male rotor and the two spacer rings 35x45x2,5 (27) of the female rotor using an oilstone.



**Fig 4.16 - Polishing Spacer Rings**

- 4.3.12 Fit the two spacer rings (26) on the male rotor shaft and the two spacer rings (27) on the female rotor shaft. Ensure the spacer rings sit firmly against the inner rings of the cylindrical roller bearings.



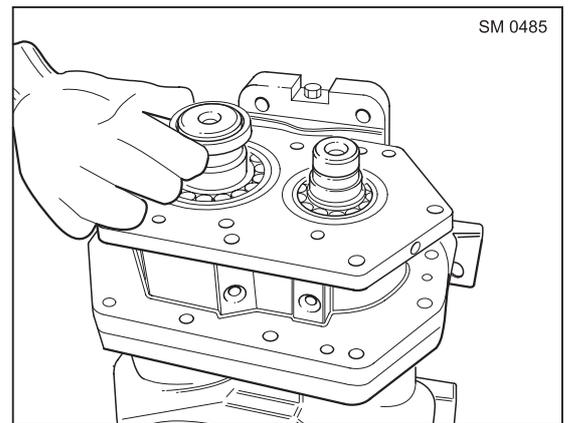
**Fig 4.17 - Fitting Spacer Rings**

- 4.3.13 Heat one half of the inner ring of the 4-point bearing (16) to a temperature of 120 to max.125°C (257°F) in an oven or by using an induction heater.

- 4.3.14 Fit this half of the inner ring onto the male rotor shaft.

**Warning:** Hot components. Use safety gloves.

**Caution:** Ensure the inner ring half is orientated correctly when fitting.



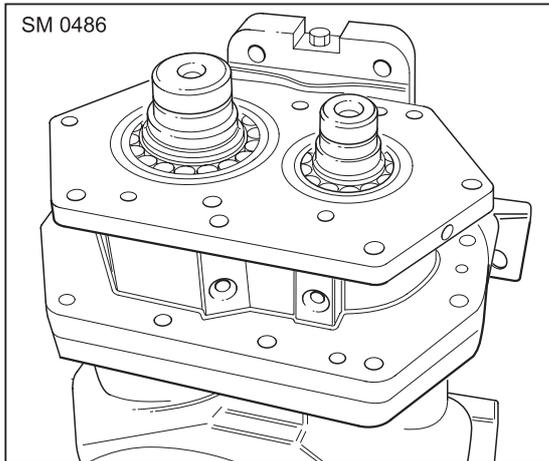
**Fig 4.18 - Fitting Bearing Inner Ring Halves**

- 4.3.15 Heat one half of the inner ring of the 4-point bearing (15) to a temperature of 120 to max.125°C (257°F) in an oven or by using an induction heater.

4.3.16 Fit this half of the inner ring onto the female rotor shaft.

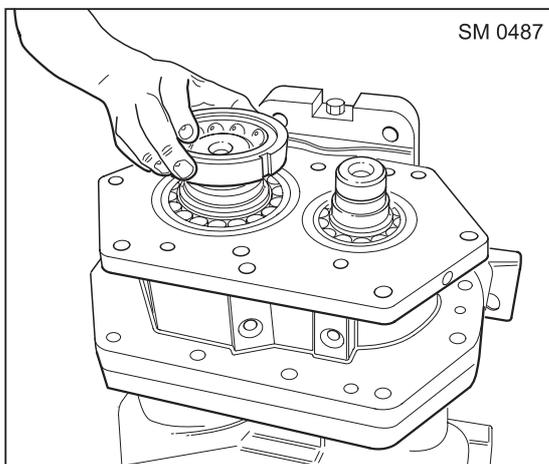
 **Warning:** Hot components. Use safety gloves.

 **Caution:** Ensure the inner ring half is orientated correctly when fitting.



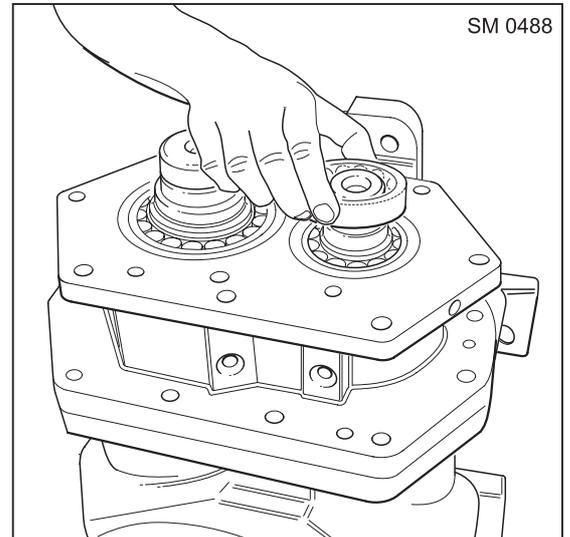
**Fig 4.19 - Inner Ring Halves In Position**

4.3.17 Fit the 4-point bearing (16) onto the male rotor shaft (against the already assembled inner ring half).



**Fig 4.20 - Fitting Male 4-Point Bearing**

4.3.18 Fit the 4-point bearing (15) onto the female rotor shaft (against the already assembled inner ring half).



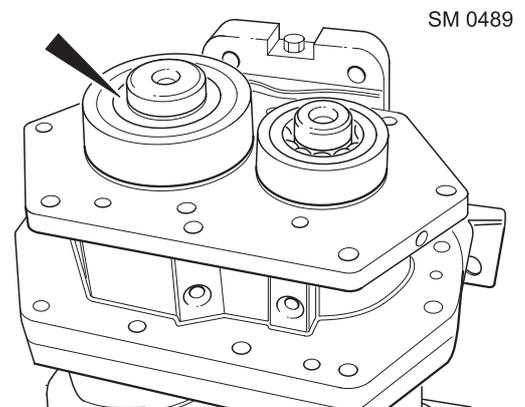
**Fig 4.21 - Fitting Female 4-Point Bearing**

4.3.19 Heat the other half of the inner ring of the 4-point bearing (16) to a temperature of 120 to max.125°C (257°F) in an oven or by using an induction heater.

4.3.20 Fit this half of the inner ring onto the male rotor shaft. Using a suitable drift, carefully drive the inner ring into position. Ensure the inner ring half sits firmly against the other half of the ring.

 **Warning:** Hot components. Use safety gloves.

 **Caution:** Ensure the inner ring half is orientated correctly when fitting.



**Fig 4.22 - 2nd Inner Ring Half Fitted To Male Bearing**

4.3.21 Heat the other half of the inner ring of the 4-point bearing (15) to a temperature of 120 to max. 125°C (257°F) in an oven or by using an induction heater.

4.3.22 Fit this half of the inner ring onto the female rotor shaft. Using a suitable drift, carefully drive the inner ring into position. Ensure the inner ring half sits firmly against the already assembled half of the ring.

**Warning:** Hot components. Use safety gloves.

**Caution:** Ensure the inner ring half is orientated correctly when fitting.

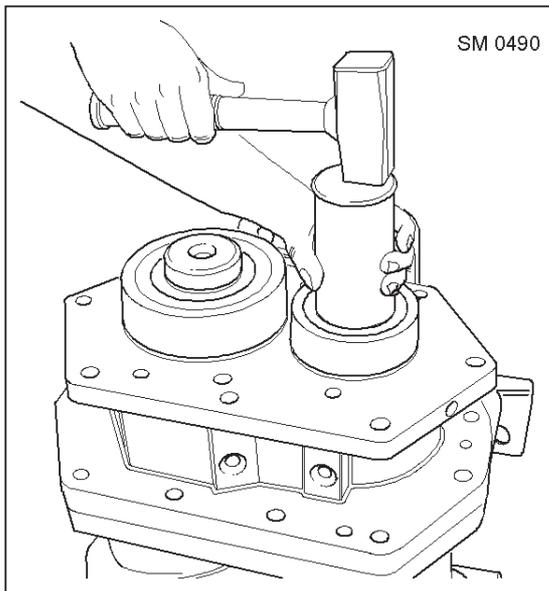


Fig. 4.23 - Fitting 2nd Inner RingHalf to Female Bearing

4.3.23 Hand-tighten the locknuts (23) and (24) on the male and female rotor shafts.

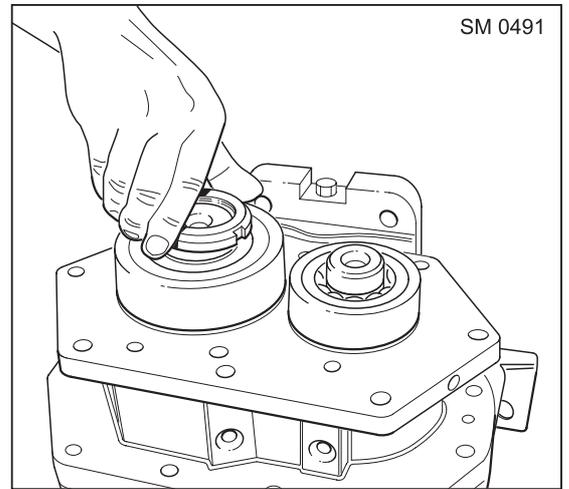


Fig 4.24 - Positioning Male Rotor Locknut

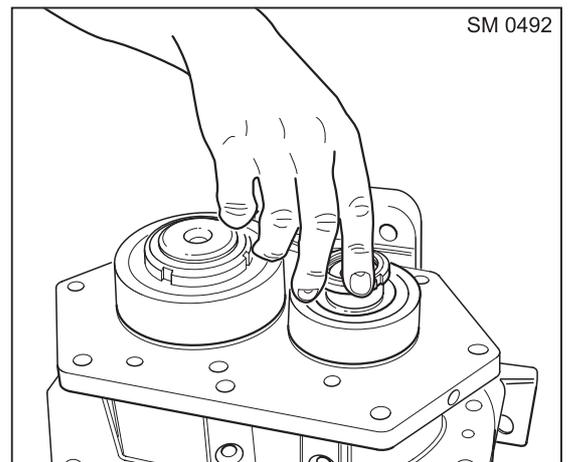
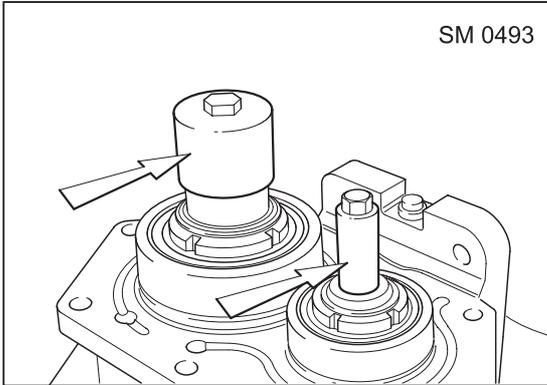


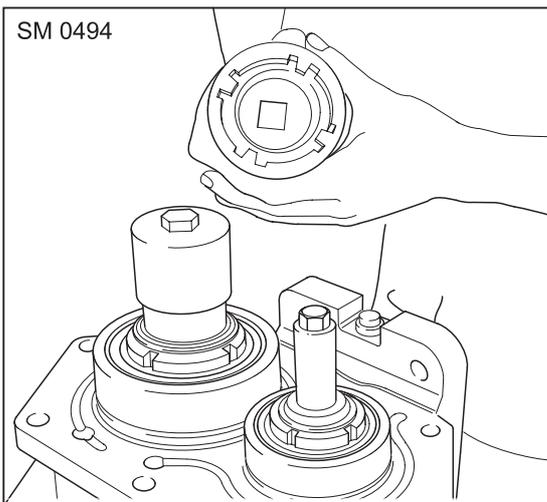
Fig 4.25 - Positioning Female Rotor Locknut

- 4.3.24 Install the guide bushes (for locknut spanner) into the centre tappings of the male and female rotors.



