SUBJECT: **Retrofitting R-12 Air Conditioning with R-134a**

MODEL: E23 / E24 / E28 / E30

Situation: Retrofit kits are available for the above models for customers who wish to convert their R-12 A/C system to the newer, more environmentally-friendly R-134a refrigerant.

Solution: A retrofit kit may be installed as a "customer-pay" accessory. Although so far this procedure is not a necessary part of any general A/C repair, we highly recommend encouraging the customer to consider this environmentally-friendly solution. This is particularly the case if the compressor needs replacement; we recommend the retrofit be performed at that time. For the customer, there is only a minimum additional cost for retrofitting his A/C system, compared to the costs of only replacing the compressor.

Some models are equipped with BOSCH A/C compressors, which are not compatible with R-134a refrigerant. Those compressors must be replaced when the system is being converted to R-134a.

The following list shows the models with factory-installed compressors which are **NOT R-134a compatible** :

Body	**Model**	**Production Date**
E23	735i	All
	L7	All
E24	635CSi	All
	M6	All
	Rear A/C units	All
E28	528e	7/85 - 3/87
	535i	7/85 - 12/87
	M5	9/87 - 11/87
E30	318i	7/85 - 8/85
	325e, 325i, 325iC	7/87 - 10/88
	325iX, M3	All

The above list should not be the only deciding factor, since a non-R-134a compatible compressor might have been installed on a previous A/C repair on these, or other, models.

A non-compatible BOSCH compressor may be identified by its part number. Please refer to the following list of non-compatible BOSCH compressors:

A/C compressor, part number	Adapter wire required?
64 52 1 377 940	yes
64 52 1 377 941	yes
64 52 1 377 943	yes
64 52 1 377 944	no
64 52 1 377 946	yes
64 52 1 377 947	no
64 52 1 385 416	no
64 52 1 385 930	no
64 52 1 386 411	no

If a vehicle is equipped with one of the compressors listed above, the compressor must be replaced by the compressor **P/N 64 52 8 363 550** , when the system is being converted to R-134a. For some of the compressors (specified in the above list), an additional adapter wire for the magnetic clutch **P/N 64 52 1 386 224** is required.

Compressor and adapter cable are not part of the retrofit kit. They must be ordered separately if required.

Procedure:

The following procedure replaces the steps listed in the installation instructions included with the kit. The information has been revised and expanded for clarity:

1. Safety Precautions when Handling Refrigerant

A/C systems are filled with refrigerant under pressure. Safety precautions must be followed when working with these systems. Refer to S.I. 64 10 92 (3536) for a list of procedures relating to safe refrigerant handling.

2. Evacuating and Removing Mineral Oil from the A/C System

2.1 Evacuate the A/C system using an approved R-12 recovery/recycling machine. Follow the directions included in the machine's instruction manual.

2.2 If you are replacing the compressor, follow this step; otherwise, skip to 2.3.

Replace the compressor according to the appropriate repair manual. Install the adapter wire for the magnetic clutch, if necessary.

2.3 Recharge the A/C system with R-12. Fill with the quantity of R-12 specified on the vehicle A/C label, or refer to S.I. 64 01 90 (3042). **Do NOT add any oil when recharging with R-12.**

2.4 Start the engine and turn on the A/C system. Run the vehicle with the A/C system turned on, engine at idle, for 10 minutes.

2.5 Repeat steps 2.1 through 2.4. This will remove most of the mineral oil from the R-12 system during the discharge. The remainder of the oil will be collected in the bottom of the receiver-dryer, which will be replaced. Any residual mineral oil left in the system will remain in the evaporator or condenser, and is not harmful to the retrofitted system.

2.6 Evacuate the A/C system.

3. Converting the A/C System Components

3.1 **NOTE**

E30 models only

Apply the new pressure switch onto the new receiver dryer, using a new O-ring. All components are provided with the retrofit kit.

All models except E30

Remove the pressure switch/switches from the old receiver dryer and install it/them into the new receiver dryer, using new O-rings. All components are provided with the retrofit kit.

3.2 Replace the old receiver dryer with the new unit along with the pressure switch/switches. Replace the O-rings on all receiver dryer connections opened during the retrofit procedure. All necessary O-rings are provided in the kit.

