

COMPRESSOR REFRIGERANT OIL CHECKING

Article Text

2001 Volvo V40

ARTICLE BEGINNING

2000-01 GENERAL SERVICING
Compressor Refrigerant Oil Checking

NOTE: For compressor applications, see COMPRESSOR APPLICATIONS article. DO NOT exceed A/C system refrigerant oil capacity, when servicing system. See REFRIGERANT OIL & REFRIGERANT SPECIFICATIONS article in GENERAL SERVICING.

NOTE: Refrigerant oil checking procedures may not be available for all makes and models. Always use refrigerant oil amounts specified in underhood A/C specification label or A/C compressor label.

REFRIGERANT OIL

Only new, moisture-free refrigerant oil should be used in the air conditioning system. This oil is highly refined and dehydrated so moisture content is less than 10 parts per million. The oil container must be tightly closed at all times when not in use, or moisture from the air will be absorbed into the refrigerant oil.

SERVICING PRECAUTIONS

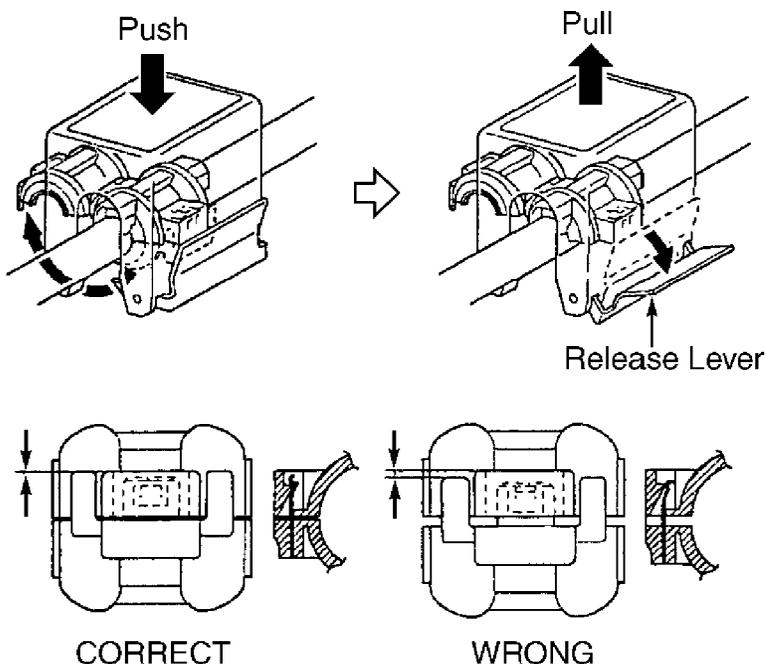
DISCHARGING SYSTEM

Discharge A/C system, using approved refrigerant recovery/recycling equipment that meets SAE J2210 requirements. Always follow recovery/recycling equipment manufacturer's instructions. After refrigerant recovery process is completed, replace any refrigerant oil removed with the same amount of new refrigerant oil.

DISCONNECTING LINES & FITTINGS

After system is discharged, carefully clean area around all fittings to be opened. Always use 2 wrenches when tightening or loosening fittings. Some refrigerant lines are connected with a coupling. Special tools may be required to disconnect lines. Cap or plug all openings as soon as lines are removed. DO NOT remove shipping caps from replacement components until ready to install.

Some Lexus/Toyota vehicles require the use of A/C Line Coupling Tool (09870-00025) for liquid tube (high side) and A/C Line Coupling Tool (09870-00015) for suction tube (low side). To disconnect, note direction of pipe clamp lock (illustration on caution label) and place tool over clamp lock. Push down on tool and release clamp lock. To connect, lubricate new "O" rings with refrigerant oil. Ensure clamp lock is installed properly. See Fig. 1.



G00037187

Fig. 1: Disconnecting & Connecting Refrigerant Lines (Lexus & Toyota)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

CONNECTING LINES & FITTINGS

NOTE: Ensure all replacement component connections match connections of system being worked on.

Always use a new gasket or "O" ring when connecting lines or fittings. Coat "O" ring with refrigerant oil and ensure it is not twisted during installation. Always use two wrenches to prevent damage to lines and fittings.

PLACING SYSTEM IN OPERATION

After component service or replacement has been completed and all connections have been made, thoroughly evacuate system with a vacuum pump. Charge system with proper amount of refrigerant and perform leak test. See REFRIGERANT OIL & REFRIGERANT SPECIFICATIONS article for system capacities. Ensure there are no leaks at any fitting that has been opened. After system has been leak tested, check system performance.

CALSONIC

V6

Infiniti & Nissan

1) If possible, before checking and adjusting oil level, operate A/C system. If A/C system can be operated properly and/or there are no excessive refrigerant oil leaks, go to next step. If A/C system cannot be operated properly and/or there is an excessive refrigerant oil leak, go to step 3).

2) Start engine and operate at 1200 RPM. Turn A/C or AUTO switch on. Set blower motor speed to maximum. If desired, set temperature control so intake air temperature is 77-86°F (25-30°C). Connect manifold gauge set to A/C system. Ensure high-side pressure is 85 psi (6.0 kg/cm²) or more. If necessary, cover front of condenser to increase pressure, if necessary. Operate A/C system for 10 minutes. Stop engine and go to next step.

3) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Measure amount of oil recovered during A/C system discharge procedure. Remove compressor from vehicle. Drain, measure, and discard refrigerant oil from old compressor through compressor drain plug. Remove drain plug from replacement compressor and drain oil into a clean container.