**Fig 4.26 - Guide Bushes For Locknut Spanners**

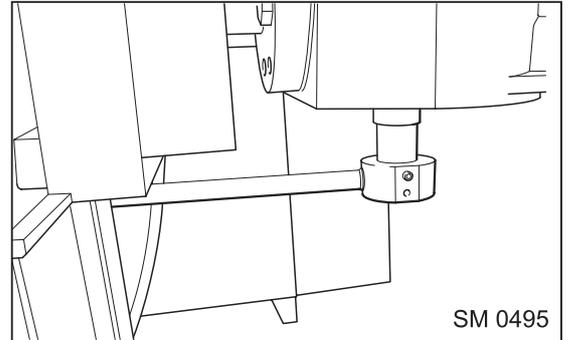
- 4.3.25 Fit the special locknut spanner onto the locknut (23) of the male rotor.



**Fig 4.27 - Positioning Male Locknut Spanner**

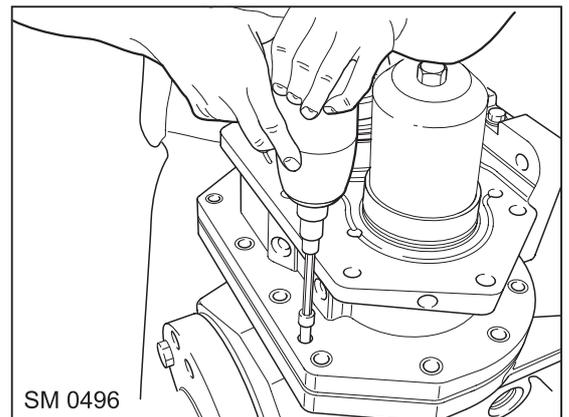
- 4.3.26 Attach shaft locking tool to the male rotor drive end.

- 4.3.27 Position the shaft locking tool so that it locks the shaft securely.



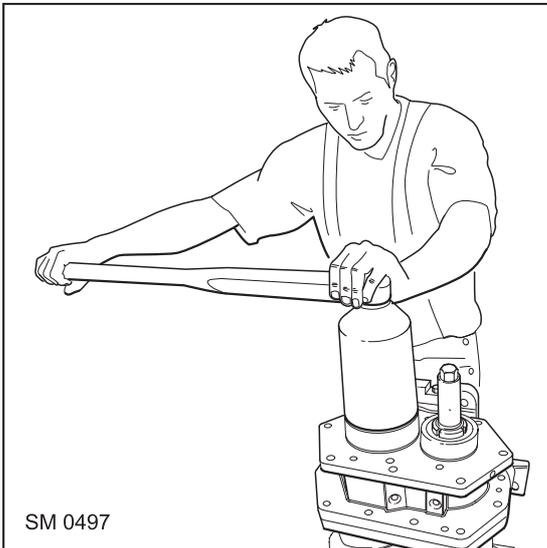
**Fig 4.28 - Shaft Locking Tool**

- 4.3.28 Screw in one bolt M10x40 (25) to lightly secure bearing housing to rotor casing.



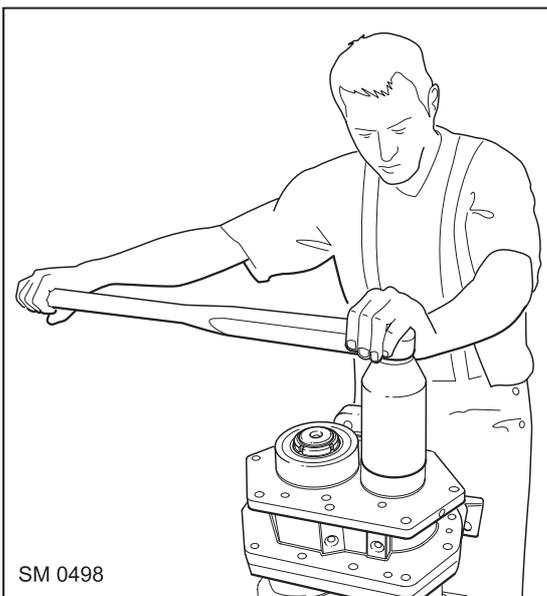
**Fig 4.29 - Securing Bearing Housing**

- 4.3.29 Tighten the locknut of the male rotor to 300Nm using a torque wrench.
- 4.3.30 Remove the special locknut spanner and the guide bush from the male rotor shaft.



**Fig 4.30 - Tightening Male Rotor Locknut**

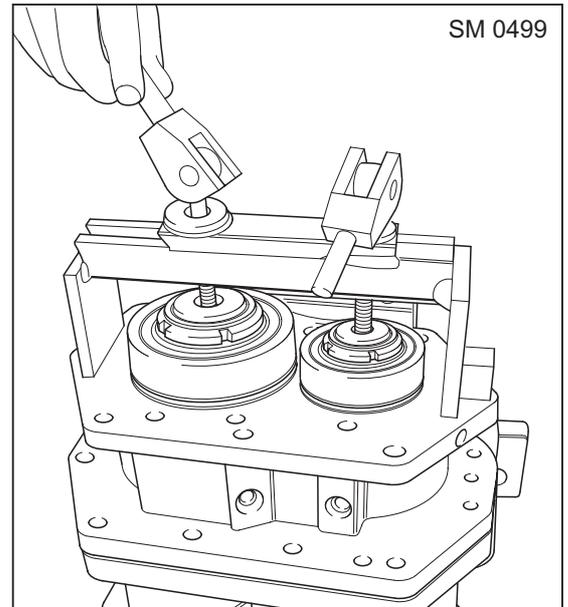
- 4.3.31 Fit the special locknut spanner onto the locknut (24) of the female rotor.
- 4.3.32 Tighten the locknut of the female rotor to 200Nm using a torque wrench.
- 4.3.33 Remove the special locknut spanner and the guide bush from the female rotor shaft.



**Fig 4.31 - Tightening Female Rotor Locknut**

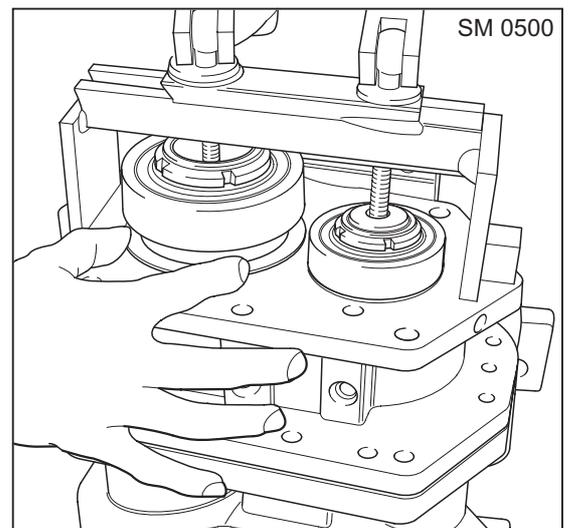
## 4.4 Set Delivery End Clearance

- 4.4.1 Position the fixture for delivery end clearance adjustment on the face of the bearing housing. (Or screw an eyebolt into the centre tapping of the rotor shaft and attach lifting tackle - start with the male rotor)



**Fig 4.32 - Delivery End Clearance Fixture**

- 4.4.2 Polish the split (two halves) spacer ring (7) using an oilstone.
- 4.4.3 Lift the male rotor slightly with the help of the fixture and position both halves of the spacer ring (7) between the outer rings of the bearings (14) and (16).

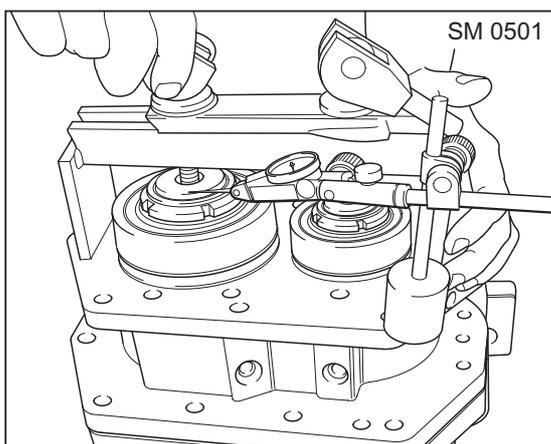


**Fig 4.33 - Fitting Split Spacer Ring - Male**

4.4.4 Position a dial gauge (with magnetic base) on the face of the casing with probe tip on the end of the male rotor shaft.

