B. Delco refrigerant compressor (engine 116 and 117)

Data

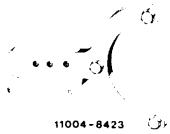
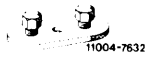
Designation	Delco, 6-cylinder swashplate compressor, 206.5 cc, model no. 59 10 763		
Max. speed		1/min	6400
Required input at max. compressor speed		kW (HP)	approx. 6.3 (8.5)

Oil filling capacity

Oil type	Refrigerant oil (for approved refrigerant oils refer to specifications for service products page no. 362)
Oil quantity for new refrigerant compressor cc	300
Oil quantity for removed compressor following repair or removal cc	200

Tightening torques	Nm
Pipeline to refrigerant compressor	17
Oil check screw	15–17
8 mm screws	35
10 mm screws	30–35
12 mm screws	40–45
Hex. nuts on threaded bolts	25–30

Special tools

Holding device for refrigerant compressor	 11004-8423	109 589 00 31 00
Mount for inner mechanism	 11004-8438	109 589 01 31 00
Pressure test plate	 11004-7632	109 589 00 25 00

Conventional tool

Double open end wrench 3/8" x 7/16" for oil check screw

Note

Operational trouble on air-conditiong system, particularly with a defective refrigerant compressor, e.g. caused by blocking or broken poppet valves, will result in considerable contamination of system under influence of burnt refrigerant oil or abrasives. Since the fact cannot be eliminated that abrasives of refrigerant compressor may enter lines of air-conditioning system, renew pipe line with hoses on refrigerant compressor in such a case. Always replace expansion valve and receiver dehydrator when renewing valve plate (83–530 and 534).

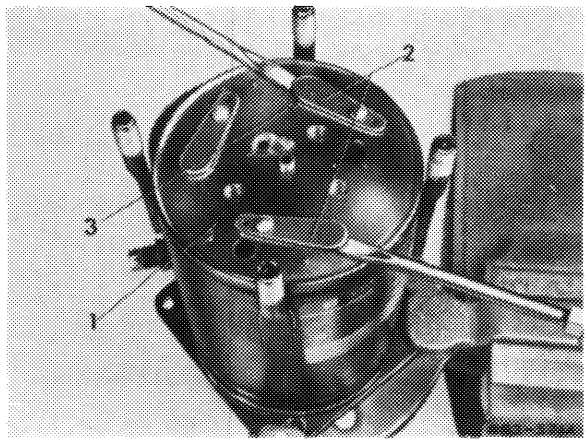
Removal

1 Remove refrigerant compressor and clean at outer surfaces (83–522).

2 Unscrew oil check screw (3) and drain all the refrigerant oil in compressor.

To speed-up draining of refrigerant oil, rotate drive shaft several times. **Do not use drained refrigerant oil again** (83–520).

3 Remove spring plate, pulley, clutch coil and shaft sealing ring (83–526).

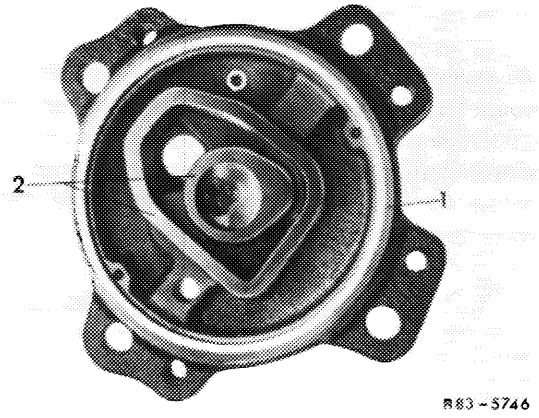


Removing rear exhaust valve plate

1 Exhaust valve plate
2 Spring holder
3 Exhaust valve

4 Turn compressor around in holding device with its front end in downward direction. Unscrew hex. nuts on compressor housing and remove rear head section. If head section is binding, apply uniform blows around head section by means of a rubber hammer.

5 Wipe refrigerant oil from sealing surfaces of rear head section and check sealing surfaces. If damage shows up, replace head section.

