

# A/C-HEATER SYSTEM - MANUAL

## Article Text

1990 Volkswagen Corrado

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### ARTICLE BEGINNING

1990 MANUAL A/C-HEATER SYSTEMS  
Volkswagen

Cabriolet, Corrado, Fox, Golf GL, GTI,  
Jetta, Jetta GLi, Vanagon

#### \* PLEASE READ THIS FIRST \*

CAUTION: When discharging air conditioning system, use only approved refrigerant recovery/recycling equipment. Make every attempt to avoid discharging refrigerant into the atmosphere.

### AIR BAG WARNING

WARNING: To avoid accidental air bag deployment on Cabriolet, see AIR BAG DEACTIVATION under SERVICING PRECAUTIONS in this article.

### DESCRIPTION

The Volkswagen air conditioning system is a cycling clutch type. The compressor is cycled on and off by a thermostatic switch to maintain constant cooling rate.

Other components include an evaporator, expansion valve, receiver-drier, control panel, condenser, high-pressure switch and a low-pressure switch. On Vanagon, the A/C thermostat can be found on left rear pillar, above relay panel assembly (behind trim panel).

The control panel includes a pair of levers and a fan control switch. The upper lever operates air distribution flap. The lower lever controls temperature selection. The rotary fan control switch controls fan speed selection.

### OPERATION

#### SYSTEM CONTROLS

##### Air Distribution Lever

When in A/C position, cool air is routed to registers and side air vents. In BI-LEVEL position, cool air is routed to floor vents as well as registers and side air vents. In HEAT position, warm air is routed to windshield vents, side window nozzles and floor and center registers. In DEFOG position, warm air is routed to windshield vents, side window nozzles and side registers.

##### Fan Control Knob

The fan control knob controls airflow. As knob is turned clockwise, air intake opens and fan operates, increasing speed as knob is moved to extreme right position.

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### Temperature Control Lever

The temperature control lever controls heating and cooling. When moved to the left, lever turns compressor on. When moved to the right, a heater water valve is opened, supplying coolant to heater core.

### HIGH-PRESSURE SWITCH

High-pressure switch shuts compressor off if high pressure reaches 210 psi (14.8 kg/cm<sup>2</sup>). High-pressure switch will reset when pressure decreases to 174 psi (12.2 kg/cm<sup>2</sup>).

### LOW-PRESSURE SWITCH

Low-pressure switch cuts off system operation when there is abnormally low pressure in system. This protects the compressor when there is not enough R-12 in system. Low-pressure switch shuts compressor off at 26 psi (1.8 kg/cm<sup>2</sup>).

### THERMOSWITCH

Thermoswitch shuts compressor off if coolant temperature rises above 248°F (120°C).

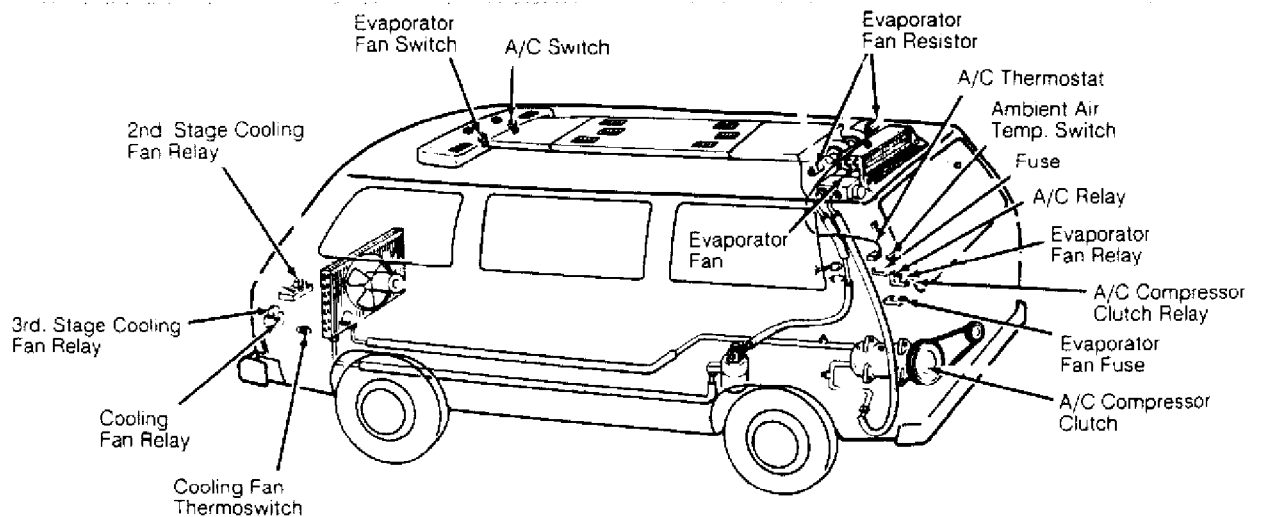


Fig. 1: Locating A/C Components (Vanagon)  
Courtesy of Volkswagen United States, Inc.

