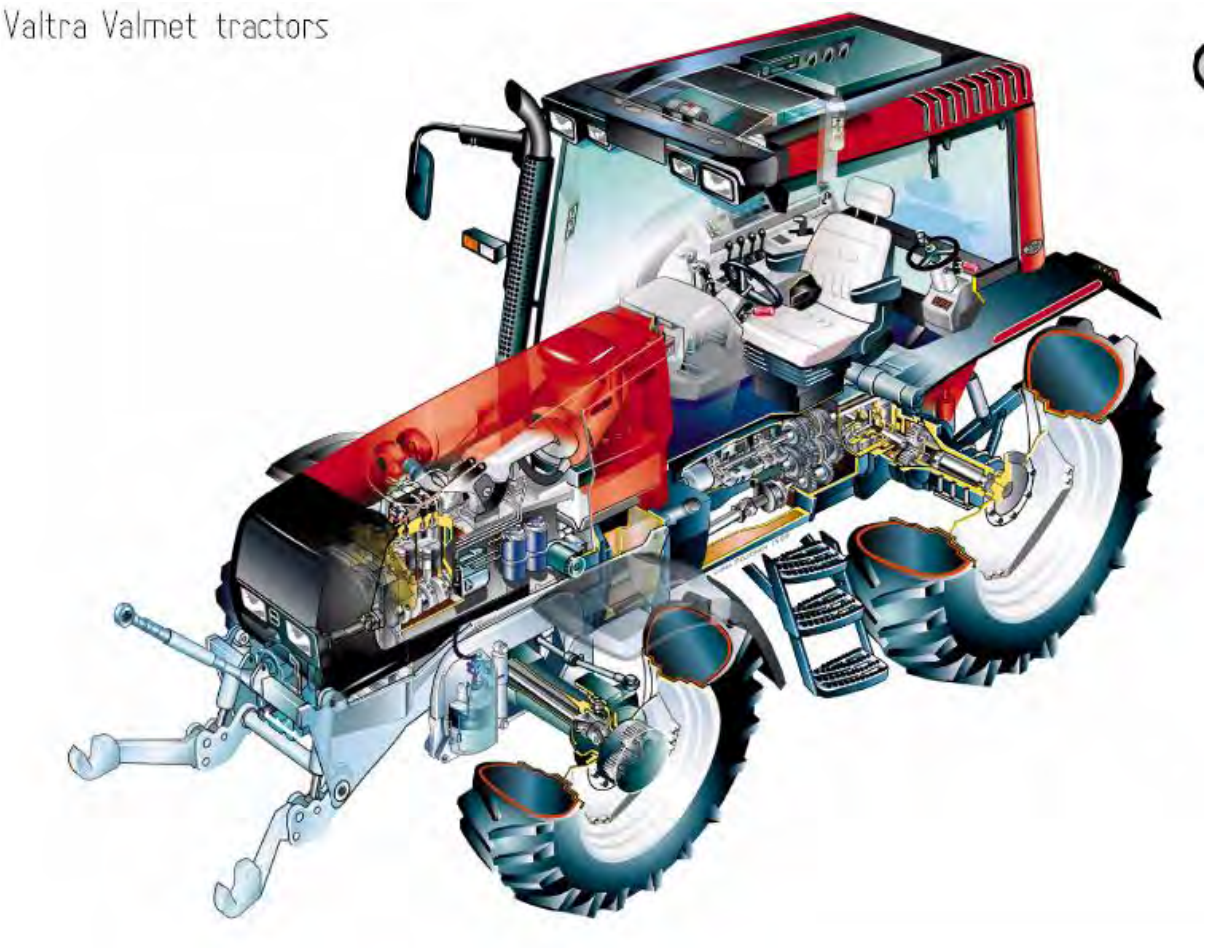
VALTRA – VALMET

MEGA MEZZO HI-TEC



WORKSHOP MANUAL

VALTRA

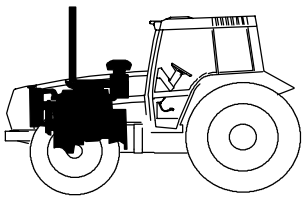
Service Manual

Tractors

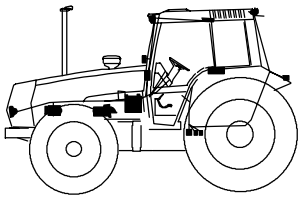
Groups 10–100

Valtra Inc.
44200 Suolahti, Finland

10 General



20 Engine



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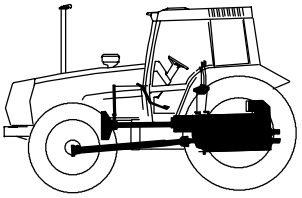