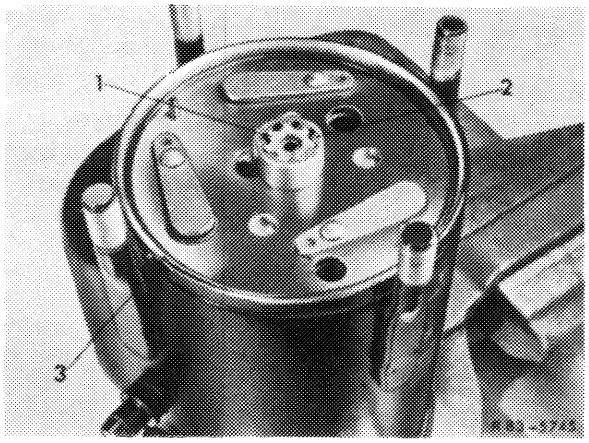


1 Head section rear
2 Sealing surface

6 Remove suction strainer, check and clean, if required.

7 Apply an identification mark on outer surface of inner and outer oil pump gear wheel. Then remove gear wheels.

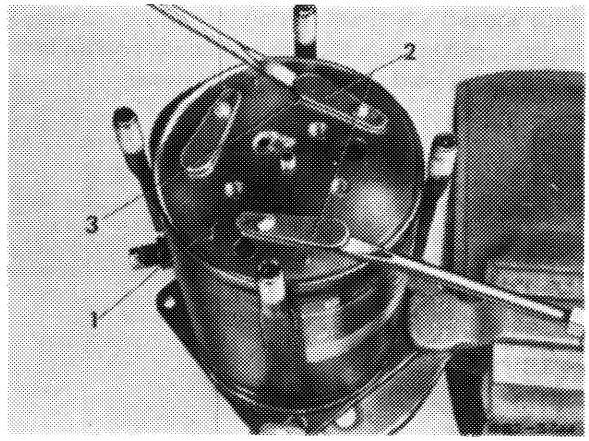
8 Remove sealing ring between head section and housing.



1 Inner gear wheel
2 Outer gear wheel
3 Sealing ring

9 Carefully remove rear valve plates, while applying two screw drivers underneath spring holders – not between spring and spring seat – and force out valve plates.

10 Check valve springs and valve seats. Replace entire valve plate, if damaged.

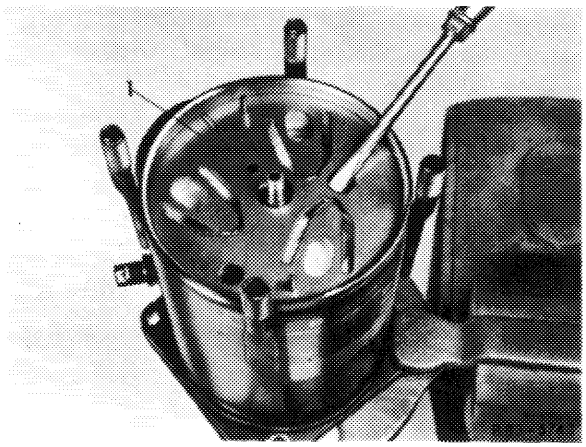


Removing rear exhaust valve plate

1 Exhaust valve plate
2 Spring holder
3 Exhaust valve

11 Lift out rear intake valve plate by means of two screw drivers, but do not use leaf spring valves as supports.

12 Check leaf springs of valve plate for damage and exchange, if required.

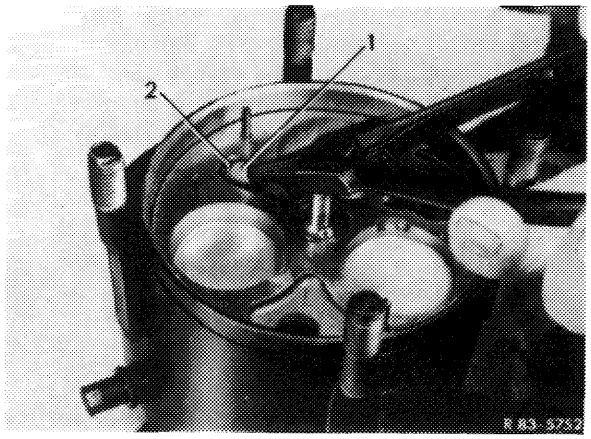


Removing rear intake valve plate

1 Intake valve plate

13 Remove oil intake pipe (1) and remove sealing ring from oil intake.

14 Loosen compressor from holding device. Place mount for inner assembly group over oil pump shaft. Lift compressor from holding device. Turn compressor around and place on work bench in such a manner that the mount for the inner assembly group rests on work bench.



Removing oil intake pipe

1 Oil intake pipe
2 O-ring
3 Removing tool

15 Lift-off front head section and compressor housing. Inner mechanism remains on mount.

Attention!
Do not knock against end of compressor shaft to push-out inner mechanism. If inner mechanism is not sliding out of compressor housing, knock with plastic hammer against front head section.

16 Put compressor housing with front head section aside and push-out head section through compressor housing, making sure that the sealing surfaces on inside of front head section are not damaged.