4.4.5 Check the existing delivery end clearance by carefully lifting the male rotor.

4.4.6 The required delivery end clearance is:  
**0,03...0,05 mm.**

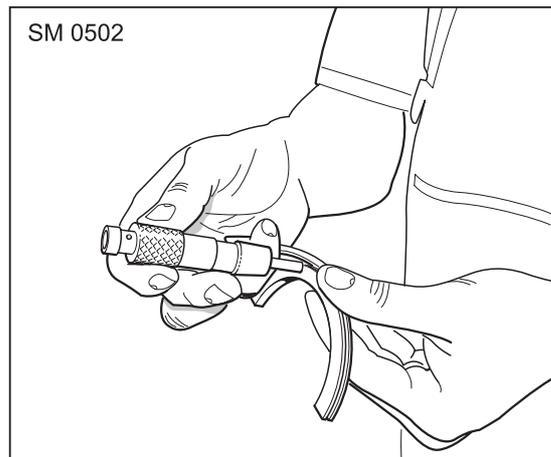


**Fig 4.34 - Checking Delivery End Clearance - Male**

4.4.7 Take out the two halves of the spacer ring (7) and measure the thickness of the ring.

4.4.8 Calculate the required thickness of the spacer ring. From the Air End Kit, select the next thickest spacer ring and grind it to the required dimension.

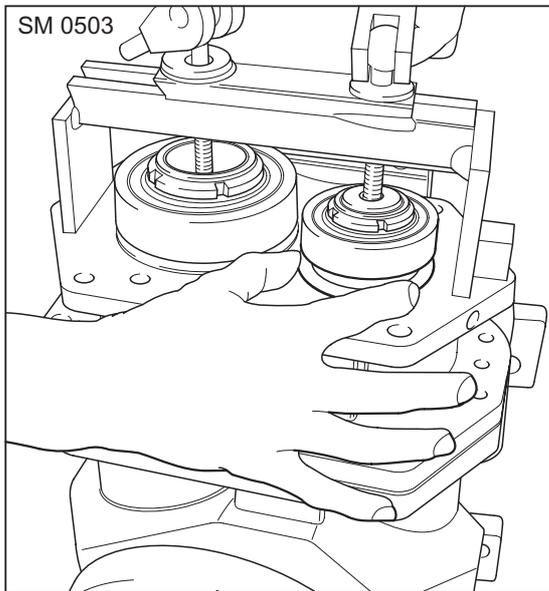
4.4.9 Re-assemble the new spacer ring (7) and re-check the delivery end clearance of the male rotor.



**Fig 4.35 - Measuring Required Thickness of Spacer Ring**

4.4.10 Polish the split (two halves) spacer ring (8) of the female rotor using an oilstone.

4.4.11 Lift the female rotor slightly and position the two halves of the spacer ring (8) between the outer rings of the bearings (13) and (15).



**Fig 4.36 - Fitting Split Spacer Ring - Female**

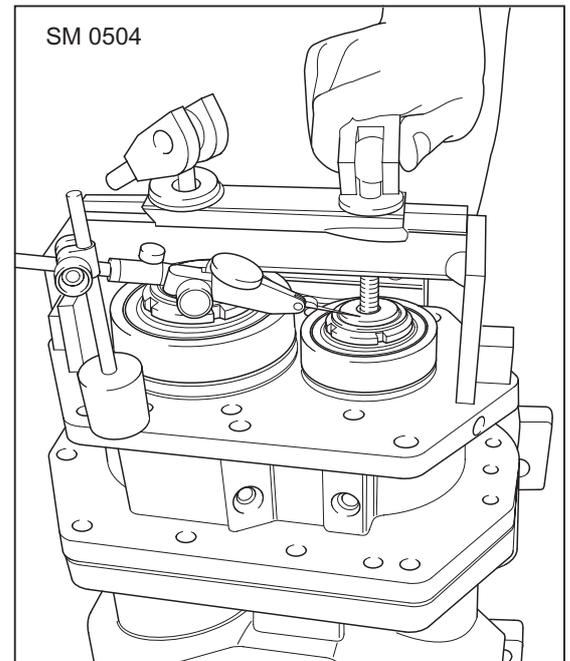
4.4.12 Position the dial gauge (with magnetic base) on the face of the casing with probe tip now on the end of the female rotor shaft.

4.4.13 Check the existing delivery end clearance by carefully lifting the female rotor.

4.4.14 The required figure of the delivery end clearance is:

**0,03...0,05 mm.**

4.4.15 Adjust the delivery end clearance of the female rotor following the same procedure detailed in paragraphs 4.4.7 to 4.4.9.



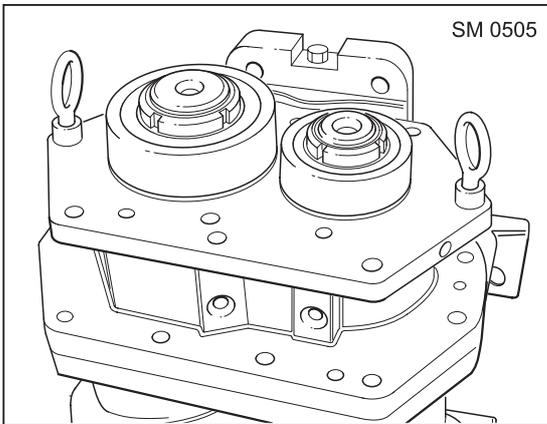
**Fig 4.37 - Checking Delivery End Clearance - Female**

4.4.16 Dismantle the delivery end clearance adjustment fixture.

4.4.17 Remove the shaft locking tool from male rotor drive shaft.

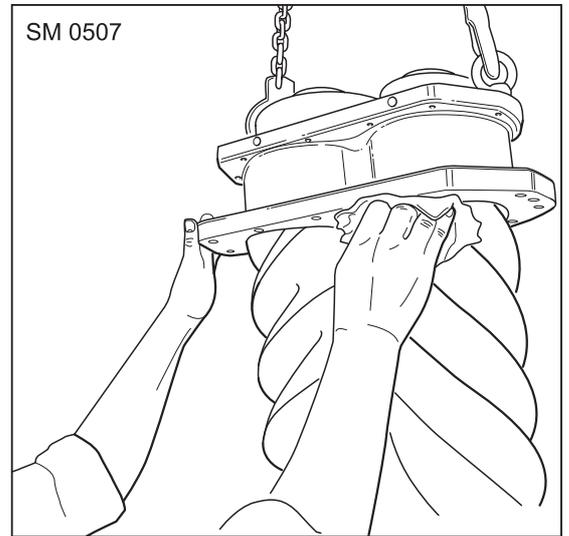
4.4.18 Unscrew and remove the one capscrew M10x40 which has fixed bearing housing on rotor casing.

4.4.19 Screw two eyebolts into the bearing housing as shown and attach lifting tackle.



**Fig 4.38 - Delivery Bearing Housing / Rotors Unit Ready For Lifting**

4.4.23 Carefully degrease and clean the face of the bearing housing (4).



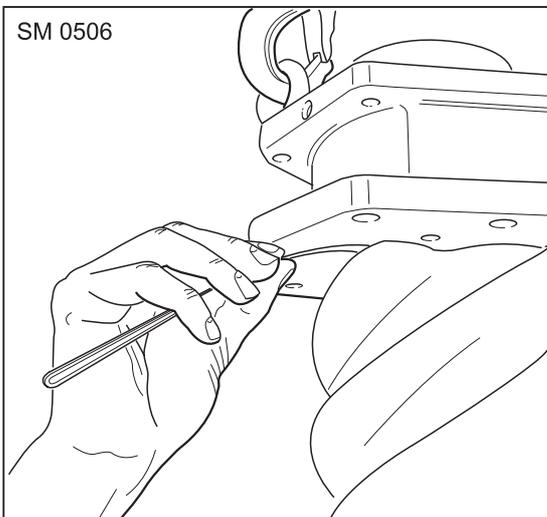
**Fig 4.40 - Cleaning Face of Bearing Housing**

4.4.20 Carefully lift the bearing housing / rotors unit out of the rotor casing.

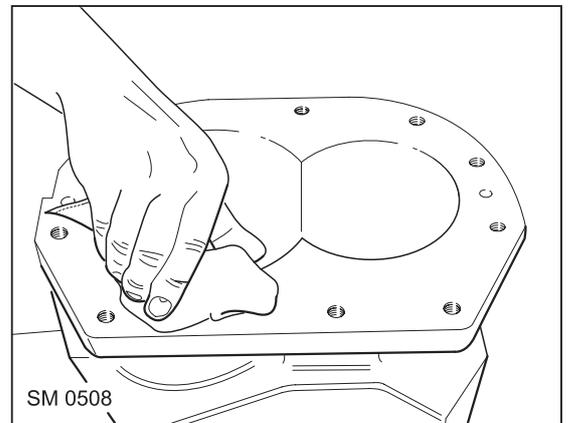
4.4.21 Check the rotor pair turns freely.

4.4.22 Measure the delivery end clearance of both rotors using a feeler gauge in several places around their circumference.

4.4.24 Carefully degrease and clean the face of the rotor casing (3).

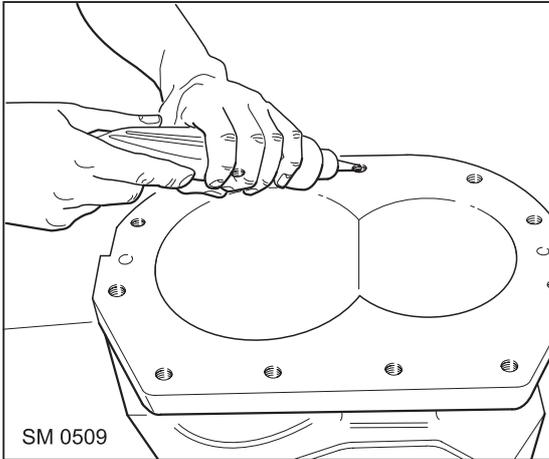


**Fig 4.39 - Re-checking Delivery End Clearances**



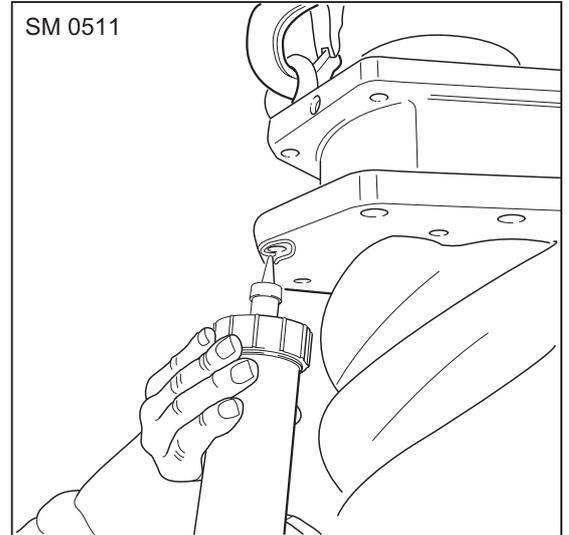
**Fig 4.41 - Cleaning Face of Rotor Casing**

4.4.25 Apply some LOCTITE 245 (screw locking) to the M10 threaded holes in the delivery end face of the rotor casing (3).



