

# **Gardner**

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# **Denver**

***TAMROTOR Compressors***

## **Enduro 6**

### **Repair instructions**

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## To the user

Enduro air end is an oil injected single stage screw, which is designed for industrial air compressors.

Each Enduro air end is designed for its own capacity range.

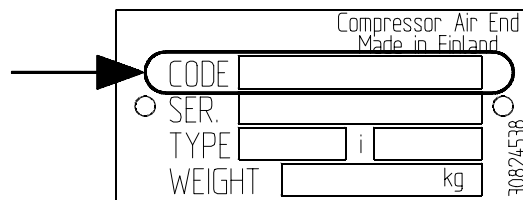
**Don't exceed the max. pressure, power and rotation speed and don't use lower than the minimum rotation speed given in the technical data.** The warranty of the air end is not valid if these values are exceeded.

Only the use of original spare parts guarantees long and reliable lifetime.

This instruction makes you acquainted with the repair of Enduro air end.

**Read these instructions carefully before starting the repair work.**

When ordering spare parts, please, give the codenumber from the plate connected to the air end.



## Safety

Read always the safety instructions of the equipment, where the air end is used!

The cleanness in all repair work is of great importance. All the foreign particles in the air end shorten the life time of the bearings and the rotors.

### Before starting the repair work

1. Disconnect the electric supply.  
(in diesel driven compressors take care that the motor cannot be started)
2. Make sure that there is no pressure in the oil receiver and close the valve between the compressor and the air line.
3. The air end and oil is hot immediately after the compressor has been stopped. Give time for cooling.

### Before starting the compressor

1. Assure that the oil used is correct (see oil recommendation), and that the oil level is correct.
2. Make sure that the rotation direction is correct by starting the compressor momentarily.  
Ma ting time 2 seconds.



**Running the compressor unit in the wrong direction causes damage.**

## Technical specification

Rotor size		
- male $\phi$	mm	95,7
- female $\phi$	mm	76,2
Lobe combination		4/5
Male rotor driven		
Displacement volume	l/rev	0,6013
Male rotor speed		
- min	rpm	2000
- max	rpm	8000
Tip speed (male)		
- min	m/s	10
- max	m/s	40
Input power		
- max	kW	30
Working pressure		
- min	bar	3
- max	bar	13
Oil injection quantity	l/min	40 - 50
Weight	kg	about 31

**On the repairing of the compressor air end use always special tools.**

## **Disassembly**

1. Clean the outside surfaces of the compressor unit from all dirt.
2. Place the compressor unit on a steady surface where the repair work can be carried out.
3. Remove the output end cover(18) mounting screws(1), and remove the cover.
4. Remove the sealing housing cover(2) screws(1), and remove the cover.
5. Mount a special tool to the drive shaft and lock it to the compressor unit body.
6. Open the shaft nuts (17 and 23) and make sure that the special tool prevents the shaft from turning.
7. Remove the pressure flange(13) mounting screws(20).
8. Remove the tool mounted to the drive shaft.
9. Remove the pressure flange by using the threads in the flange.  
(In older models remove the pressure flange by lightly tapping the drive shaft with a copper drift.  
Note! Do not use a screw driver to pry off the flange.)
10. Remove the rotors from the body.  
**Note!** Handle the rotors with care.
11. Note the positions of the ball bearings(15 and 22).
12. Remove the outer bearing races (tap out with a drift) from the bearing housings.  
**Note!** A puller must be used for the bearing(9).
13. Use a puller to remove the inner bearing races.  
**Note!** Take care not to damage the shaft when you remove the shaft seal inner ring.
14. Remove the shaft seal(6) from its housing. Note the position of the seal.
15. Remove the remains of the sealings from the covers, and wash all parts clean.

16. Check the parts :

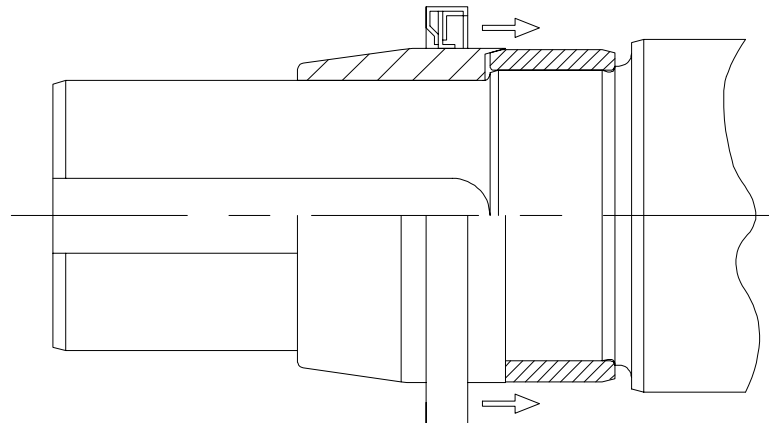
Part	Do not reuse if
Rotors	- ends have seizure marks
	- contact surface marks are uneven
	- rotors have scratches or dents
	- bearing seats are worn
	- rotors have touched body or end flanges
Body	- rotors have touched body
	- body shows signs of overheating (blue colour)
Discharge flange	- flange shows signs of overheating (blue colour)
	- rotors have touched flange
	- O-ring groove is damaged