17 Wipe refrigerant oil from sealing surface of front head section and check sealing surface. If damage shows up, replace head section.

18 Remove front exhaust and intake valve plate. Check leaf springs and their seats. Replace these parts, if required.

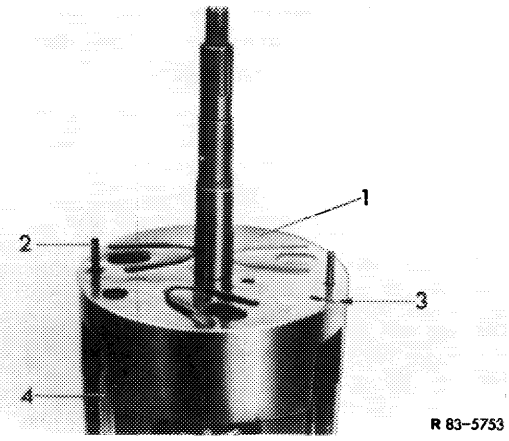
19 Check inner mechanism for damage. If essential damage (e. g. seized spots on cylinder running surface) shows up caused by a shortage of refrigerant or oil, it is recommended to install a complete exchange compressor or a new compressor.

Installation

20 Place inner mechanism on mount.

21 Insert new guide pins (2) into front cylinder half, if previously removed.

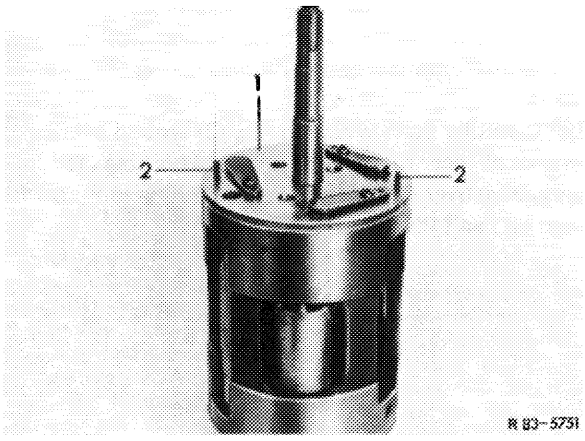
22 Mount front intake valve plate (1) on front cylinder half. Align oil return slot and overflow pipe by means of guide pins (2).



Installation of front intake valve plate

1 Intake valve plate
2 Guide pins
3 Oil return slot
4 Overflow pipe

23 Install front exhaust valve plate, making sure that bores in valve plate are in alignment with guide pins.

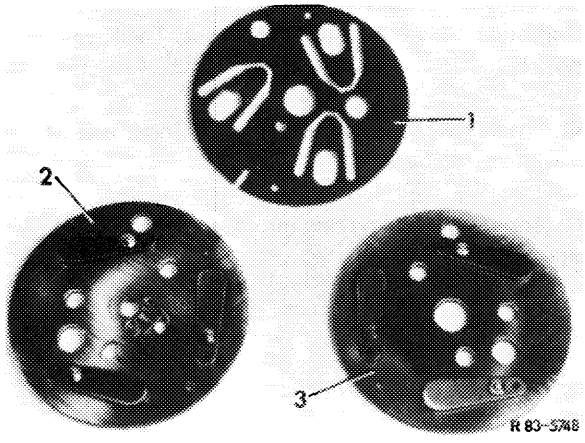


Installation of front exhaust valve plate

1 Exhaust valve plate
2 Guide pin

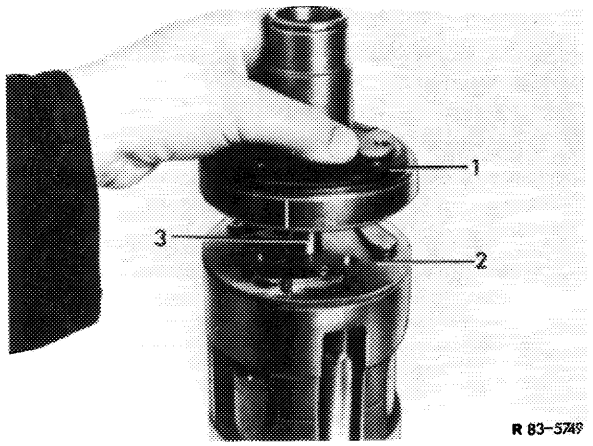
Note: The front exhaust valve plate (1) is recognized by a large-diameter hole in center of plate.