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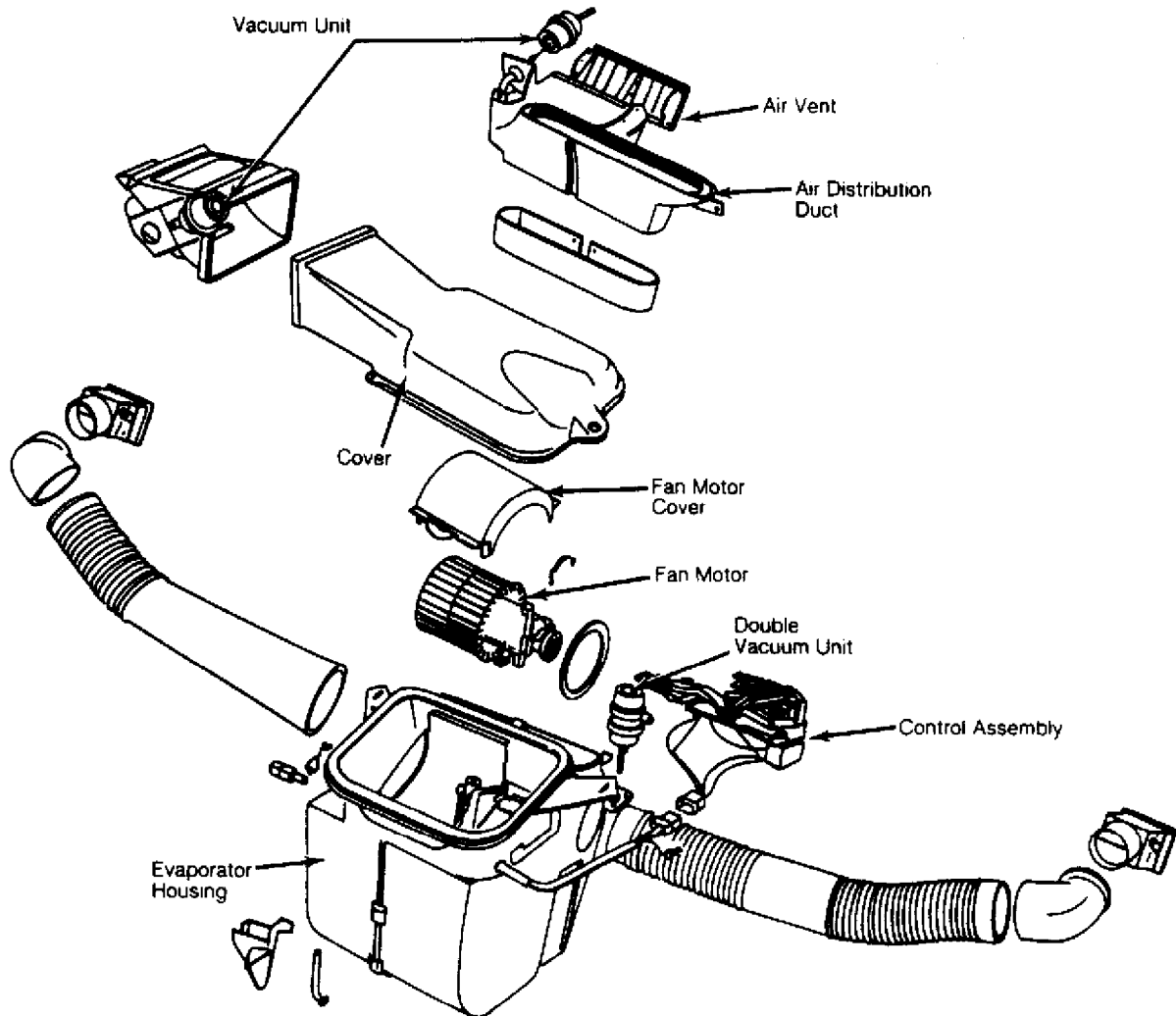


Fig. 2: Exploded View of Manual A/C-Heater System Components (Cabriolet)

Courtesy of Volkswagen United States, Inc.