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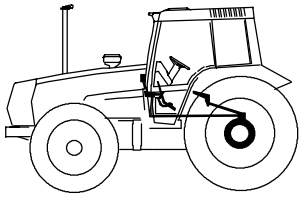
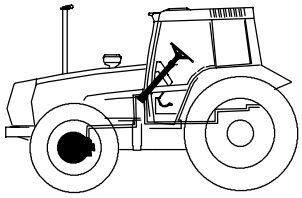
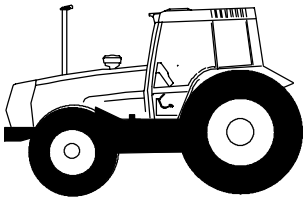


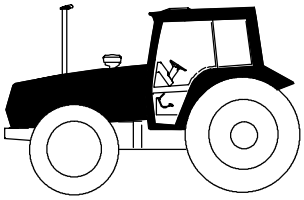
50 Brake system



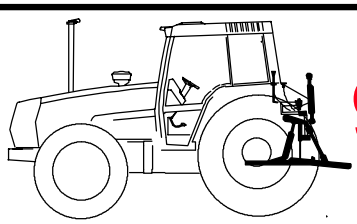
60 Steering system and Front axle



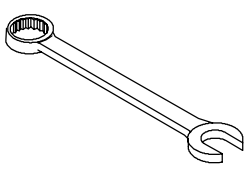
70 Frame and Wheels



80 Cab and Shields



90 Hydraulics



100 Tools

Contents

Technical data

Important! These instructions present both the earlier air conditioner (refrigerant R12) and the later air conditioner which has refrigerant R134a (Suva). The compressor and the drier reservoir have markings stating which one of the refrigerants is in the system. If R12 refrigerant is replaced with R134a, see page **831**/**10**. Tractors which have the earlier air conditioner, the heater and air conditioner control panel is fitted on the front side of the cab roof. On the later air conditioner, the control panel is placed on the RH side of the cab roof.

Air conditioner on Valmet 6000–8750 tractors:

Refrigerant	R12 or R134a (SUVA)
– refrigerant filling in system	1,4 kg
Compressor Diesel Kiki DKS 15 CH:	
– Number of cylinders	6 pcs
– Cyl diam x stroke	ø 34 mm x 24 mm
– Max revs	7000 r/min
– Lubricating oil if refrigerant R12	Freol DS–83P or Esso 2980
– Lubricating oil if refrigerant R134a	ZXL 100 PG (DH–PS)
– Lubricating oil volume	200 cm^3 (2,0 dl)
Electro–magnetic clutch:	
– voltage	12 V (DC)
– starting torque	50 Nm
– power consumption	44 W (max)
– clutch clearance	0,3–0,6 mm
Drier	
– heat fuse melts at (not heat fuse if refrigerant R134a)	+107...+118˚C
Pressure switch switches off at max pressure, R12	2,55±0,2 MPa
Pressure switch switches off at max pressure, R134a	3,40±0,2 MPa
– switches on again when pressure drops	0,57±0,2 MPa
Pressure switch switches off at min pressure	190±20 kPa
– switches on again when pressure rises up to	200±30 kPa
Thermostatic switch:	
– switch off when evaporator temperature is below	+2...+3 ˚C
– switch on when evaporator temperature has risen up to (max cooling effect)	+6...+7 ˚C
– switch on when evaporator temperature has risen up to (min cooling effect)	about +19 ˚C
High and low pressures at engine revs 1500 r/min between temperatures +20...+25 ˚C:	
– low pressure	50–300 kPa
– high pressure	700–1400 kPa

Operating principle

An air conditioner takes heat from the cab air when outdoor temperature is high. Refrigerant in the system is exposed under different pressures and temperatures and this causes a cooling effect. Refrigerant vaporizes in the evaporator and evaporation absorbs heat which is taken from the warm cab air which is blown through the evaporator.

The air conditioner functions so that the refrigerant is continuously circulated in the system at which time it changes from liquid form into gaseous form. This process absorbs heat from the cab when the refrigerant vaporises in the evaporator and emits heat to outdoors when refrigerant becomes condensed in the condenser.

Although the process has four parts, it can be divided into two main parts: high pressure side and low pressure side according to the figure below.