24 Coat sealing surfaces on ribs of front head section with refrigerant oil.



1 Intake valve plate
2 Exhaust valve plate rear
3 Exhaust valve plate front

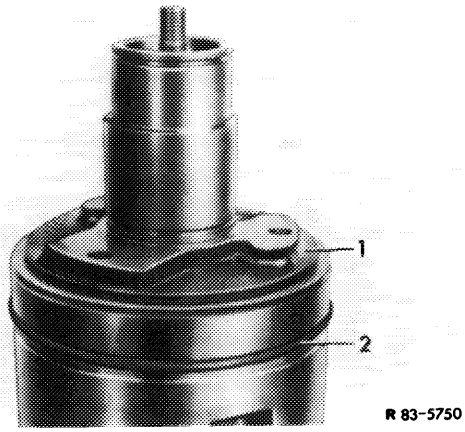
25 Determine position of head section (1) in relation to guide pins (2) of inner assembly group. Mark location of bores on outside of head section. Insert head section in correct position, without touching sealing surfaces with shaft (3). Do not rotate head section for engaging guide pins, since sealing surfaces will then make contact with valve bores.



Installation of front head section

1 Head section front
2 Exhaust valve plate
3 Shaft

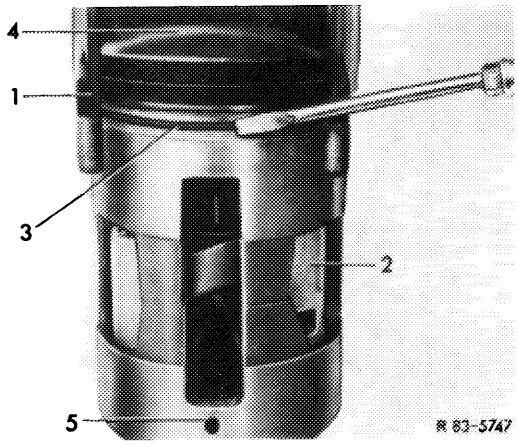
26 Provide chamfered groove on lower end of head section (1) well with refrigerant oil and insert a new sealing ring (2) into groove.



1 Head section front
2 Sealing ring

27 Coat inner surface of compressor housing with refrigerant oil and then slip housing over inner mechanism until it is seated on sealing ring (3).

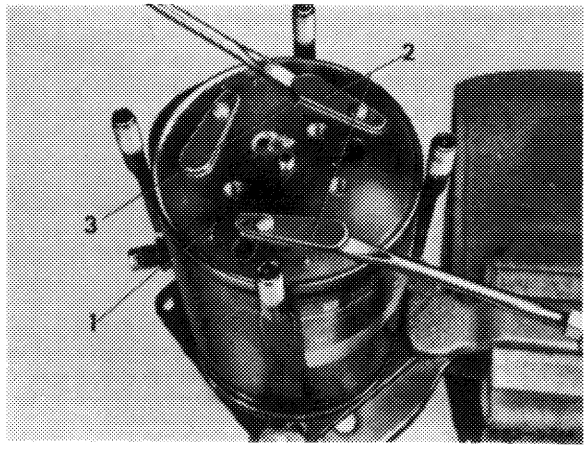
28 Carefully push-in sealing ring (3) around circumference of inner mechanism (2), until housing (1) slips down over mechanism. When housing slips down, align oil pan (4) with bore (5).



29 Turn compressor around while holding mount in position and insert into holding device. Then remove mount.

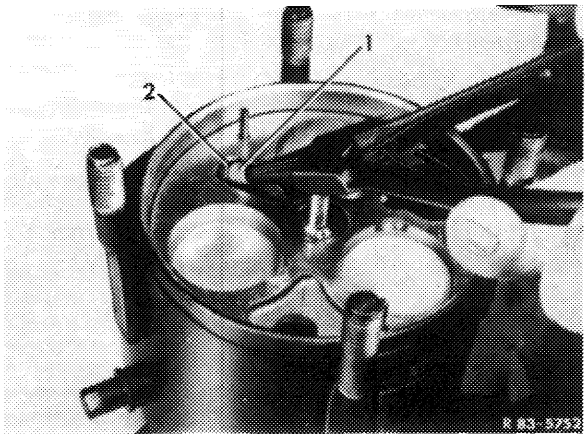
30 Insert new guide pins into rear cylinder half (if previously removed).