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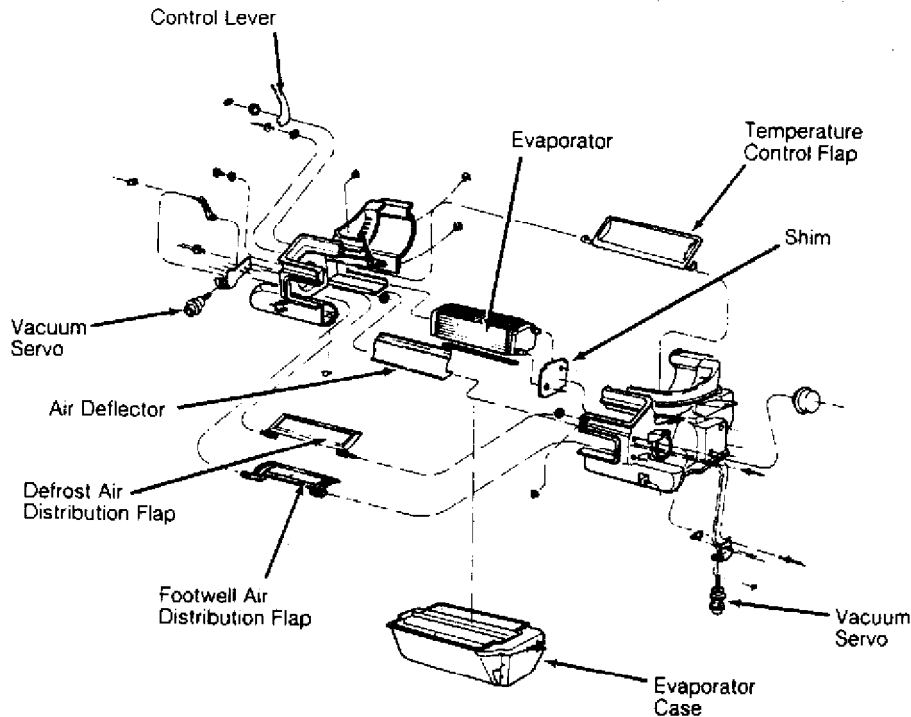


Fig. 3: Exploded View of Manual A/C-Heater System Components (Fox & Fox Wagon)

Courtesy of Volkswagen United States, Inc.

### SERVICING PRECAUTIONS

**WARNING:** Cabriolet is equipped with a driver's side air bag. Air bag equipped vehicles have AIRBAG stamped on the steering wheel horn pad. The air bag system capacitor maintains a voltage charge sufficient to cause air bag deployment for up to 20 MINUTES after ignition switch is turned off and battery is disconnected.

### AIR BAG DEACTIVATION - CABRIOLET

#### Disabling System

Ensure ignition switch is OFF. Disconnect negative battery cable and insulate terminal. Wait at least 20 MINUTES before servicing vehicle.

#### System Functional Check

When all service work is completed, reconnect negative battery cable. Turn ignition on. Ensure LEFT air bag indicator light (above air bag symbol) comes on for about 5 seconds and then goes out. If left air bag indicator light does not operate as indicated, air bag system needs to be serviced.

### ADJUSTMENTS

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### MICROSWITCH

Loosen microswitch mounting screw. Move microswitch so switch is on when lever is at maximum A/C, NORM (normal), BI-LEVEL or extreme right position, and off when lever is at VENT or HEAT position. Tighten microswitch mounting screw. Recheck operation.

### TEMPERATURE SWITCH

Move temperature lever to full cool position. Loosen temperature switch mounting screw. Move temperature switch counterclockwise to full stop position. Tighten temperature switch mounting screw.

### TROUBLE SHOOTING

#### NO COOLING

1) Ensure fan motor operates in all 4 speeds, air duct closes off outside air and heater water valve is closed. Adjust belt tension.

2) Inspect receiver-drier pressure seal. If seal is good, go to step 5). If seal is broken, evacuate and recharge system. If system cools properly, testing is complete. If system does not cool, connect pressure gauges.

3) Set engine speed at 2500 RPM. Insert thermometer in left register and close all others. Place controls on high blower and maximum cooling. With vehicle out of direct sunlight, close all windows. Radiator fan should come on with system pressure at 200 psi (14 kg/cm<sup>2</sup>).

NOTE: If system doors allow air leaks, evaporator will freeze up and testing will not be possible.

4) If fan does not operate, replace pressure switch. Ensure system is okay. If fan does come on, turn engine off and check for condenser obstructions and blocked airflow.

5) Turn air conditioner on and off with temperature control lever. Ensure compressor clutch engages. Push lever to extreme right position and back again. A click should be heard from compressor clutch. If a click is not heard, check for voltage at clutch coil wire with switch on. If voltage is present, replace clutch coil. If voltage is not present, check wiring or replace thermostatic switch.

6) If compressor clutch operates, check gauge readings. If both are low, locate leak and recharge system. If both are high, replace expansion valve. If low side is too high and high side reads too low, replace or rebuild compressor.

#### INSUFFICIENT COOLING

1) Ensure fan motor operates at all 4 speeds, air duct closes off outside air intake and heater water valve is closed. Adjust compressor belt tension and clean condenser.

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NOTE: If system doors allow air leaks, evaporator will freeze up and testing will not be possible.

2) Adjust engine speed to 2500 RPM. Position controls for maximum cooling and high blower. Insert thermometer in left register and close all other ducts. With vehicle out of sun, close all windows and doors. Connect pressure gauges and check readings.

3) If both gauges read too high, replace expansion valve. If both read too low, recharge system after locating leak. If both readings are normal, go to next step. If pressure side is too high and suction side is normal, go to step 5). If pressure side is too low and suction side is too high, go to step 6). If pressure side is normal and suction side is too low, go to step 7).

4) Turn compressor off and observe gauges. If readings equalize in 30 seconds, replace compressor. If readings take longer to equalize, ensure capillary installation in evaporator is 7" (178 mm) long on all models.