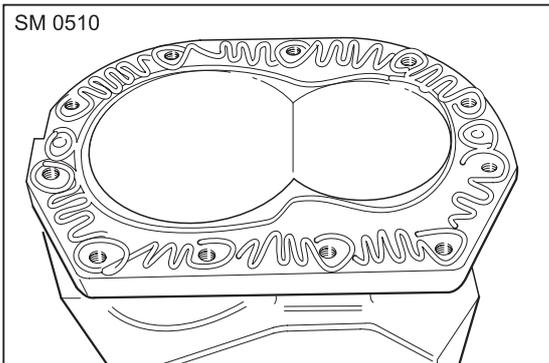
**Fig 4.42 - Applying Loctite**

4.4.27 Apply a closed bead of LOCTITE 510 to both threaded holes (M10 threaded holes for jacking screws) in the bearing housing (4).



**Fig 4.44 - Applying Loctite to Jacking Screw Holes**

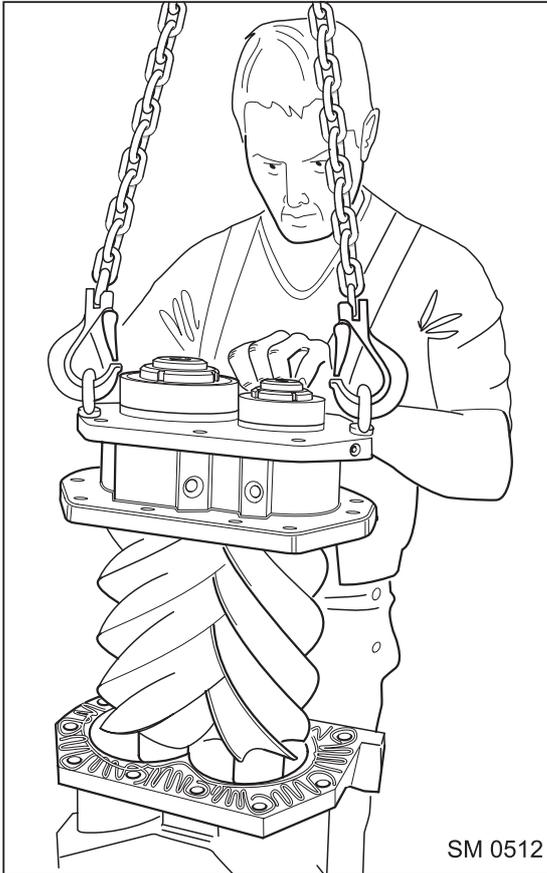
4.4.26 Apply LOCTITE 510 to the delivery end face of the rotor casing (3) as shown.



**Fig 4.43 - Applying Loctite to Delivery End Face**

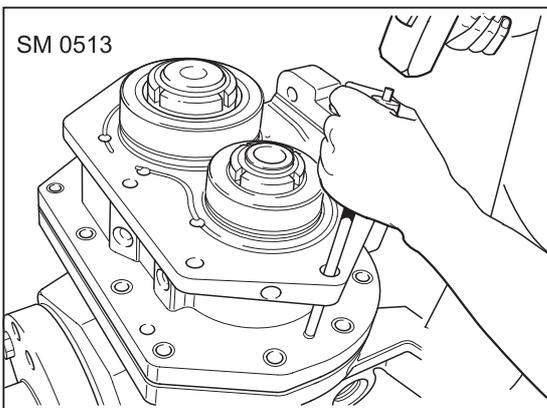
4.4.28 Carefully lower the bearing housing / rotors unit into the rotor casing.

**⚠ Caution:** Be careful not to damage the profile of the rotors.



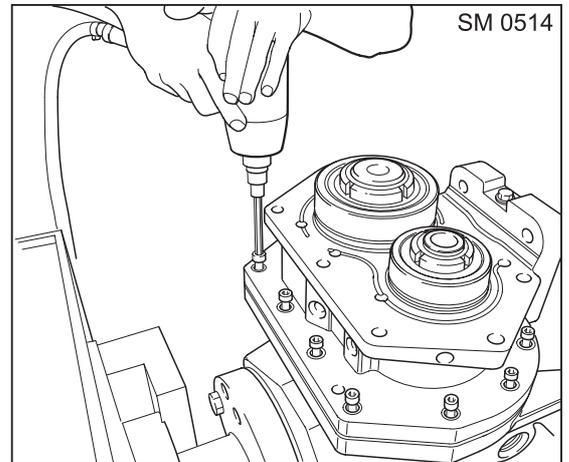
**Fig 4.45 - Lowering Bearing Housing / Rotors Unit into Rotor Casing**

4.4.29 Drive in the two alignment pins 8m6 x 28 (22) using a hammer and a drive-in mandril.



**Fig 4.46 - Fitting Dowel Pins**

4.4.30 Screw in the capscrews M10x40 (25) crosswise.

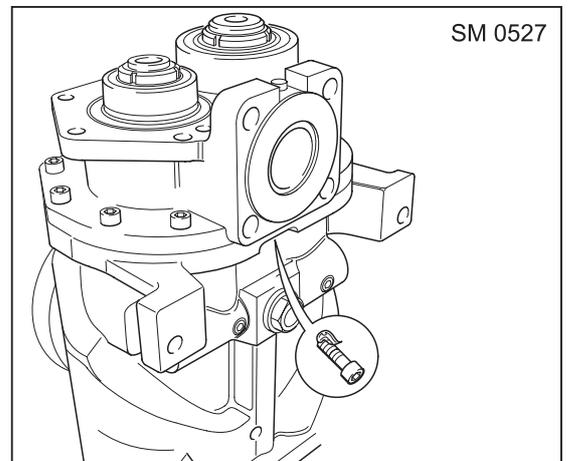


**Fig 4.47 - Fitting and Securing Capscrews**

4.4.31 Apply some LOCTITE 245 (screw locking) on one hexagon bolt M10x30 (31).

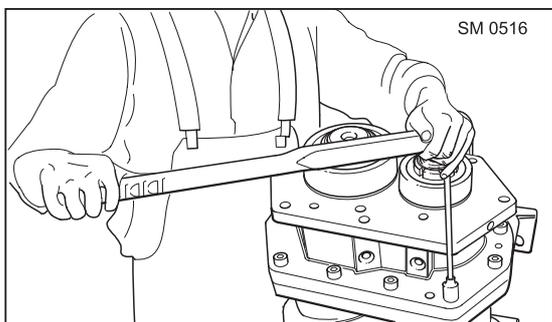
4.4.32 Screw this hexagon bolt into the bearing housing from below and tighten it.

**⚠ Caution:** Do not forget to fit this bolt.



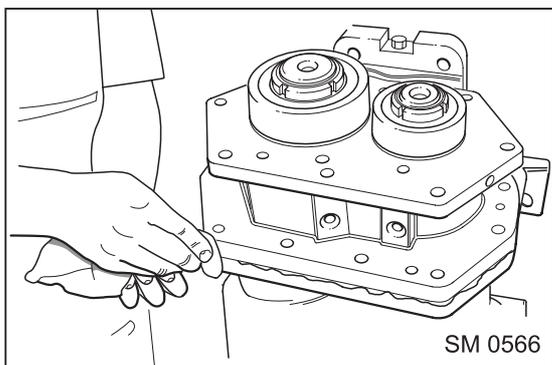
**Fig 4.48 - Fitting and Securing Bolt**

- 4.4.33 Tighten the bolts M10x40 (25) to 50 Nm using a torque wrench.



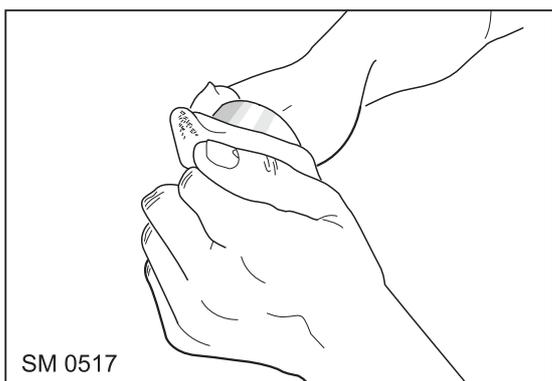
**Fig. 4.49 - Torque Tightening Bearing Housing Capscrews**

- 4.4.34 Clean any excess Loctite from the rotor casing/bearing housing.



**Fig 4.50 - Removing Excess Loctite**

- 4.4.35 Degrease and clean the inner ring (18) of the shaft oil seal.

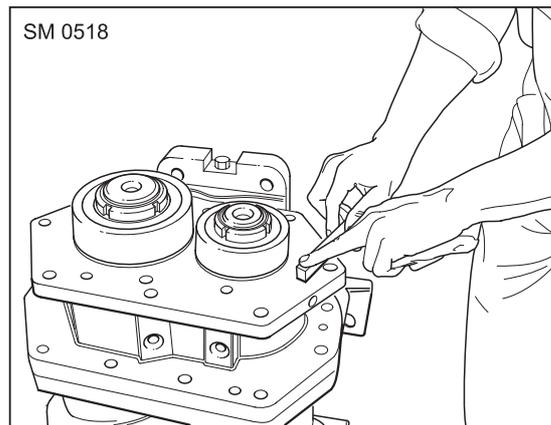


**Fig 4.51 - Cleaning Inner Rings in Preparation for Heating**

- 4.4.36 If using an oven, heat this inner ring(18) and the inner rings of the inlet end bearings (11), (12) and the spacer ring (32) to a temperature of 120 to max. 125°C (257°F).

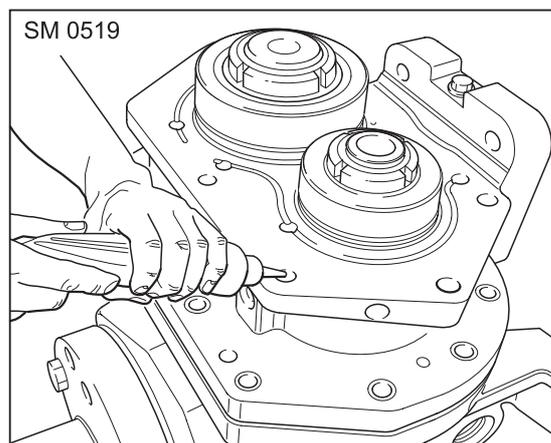
**Note:** If using an induction heater, this could be done later.