31 Insert new sealing ring into bore for oil intake pipe.



1 Exhaust valve plate
2 Spring holder
3 Exhaust valve

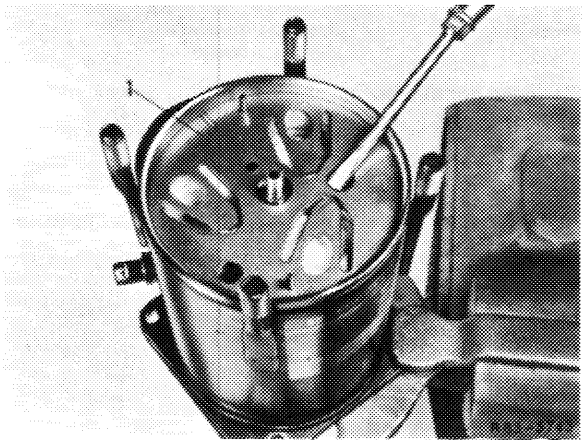
32 Provide oil intake pipe with refrigerant oil and install, while turning compressor mechanism around until oil intake pipe (1) is in alignment with hole in housing wall.



Removing oil intake pipe

1 Oil intake pipe
2 O-ring
3 Removing tool

33 Insert rear intake valve plate over guide pins with oil return slot in direction of oil pan.



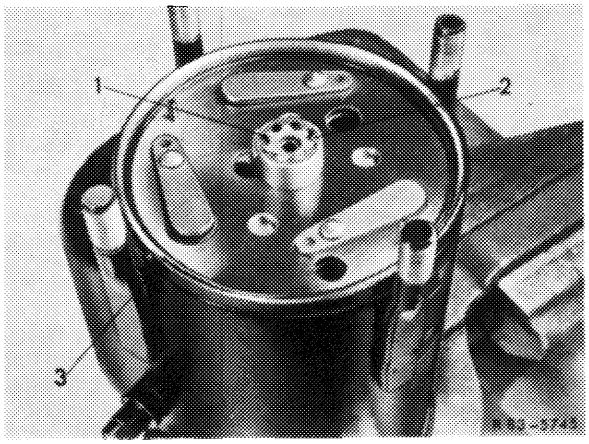
Installing rear intake valve plate

1 Intake valve plate

34 Install rear exhaust valve plate over guide pins.

35 Slip inner oil pump gear wheel (1) on shaft with the previously applied mark pointing upwards.

36 Slip outer oil pump gear wheel (2) over inner gear wheel (1), with the previously applied mark pointing upwards.



1 Inner gear wheel
2 Outer gear wheel
3 Sealing ring

37 Provide rear exhaust valve plate completely and around outer diameter between housing and valve plate with refrigerant oil.

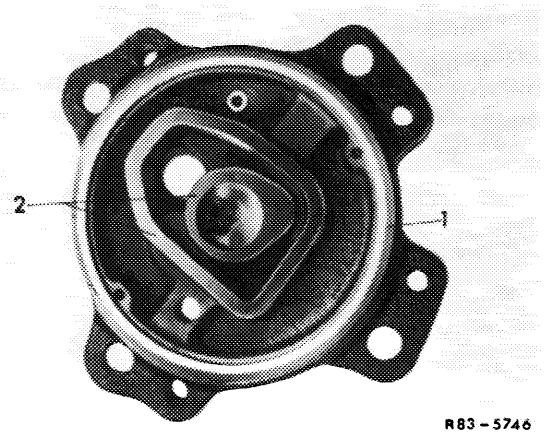
38 Provide new sealing ring (3) between head section and housing with refrigerant oil and place on exhaust valve plate or in housing.

39 Insert suction strainer into rear head section. Caution! Do not damage.

40 Provide sealing surfaces on ribs of head section with refrigerant oil.

41 Slip rear head section over studs while making sure that the strainer is not falling out of its seat and that the teflon gasket is undamaged.

Note: If the rear head section is not engaging in guide pins, turn front head section and push manually.