17. Always fit new bearings and sealings.  
Use original spare parts.

## Assembly

1. Install the bearings(7 and 9) to the body.  
Use Loctite 601 to lock the bearings in place and use assembling tool.  
Lubricate the bearings.
2. Install the inner races of the bearings(14 , 21 , 7 and 9) to the rotors.
3. Insert the rotors into the body, and lock the drive shaft with the special tool.
4. Install the bearings(14 and 21) to the pressure flange and use Loctite 601 to lock the bearings in place. Use special tool.  
Lubricate the bearings.
5. Use grease when installing the O-rings(12 and 19) into their grooves. Mount the pressure flange.
6. Install the pins(11, 2 pcs) to the pressure flange.
7. Tighten the screws(20) to 180 Nm.  
Tighten crosswise.
8. Install the pressure flange ball bearings(15 and 22). Use special tool.  
**Note!** Thick side of inner race upwards.
9. Install the shaft nuts(17 and 23) with their own tools. Apply Molykote 1000 to the threads.
10. Adjust end float:
  - Tighten the shaft nuts lightly so that the clearance between the rotor ends and the pressure flange disappears. Do not overtighten.
  - Open the nuts (approx. 8 - 12°) so that the clearance between the rotor ends and the pressure flange is 0,03 to 0,05 mm. Move the rotors up and down to measure the clearance. Use a dial gauge. Note that the shaft nuts need no separate locking.

11. Mount the output end cover(18) with the sealing(16), and tighten the screws(1) to 25 Nm.
12. Install the dust ring and the shaft seal into the sealing housing (2).  
Use Loctite 542.  
**Note!** Shaft seal lip facing inwards.
13. Install the shaft seal inner ring. Use Loctite 601 and the mounting tool.
14. Install the shaft seal mounting tool into the rotor axle against the shaft seal inner ring and install the sealing housing carefully into its position (see drawing).  
Remember also to install the sealing.  
**Note!** Oil hole must remain open between body and sealing housing.
15. Tighten the sealing housing screws(1) to 25 Nm.
16. Pour in some oil through the intake and rotate the drive shaft a few times.  
Plug and seal all openings.  
Protect the drive shaft against corrosion.



# Lubricants and tools that you need

## Lubricants

Lubricating oil	SAE 10W
Grease	Molykote 1000

## Cement

Cement	Loctite 601
Cement	Loctite 542

## Mounting tool set

**Mounting tool set for Enduro 6 compr. unit 308 464 88**

bearing inner race mounting tools:  
 inlet end, male rotor roller bearing  
 inlet end, female rotor roller bearing  
 discharge end, male rotor bearings  
 discharge end, female rotor bearings

bearing mounting tools to body:  
 inlet end, male rotor roller bearing  
 inlet end, female rotor roller bearing

bearing mounting tools to pressure flange:  
 male rotor roller bearing  
 female rotor roller bearing