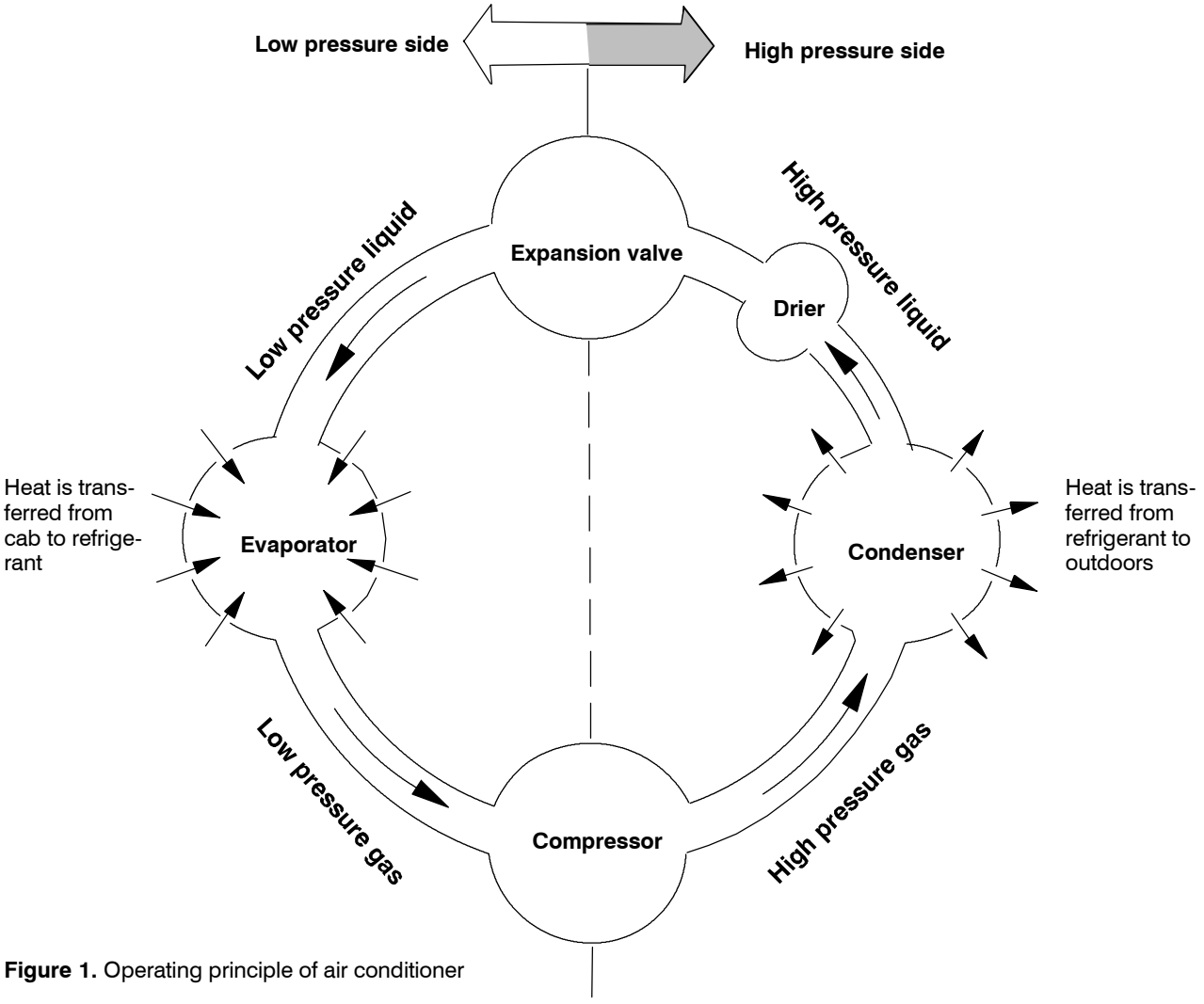
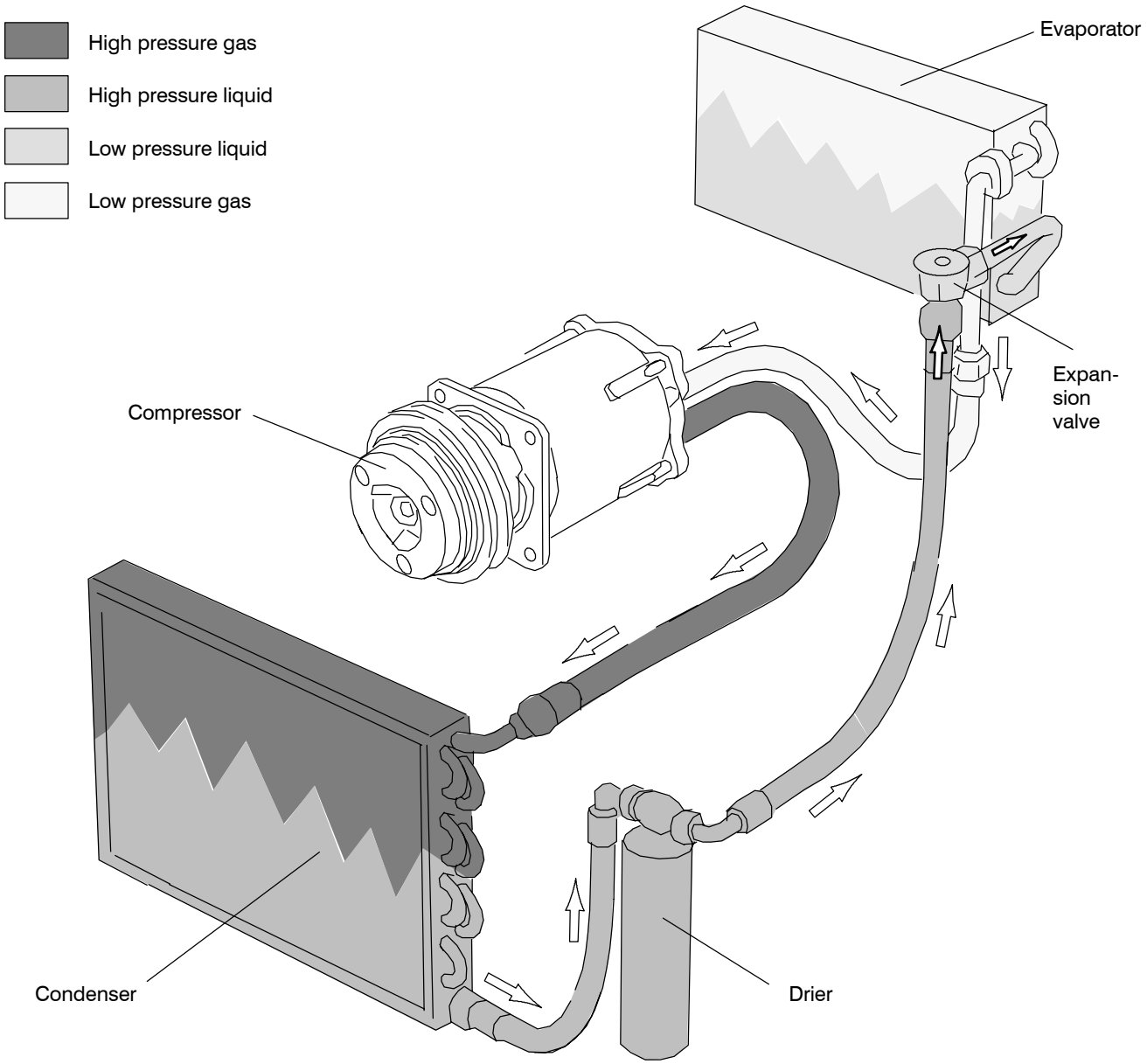


