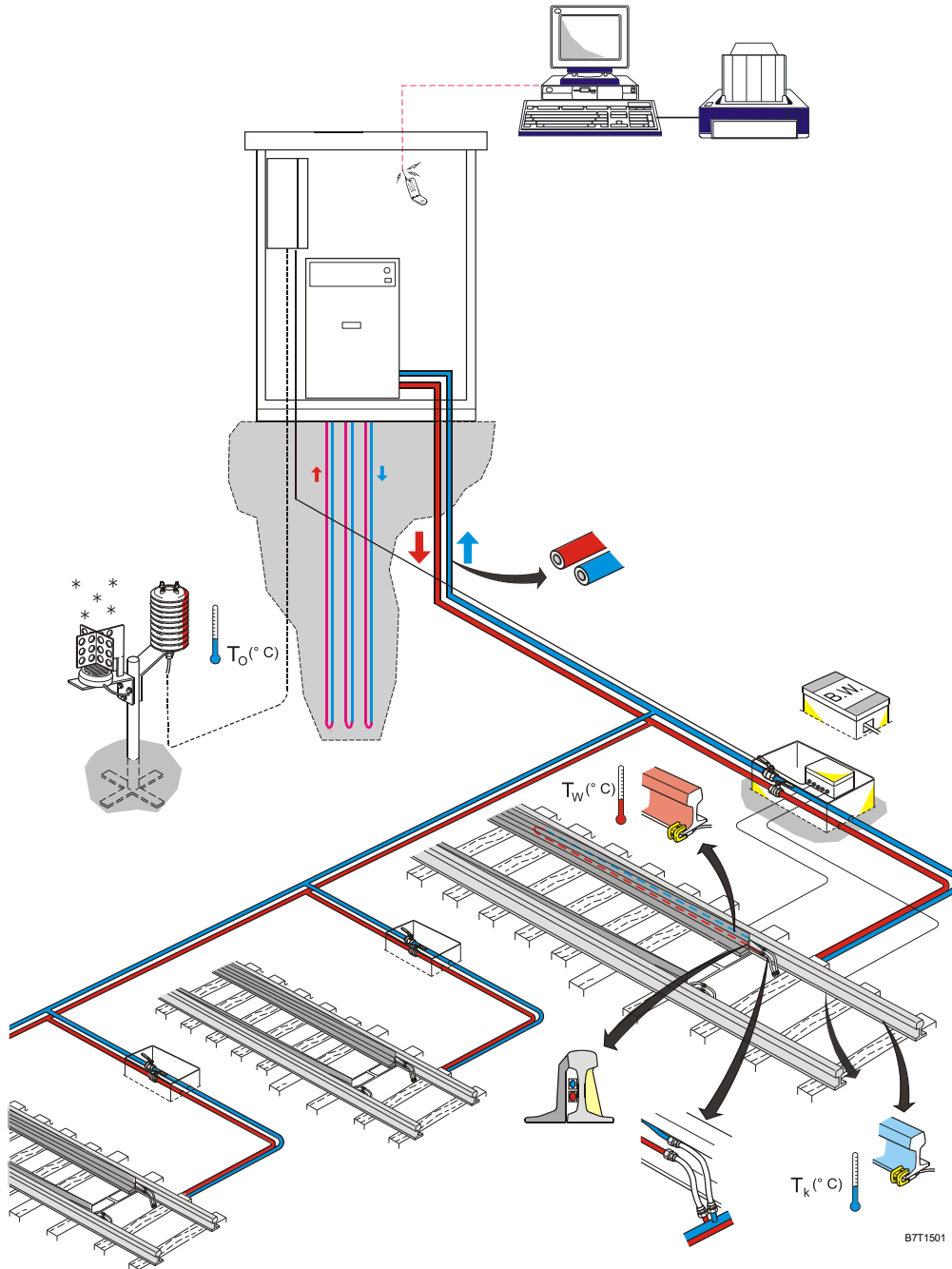


POINT HEATING

System using geothermal heating



**ENERGY EFFICIENT, RELIABLE
AND LOW-MAINTENANCE**

GEOHERMAL HEATING FOR RAILWAY POINTS

Points are mostly heated by systems that use electricity or gas.

Geothermal heating using natural underground warmth is a good alternative because of its low energy consumption and limited impact on the environment.

HOW THE HEAT PUMP WORKS:

The natural underground warmth (approx. 10 °C) heats the liquid in the evaporator. The rise in temperature causes the liquid to turn into a gas. The pressure of the gas is increased in the compressor, increasing the temperature to around 50-60°C.

The gas is cooled in the condenser, releasing the energy. The heat produced is transferred to the heating system of the points. The expansion valve reduces the pressure, and the cycle is repeated.

ENERGY CONSUMPTION:

The energy required to heat the points consists of 75% underground heat and 25% electrical energy (for the compressor and circulation pumps).

CAPACITY:

The heating capacity required (for the number and type of points, heating pipe lengths and expected weather conditions) is determined by the following aspects:

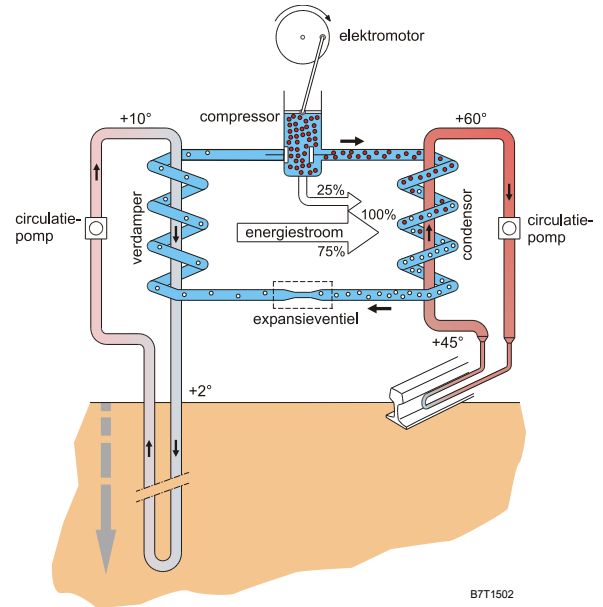
- capacity of heat pump
- number, depth and length of vertical heat exchangers underground
- the design of the heat exchangers on the points

HEATING AT THE POINTS:

The heat is transferred to the points through a well-insulated network of pipes.

The heat exchanger is a long steel tube attached to the rail and/or switch blade. The heat of the liquid is transferred to the stockrail, switch blade, slide plate and lever of point machine.

The use of insulating and heat conducting materials results in a very efficient point heating system.



SPECIAL FEATURES:

- Reliable and very low-maintenance system.
- Usable in very cold winter conditions.
- Depth of the vertical underground heat exchanger up to 90 m.
- Only a low-power electrical connection required.
- Low energy consumption: roughly 75 to 80% less than an equivalent electrical heating system.
- No need to remove parts when using a tamping machine.
- Remote control, monitoring and diagnosis using GSM/GPRS and the internet.
- In the event of the heat pump failing, the underground warmth is transferred directly to the points.
- High availability for the points due to low risk of failure.
- Cooling of points in summer is possible by transferring heat to the ground.