3.3 Connect the Pressure Switch/Switches to the Vehicle Harness

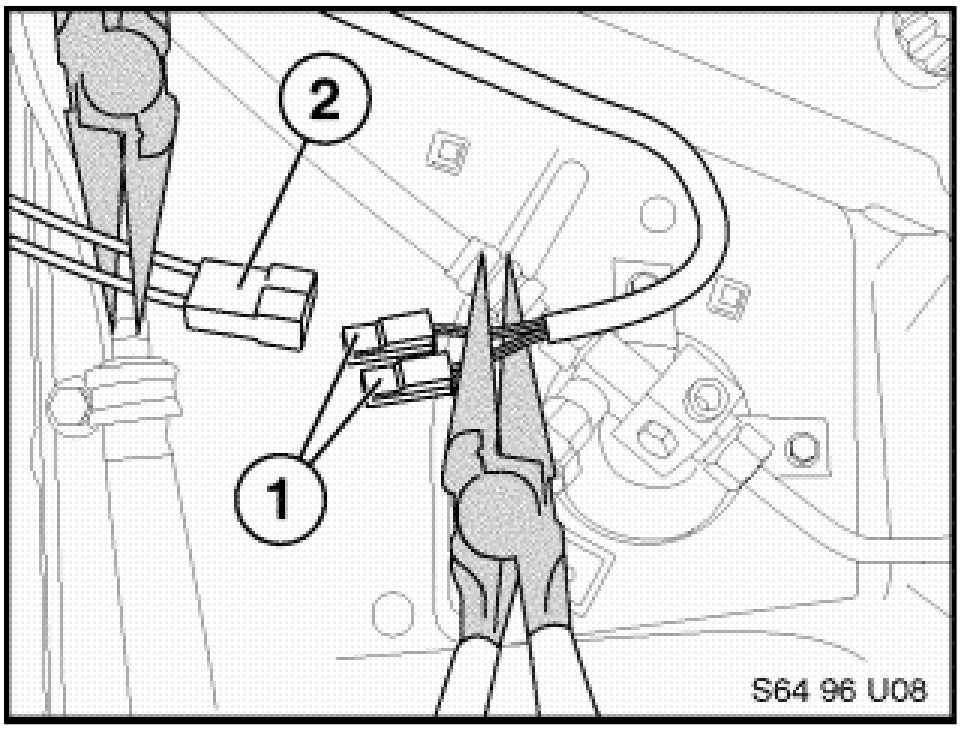
All models except E30

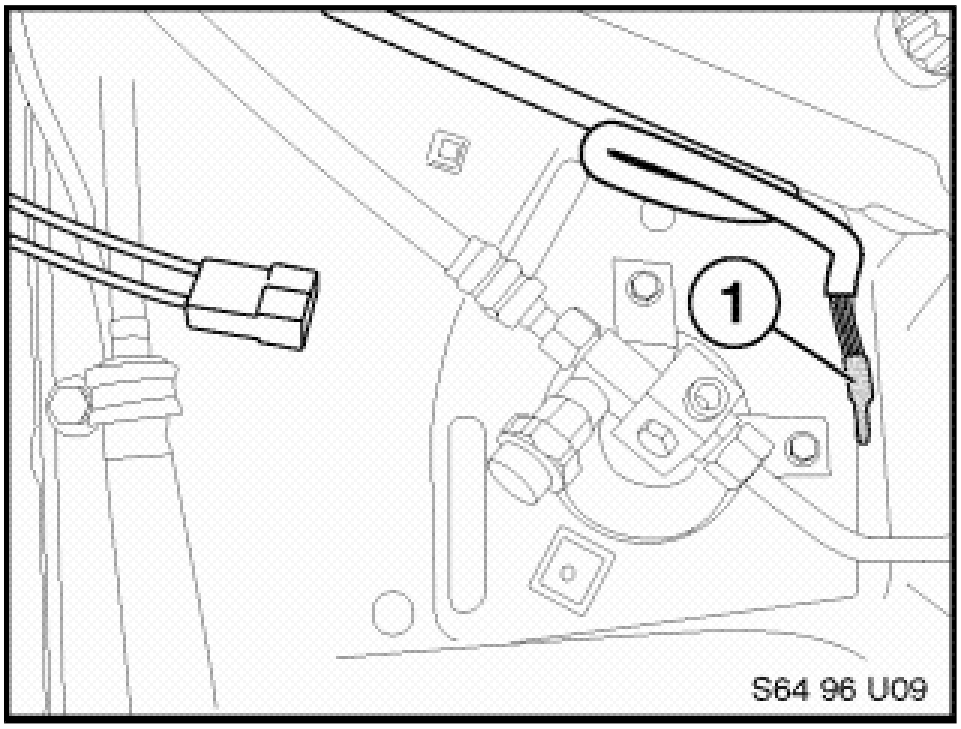
Reconnect the old pressure switch(es) to the vehicle harness. **Proceed with step 3.4.**

Only E30 models with separate high and low pressure switch

Refer to the illustrations below.