Figure 1. Operating principle of air conditioner



Circulation of the refrigerant begins from the compressor. The compressor sucks low pressure gas from the evaporator and compresses high pressure gas into the condenser. In the condenser gaseous refrigerant becomes condensed and emits heat to outdoors. From the condenser high pressure liquid flows via a drier to the expansion valve in which a part of the liquid vaporizes and the refrigerant cools and its pressure drops. Liquid flows from the expansion valve into the evaporator where cab heat changes liquid into gas. This low pressure gas then flows into the compressor suction side from where a new circulation begins.

Max. cooling effect corresponds to the situation when the compressor works all the time. In order to achieve a certain cooling effect, the compressor has to keep a certain pressure in the evaporator outlet side.

An evaporation temperature of Freon R12 is −30˚C at normal air pressure. The corresponding value of the R134 is −26˚C. When pressure increases the evaporation temperature rises and vice versa.

When the air conditioner is operating the low pressure hoses are cold and high pressure hoses are warm.

Liquid refrigerant from the condenser is filtered and dried in the drier container. The drier also prevents gaseous freon from entering into the expansion valve. In the drier container there is a pressure switch which switches off current to the compressor if pressure in the high pressure circuit rises too high or becomes too low:

In addition, the drier has a heat fuse (not if refrigerant R134a) which melts at **107–118 ˚C** (corresponds pressure 3,4–3,8 MPa) and refrigerant blows off. The drier has two inspection glasses through which can be checked the refrigerant filling and moisture in the system (see page **831/2**).

Earlier air conditioner which has the control panel fitted in the front part of the cab roof.