- 4.4.37 Thoroughly clean and degrease the face of the bearing housing (4). Use an oilstone to remove any burrs.



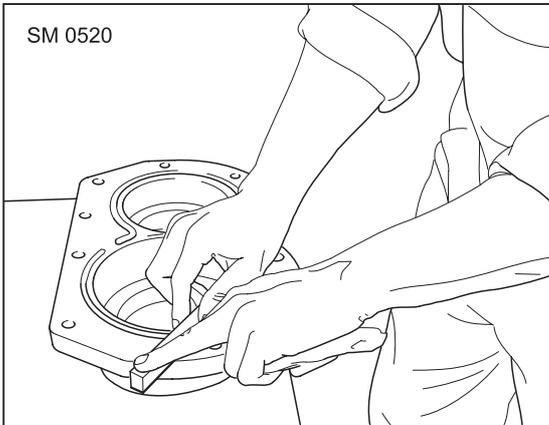
**Fig 4.52 - Preparing Face of Bearing Housing**

- 4.4.38 Apply some LOCTITE 245 (screw locking) to the M10 threaded holes in the bearing housing.



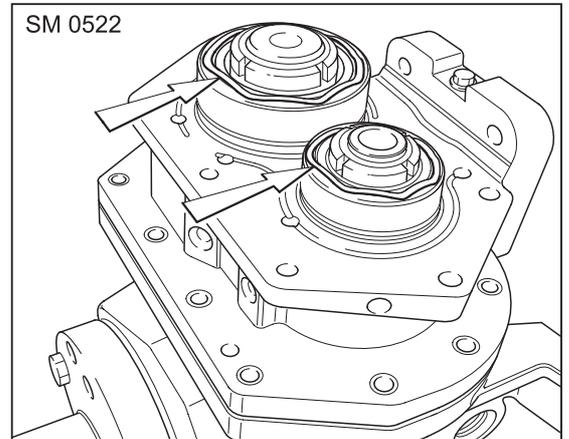
**Fig 4.53 - Applying Loctite**

4.4.39 Thoroughly clean and degrease the face of the delivery end cover (5). Use an oilstone to remove any burrs.



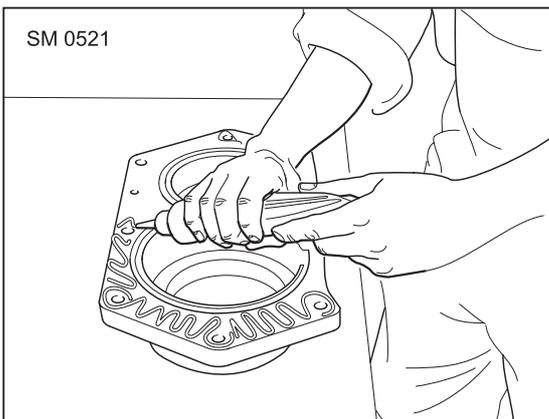
**Fig 4.54 - Preparing Face of Delivery End Cover**

4.4.41 Place the two waved washers (9) on the outer ring of the bearing (16) (male rotor) and the two waved washers (10) on the outer ring of the bearing (15) (female rotor).



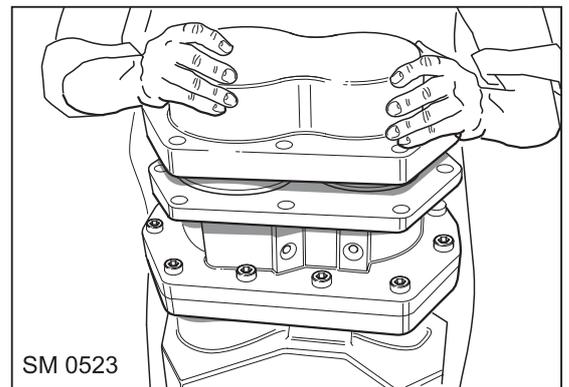
**Fig 4.56 - Positioning Waved Washers**

4.4.40 Apply LOCTITE 510 to the face of the delivery end cover (5) as shown.



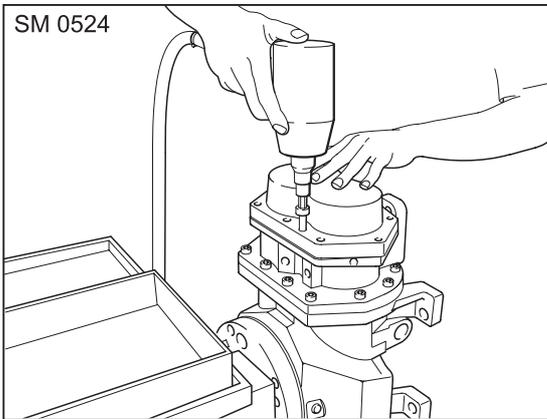
**Fig 4.55 - Applying Loctite**

4.4.42 Carefully lower the delivery end cover (5) into position on the bearing housing. If necessary attach lifting tackle.



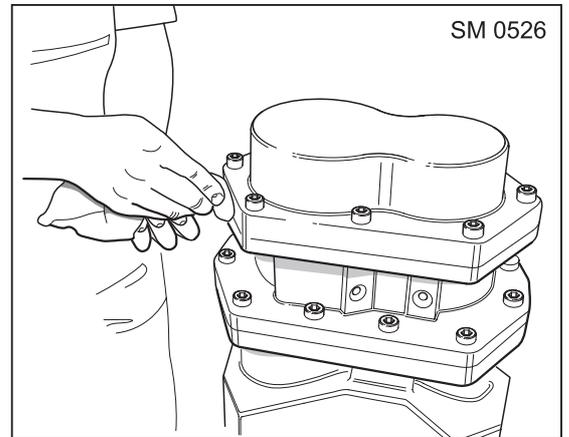
**Fig 4.57 - Lowering Delivery End Cover into Position**

4.4.43 Screw in the capscrews M10x40 (25) and tighten crosswise.



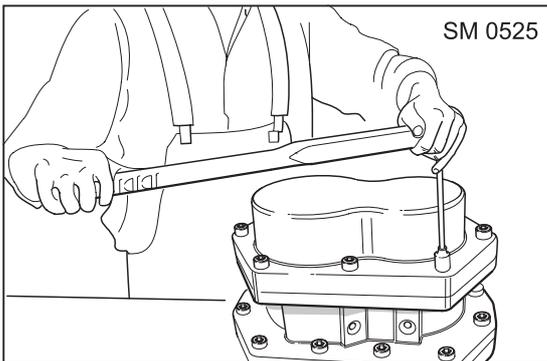
**Fig 4.58 - Fitting and Securing Capscrews**

4.4.45 Clean any excess LOCTITE from the bearing housing/ delivery end cover.



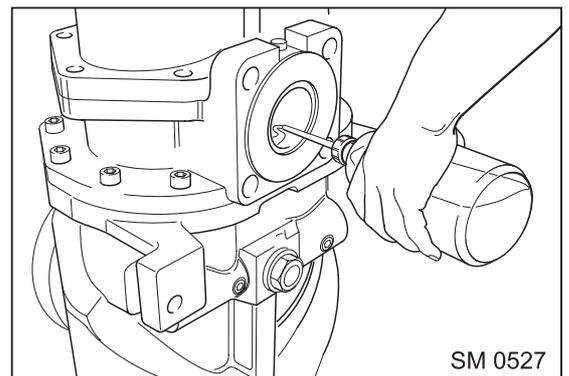
**Fig 4.60 - Removing Excess Loctite**

4.4.44 Tighten the bolts M10x40 (25) to 50 Nm using a torque wrench.



**Fig 4.59 - Torque Tightening Capscrews**

4.4.46 Pour some anti-rust oil (250 ml) through the outlet into the air end to prevent seizure of the rotors.



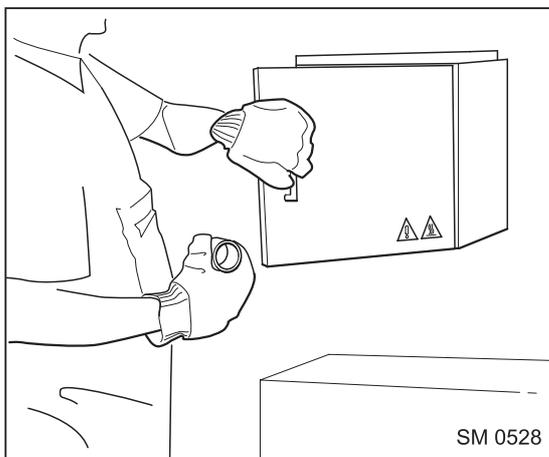
**Fig 4.61 - Applying Anti-Rust Oil**

## 5 Assembly - Inlet End

### 5.1 Bearings

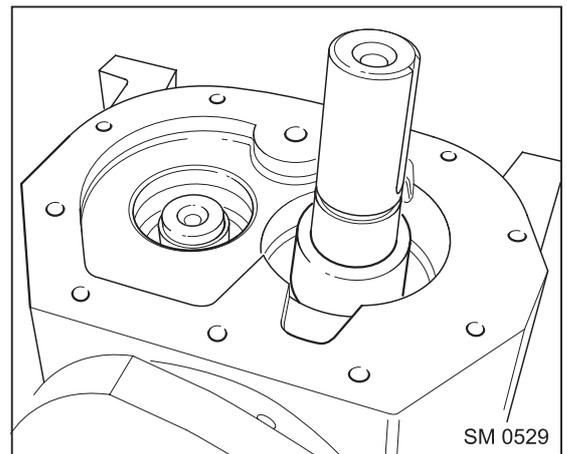
- 5.1.1 Turn the air end on the rotating fixture through 180° so that the drive end is now uppermost.
- 5.1.2 Take the inner ring of bearing (11) out of the oven (previously heated to a temperature of 120 to max. 125°C/ 257°F. See section 4.4.36).