5) If installation is correct, run system at maximum cooling for 15 minutes. If thermometer indicates temperature below 36°F (2°C) when compressor is turned off, or temperature is above 48°F (9°C) with compressor on, replace temperature switch.

6) Check condenser fins and clean or straighten. If operation is still not correct, discharge system, using approved refrigerant recovery/recycling equipment, until bubbles show in sight glass. Recharge until bubbles disappear, and recheck pressures. If still incorrect, locate leaks and tighten fittings. Discharge system using approved refrigerant recovery/recycling equipment. Evacuate to remove all air and recharge system.

7) Check for bubbles at sight glass. If present, repair leaks and recharge system. If no bubbles are present, check condenser-to-expansion valve line for kinks and repair if necessary. Feel along line from condenser to expansion valve. If there are no cold spots, replace expansion valve.

8) If cold spot is felt, remove and flush out lines and condenser. Check for bubbles at sight glass. If there are no bubbles present, replace compressor. If bubbles are present, check for leaks. Repair and recharge system.

## INTERMITTENT COOLING

1) Ensure fan motor operates in all 4 speeds, air duct closes off outside air and heater water valve is closed. Adjust belt tension and clean condenser.

NOTE: If system doors allow air to leak by, evaporator will freeze up and testing will no longer be possible.

2) Adjust engine speed to 2500 RPM. Set controls for maximum cooling and high fan. Insert thermometer in left air duct and close all other ducts. With vehicle under shade, close windows and doors and connect pressure gauges. Operate system for 10 minutes.

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3) Check for cool air from left duct. Low-pressure gauge should read more than 16 psi (1.1 kg/cm<sup>2</sup>). If low-pressure gauge is incorrect, hold hands around expansion valve to warm valve. If pressure rises, moisture is present in system. Discharge using approved refrigerant recovery/recycling equipment. Evacuate and recharge system. If pressure does not rise, go to next step.

4) Check temperature on thermometer when thermostatic switch turns compressor off. If temperature is 39°F (4°C), system is okay. If lower than 39°F (4°C), ensure capillary tube installed length is 7" (178 mm). If installation is correct, replace thermostatic switch.

### REMOVAL & INSTALLATION

NOTE: Removal and installation procedures on other models or components are not available from manufacturer.

### EVAPORATOR - VANAGON

1) Discharge refrigerant from system using approved refrigerant recovery/recycling equipment. Remove sun visors and sun visor retaining clips. Lower front housing and front air duct.

2) Disconnect wiring connectors to A/C switches. Remove front housing, front air ducts, center air duct, rear air duct, left side rear trim panel and right side rear trim panel.

3) Support evaporator housing. Remove left and right side evaporator housing mounting screws. Lower evaporator housing. Remove evaporator housing covers. Remove evaporator. See Fig. 4. To install, reverse removal procedure. Evacuate and recharge system.

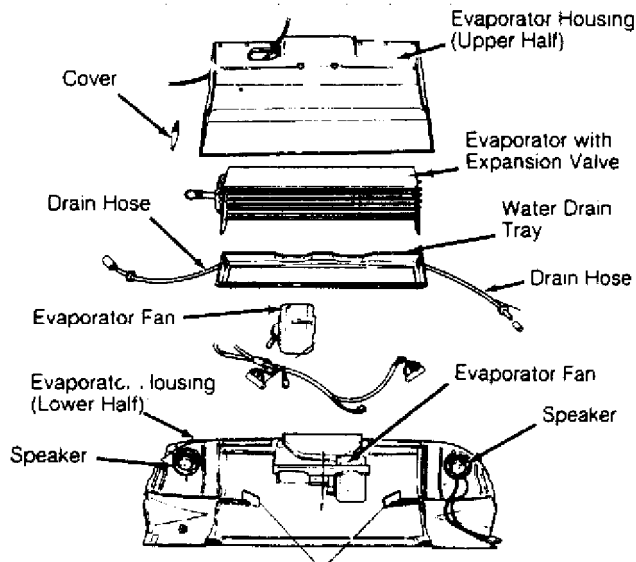


Fig. 4: Exploded View of Evaporator Assembly (Vanagon)  
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### A/C SYSTEM SPECIFICATIONS

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#### A/C SYSTEM SPECIFICATIONS TABLE

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Application	Specification
System Type .....	Cycling Clutch
Compressor Type .....	Sanden 5-Cylinder
Compressor Oil Capacity	
Cabriolet .....	6.0 oz.
Fox .....	1.4 oz.
Compressor Belt Deflection	
All Models .....	(1) 3/16" (4.8 mm)
System Oil Capacity	
Vanagon .....	5.0 oz.
All Others .....	4.6 oz.
Refrigerant (R-12) Capacity	
Corrado .....	37-40 oz.
Vanagon .....	50 oz.
All Other Models .....	38-40 oz.
System Operating Pressures	
Low Side .....	26-40 psi (1-2 kg/cm <sup>2</sup> )
High Side .....	150-210 psi (10.5-19 kg/cm <sup>2</sup> )

(1) - Deflection is measured at center of belt, between  
A/C compressor pulley and crankshaft pulley.