4) Replace compressor oil drain plug and tighten to 13 ft. lbs. (18 N.m). Add refrigerant oil to replacement compressor, through suction port, equal to amount drained from old compressor plus amount recovered during discharge procedure. If any other A/C system components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (INFINITI & NISSAN - CALSONIC V6) table.

COMPONENT REFRIGERANT OIL CAPACITIES (INFINITI & NISSAN - CALSONIC V6)

Component	Ounces
Compressor	(1)
Condenser	2.5
Evaporator	2.5
Receiver-Drier	(2) 0.2
Refrigerant Leak	(3) 1.0
System Total	6.8

(1) - Ensure replacement compressor contains refrigerant oil equal to amount drained from old compressor, plus amount recovered during discharge procedure.

(2) - Add to replacement compressor through suction port.

(3) - Add refrigerant oil only if a large refrigerant oil leak has occurred.

FORD & HALLA

FORD FS-10 10-CYLINDER

NOTE: Replacement compressor may be shipped with refrigerant oil. Drain refrigerant oil from replacement compressor into a clean, dry container. Return specified amount of refrigerant oil back into replacement compressor.

Mazda (B2300, B2500, B3000 & B4000 & Tribute)

1) Slowly discharge system. Remove A/C compressor. Drain, measure and discard old compressor oil from suction and discharge ports. Rotate compressor shaft 6-8 times while draining oil.

2) If amount drained from old compressor is 3.0-5.0 ounces, add amount drained plus one ounce of new refrigerant oil to replacement compressor.

3) If amount drained is less than 3.0 ounces, add 3.0 ounces of refrigerant oil. If amount drained is greater than 5.0 ounces, add 5.0 ounces of refrigerant oil. Use new "O" rings on refrigerant lines. Install A/C compressor. Evacuate and charge A/C system. Perform leak test.

4) When replacing other A/C system components, add specified amount of refrigerant oil. See COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - FORD FS-10 10-CYL.) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - FORD FS-10 10-CYL.)

Component	Ounces
Accumulator	(1)
Condenser	(2) 1.0
Evaporator	(2) 3.0
Other A/C System Components	2.0

(1) - Drill two 1/2" holes in bottom of old accumulator. Drain, measure and discard old oil. Add refrigerant oil equal to amount drained from old accumulator, plus 2.0 ounces to replacement accumulator.

(2) - Add specified amount of refrigerant oil to inlet of condenser or accumulator.

Nissan (Quest)

1) If possible, before checking and adjusting oil level, operate A/C system. If A/C system can be operated properly and there are no excessive refrigerant oil leaks, go to next step. If A/C system cannot be operated properly and/or there is an excessive refrigerant oil leak, go to step 3).

2) Start engine and operate at 1200 RPM. Turn A/C or AUTO switch on. Turn recirculation switch off. Set blower motor speed to maximum. If desired, set temperature control so intake air temperature is 77-86°F (25-30°C). Operate A/C system for 10 minutes. Stop engine and go to next step.

3) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Measure amount of oil recovered during A/C system discharge procedure. Remove compressor from vehicle. Drain, measure, and discard refrigerant oil from old compressor. Drain shipping oil from replacement compressor into a separate, clean container.

4) Add refrigerant oil to replacement compressor, through suction port, equal to amount drained from old compressor plus amount recovered during discharge procedure. If any other A/C system components are replaced, add new refrigerant oil to system as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (NISSAN - FORD FS-10 10-CYL.) table.

COMPONENT REFRIGERANT OIL CAPACITIES (NISSAN - FORD FS-10 10-CYL.)

Component	Ounces
Accumulator	(1) 2.0
Compressor	(2)
Condenser	(3) 2.5
Evaporator	(3) 2.5
Refrigerant Lines	(4) 1.0-1.7

(1) - If accumulator and compressor are being replaced at the same time, add additional specified amount of refrigerant oil to compressor. If only accumulator is being replaced, add specified amount of refrigerant oil to accumulator.

(2) - Ensure replacement compressor contains refrigerant oil equal to amount drained from old compressor, plus amount recovered during discharge procedure.

(3) - Slowly add specified amount of refrigerant oil to low-pressure side of component.

(4) - Add only if a large refrigerant oil leak is indicated.

HALLA HS-15 & HALLA HS-18

NOTE: Component refrigerant oil capacities for Hyundai Santa Fe were not available from manufacturer.

NOTE: Kia Optima, although not specified by manufacturer, may use a Halla compressor.

Hyundai & Kia (Optima)

Whenever replacing any A/C system component, add refrigerant oil to maintain original total amount. On all models, when replacing A/C system components, add specified amount of refrigerant oil to component. See COMPONENT REFRIGERANT OIL CAPACITIES (HYUNDAI - HALLA HS-15 & HALLA HS-18) or COMPONENT REFRIGERANT OIL CAPACITIES (KIA) tables.

COMPONENT REFRIGERANT OIL CAPACITIES (HYUNDAI - HALLA HS-15 & HALLA HS-18)

Application & Component	Ounces
Accent	
Compressor	1.0
Condenser	2.1
Evaporator	1.3
Tube Or Hose	0.5
Elantra & Tiburon	
Compressor	1.0
Condenser	1.4
Evaporator	1.6
Receiver-Drier	1.1
Sonata	
Compressor	1.6
Condenser	1.3
Evaporator	1.0
Hose	0.3
Receiver-Drier	0.6
XG300	
Condenser	1.4
Evaporator	1.0
Receiver-Drier	0.6
Suction Hose	0.3

COMPONENT REFRIGERANT OIL CAPACITIES (KIA)

Application & Component	Ounces
Optima	
Compressor	1.6
Condenser	1.3
Evaporator	1.0
Hose	0.3
Receiver-Drier	0.6

HARRISON (DELPHI THERMAL)

HD6/HT6 & HT6/HP6 6-CYLINDER

Isuzu (Hombre 4.3L & Trooper)

1) If possible, operate A/C system before checking refrigerant oil level. Open engine hood and all doors. Turn A/C on and set blower motor to high speed. Start engine and operate at 800-1000 RPM for at least 20 minutes. Turn engine off and go to next step. If A/C system cannot be operated, go to step 4).

2) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor from vehicle. Drain and measure refrigerant oil from old compressor through suction and discharge ports. Inspect refrigerant oil for contamination. If oil volume has increased, oil color has changed, or debris is present, receiver-drier must be replaced.

3) If less than 3.0 ounces of refrigerant oil is drained from old compressor, inspect A/C system for oil leaks. Repair or replace components as necessary. Add 3.0 ounces of refrigerant oil to replacement compressor. If more than 3.0 ounces of refrigerant oil is drained from old compressor, add refrigerant oil to replacement compressor equal to amount drained from old compressor.

4) If A/C system cannot be operated, discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor. Drain and measure refrigerant oil from old compressor through suction and discharge ports. Inspect refrigerant oil for contamination. If oil volume has increased, oil color has changed, or debris is present, receiver-drier must be replaced.

5) If more than 3.0 ounces is drained from old compressor, add refrigerant oil to replacement compressor equal to amount drained from old compressor. Install compressor and go to step 8).

6) If less than 3.0 ounces of refrigerant oil is drained from old compressor, add 3.0 ounces of refrigerant oil to replacement compressor and install on vehicle. Evacuate and charge A/C system. Open engine hood and all doors. Turn A/C on and set blower motor to

high speed. Start engine and operate at 800-1000 RPM for at least 20 minutes to stabilize system. Turn engine off and go to next step.

7) Remove replacement compressor from vehicle. Drain and measure refrigerant oil. If more than 3.0 ounces is drained from compressor, add refrigerant oil to compressor equal to amount drained. If less than 3.0 ounces of refrigerant oil is drained from replacement compressor, add 3.0 ounces of refrigerant oil to compressor. Go to next step.

8) If replacing other A/C system components, add specified amount of refrigerant oil to component. See COMPONENT REFRIGERANT OIL CAPACITIES (ISUZU - HARRISON HD6/HT6 6-CYL.) table. Evacuate, charge, and leak test A/C system. Ensure A/C system is operating properly.

COMPONENT REFRIGERANT OIL CAPACITIES (ISUZU - HARRISON HD6/HT6 6-CYL.)

Component	Ounces
Compressor	(1)
Condenser	1.0
Evaporator	1.7
Receiver-Drier	1.0
Refrigerant Line	0.3

(1) - Drain and measure refrigerant oil from old compressor. If old compressor had less than 3.0 ounces, add 3.0 ounces of refrigerant oil to replacement compressor. If old compressor had more than 3.0 ounces, add refrigerant oil equal to amount drained from old compressor.

V7 7-CYLINDER

Isuzu (Hombre 2.2L)

A replacement compressor is shipped with 9 ounces of refrigerant oil. Drain oil from old compressor through oil drain plug and measure oil. Remove refrigerant oil from replacement compressor through oil drain plug and save. Add refrigerant oil equal to amount drained from old compressor, to replacement compressor. If any other major components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (ISUZU - HARRISON V7 7-CYL.) table.

COMPONENT REFRIGERANT OIL CAPACITIES (ISUZU - HARRISON V7 7-CYL.)

Component	Ounces
Condenser	1.0
Evaporator	1.7
Receiver-Drier	1.0
Refrigerant Lines	0.3

KEIHIN

SCROLL

Honda

1) Replacement compressor is shipped with 4.3 ounces of refrigerant oil. Drain, measure, and discard oil from old compressor. Drain shipping refrigerant oil from replacement compressor equal to difference between amount drained from old compressor and amount shipped in replacement compressor. DO NOT drain more than 1.7 ounces of refrigerant oil from replacement compressor.

2) If replacement compressor is shipped without refrigerant oil, add same amount of refrigerant oil to replacement compressor that was drained from old compressor. If any other major components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (HONDA - KEIHIN SCROLL) table.

COMPONENT REFRIGERANT OIL CAPACITIES (HONDA - KEIHIN SCROLL)

Component	Ounces
Compressor	(1) 4.3
Condenser	0.8
Evaporator	1.3
Leak Repair	0.8
Receiver-Drier	0.3
Refrigerant Lines	0.3

(1) - Drain shipping oil from replacement compressor equal to difference between amount drained from old compressor and amount

shipped in replacement compressor.

NIPPONDENSO (DENSO)

ROTARY VANE

Mazda

Replacement compressor is shipped with 6.8 ounces of refrigerant oil. Drain, measure, and discard oil from old compressor. Drain refrigerant oil from replacement compressor equal to amount drained from old compressor, plus 0.5 ounce. If other system components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - NIPPONDENSO ROTARY VANE) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - NIPPONDENSO ROTARY VANE)

Component	Ounces
Compressor	6.8
Condenser	1.0
Evaporator	1.4
Receiver-Drier	0.3
Refrigerant Lines	0.3

SCROLL, 6-CYL., 7-CYL. OR 10-CYL.

Acura, Honda & Isuzu

1) Replacement compressors are shipped with a specific amount of refrigerant oil. Drain, measure, and discard oil from old compressor.