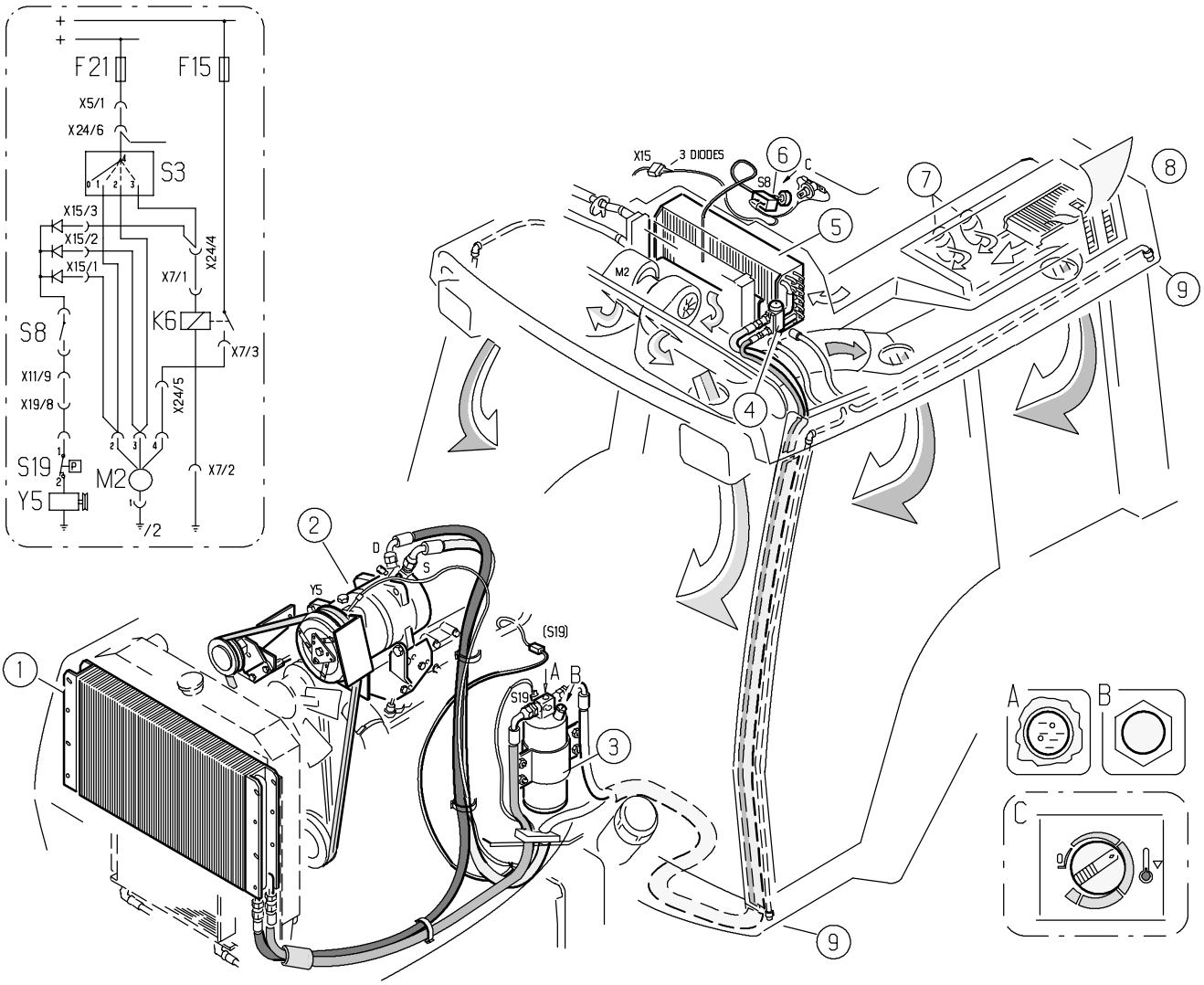


Figure 3. Air conditioner on Valmet 6100–8100 tractors.

1. Condenser
2. Compressor
3. Drier
A=Inspection glass
B=Moisture indicator
4. Expansion valve
5. Evaporator
6. Temperature switch
7. Re–circulation nozzles
8. Air inlet into cab
9. There are valves in the outlet pipes for condensing water. The valves prevent air from entering into the evaporator housing. Water becomes condensed in the housing when the warm cab air flows through the cold evaporator.