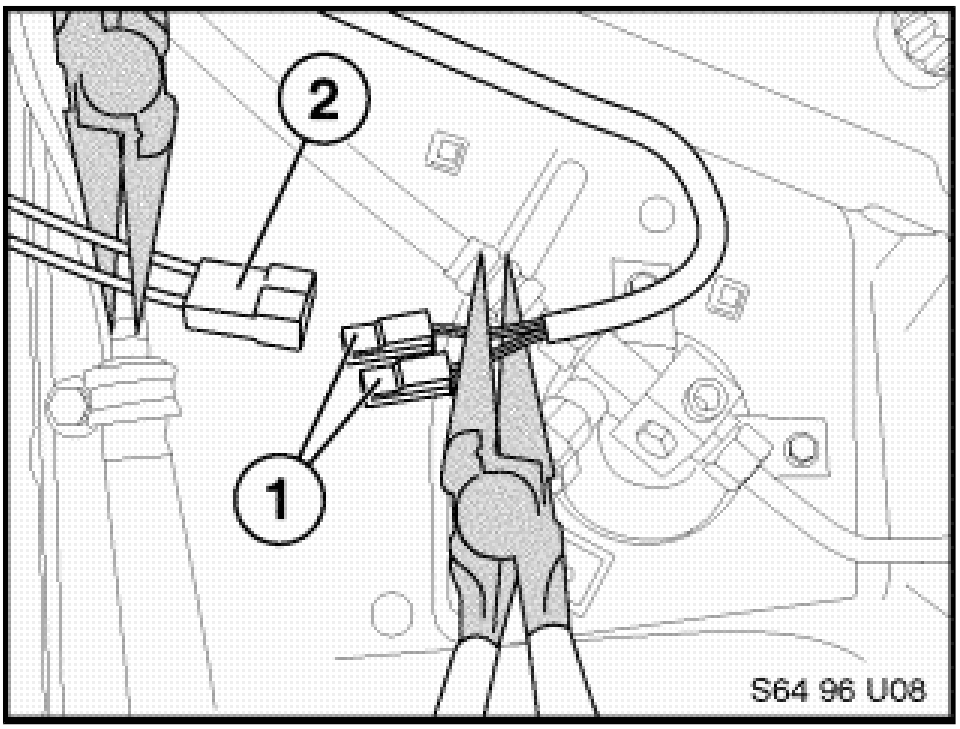
Cut off connector (1) from the vehicle harness.