2) Remove refrigerant oil from replacement compressor equal to difference between amount drained from old compressor and amount shipped in replacement compressor. See COMPONENT REFRIGERANT OIL CAPACITIES (ACURA, HONDA & ISUZU - NIPPONDENSO) table. If no oil is drained from old compressor, DO NOT drain more than 1.7 ounces from replacement compressor.

3) If replacement compressor is shipped without refrigerant oil, add refrigerant oil to replacement compressor equal to amount of oil drained from old compressor. When any other component is replaced, add refrigerant oil to component as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (ACURA, HONDA & ISUZU - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (ACURA, HONDA & ISUZU - NIPPONDENSO)

Component	Ounces
Compressor (1)	
Acura	
Integra	4.7
MDX	7.0
3.2CL	5.3
3.2TL	4.3
3.5RL	4.7
Honda	
Accord & Odyssey	5.3
Insight	4.3
Condenser	
Acura	
Except MDX & 3.5RL	0.8
MDX & 3.5RL	1.0
Honda	
Accord	0.8
Insight	0.5
Odyssey	1.0
Evaporator	
Acura	
Integra, MDX, 3.2CL & 3.5RL	1.3
3.2TL	1.7
Honda	
Accord & Odyssey	(2) 1.3
Insight	1.2
Receiver-Drier	
Acura	
Integra, 3.2CL & 3.5RL	0.3
3.2TL	0.5
Honda	
Accord, Insight & Odyssey	0.3
Leak Repair	

Acura	
Integra, MDX, 3.2CL, 3.2TL & 3.5RL	0.8
Honda	
Accord, Insight & Odyssey	(2) 0.8
Refrigerant Line Or Hose	
Acura	
Integra, MDX, 3.2CL & 3.5RL	0.3
3.2TL	0.7
Honda	
Accord	0.8
Insight & Odyssey	(2) 0.3

- (1) - Ensure replacement compressor contains same amount of refrigerant oil that was drained from old compressor. On Acura and Honda models, DO NOT drain more than 1.7 ounces of refrigerant oil from replacement compressor.
- (2) - On Odyssey, when replacing any rear A/C system component, drain and measure refrigerant oil from old component. Fill replacement component with refrigerant oil equal to amount drained from old component.

Audi

- 1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor from vehicle. Replacement compressor is shipped with refrigerant oil.
- 2) Drain, measure and discard oil from old compressor. Drain refrigerant oil from replacement compressor and add oil equal to amount drained from old compressor, but not less than 2.7 ounces. Remainder of oil specified can be added to replacement accumulator or evaporator if necessary.
- 3) After adding oil to compressor, rotate compressor shaft about 10 times to circulate oil in compressor to prevent compressor damage. If any other major components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (AUDI - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (AUDI - NIPPONDENSO)

Component	Ounces
Compressor	(1) 2.7
Condenser	(2) 0.3
Evaporator	(2) 0.7
Receiver-Drier	(2) 1.0
Refrigerant Lines	(2) 0.3
System Total	(1) 6.9-10.1

- (1) - Drain shipping oil from replacement compressor. Add refrigerant oil to replacement compressor equal to amount drained from old compressor, but not less than 2.7 ounces.
- (2) - Plus amount drained from old component.

NOTE: On Jaguar, to avoid spilling refrigerant oil, install blanking plugs to compressor ports after removing refrigerant lines.

Jaguar

- 1) If there has been a refrigerant loss because of a burst line for example, go to next step. If reinstalling an existing compressor, remove blanking plugs and drain, measure and discard old refrigerant oil from compressor. Using refrigerant oil, flush compressor and drain thoroughly. Fill compressor with refrigerant oil equal to amount drained from compressor, plus amount recovered during refrigerant recovery.
- 2) Remove blanking plugs and drain, measure and discard refrigerant oil from old compressor. Fill replacement compressor with refrigerant oil equal to amount drained from old compressor. Install blanking plugs to compressor ports. When replacing components, add specified amounts of refrigerant oil, plus amount recovered during refrigerant recovery. See COMPONENT REFRIGERANT OIL CAPACITIES (JAGUAR - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (JAGUAR - NIPPONDENSO)

Component	Ounces
Condenser	(1) 1.4
Evaporator	(1) 1.4
Receiver-Drier	(2)

- (1) - Plus amount recovered during refrigerant recovery.

(2) - Only add amount recovered during refrigerant recovery.

Land Rover

1) Replacement compressor is shipped with 6.1 ounces of refrigerant oil. Drain, measure, and discard oil from old compressor. Rotate compressor shaft to assist in complete draining. Drain refrigerant oil from replacement compressor equal to amount drained from old compressor, plus 0.7 ounce. Install sealing caps to compressor inlet and outlet ports until refrigerant lines are installed.

2) If a sudden refrigerant loss has occurred, such as a burst line, most of the refrigerant oil will be lost. Remove compressor and drain refrigerant oil. Rotate compressor shaft to assist in complete draining. Add 4.4 ounces of refrigerant oil to compressor and install sealing caps to compressor ports until refrigerant lines are installed. If any other major components are replaced, add refrigerant oil as specified. See

COMPONENT REFRIGERANT OIL CAPACITIES (LAND ROVER - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (LAND ROVER - NIPPONDENSO)

Component	Ounces
Condenser	1.4
Evaporator	2.7
Receiver-Drier	0.7
Refrigerant Line	0.7
System Total	
Discovery	6.1
Range Rover	5.1
Sudden Discharge	
Discovery	(1) 4.4
Range Rover	(1) 3.4

(1) - Add to replacement compressor.

NOTE: Lexus vehicles may be equipped with a modulator (receiver-drier) tube attached to side of condenser. Modulator tube contains a dryer (dessicant bag) and filter.