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#### WIRING DIAGRAMS



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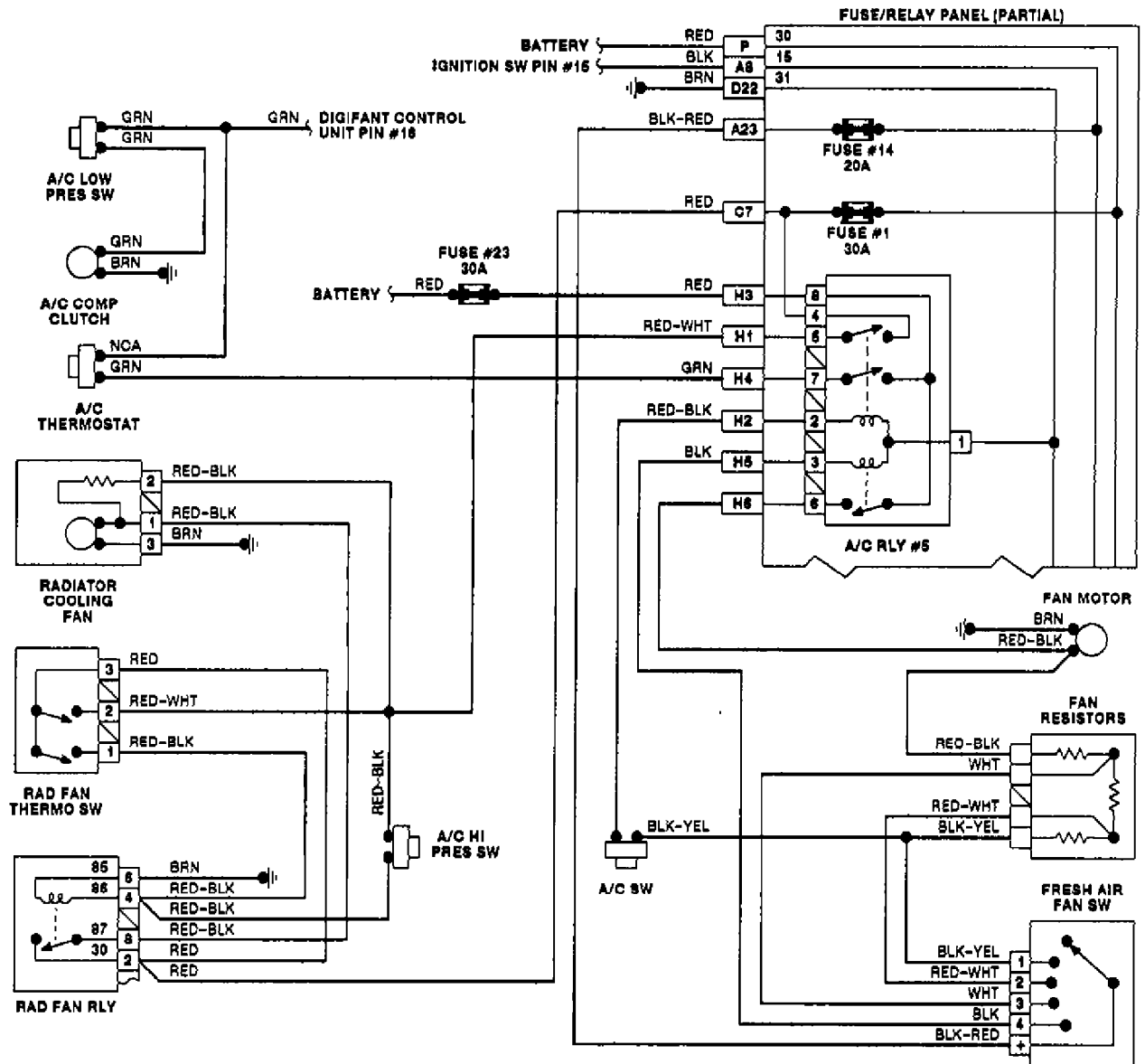


Fig. 5: Manual A/C-Heater System Wiring Diagram (Cabriolet)