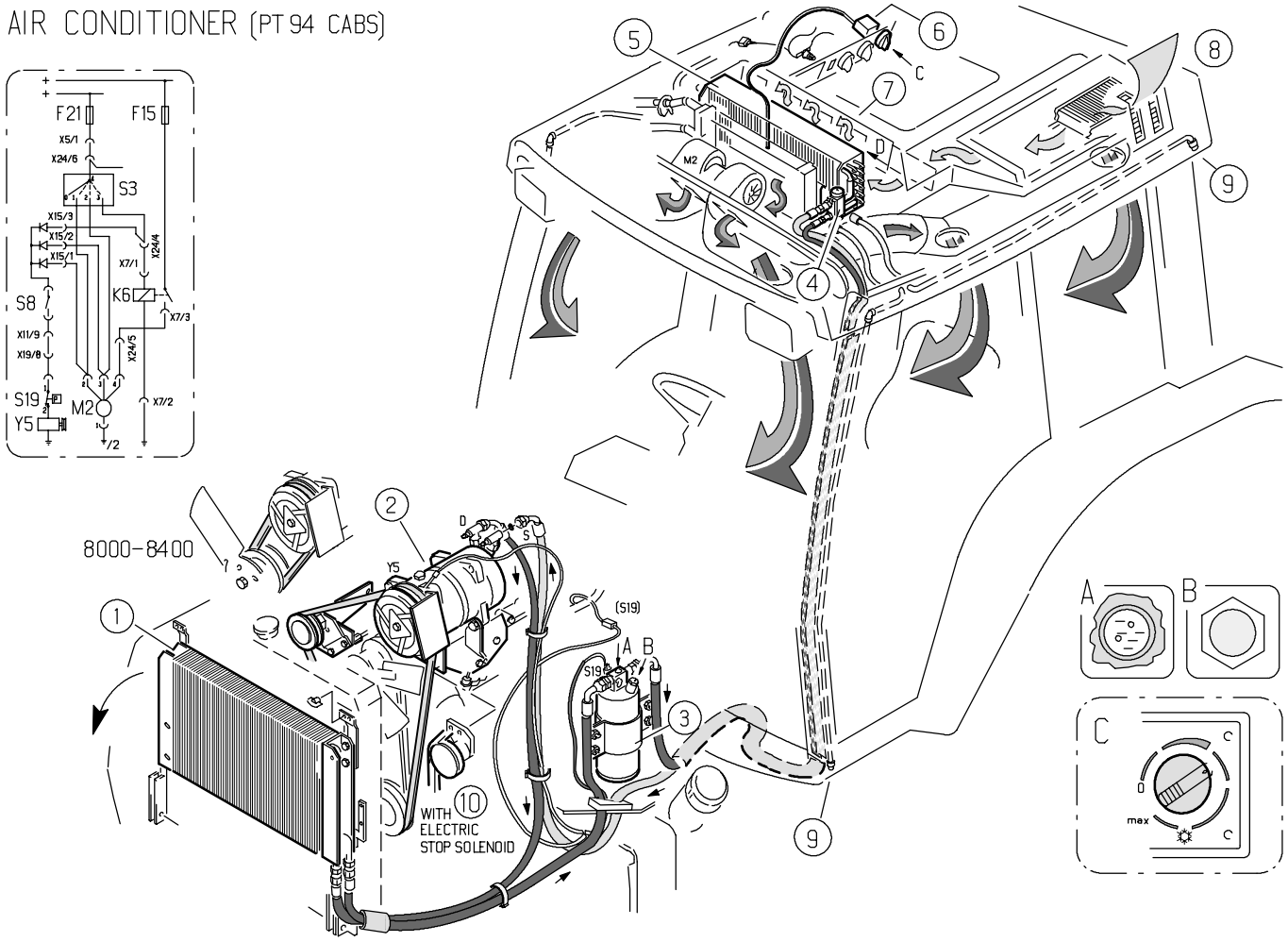
Wiring diagram:
F21 = Air conditioner fuse
F15 = Fan fuse
S3 = Fan switch
S8 = Temperature switch
S19 = Pressure switch
Y5 = Electromagnetic clutch
M2 = Fan
K6 = Relay, max speed III of fan

Compressor (2) is driven by an extra belt pulley at the front end of the crankshaft. The compressor belt pulley is fitted with an electromagnetic clutch, which switches the compressor off and on according to the required cooling effect. The compressor is shown on page 831/9.

The expansion valve (4) regulates the amount of refrigerant in the evaporator (5) so that the refrigerant vaporizes in the best possible way. The expansion valve lets only as much refrigerant flow into the evaporator as the evaporator can vaporize. The expansion valve is shown on the next page.

Temperature switch sensor (6) (capillary tube) is pushed between the evaporator fins and it senses evaporator temperature in its coldest place. The sensor switches off the compressor when the evaporator temperature drops below +2...+3˚C (prevents icing on the evaporator), and switches on again when the evaporator temperature has risen over +6...+7˚C (or up to +19˚C when the temperature switch is in min position).

Later air conditioner (ECOND) which has the control panel fitted on the RH side of the cab roof. Refrigerant R134a.



Picture 4. The following modifications have been made:

1. The condenser has more cooling area. The front covering is openable and the condenser has hinges in the lower edge for easier cleaning.
2. New compressor which has new oil type and new service valves. Compressor seal material is different. The compressor type plate is marked with the new refrigerant R134a.
3. New drier reservoir with new synthetic drying material. The drier has not a heat fuse. The drier reservoir type plate is marked with new refrigerant type. On the latest tractors the drier reservoir is fitted in front of the engine radiator.
4. Expansion valve has different adjusting values
5. Larger evaporator
6. Air conditioner switch is placed on the roof console on the RH side of the roof.
7. Recirculation grille with an adjustable valve.
8. Cab air filter
9. Condension water draining pipes
10. An additional belt pulley, if the tractor has the electric stop solenoid on the fuel injection pump.

All rubber pipes and seals are of different material.