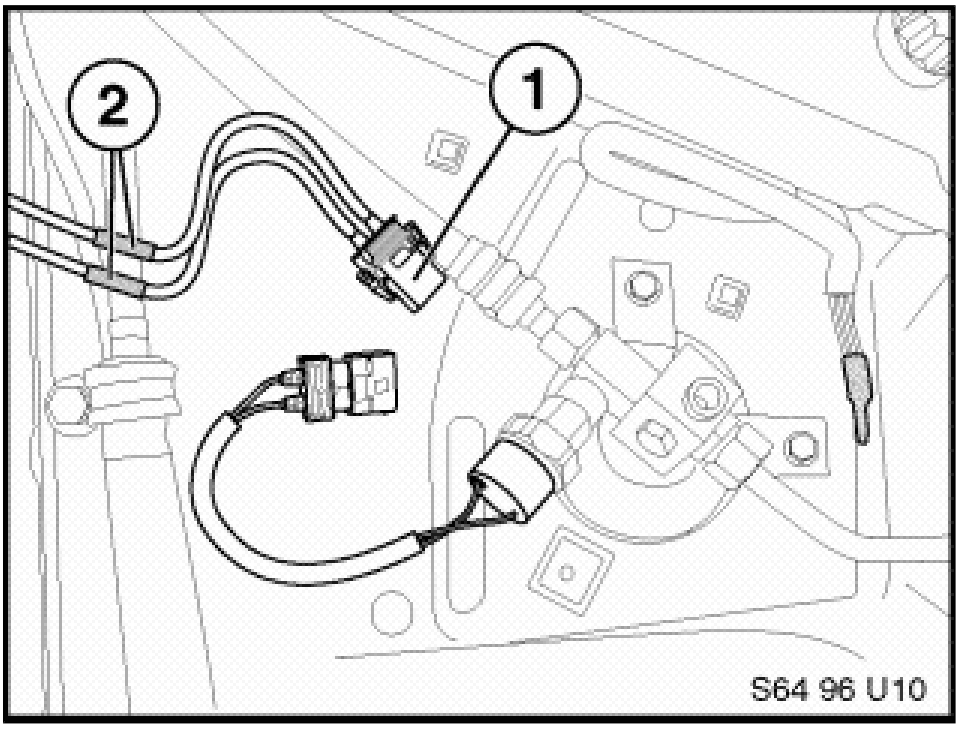




Splice the wire ends together, solder the connection and insulate it with shrink-wrap tubing (1).

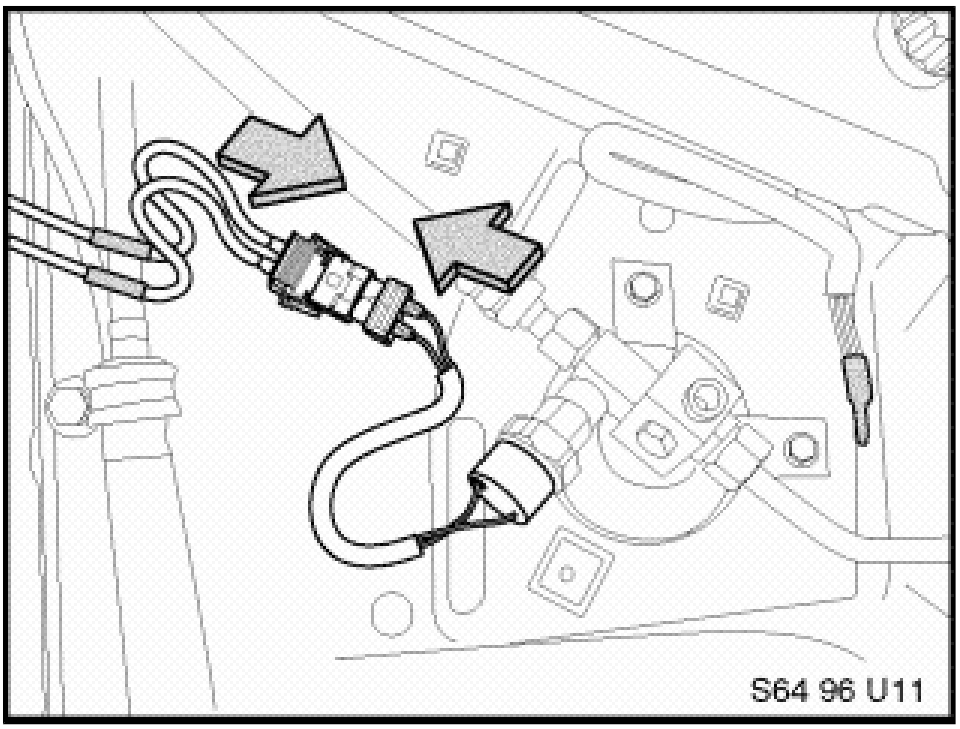
Cut off connector (2) from the vehicle harness.





Strip the isolation from the wire ends and install a new black 2-pin connector (1), repair set D, P/N 1 378 400. Splice the wire ends of the new connector together with the wire ends from the harness, solder the connections and insulate it with shrink-wrap tubing (2).

Connect the plug of the new pressure switch to the new connector on the vehicle harness.



3.4 Install the service port quick-disconnect adapters.

The larger, red-capped adapter is for the high side line, which runs from the condenser to the evaporator. The line with the sight glass is the high side line.

Only E30 models

The high side service port is located on the high side pipe.

All models except E30

The high side service port is located right on top of the receiver dryer.

The smaller, blue-capped adapter is for the low side line, which runs from the evaporator to the compressor inlet.

Do not overtighten the adapters on the line fittings. The adapters contain O-ring seals and will seat fully with minimum torque. The pipe fitting joints are relatively fragile and will shear if overtightened. A torque of 10-12 Nm should be applied.

