E. Pre-heating System

The pre-heating system serves to increase the temperature of the compressed air and to ignite fuel particles at the surface of the hot wire of the glow plugs, thus allowing the starting of a cold engine.

In the diesel engine the combustion is accomplished by the self-ignition of the fuel injected into the highly compressed and therefore highly heated combustion air. The compression temperatures of a diesel engine under hot running conditions are approx. 700 to 900° C. During the starting of a cold engine without pre-heating, however, the compression temperatures are only approx. 300° C. This temperature is not sufficient for the self-ignition of the fuel.

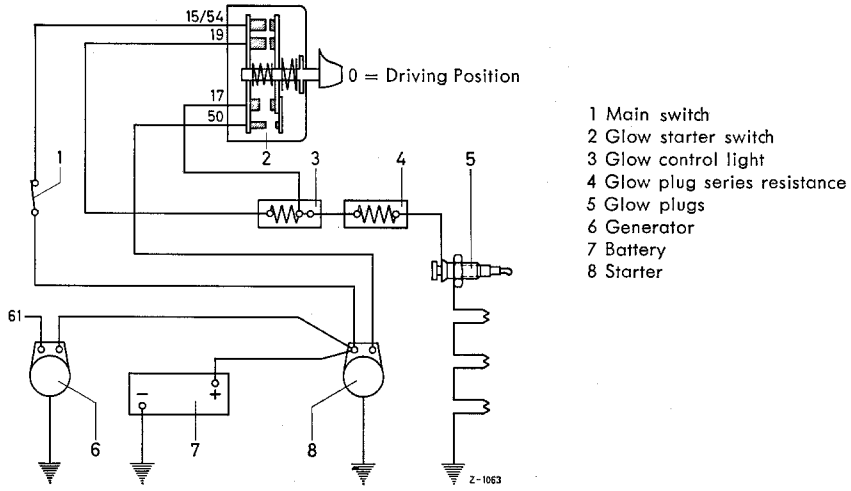

Figure 15–00/5

Electric wiring diagram of a pre-heating system with glow starter and stop switch

The glow plugs receive their power from the 12-volt battery via the glow starter switch. The glow plugs are connected in series with the glow control light (3) and the additional glow plug series resistance (4) (see Fig. 15–00/5) in accordance with the rated voltage of the glow plugs, so that the sum of all individual rated voltages, including loss of voltage in the lines, corresponds to the rated voltage of the battery.

During the starting the glow control light is shorted, so that the heat output of the glow plugs does not drop too much during the decreasing battery voltage (see Figure 15–00/5 and also Job No. 15–33, Description of the four Switch Positions, item d).

The duration of the pre-heating depends on the temperature of the engine and the outside temperature.

Average pre-heating periods with cold engine:

Outside temperature + 20° C approx. 20 seconds
Outside temperature 0° C approx. 40 seconds
Outside temperature —5° C approx. 1 minute
At lower temperatures no more than 2 minutes.

Change: Paragraph on Model OM 621 added

On Model **OM 636** there are two different versions of pre-heating systems:

1st version: Glow plugs Bosch KE/GA 2/2 and Beru 202/GE with spiral filament and a rated voltage of 1.4 Volt each, glow control light with a rated voltage of 1.4 Volt, and glow plug series resistance with a rated voltage of 5.0 Volt.

2nd version: Glow plugs Bosch KE/GA 1/8 and Beru 214 GK with eye-shaped filament and a rated voltage of 0.9 Volt each, glow control light with a rated voltage of 0.9 Volt, and glow plug series resistance with a rated voltage of 6.6 Volt.

To prevent damages in the pre-heating system following the replacement of a glow plug, a glow control light, or a glow plug series resistance, watch out for correct rated voltage which is visibly marked on each of these parts.

On Model **OM 621** there are two different versions of glow plugs:

1. Glow plug Bosch KE/GA 1/8 and Beru 214 GK (2-pole, 0.9 Volt, approx. 40 Amp.) installed in engines of type 621.910, models 190 D or 190 Db and 180 Dc. Filament loop length approx. 15 mm, filament loop width 8 to 9 mm, filament thickness for the Bosch and Beru glow plug 1.7 mm dia.

2. Glow plug Bosch KE/GA 1/21 and Beru 381 GK (2-pole, 0.9 Volt, approx. 40 Amp.) installed in engines of type 621.912 for model 190 Dc and 621.913 for models L and O 319 D.

Attention! The OM 621 engine used in models 190 Dc and L and O 319 D for heavier service the glow plug filament must be thicker and the loop was shortened to prevent burning out and breaking of the filament. Filament loop length approx. 10 mm, filament loop width 8 to 9 mm, filament thickness for the Bosch glow plug 1.8 mm dia., for the Beru glow plug 1.9 mm dia. **For this reason install only Bosch glow plugs KE/GA 1/21, or Beru 381 GK, respectively, into engine models 190 Dc, L and O 319 D, provided with OM 621.**

Note: The stem of the Beru glow plug which comes out of the filament, is not conductive and thus is not susceptible to short circuits.