Expansion valve

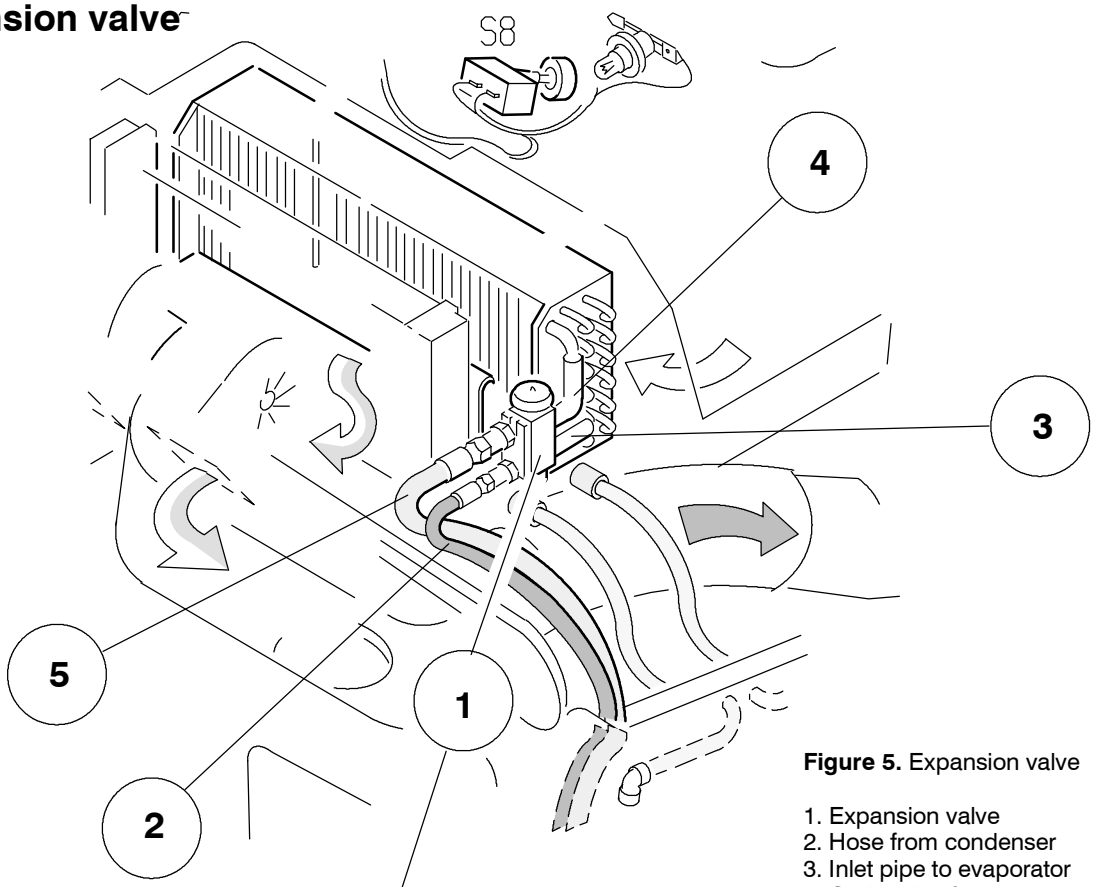
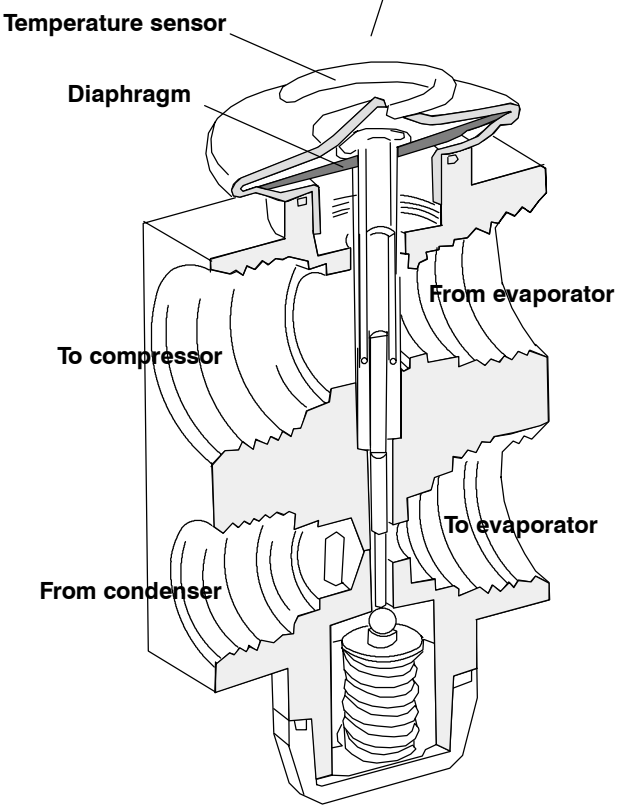