  **Warning:** Hot components. Use safety gloves.



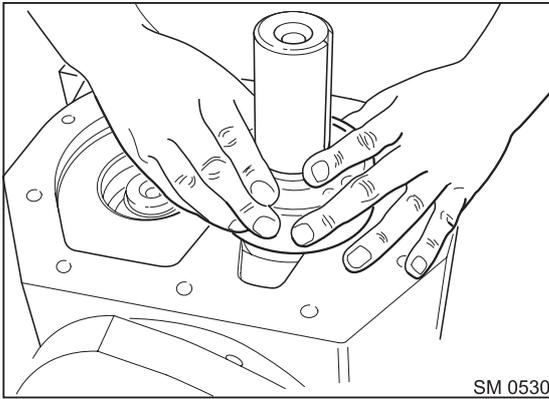
**Fig 5.1 - Removing Heated Bearing Inner Ring From Oven**

- 5.1.3 Slide the inner ring of the bearing (11) onto the drive end of the male rotor shaft. Ensure that the inner ring is seated firmly against the shaft shoulder.
- 5.1.4 Then slide the spacer ring (32) (heated to a temperature of 120 to max. 125°C/ 257°F) onto the drive end of the male rotor shaft. Ensure that the spacer ring (32) is seated firmly against the before assembled inner ring (11).
- 5.1.5 Finally slide the inner ring of the bearing (12) (heated to a temperature of 120 to max. 125°C/ 257°F) onto the end of the female rotor shaft. Ensure that the inner ring is seated firmly against the shaft shoulder.
- 5.1.6 Let the inner rings cool down for 5 minutes minimum.



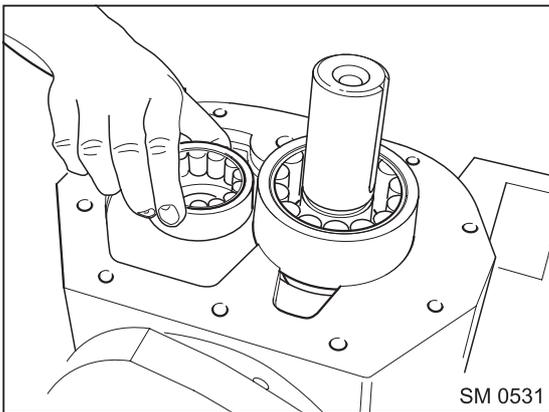
**Fig 5.2 - Spacer Ring and Inner Rings**

5.1.7 Position the cylindrical roller bearing (11) onto the male rotor.



**Fig 5.3 - Positioning Male Roller Bearing**

5.1.8 Set the cylindrical roller bearing (12) onto the female rotor.

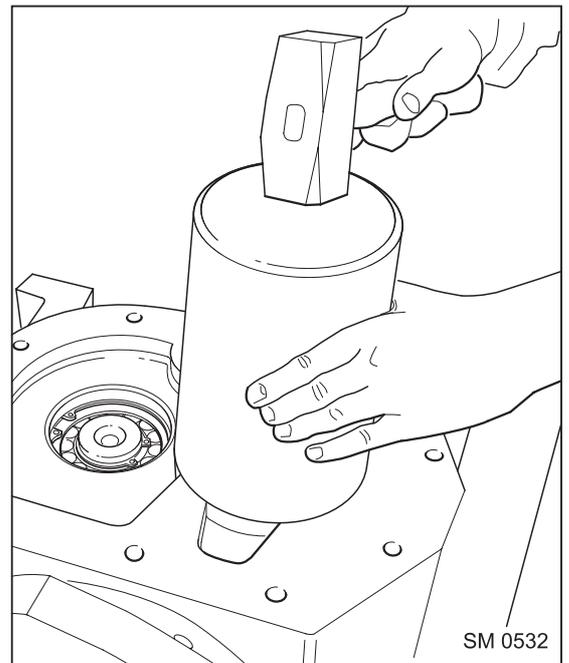


**Fig 5.4 - Positioning Female Roller Bearing**

5.1.9 Fit the cylindrical roller bearing (11) into the rotor casing (male rotor side). Ensure the outer ring sits firmly against the shoulder of the rotor casing with the careful use of a hammer and drift.



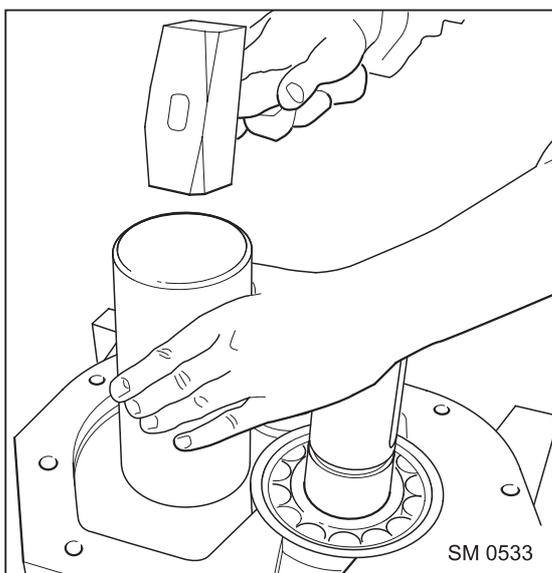
**Caution:** Do not damage the rolling elements or bearing races.



**Fig 5.5 - Fitting Male Roller Bearing**

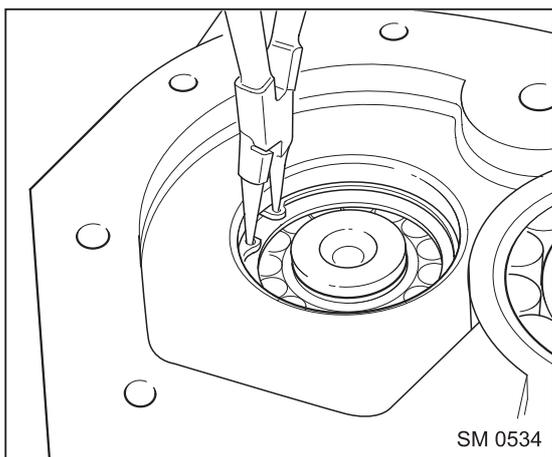
- 5.1.10 Assemble the cylindrical roller bearing (12) into the rotor casing (female rotor side). Ensure the outer ring sits firmly against the shoulder of the rotor casing with the careful use of a hammer and drift.

**⚠ Caution:** Do not damage the rolling elements or bearing races.



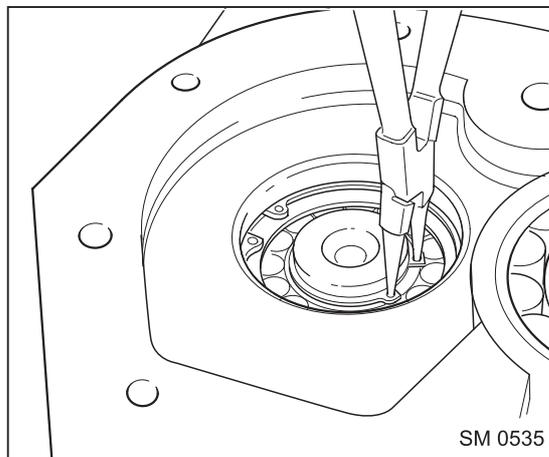
**Fig 5.6 - Fitting Female Roller Bearing**

- 5.1.11 Fit the circlip (20) into the groove of the rotor casing for axial location of the bearing outer ring.



**Fig 5.7 - Fitting Circlip in Casing**

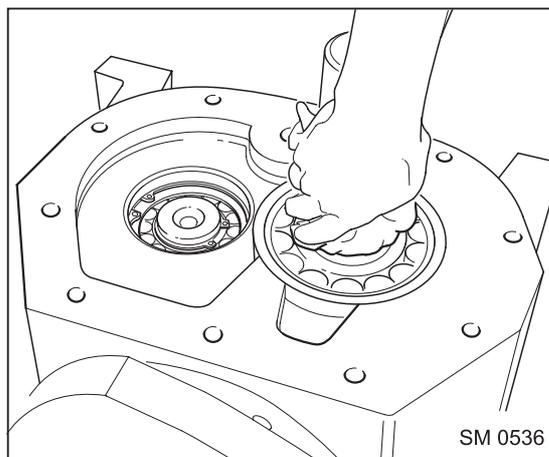
- 5.1.12 Fit the circlip (21) into the groove of the female rotor shaft for axial location of the bearing inner ring.



**Fig 5.8 - Fitting Circlip Onto Female Shaft**

## 5.2 Front Cover and Oil Seal

- 5.2.1 Degrease and clean the end of the male rotor shaft .



**Fig 5.9 - Cleaning Male Rotor Shaft**

- 5.2.2 Apply LOCTITE 620 on the seat of the inner ring of the oil seal on the male rotor shaft.

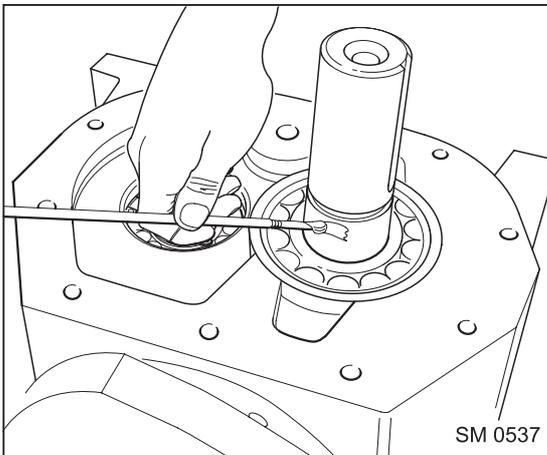


Fig 5.10 - Applying Loctite

- 5.2.3 Slide the inner ring (18) (heated to a temperature of 120 to max.125°C/ 257°F) of the oil seal onto the shaft end of the male rotor.

- 5.2.4 Ensure that this inner ring (18) is seated firmly against the spacer ring (32) with the careful use of a hammer and drift.

**Warning:** Hot components. Use safety gloves.

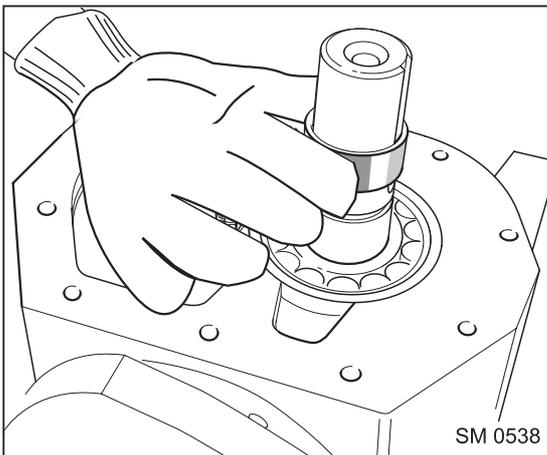


Fig 5.11 - Fitting Inner Ring of Oil Seal

- 5.2.5 Polish the flange face of the front cover (6) using an oilstone.