1 Head section rear
2 Sealing surface

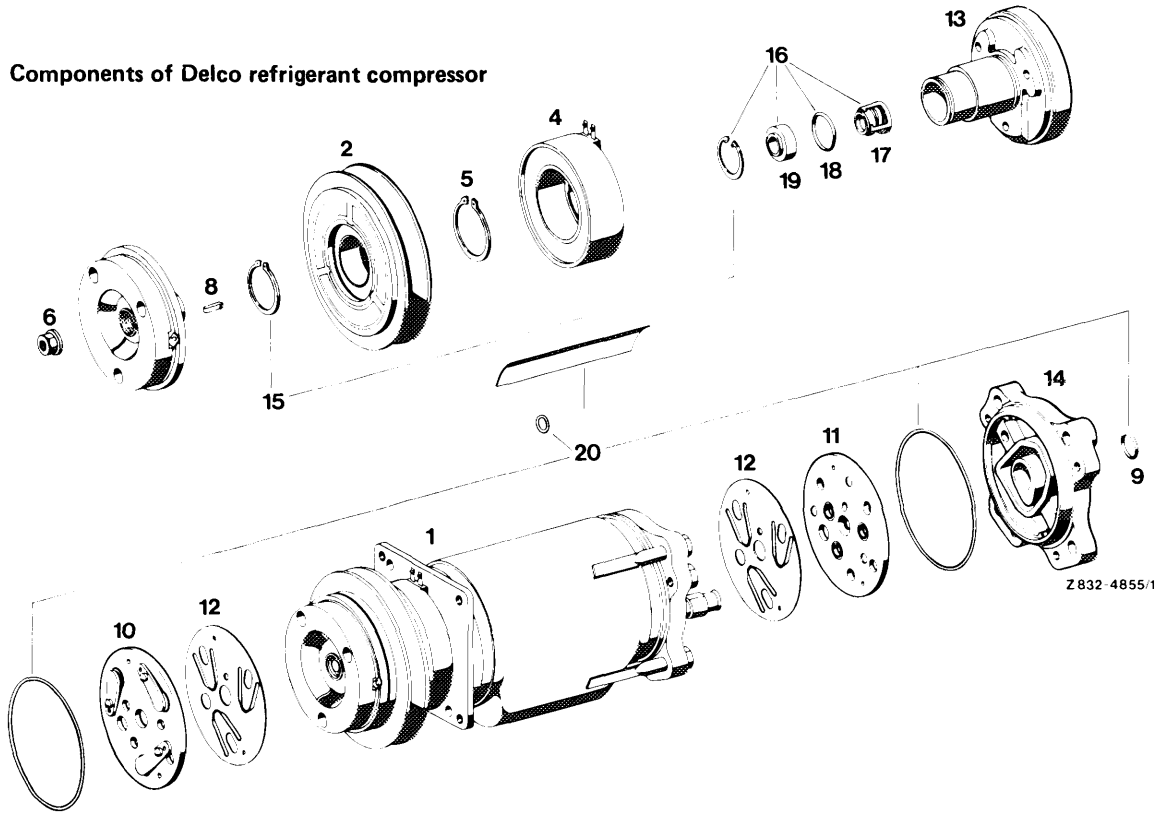
42 Screw hex. nuts on threaded bolts and tighten uniformly.

43 Turn compressor around in holding device and install shaft seal, clutch coil, pulley and spring plate (83–526).

44 Fill fresh refrigerant oil (200 cc) into compressor (83–520).

45 Check Delco refrigerant compressor for leaks (83–525).

Components of Delco refrigerant compressor



1 Delco refrigerant compressor
2 Pulley
3 Spring plate
4 Clutch coil
5 Locking ring
6 Collar nut
8 Key
9 O-ring
10 Exhaust valve plate front
11 Exhaust valve plate rear
12 Intake valve plate
13 Head section front
14 Head section rear
15 Locking ring (set)
16 Sealing set
17 Shaft seal
18 O-ring
19 Ceramic ring
20 Sealing set

C. Delco-refrigerant compressor (engine 617.951)

Data

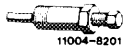
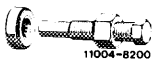
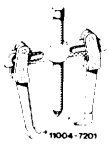
Designation	Delco (Frigidaire) radial 4-cylinder
Max. speed 1/min	7000
Required output at max. compressor speed kW (HP)	approx. 6.3 (8.5)
Cylinder capacity	164 cm^3

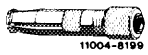
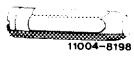
Oil capacity

Oil type refrigerant oil (for approved refrigerant oils refer to "Specifications for service products" page no. 362)	
Oil quantity, new, in refrigerant compressor	170 cm^3

Tightening torques	Nm	(kpm)
Screws (8) pulley-coupling body	11	(1.1)
Screw M 10 x 30 pipe line to refrigerant compressor	50±3	(5±3)
Nut (1) on drive shaft	13	(1.3)
Screws (5 and 6) M 12 refrigerant compressor to carrier	60+10	(6+1)
Hose line (14) from evaporator to pipe line 7/8"	29–37	(2.9–3.7)
Hose line (15) from pipe line to condenser 3/4"	24–28	(2.4–2.8)

Special tools

Holding device for refrigerant compressor	 11004-8103	116 589 14 31 00
Holding wrench for coupling	 11004-8104	116 589 04 40 00
Remover for coupling plate	 11004-8201	000 589 07 35 00
Installer with spacing member for spring plate	 11004-8200	000 589 49 43 00
Guide member	 11004-8203	116 589 05 63 00
Two-claw puller	 11004-7201	000 589 88 33 00
Knock-out mandrel		115 589 02 35 02

Remover and installer for slip ring	 11004-8199	000 589 21 61 00
Remover and installer for shaft seal	 11004-8198	000 589 65 63 00
Pressure test plate for refrigerant compressor	 11004-7632	109 589 00 25 00