Lexus

After refrigerant recovery process is completed, amount of refrigerant oil removed from old compressor must be measured and same amount added to replacement compressor. When replacing components, add specified amount of refrigerant oil. See

COMPONENT REFRIGERANT OIL CAPACITIES (LEXUS - NIPPONDENSO)

Component	Ounces
Condenser	
ES 300	(1) 1.4
GS 300, GS 400, GS 430, IS 300, LS 400, LS 430, LX 470 & RX 300	(2) 1.4
SC 300 & SC 400	(1) 1.4
Evaporator	
ES 300, GS 300, GS 400, GS 430, IS 300, LS 400, LS 430, LX 470 & RX 300	(2) 1.4
SC 300 & SC 400	(1) 1.4
Receiver-Drier	
ES 300 & RX 300	(2) 0.7
LS 400	(2) 0.3
SC 300 & SC 400	(1) 0.3

(1) - Add amount specified of refrigerant oil to compressor.

(2) - Add amount specified of refrigerant oil to component.

Mazda (MPV)

After refrigerant recovery process is completed, amount of refrigerant oil removed from old compressor must be measured and same amount added to replacement compressor. When replacing components, add specified amount of refrigerant oil. See COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - NIPPONDENSO)

Component	Ounces
Condenser	1.4
Evaporator (Front Or Rear)	1.4

Receiver-Drier	0.3
Refrigerant Line	0.3

Mercedes-Benz

1) Drain, measure, and discard refrigerant oil from old compressor. Drain shipping oil from replacement compressor into a clean container. Add refrigerant oil to replacement compressor equal to amount drained from old compressor, plus 0.7 ounce.

2) If a sudden refrigerant discharge greater than 1.4 ounces has occurred, add 1.4 ounces of refrigerant oil after repairs. If a slow refrigerant leak less than 1.4 ounces has occurred, add 0.7 ounce of refrigerant oil after repairs. If any other components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (MERCEDES-BENZ - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MERCEDES-BENZ - NIPPONDENSO)

Component	Ounces
Compressor	(1)
Condenser	(2) 0.7
Evaporator	1.4
Receiver-Drier	0.3
Leak Repair	(3) 1.4
Pressure Or Suction Lines	(4) 0.7

- (1) - Ensure replacement compressor contains refrigerant equal to amount drained from old compressor plus 0.7 ounce.
 - (2) - On vehicles equipped with rear A/C, add 0.7 ounce of refrigerant oil to system when replacing rear condenser.
 - (3) - Approximate amount of refrigerant oil lost when system is suddenly discharged.
 - (4) - When replacing rear A/C lines, add specified amount of refrigerant oil for each line replaced.
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Mitsubishi

Replacement compressor is shipped with refrigerant oil. Drain, measure, and discard refrigerant oil from old compressor. Drain refrigerant oil from replacement compressor equal to difference between amount drained from old compressor and amount shipped in replacement compressor. If any other components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (MITSUBISHI - NIPPONDENSO 10-CYL.) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MITSUBISHI - NIPPONDENSO 10-CYL.)

Application & Component	Ounces
Montero	
2000 Models	
Condenser	1.4
Evaporator	1.4
Receiver-Drier	0.3
Suction Hose	0.3
2001 Models	
Condenser	0.5
Evaporator	2.0
Receiver-Drier	0.3
Suction Hose	0.3

Porsche

After refrigerant recovery/recycling process is completed, measure amount of refrigerant oil removed from system. Add refrigerant oil equal to amount removed from A/C system, plus amount specified for each component replaced. See COMPONENT REFRIGERANT OIL CAPACITIES (PORSCHÉ - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (PORSCHÉ - NIPPONDENSO)

Component	Ounces
Compressor	1.7
Condenser	(1) 1.4
Evaporator	0.7
Leak Repair	(2) 2.0
Receiver-Drier With Refrigerant Lines	1.0

- (1) - Boxster has two condensers, one located under each headlight.

Capacity of each condenser is 0.7 ounce.

- (2) - Approximate amount of refrigerant oil lost when system is suddenly discharged.

Saab

The A/C system is filled with a specified amount of compressor oil. The compressor must be topped off with the specified amount. See COMPONENT REFRIGERANT OIL CAPACITIES (SAAB 9-5 - NIPPONDENSO) table. Topping off should be carried out on the high-pressure side of the compressor.

COMPONENT REFRIGERANT OIL CAPACITIES (SAAB 9-5 - NIPPONDENSO)

Component	Ounces
Compressor	(1) 1.7
Condenser	1.0
Expansion Valve	0.5
Evaporator	1.0
Receiver-Drier	1.0
Refrigerant Lines	0.5

- (1) - To avoid an excessive amount of oil in the A/C system, shipping oil must be drained from compressor before it is installed.

Suzuki

Replacement compressor is shipped with 3.4 ounces of refrigerant oil. Drain 1.4 ounces of refrigerant oil from replacement compressor before installing. If any other components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (SUZUKI - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (SUZUKI - NIPPONDENSO)

Component	Ounces
Compressor	3.4
Condenser	(1) 0.7-1.0
Evaporator	(2)
Refrigerant Line	(2)
Receiver-Drier	(1) 0.3

- (1) - Add refrigerant oil to compressor suction-side of component.
(2) - Drain, measure, and discard refrigerant oil from component. Add refrigerant oil to replacement component equal to amount removed from old component.

NOTE: Toyota vehicles may be equipped with a modulator (receiver-drier) tube attached to side of condenser. Modulator tube contains a dryer (dessicant bag) and filter.