- 5.2.6 Degrease and clean the face.

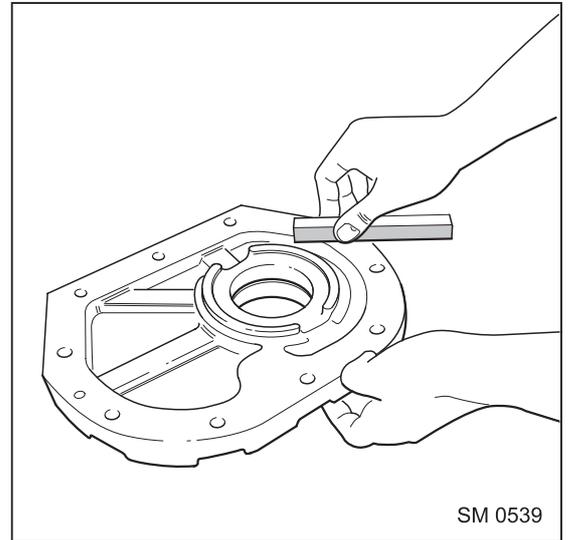


Fig 5.12 - Cleaning Face of Front Cover

- 5.2.7 Degrease and clean the bore of the oil seal in the front cover (6).

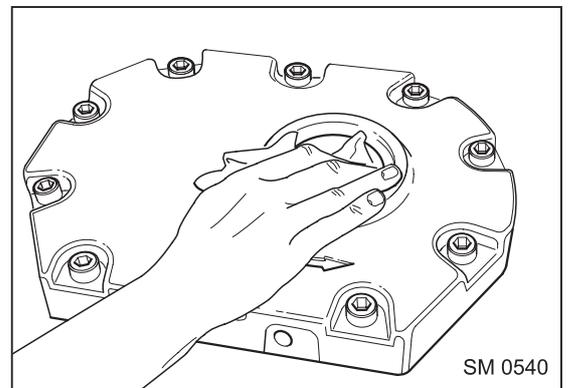
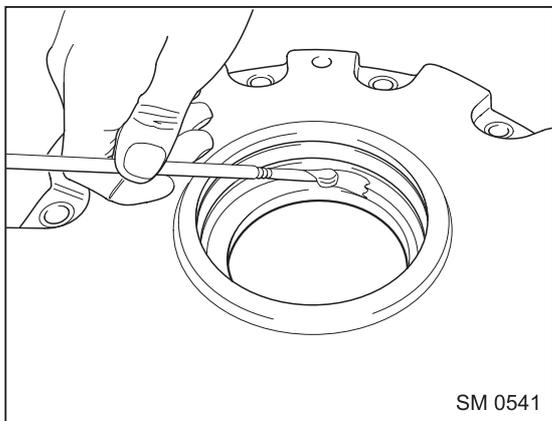


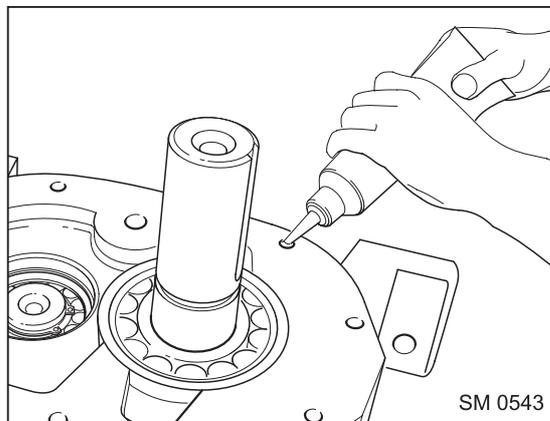
Fig 5.13 - Cleaning Oil Seal Bore in Front Cover

5.2.8 Apply some LOCTITE 620 on the seat of the oil seal ring in the front cover (6) as shown.



**Fig 5.14 - Applying Loctite**

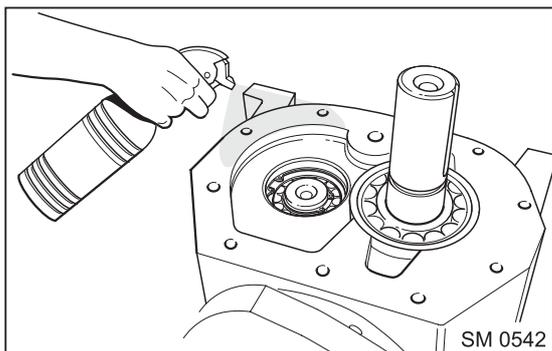
5.2.11 Apply some LOCTITE 245 (screw locking) to the M10 threaded holes in the rotor casing.



**Fig 5.16 - Applying Loctite**

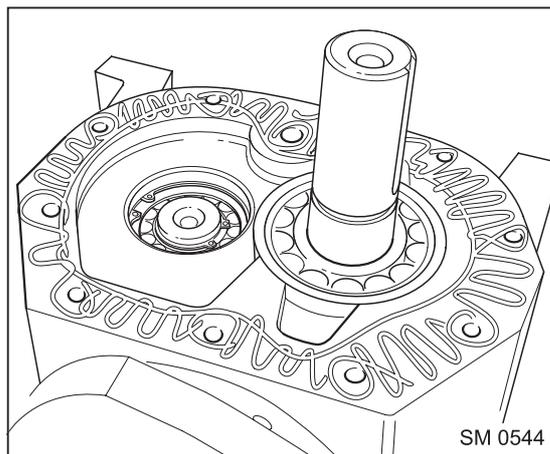
5.2.9 Polish the drive end face of rotor casing (3) using an oilstone.

5.2.10 Degrease and clean the face.



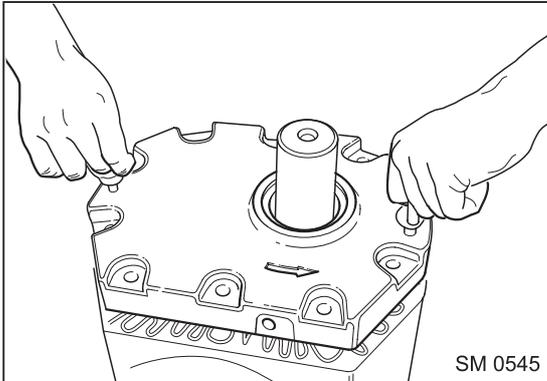
**Fig 5.15 - Cleaning Face of Rotor Casing**

5.2.12 Apply LOCTITE 510 to the face of the rotor casing (3) as shown.



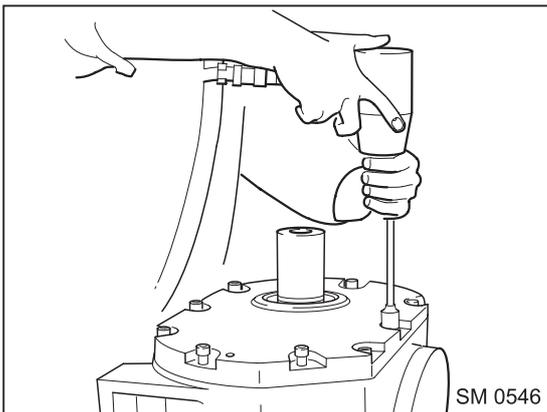
**Fig 5.17 - Applying Loctite**

- 5.2.13 Screw two M10 eyebolts into the front cover (6). Carefully lower the front cover into position on the rotor casing.



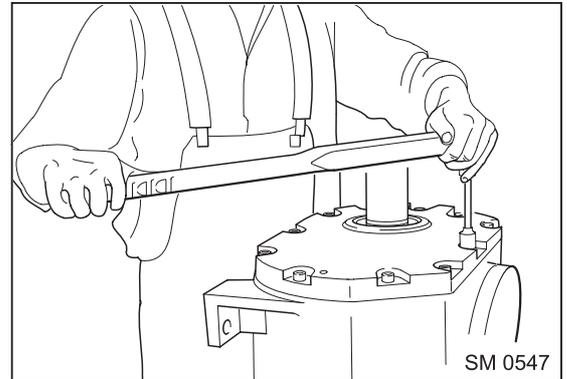
**Fig 5.18 - Positioning Front Cover**

- 5.2.14 Screw in the bolts M10x40 (25) and tighten crosswise.



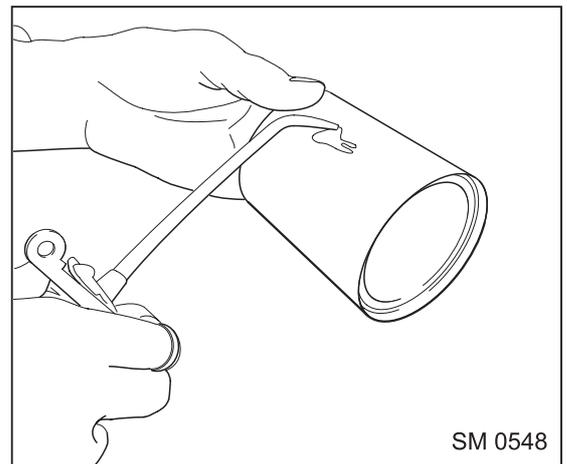
**Fig 5.19 - Positioning Front Cover Screws**

- 5.2.15 Tighten the bolts M10x40 (25) to 50 Nm crosswise using a torque wrench.



**Fig 5.20 - Securing Front Cover Screws**

- 5.2.16 Lubricate the assembly sleeve\* with compressor oil to ease lip seal assembly.