Conventional tools

Socket 14 mm, 3/8" square	e.g. made by Hazet, 5630 Remscheid
Slip gauge (set)	e.g. made by Hazet, 5630 Remscheid order no. 2147
Langbeck pliers 72A (inside lock)	e.g. made by Hazet, 5630 Remscheid order no. 1846 a–1
Pliers for locking ring J 2 (outside lock)	e.g. made by Hazet, 5630 Remscheid order no. 1846 c–2
Double open end wrench 1/2" x 9/16", 5/8" x 3/4", 7/8" x 15/16", 1" x 11/8"	

Self-made tool

Remover for O-ring

a) Renewing shaft seal of refrigerant compressor

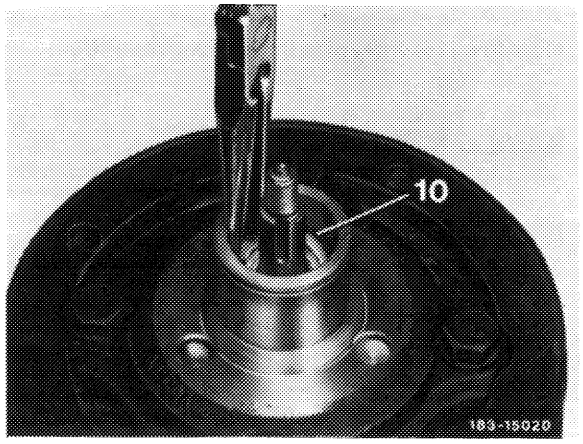
Removal

1 Drain air-conditioning system (83–516).

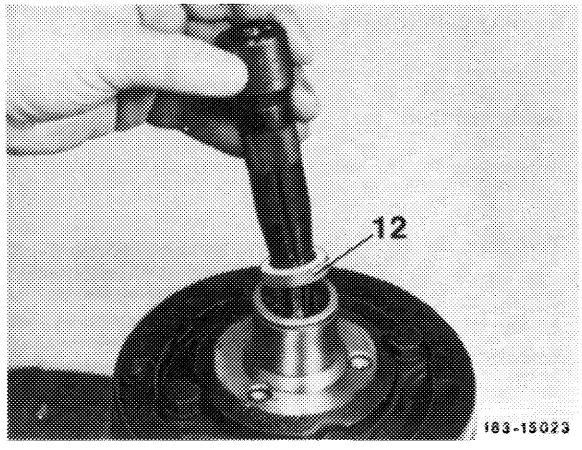
2 Remove refrigerant compressor (83–522).

3 Remove spring plate (83–526).

4 Remove locking ring (10) for shaft seal.

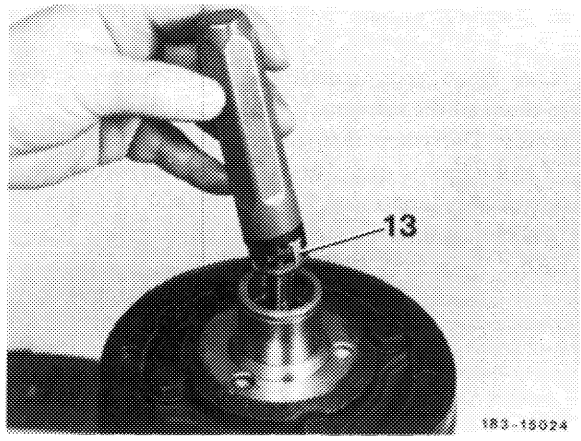


5 Remove slip ring (12) by means of remover and installer.



6 Remove shaft seal (13) by means of remover and installer. For this purpose, press down on tool, turn tool clockwise to get a hold of shaft seal lug with locking tongues on tool. Completely remove shaft seal by pulling seal in straight direction from shaft.

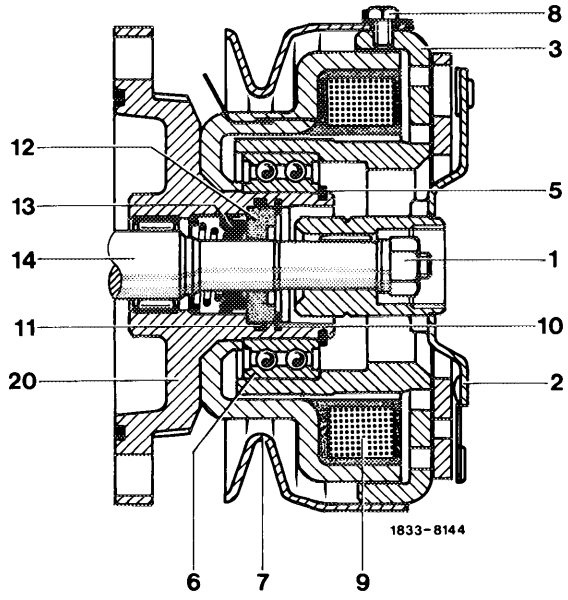
7 Remove O-ring (11) from inside bore in housing cover. A wire, bent to a hook, may be used for this purpose.