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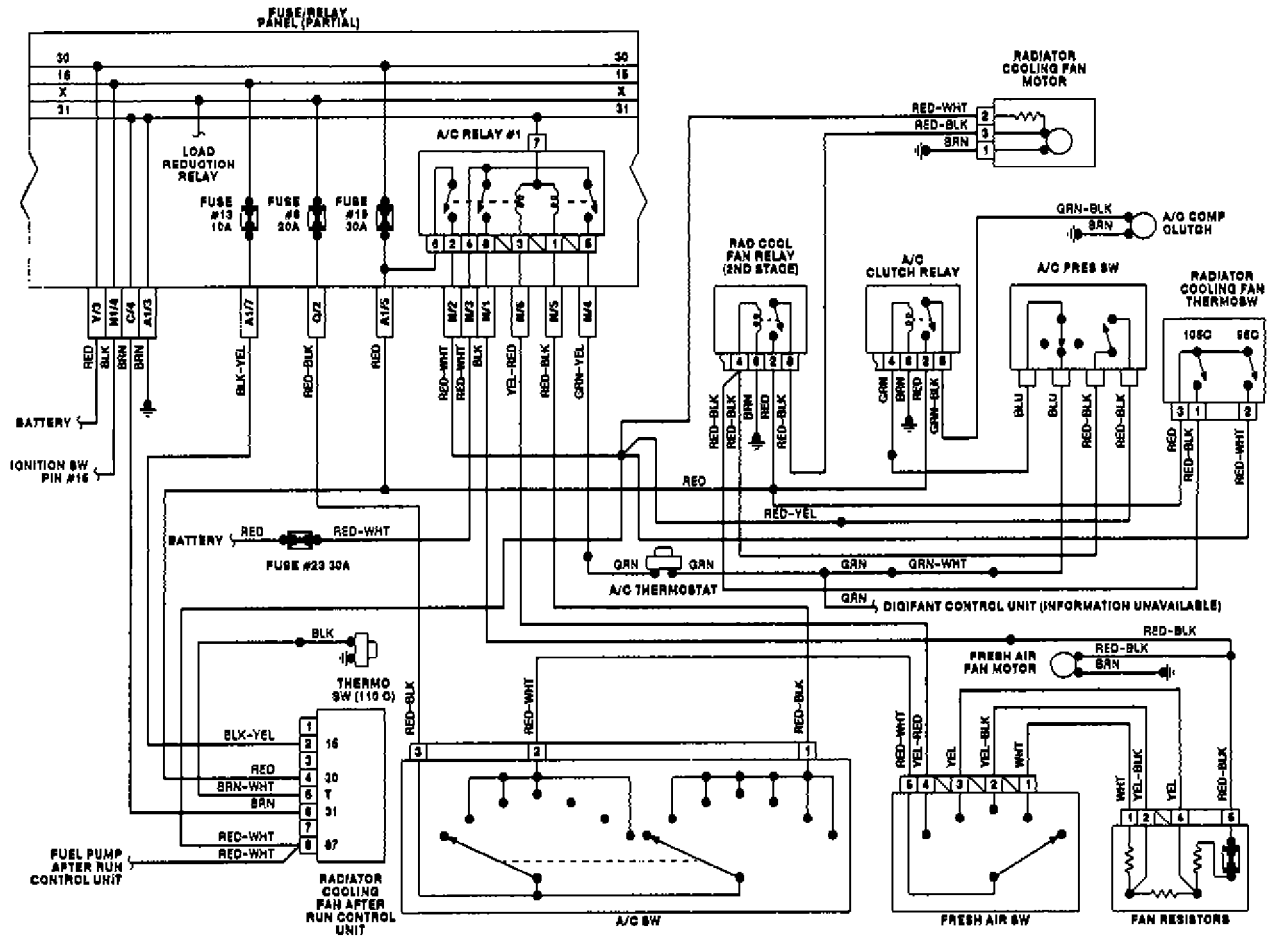


Fig. 6: Manual A/C-Heater System Wiring Diagram (Corrado)

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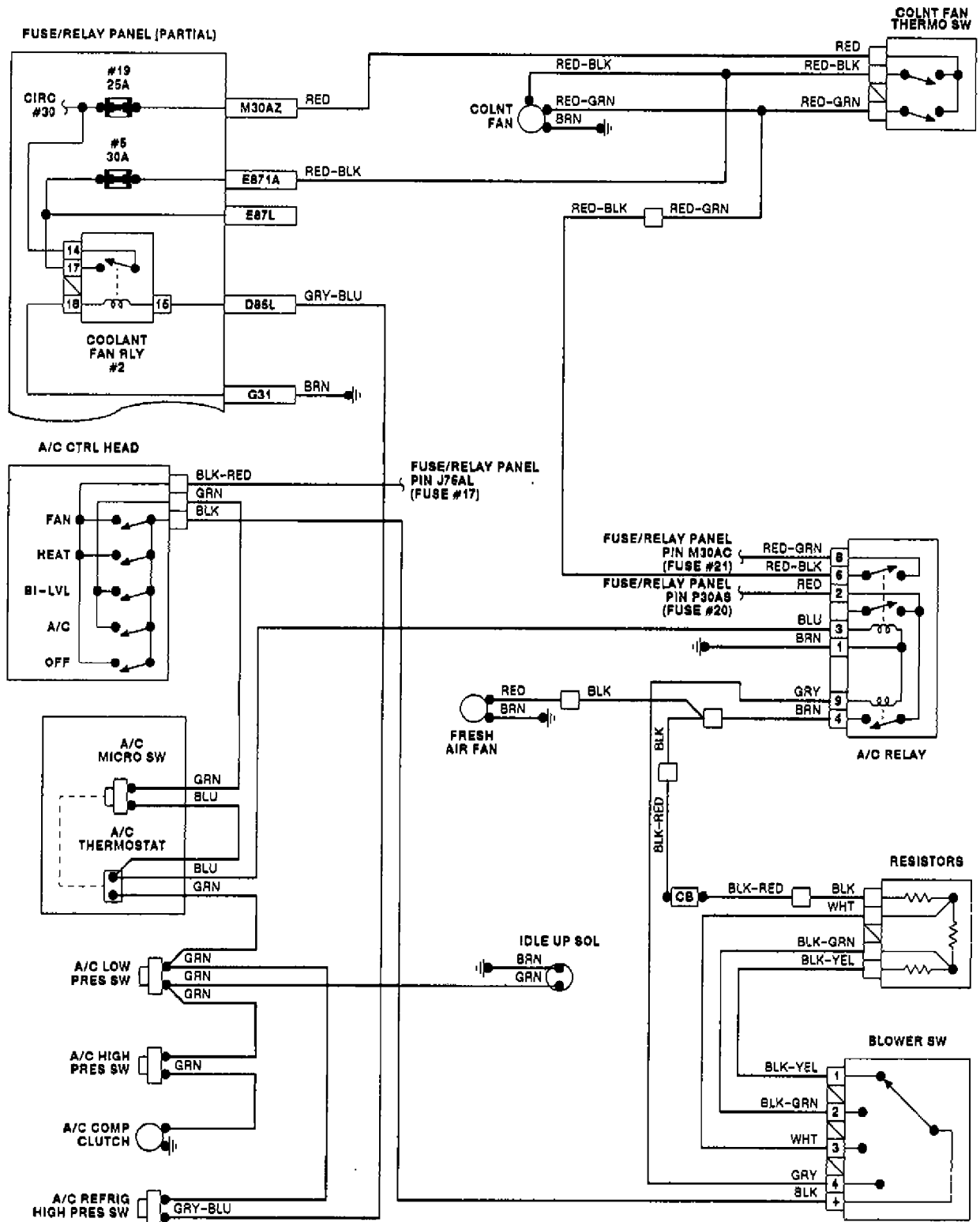