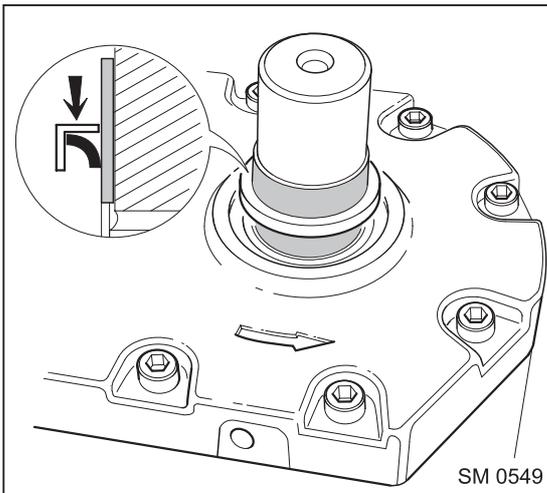


**Fig 5.21 - Lubricating the Assembly Sleeve**

5.2.17 Position the assembly sleeve on the male rotor shaft, ensuring that it sits correctly on the inner ring (18).

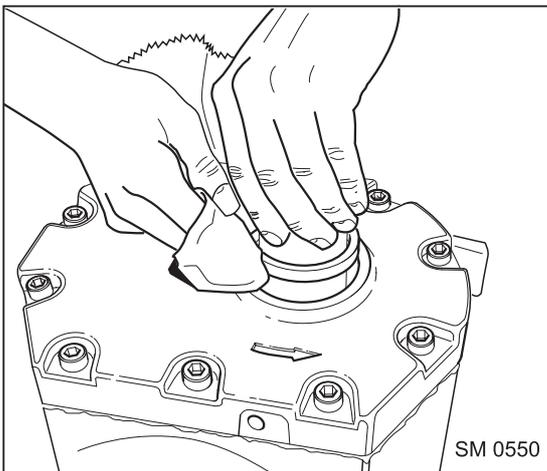
5.2.18 Carefully slide the lip seal ring (19) over the assembly sleeve, but only half way.

- ⚠ **Caution:** (i) Ensure sealing lip is not damaged or distorted during assembly.
- (ii) Ensure lip seal ring is correctly orientated.



**Fig 5.22 - Lip Seal Partially Installed**

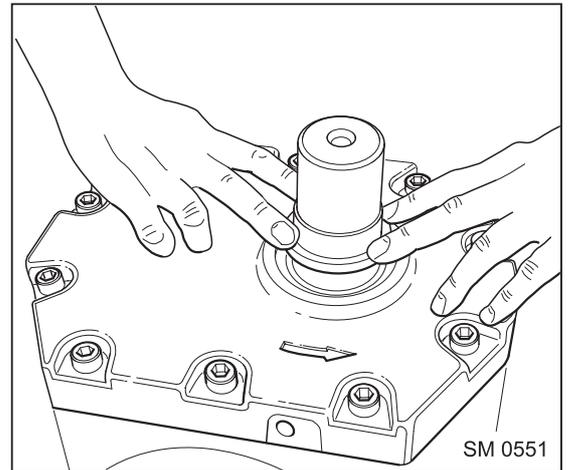
5.2.19 Degrease and clean the outer face of the lip seal ring (19).



**Fig 5.23 - Cleaning Lip Seal**

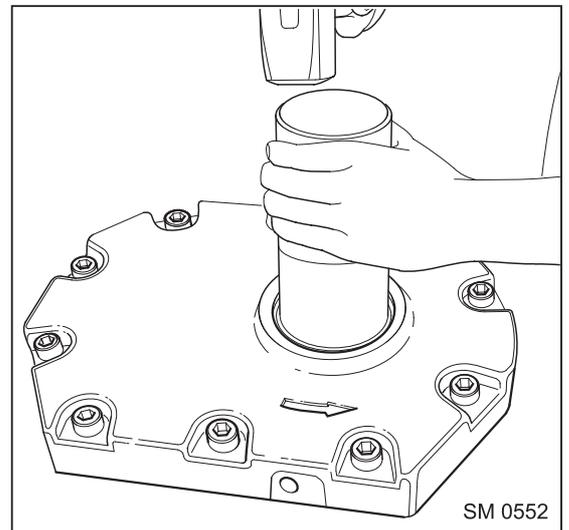
5.2.20 Carefully slide the lip seal ring (19) the rest of the way down over the assembly sleeve.

- ⚠ **Caution:** Ensure sealing lip is not damaged or distorted during assembly.



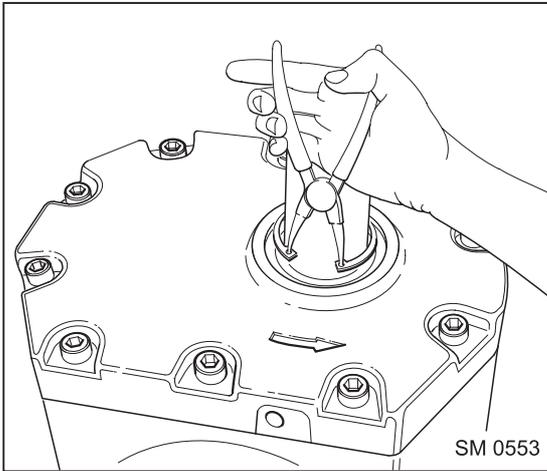
**Fig 5.24 - Positioning Lip Seal**

5.2.21 Drive the lip seal ring (19) into the bore of the front cover (6) with the careful use of a hammer and drift. Ensure the lip seal ring sits firmly against the shoulder of the front cover.



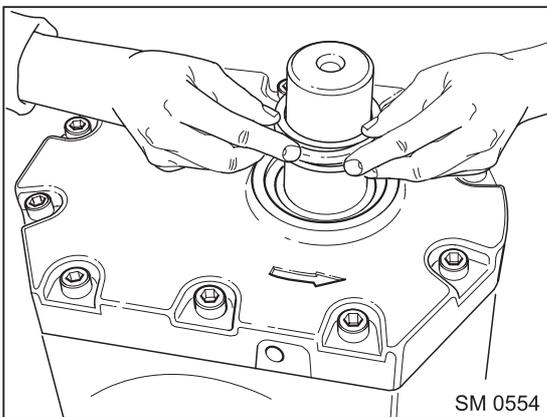
**Fig 5.25 - Fitting Lip Seal**

- 5.2.22 Remove the assembly sleeve.  
 5.2.23 Fit both inner circlips (20) 72x2,5 into the grooves of the front cover (6).



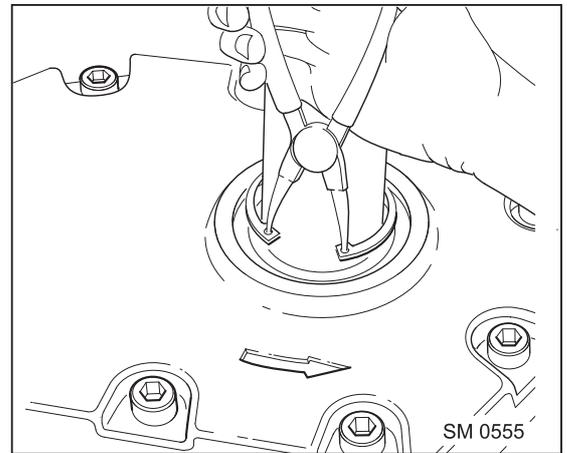
**Fig 5.26 - Fitting Circlips**

- 5.2.24 Moisten the running face of the felt ring (17) with compressor oil.  
 5.2.25 Insert an adjusting washer (45), the felt ring (17) and the second adjusting washer (45) over the inner ring as shown. Ensure this package sits firmly against the circlip (20).



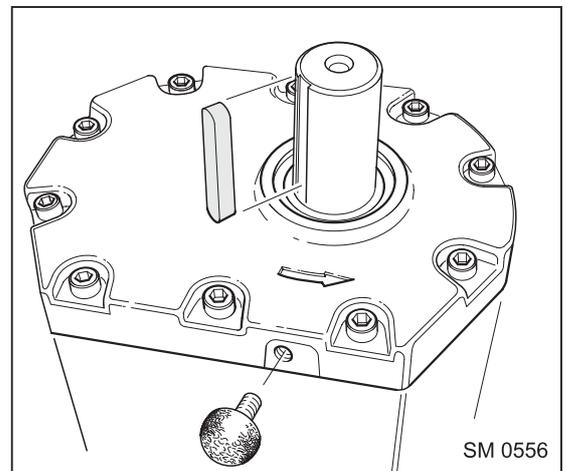
**Fig 5.27 - Fitting Felt Ring and Adjusting Washers**

- 5.2.26 Fit the outer circlip (20) into the groove of the front cover.



**Fig 5.28 - Fitting Circlip**

- 5.2.27 Carefully drive the key into the keyway on the drive end of the male rotor shaft using a copper hammer.  
 5.2.28 Screw the breather ((160) in the oil seal kit) into the threaded hole (R1/8") at the top of the front cover.



**Fig 5.29 - Fitting Drive Key and Breather**

- 5.2.29 Clean any excess LOCTITE from the rotor casing and front cover.

## 6 Repair Kits

### 6.1 Air End Repair Kit

Item No.	Part No.	Description	Qty.
	<b>A10212974</b>	<b>Air End Repair Kit comprising:</b>	
7	A10216374	Split Spacer Ring	1
8	A10216474	Split Spacer Ring	1
9	A93573630	Waved Washer	2
10	A93573640	Waved Washer	2
11	A93575550	Cylindrical Roller Bearing	1
12	A93572970	Cylindrical Roller Bearing	1
13	A93574550	Cylindrical Roller Bearing	1
14	A93575530	Cylindrical Roller Bearing	1
15	A93574530	4-Point Bearing	1
16	A93575540	4-Point Bearing	1
20	A93147410	Circlip	1
21	A93146280	Circlip	1
23	A93575260	Locknut	1
24	A93574770	Locknut	1
25	A93049170	Cylind.Screw	18
26	A93321740	Spacer Ring	2
27	A93321750	Spacer Ring	2
31	A93015110	Hex. Head Screw	1
33	A93060030	Locking Screw	1
46	A93061910	Locking Screw	2
47	A93189050	Sealing Ring	2
48	A93060320	Locking Screw	1
51	A93189460	Sealing Ring	1
52	A93060380	Locking Screw	1
53	A93189550	Sealing Ring	1
54	A93189460	Sealing Ring	1
102	100004669	Air End Oil Seal Kit EK145NK	1

**6.2 Oil Seal Kit**

Item No.	Part No.	Description	Qty.
	<b>100004669</b>	<b>Air End Oil Seal Kit comprising:</b>	
17	A93343510	Felt Ring	1
18	A05351574	Inner Ring	1
19	A93221230	Oil Seal	1
20	A93147410	Circlip	3
25	A93049170	Cylind.Screw	10
28	A93160940	Key	1
32	A10215774	Spacer Ring	1
45	A93321340	Adjusting Washer	2
150	A92190910	Loctite Type 510/ 50 ml	1
152	A92190200	Ergo 4052 thread locking medium blue 10g	1
160	A13012774	Breather	1