Installation

8 Check whether parts of old shaft seal are still in bore of housing cover. Clean bore prior to inserting new seal.

9 Immerse new parts of seal in clean refrigerant oil. Insert O-ring (11) into groove of housing cover.



1	Nut on drive body	9	Magnetic coil
2	Spring plate	10	Locking ring
3	Coupling body	11	O-ring
5	Locking ring	12	Slip ring
6	Bearing for coupling body	13	Shaft seal
7	Pulley	14	Drive shaft
8	Screw with lock	20	Housing cover

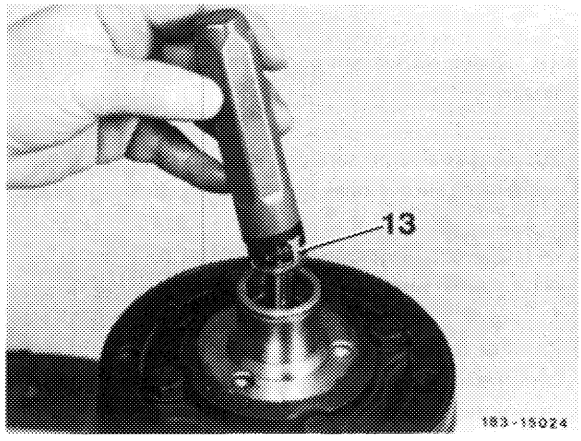
10 Insert shaft seal (13) into tool, and step on shaft. Keep turning tool to the left until shaft seal engages in shaft. Only then turn tool counterclockwise for disconnection from lugs of shaft seal and remove.

11 Introduce slip ring (12) by means of tool into bore until ring touches shaft seal. Make sure that O-ring (11) is not pushed out of groove.

Attention!
Protect sealing surface of slip ring (12) against any damage, such as scratches.

12 Introduce locking ring (10) with flat side in downward direction into bore until locking ring rests on slip ring. Then push with locking pliers or a screwdriver on locking ring until locking ring snaps into groove.

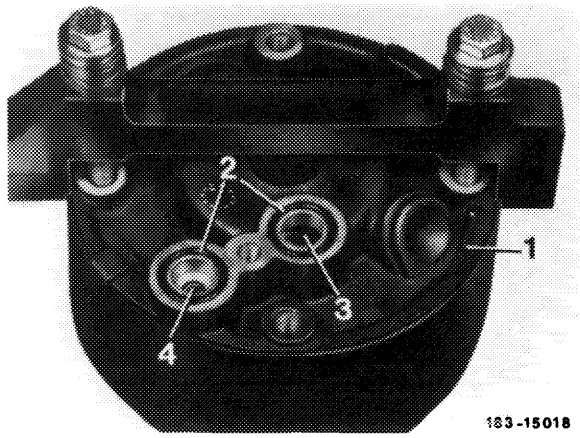
13 Install spring assembly (83–526).



b) Check refrigerant compressor for outside leaks

Note: When working on shaft seal it is recommended to drain all the refrigerant oil from refrigerant compressor. Determine drained quantity of refrigerant oil and fill same quantity of fresh refrigerant oil into refrigerant compressor. For details refer to section "Checking oil level in refrigerant compressor" (83–520).

14 Check installed sealing ring (2) on refrigerant compressor (1) for condition and renew, if required, also provide with refrigerant oil.



1 Refrigerant compressor
2 Sealing ring
3 Suction connection
4 Pressure connection

15 Screw pressure test plate (3) with available hex. screw to refrigerant compressor (1).

16 Connect inner connection of pressure test plate to service line (4) of service unit.

17 Let refrigerant vapor flow into refrigerant compressor. A bottle or filling cylinder pressure of above 4 bar gauge pressure is required.

18 In installation position of refrigerant compressor, rotate compressor shaft several times manually in direction of rotation.

19 Check refrigerant compressor for leaks with leak tester.

20 Close valve on service unit or on filling cylinder again and remove hose line from pressure test plate.

21 Remove pressure test plate, but only directly prior to installing pipe line.

22 For details concerning oil capacity of refrigerant compressor refer to checking "Oil level in refrigerant compressor" (83–522).