Fig. 7: Manual A/C-Heater System Wiring Diagram (Fox)

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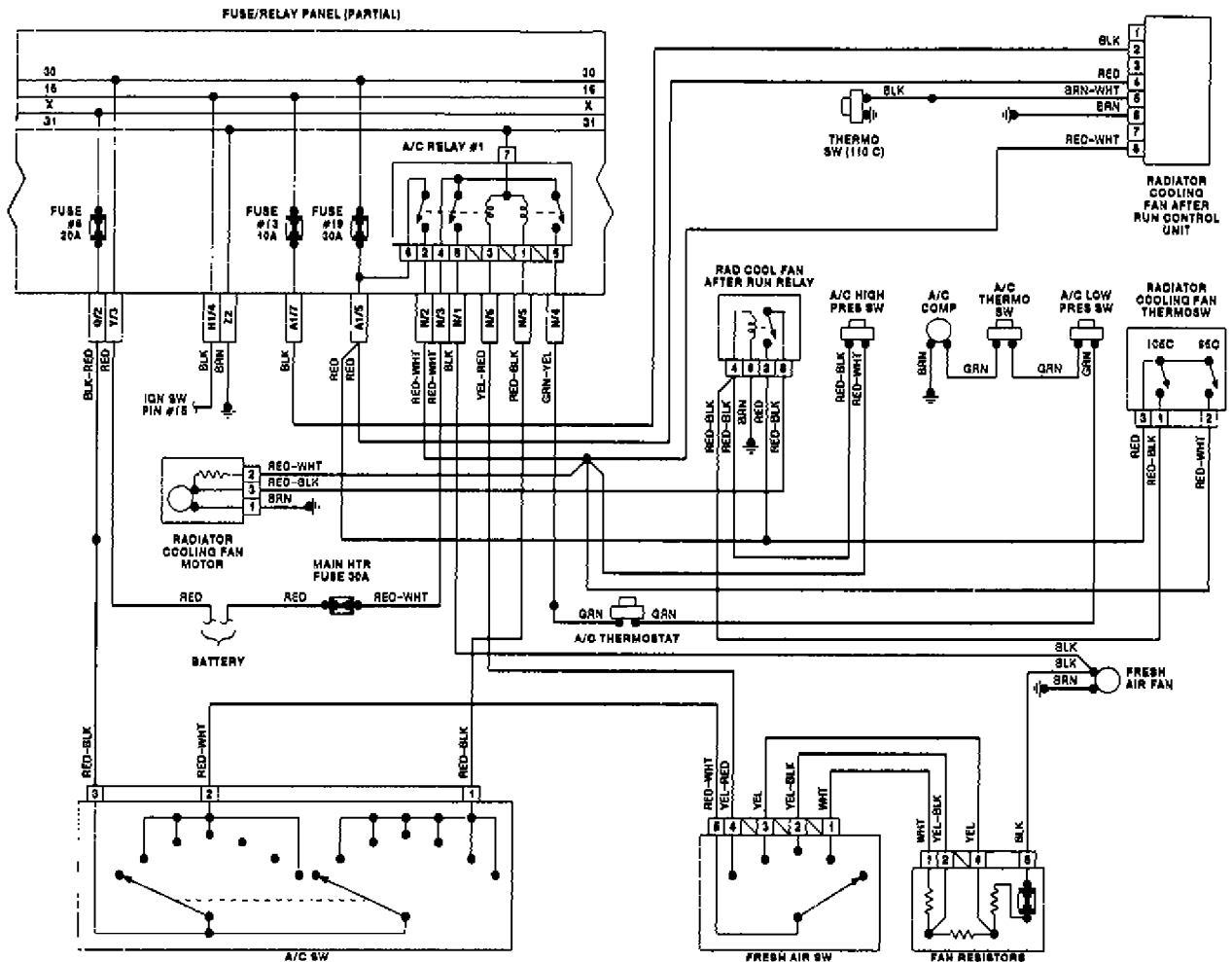
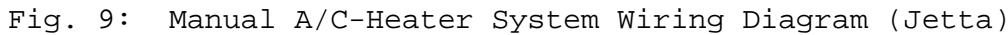