Figure 5. Expansion valve

1. Expansion valve
2. Hose from condenser
3. Inlet pipe to evaporator
4. Outlet pipe from evaporator
5. Hose to compressor suction side



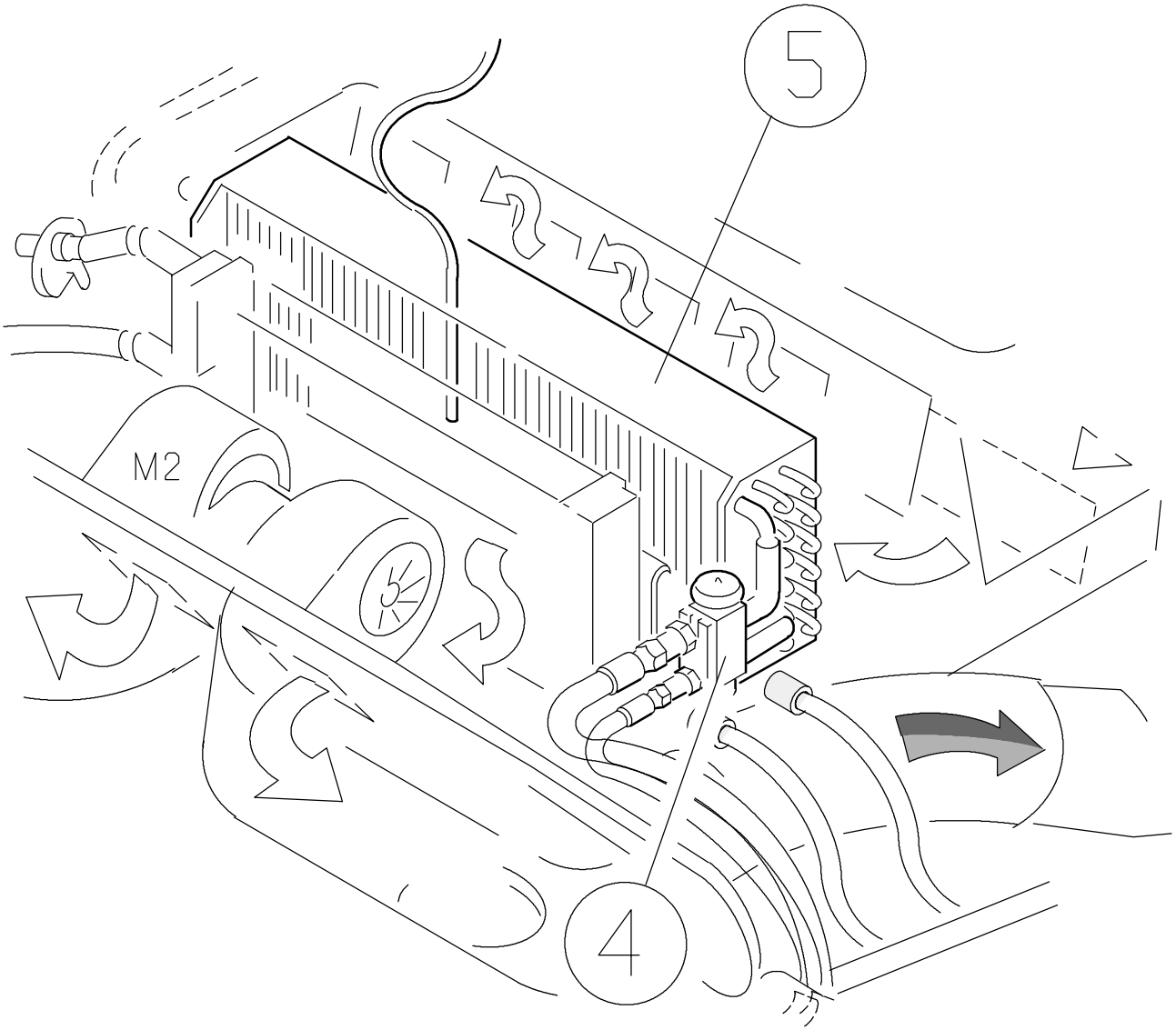
When the compressor starts pressure drops in the evaporator and the diaphragm pushes the pin downwards and the ball opens. Refrigerant can now flow via the spring housing into the evaporator

When the temperature in the evaporator outlet pipe lowers, the temperature sensor pulls the diaphragm upwards and the valve ball closes preventing refrigerant from flowing into the evaporator.

In this way the expansion valve regulates all the time the amount of refrigerant in the evaporator.

On the later air conditioner, the expansion valve functions in a similar way.

Note! The expansion valve and the metal pipes have been covered with insulating mass 30794000.



Picture 6. The new air conditioner

4. Expansion valve
5. Evaporator. At the rear of the evaporator there is the recirculation grille.