Toyota

After refrigerant recovery process is completed, drain old compressor and measure amount of refrigerant oil removed. Add same amount drained from old compressor to replacement compressor. When replacing components, add specified amounts of refrigerant oil. See COMPONENT REFRIGERANT OIL CAPACITIES (TOYOTA - NIPPONDENSO) table.

COMPONENT REFRIGERANT OIL CAPACITIES (TOYOTA - NIPPONDENSO)

Component	Ounces
Compressor	
Higlander	(1) 4.1-4.6
RAV4	3.5
Condenser	
Avalon, Camry Solara, Corolla & Land Cruiser	(2) 1.4
Camry, Sienna & 4Runner	(3) 1.4-1.7
Celica	(3) 1.4
ECHO	(3) 1.4
MR2	(3) 1.4
Prius	(4)
RAV4	(3) 1.4
Tacoma	(2) 1.4-1.7
Tundra	(3) 1.4-1.7
Evaporator	
Avalon, Camry Solara, Corolla & Land Cruiser	(2) 1.4
Camry & 4Runner	(3) 1.4-1.7
Celica	(3) 1.4

ECHO	(3)	1.4
MR2	(3)	1.4
Prius	(4)	
RAV4	(3)	1.4
Sienna (Front & Rear)	(5)	1.4
Tacoma	(2)	1.4-1.7
Tundra	(3)	1.4-1.7
Receiver-Drier		
Avalon, Corolla & Tacoma	(2)	0.7
Camry & Camry Solara	(3)	0.7
Celica	(3)	0.3
Land Cruiser	(4)	
RAV4	(2)	0.3
Sienna, Tundra & 4Runner	(3)	0.7

- (1) - Oil capacity for other system components is not available from manufacturer.
- (2) - Add specified amount of refrigerant oil to component.
- (3) - Add specified amount of refrigerant oil to compressor.
- (4) - Information is not available from manufacturer. Refer to underhood A/C system specification label.
- (5) - When replacing either a front or a rear evaporator, add amount specified to replacement evaporator.

Volkswagen

Recover refrigerant using approved recovery/recycling equipment. Replacement compressor is shipped with refrigerant oil equal to system requirement. If other components are replaced without compressor replacement, add refrigerant oil according to the system distribution specified. See COMPONENT REFRIGERANT OIL CAPACITIES (VOLKSWAGEN - NIPPONDENSO) table. Before installation, all system components (except compressor) should be filled with refrigerant oil.

COMPONENT REFRIGERANT OIL CAPACITIES (VOLKSWAGEN - NIPPONDENSO)

Component	Percent Of Total Refrigerant Oil In System
Compressor	50%
Condenser	10%
Evaporator	20%
Receiver-Drier	10%
Suction Line	10%

PANASONIC

ROTARY VANE

Mazda (Millenia & Protege)

Replacement compressor is shipped with 5.9 ounces of refrigerant oil. Drain, measure, and discard oil from old compressor. Drain refrigerant oil from replacement compressor equal to amount drained from old compressor, plus 0.4-0.6 ounce. If other components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - PANASONIC) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - PANASONIC)

Component	Ounces
Compressor	5.9
Condenser	
Millenia	0.6
Protege	1.0
Evaporator	
Millenia	1.7
Protege	1.0
Receiver-Drier	0.3
Refrigerant Lines	
Millenia	0.3
Protege	0.2

SANDEN

NOTE: Audi TT component refrigerant capacities were not available from manufacturer.

SCROLL

Honda (Civic)

1) Replacement compressors are shipped with refrigerant oil. Drain and measure oil from old compressor. Remove refrigerant oil from replacement compressor equal to difference between amount drained from old compressor and amount shipped in replacement compressor. DO NOT drain more than 1.7 ounces of refrigerant oil from replacement compressor.

2) If replacement compressor is shipped without refrigerant oil, add the same amount of refrigerant oil to replacement compressor that was drained from the old compressor. If any other components are replaced, add refrigerant oil as specified. See

COMPONENT REFRIGERANT OIL CAPACITIES (HONDA - SANDEN SCROLL) table.

COMPONENT REFRIGERANT OIL CAPACITIES (HONDA - SANDEN SCROLL)

Component	Ounces
Compressor	4.3
Condenser	0.7
Evaporator	0.7
Leak Repair	0.8
Receiver-Drier	0.3
Refrigerant Lines	0.3

Mazda (626)

1) Drain, measure and discard oil from old compressor. On 626, replacement compressor is shipped with 8.1 ounces of refrigerant oil. Drain refrigerant oil from replacement compressor equal to amount drained from old compressor, plus 0.5 ounce.

2) If other components are replaced, add refrigerant oil as specified. See

COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - SANDEN SCROLL) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MAZDA - SANDEN SCROLL)

Component	Ounces
Accumulator	0.5
Compressor	8.1
Condenser	0.8
Evaporator	1.7
Refrigerant Lines	0.3

Mitsubishi

Replacement compressor is shipped with refrigerant oil. Drain, measure, and discard refrigerant oil from old compressor. Drain refrigerant oil from replacement compressor equal to difference between amount drained from old compressor and amount shipped in replacement compressor. If any other components are replaced, add refrigerant oil as specified. See

COMPONENT REFRIGERANT OIL CAPACITIES (MITSUBISHI - SANDEN SCROLL) table.