special tool for locking rotors

drift for pins

lock nut wrench:  
 male rotor  
 female rotor

mounting tool for shaft seal inner ring	034 248 38
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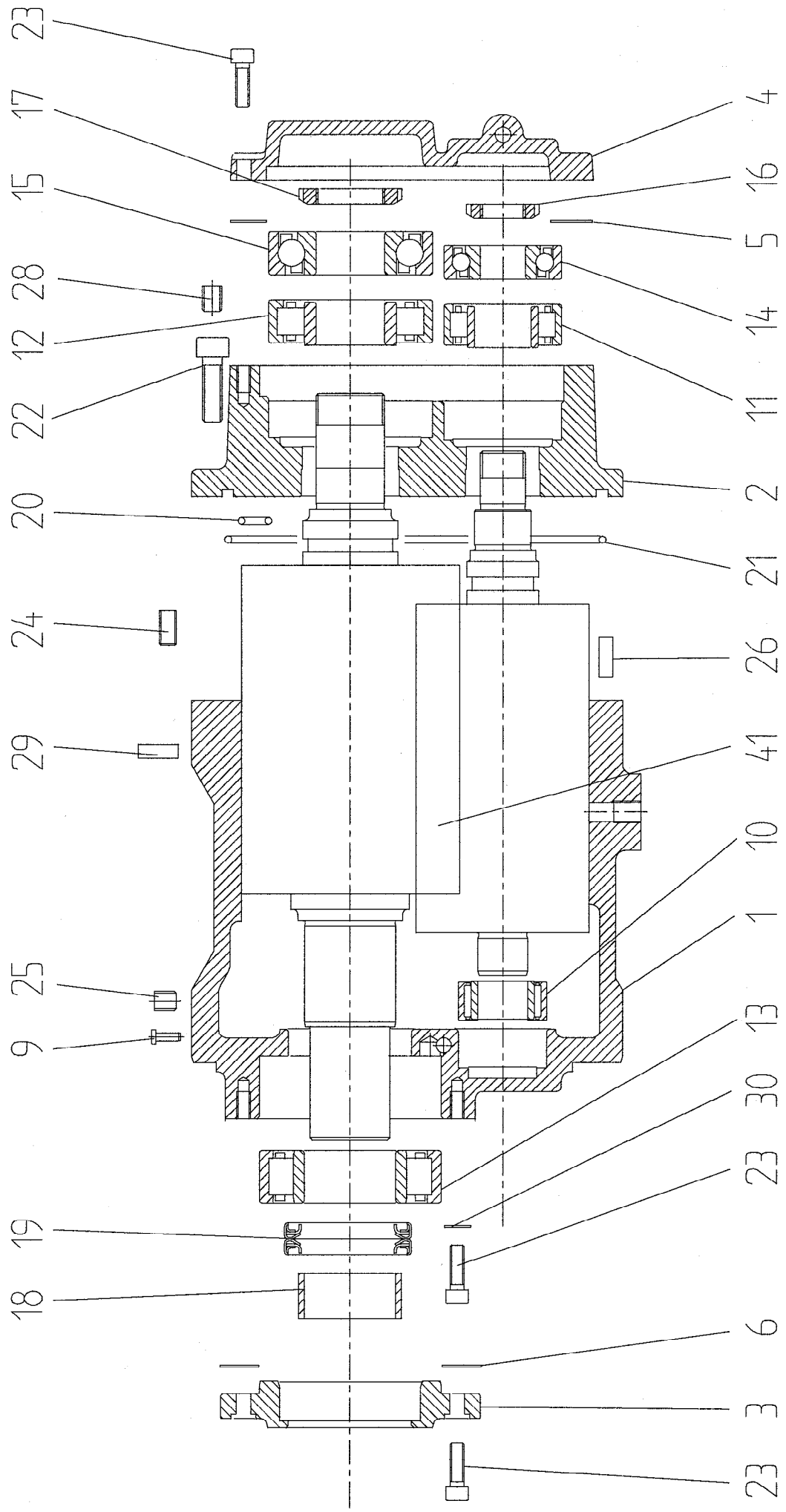
shaft seal mounting bushing	034 247 08
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shaft seal mounting tool	034 160 08
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**Varaosat  
Reservdelar  
Spare parts**

**Enduro 6  
040 223 79**



Viite N:o Det.Nr Ref.No	Tilaus N:o Reservdel Nr Order No	Kpl Antal Qty	Nimitys	Benämning	Description
	<b>040 223 79</b>		<b>KOMPRESSORI- YKSIKKÖ</b>	<b>KOMPRESSOR- ENHET</b>	<b>COMPRESSOR AIR END</b>
	503 082 00	1	Korjaussarja (sisältää osat/innehåller 19, 21-23)	Reparationssats delar/include parts 3, 6, 7, 9, 11, 12, 14-17,	Repair kit
1	040 224 08	1	Runko	Rotorhus	Rotor casing
2	040 225 28	1	Painelaippa	Avloppsgavel	Discharge cover
3	037 918 28	1	Tiivistekansi	Tätninglock	Seal cover
4	037 926 88	1	Lähtökansi	Avloppskupa	Outlet cover
5	308 097 88	1	Tiiviste	Tätning	Gasket
6	308 096 58	1	Tiiviste	Tätning	Gasket
9	308 099 38	1	Kuristin	Strypning	Orifice
10	853 874 39	1	Neulalaakeri	Nållager	Needle roller bearing
11	870 893 59	1	Rullalaakeri	Rullager	Roller bearing
12	812 752 19	1	Rullalaakeri	Rullager	Roller bearing
13	812 751 99	1	Rullalaakeri	Rullager	Roller bearing
14	874 567 99	1	Kuulalaakeri	Kullager	Ball bearing
15	870 200 29	1	Kuulalaakeri	Kullager	Ball bearing
16	874 541 09	1	Akselimutteri	Axelmutter	Lock nut
17	872 525 89	1	Akselimutteri	Axelmutter	Lock nut
19	309 318 20	1	Akselitiiviste kok.p. sisältää osan 18	Axeltätning smst. innehåller delen 18	Shaft seal assy include item 18
20	879 088 49	2	O-rengas	O-ring	O-ring
21	874 542 39	1	O-rengas	O-ring	O-ring
22	895 571 09	4	Kuusiokoloruuvi	Insexskruv	Hex.socket screw
23	445 774 60	16	Kuusiokoloruuvi	Insexskruv	Hex.socket screw
24	872 198 19	2	Tulpparuuvi	Pluggskruv	Plug screw
25	870 899 19	6	Tulpparuuvi	Pluggskruv	Plug screw
26	815 318 69	2	Jousisokka	Fjäderpinne	Spring pin
28	448 595 80	1	Pidätinruuvi	Skruv	Screw
29	807 047 79	3	Kuusiokolotulppa	Insexskruv	Hex.socket screw
30	895 505 49	1	Kuparitiiviste	Tätning	Gasket
41	308 123 31	1	Roottoripari	Rotorpar	Rotor pair