Fig. 8: Manual A/C-Heater System Wiring Diagram (Golf GL & GTI)

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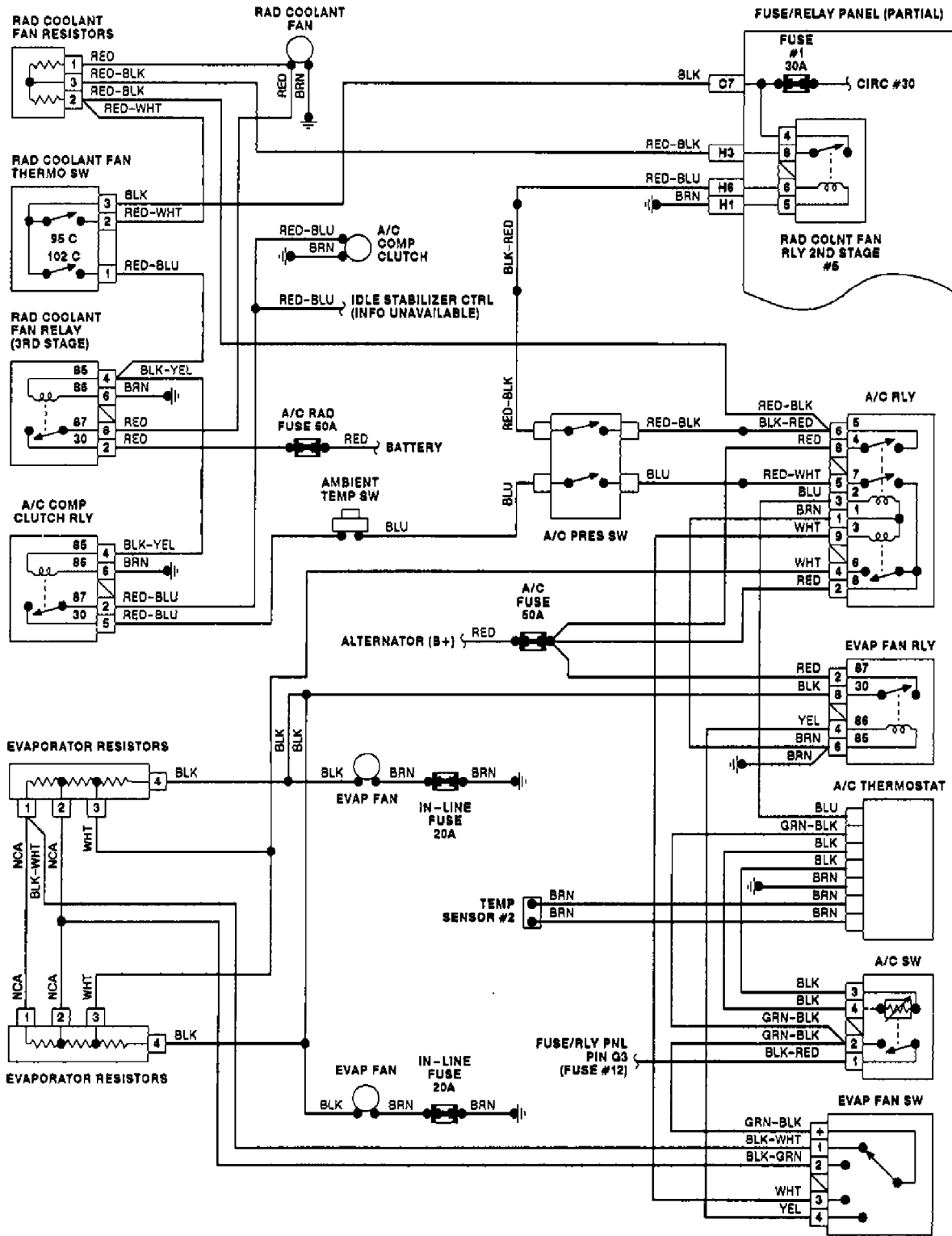


Fig. 11: Manual A/C-Heater System Wiring Diagram (Vanagon)

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