COMPONENT REFRIGERANT OIL CAPACITIES (MITSUBISHI - SANDEN SCROLL)

Component	Ounces
Compressor (1)	
Diamante	4.9-5.6
Eclipse	
2000 Models	4.1
2001 Models	3.4
Mirage	5.1
Galant	4.1
Condenser	
Diamante, Eclipse & Mirage	0.5
Galant	0.5
Montero Sport	2.4
Evaporator	
Diamante, Eclipse, Galant, & Mirage	2.0
Montero Sport	0.7
Receiver-Drier	
Diamante, Eclipse, Galant, Mirage & Montero Sport	0.3
Refrigerant Lines	
Diamante, Eclipse, Galant, Mirage & Montero Sport	0.3

(1) - If replacement compressor is shipped without refrigerant oil, add same amount of refrigerant oil to replacement compressor that was drained from old compressor.

Saab

The A/C system is filled with a specified amount of

compressor oil. The compressor must be topped off with the specified amount. See COMPONENT REFRIGERANT OIL CAPACITIES (SAAB 9-3 - SANDEN SCROLL) table. Topping off should be carried out on the high-pressure side of the compressor.

COMPONENT REFRIGERANT OIL CAPACITIES (SAAB 9-3 - SANDEN SCROLL)

Component	Ounces
Compressor	(1) 1.7
Condenser	1.0
Expansion Valve	0.5
Evaporator	1.0
Receiver-Drier	1.0
Refrigerant Lines	0.5

(1) - To avoid an excessive amount of oil in the A/C system, shipping oil must be drained from compressor before it is installed.

7-CYLINDER

Suzuki

Drain, measure, and discard refrigerant oil from old compressor. Drain shipping oil from replacement compressor into a clean container. Add refrigerant oil to replacement compressor equal to amount removed from old compressor. If any other components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (SUZUKI - SANDEN 7-CYL.) table.

COMPONENT REFRIGERANT OIL CAPACITIES (SUZUKI - SANDEN 7-CYL.)

Component	Ounces
Compressor	3.0
Condenser	(1) 0.7-1.0
Evaporator	(2)
Refrigerant Line	(2)
Receiver-Drier	(1) 0.3

(1) - Add refrigerant oil to compressor suction-side of replacement component.
 (2) - Drain, measure, and discard refrigerant oil from component. Add refrigerant oil to replacement component equal to amount removed from old component.

Volkswagen

Recover refrigerant using approved recovery/recycling equipment. Replacement compressor is shipped with refrigerant oil equal to system requirement. If other components are replaced without compressor replacement, add refrigerant oil according to the system distribution specified. See COMPONENT REFRIGERANT OIL CAPACITIES (VOLKSWAGEN - SANDEN 7-CYL.) table. Before installation, all system components (except compressor) should be filled with refrigerant oil.

COMPONENT REFRIGERANT OIL CAPACITIES (VOLKSWAGEN - SANDEN 7-CYL.)

Component	Percent Of Total Refrigerant Oil In System
Compressor	50%
Condenser	10%
Evaporator	20%
Receiver-Drier	10%
Suction Line	10%

SEIKO-SEIKI

ROTARY VANE

Suzuki

Drain, measure, and discard refrigerant oil from old compressor. Drain shipping oil from replacement compressor into a clean container. Add refrigerant to replacement compressor equal to amount removed from old compressor. If any other components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (SUZUKI - SEIKO-SEIKI) table.

COMPONENT REFRIGERANT OIL CAPACITIES (SUZUKI - SEIKO-SEIKI)

Component	Ounces
Compressor	5.1
Condenser	(1) 0.7-1.0
Evaporator	(2)
Refrigerant Line	(2)
Receiver-Drier	(1) 0.3

- (1) - Add refrigerant oil to compressor suction-side of replacement component.
 - (2) - Drain, measure and discard refrigerant oil from component. Add refrigerant oil to replacement component equal to amount removed from old component.
-

ZEXEL

ROTARY VANE

Honda (Passport) & Isuzu (Amigo, Rodeo & Vehi-CROSS)

1) If A/C system cannot be operated, go to step 4). If possible, operate A/C system before checking refrigerant oil level. Open engine hood and all doors. Turn A/C on and set blower motor to high speed. Start engine and operate it at 800-1000 RPM for at least 20 minutes. Turn engine off and go to next step.

2) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor from vehicle. Drain and measure refrigerant oil from old compressor through suction and discharge ports. Inspect refrigerant oil for contamination. If oil volume has increased, oil color has changed, or debris is present, receiver-drier must be replaced.

3) If less than 3.0 ounces of refrigerant oil is drained from old compressor, inspect A/C system for oil leaks. Repair or replace components as necessary. Add 3.0 ounces of refrigerant oil to replacement compressor. If more than 3.0 ounces of refrigerant oil is drained from old compressor, add refrigerant oil to replacement compressor equal to amount drained from old compressor.

4) If A/C system cannot be operated, discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor. Drain and measure refrigerant oil from old compressor through suction and discharge ports. Inspect refrigerant oil for contamination. If oil volume has increased, oil color has changed, or debris is present, receiver-drier must be replaced.

5) If more than 3.0 ounces is drained from old compressor, add refrigerant oil to replacement compressor equal to amount drained from old compressor. Install compressor and go to step 8).

6) If less than 3.0 ounces of refrigerant oil is drained from old compressor, add 3.0 ounces of refrigerant oil to replacement compressor and install on vehicle. Evacuate and charge A/C system. Open engine hood and all doors. Turn A/C on and set blower motor to high speed. Start engine and operate at 800-1000 RPM for at least 20 minutes to stabilize system. Turn engine off and go to next step.

7) Remove replacement compressor from vehicle. Drain and measure refrigerant oil. If more than 3.0 ounces is drained from compressor, add refrigerant oil to compressor equal to amount drained. If less than 3.0 ounces of refrigerant oil is drained from replacement compressor, add 3.0 ounces of refrigerant oil to compressor. Go to next step.