3.5 Connect an R-134a vacuum pump to the vehicle and maintain a vacuum close to 30 inches for a minimum of 40 minutes. This extended vacuum purge will ensure that any remaining R-12 or moisture trapped in the system is boiled away before charging with R-134a. After the vacuum cycle completes, a vacuum decay test should be performed on the sealed system to detect any leaks caused by improperly seated O-rings. Close off all manifold valves and monitor the pressure gauges for a loss of vacuum. Vacuum should not decrease over several minutes.

4. Charging A/C System with Lubricant and R-134a Refrigerant

4.1 Charge the system with compressor lubricant

With compressor replacement

No lubricant has to be charged into the system. The R-134a replacement compressor already contains the appropriate amount of PAG oil.

Without compressor replacement

Use the established system vacuum to draw in the appropriate amount of PAG lubricant (P/N 82 11 1 468 042) into the A/C system. Refer to the blue charging label included in the retrofit kit for the proper amount of PAG lubricant to use.

4.2 Charge the A/C system with R-134a. The refrigerant flow will push the PAG lubricant out of the service hoses and into the system. Charge with the appropriate amount of refrigerant according to the blue label included in the retrofit kit. Refer to the chart below if the kit contains multiple labels.

Model	Fill capacity g (lbs) R-134a	Old information label R-12 #	New information label R-134a #
E30, E28 M5	900 ПїS 25g (1.98 ПїS 0.05lbs)	1 381 958 1 380 981	8 363 254.9
E24, E36 E28 M10, M20	1000 ПїS 25g (2.20 ПїS 0.05lbs)	1 380 982 2 122 023	8 363 258.9
E23, E28 M30	1100 ПїS 25g (2.43 ПїS 0.05lbs)	1 380 983	8 363 256.9

5. Checking A/C System for Leaks

Check for leaks with an electronic R-134a leak detector, especially at connections that were opened for the retrofit. Refer to S.I. 04 26 92 (3644) for an approved R-134a leak detector.

6. Verify the A/C System Works Properly.

7. Locate and peel off the original engine-compartment A/C information label. Make certain this area is clean, and attach the new appropriate blue A/C information label from the retrofit kit. If necessary, refer to the chart above to determine the proper label. Both English and German language labels are provided in the kit. The English version of the label should be installed. Record the date and the name of the dealership/service organization that performed the retrofit on the label with a permanent marker.

Parts Information:

E23 Retrofit Kit	82 31 9 067 400
64 50 1 365 078	O-Ring
64 50 8 363 256	Label R-134a
64 11 8 363 259	Valve
64 11 8 363 260	Valve
64 53 8 363 554	Drying Container
64 50 8 390 602	O-Ring
64 50 8 390 603	O-Ring
01 29 9 788 367	Installation Instruction
E24 Retrofit Kit (up to 2/86)	82 31 9 067 397
64 50 8 363 255	Label R-134a
64 50 8 363 258	Label R-134a
64 11 8 363 259	Valve
64 11 8 363 260	Valve
64 53 8 363 555	Drying Container
64 50 8 390 601	O-Ring
64 50 8 390 602	O-Ring
01 29 9 788 367	Installation Instruction
E 24 Retrofit Kit (as of 2/86)	82 31 9 067 398
64 50 8 363 255	Label R-134a
64 50 8 363 258	Label R-134a
64 11 8 363 259	Valve
64 11 8 363 260	Valve
64 53 8 363 556	Drying Container
64 50 8 390 601	O-Ring
64 50 8 390 602	O-Ring
01 29 9 788 367	Installation Instruction
E 28 Retrofit Kit	82 31 9 067 401
64 50 8 363 254	Label R-134a
64 50 8 363 256	Label R-134a
64 50 8 363 258	Label R-134a
64 11 8 363 259	Valve

64 11 8 363 260	Valve
64 53 8 363 555	Drying Container
64 50 8 390 602	O-Ring
64 50 8 390 603	O-Ring
01 29 9 788 367	Installation Instruction
E 30 Retrofit Kit	82 31 9 067 394
64 50 8 363 254	Label R-134a
64 11 8 363 259	Valve
64 11 8 363 260	Valve
64 50 8 390 601	O-Ring
64 50 8 390 602	O-Ring
64 53 8 390 971	Pressure Switch
64 53 8 391 025	Drying Container
01 29 9 788 367	Installation Instruction
A/C Compressor	64 52 8 363 550
Adapter Wire	64 52 1 386 224
PAG lubricant	82 11 1 468 042

Warranty Information: The retrofit of an R-12 system to R-134a is not covered under warranty.