8) If replacing other A/C system components, add specified amount of refrigerant oil to component. See COMPONENT REFRIGERANT OIL CAPACITIES (HONDA & ISUZU - ZEXEL ROTARY VANE) table. Evacuate, charge, and leak test A/C system. Ensure A/C system is operating properly.

COMPONENT REFRIGERANT OIL CAPACITIES (HONDA & ISUZU - ZEXEL ROTARY VANE)

Component	Ounces
Condenser	2.5
Evaporator	2.5
Liquid Tank (Receiver-Drier)	0.2
Refrigerant Lines	0.3

Infiniti (G20) & Nissan

1) If possible, before checking and adjusting oil level, operate A/C system. If A/C system can be operated properly and there are no excessive refrigerant oil leaks, go to next step. If A/C system cannot be operated properly and/or there is an excessive refrigerant oil leak, go to step 3).

2) Start engine and operate at 1200 RPM. Turn A/C switch on.

Set blower motor speed to maximum. If desired, set temperature control so intake air temperature is 77-86°F (25-30°C). Turn recirculation switch off. Operate A/C system for 10 minutes. Stop engine and go to next step.

3) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Measure amount of oil recovered during A/C system discharge procedure. Remove compressor from vehicle. Drain, measure, and discard refrigerant oil from old compressor. Drain shipping oil from replacement compressor into a separate, clean container.

4) Add refrigerant oil to replacement compressor through suction port equal to amount drained from old compressor, plus amount recovered during discharge procedure. If any other A/C system components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (INFINITI (G20) & NISSAN - ZEXEL ROTARY VANE) table for specified amount.

COMPONENT REFRIGERANT OIL CAPACITIES (INFINITI G20 & NISSAN - ZEXEL ROTARY VANE)

Component	Ounces
Compressor	(1)
Condenser	2.5
Evaporator	2.5
Receiver-Drier	(2) 0.2
Refrigerant Lines (3)	1.0

- (1) - Ensure replacement compressor contains refrigerant oil equal to amount drained from old compressor, plus amount recovered during discharge procedure.
- (2) - Add to replacement compressor through suction port.
- (3) - Add refrigerant oil to replacement line only if a large refrigerant leak has occurred.

Subaru (Legacy)

1) If possible, before checking and adjusting oil level, operate A/C system. If A/C system cannot be operated, go to step 3). Install manifold gauge set. Start engine and operate at 1500 RPM. Turn A/C on. Set air source to recirculate and blower motor speed to maximum.

2) Ensure evaporator intake air temperature is greater than 80°F (27°C). Ensure refrigerant discharge pressure is greater than 85 psi (6.0 kg/cm²). After operating system for 10 minutes, stop engine and go to next step.

3) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Close low-side valve until high-side pressure is less than 50 psi (3.5 kg/cm²), then open low-side valve and complete system discharge.

4) Remove compressor from vehicle. Drain, measure, and discard refrigerant oil from old compressor. Drain shipping oil from replacement compressor into a separate, clean container.

5) Add refrigerant oil to replacement compressor equal to amount drained from old compressor. Ensure that at least 0.7 ounce of refrigerant oil is added to replacement compressor. If any other A/C system components are replaced, add refrigerant oil as specified. See COMPONENT REFRIGERANT OIL CAPACITIES (SUBARU - ZEXEL ROTARY VANE) table.

COMPONENT REFRIGERANT OIL CAPACITIES (SUBARU - ZEXEL ROTARY VANE)

Component	Ounces
Compressor	(1)
Condenser	0.07
Evaporator	3.9
Receiver-Drier	0.2
Refrigerant Hose	0.03

- (1) - Ensure replacement compressor contains refrigerant oil equal to amount drained from old compressor, but at least amount 0.7 ounce.

6-CYLINDER

Audi

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor from vehicle. Measure amount of refrigerant oil removed during recovery process. Add the same amount of refrigerant oil removed to A/C system.

2) Add 1.0 ounce of refrigerant oil when replacing

accumulator. When replacing condenser, add amount drained from old condenser, plus 0.3 ounce of refrigerant oil. When replacing evaporator, add amount drained from old evaporator, plus 0.7 ounce of refrigerant oil.

Volkswagen

Recover refrigerant using approved recovery/recycling equipment. Replacement compressor is shipped with refrigerant oil equal to system requirement. If other components are replaced without compressor replacement, add refrigerant oil according to the system distribution specified. See COMPONENT REFRIGERANT OIL CAPACITIES (VOLKSWAGEN - ZEXEL 6-CYL.) table. Before installation, all system components (except compressor) should be filled with refrigerant oil.

COMPONENT REFRIGERANT OIL CAPACITIES (VOLKSWAGEN - ZEXEL 6-CYL.)

Component	Percent Of Total Refrigerant Oil In System
Compressor	50%
Condenser	10%
Evaporator	20%
Receiver-Drier	10%
Suction Line	10%

Volvo

Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor from vehicle. Drain, measure, and discard oil from old compressor. Add refrigerant oil to replacement compressor equal to amount drained from old compressor. If any A/C system components are replaced, add specified amount of refrigerant oil to component. See COMPONENT REFRIGERANT OIL CAPACITIES (VOLVO - ZEXEL 6-CYL.) table.

COMPONENT REFRIGERANT OIL CAPACITIES (VOLVO - ZEXEL 6-CYL.)

Component	Ounces
Condenser	1.0
Evaporator	1.5
Receiver-Drier	1.0
Tube Or Hose	0.3