

Preheating Relay with Negative Lamp Output

TENU 1586 Preheating Relay controls 4 glow plugs and the indicator lamp on the dashboard in diesel vehicles.

The current drawn by glow plugs increases logarithmically and reaches extremely high values in low temperatures. The device includes a very powerful internal relay to switch such high currents.



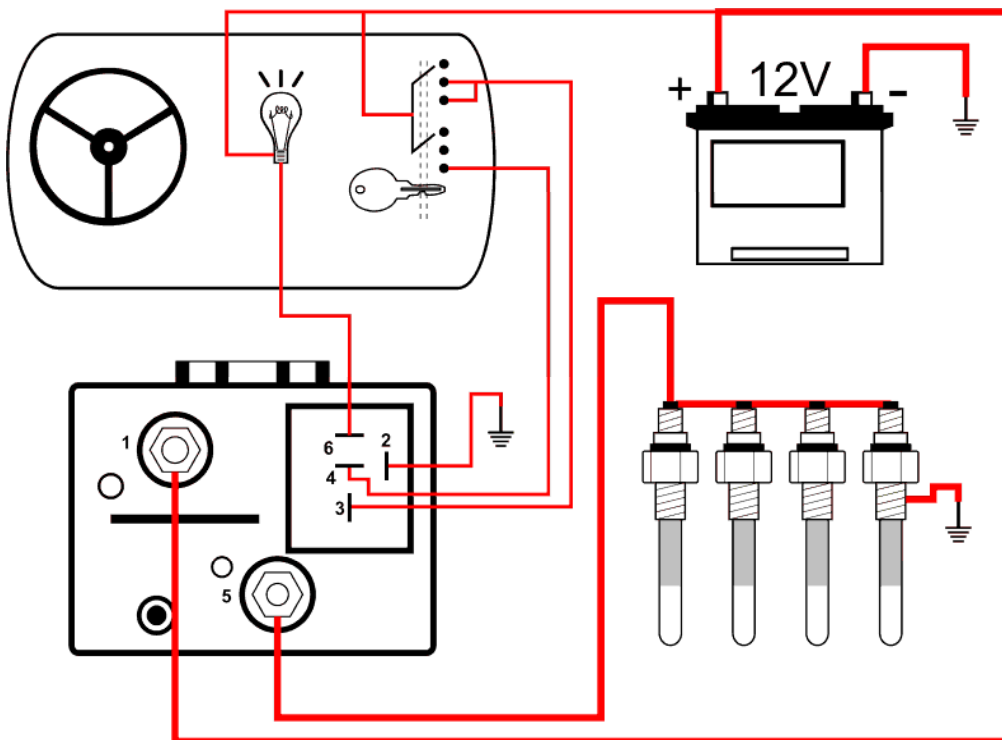
Operation

The device starts energizing glow plugs and indicator lamp with ignition switched on. If engine is started, the indicator lamp goes off and heating continues until engine start key is released. If the engine isn't started, indicator lamp stays on for 6 seconds and heating continues for another 4 seconds after the lamp goes off.

Features

- Powerful relay output, withstanding high glow plug currents in low temperatures
- Fault protected, *negative* indicator lamp output

Connection Diagram



Electrical Connections

1	Direct +12V from battery	M6 screw terminal
2	Chassis	0,80 x 6,40 mm male blade terminal
3	+12V from ignition switch	0,80 x 6,40 mm male blade terminal
4	+12V from engine start switch	0,80 x 6,40 mm male blade terminal
5	+12V relay output to glow plugs	M5 screw terminal
6	+12V output to indicator lamp	0,80 x 6,40 mm male blade terminal

Operation Conditions

	Minimum	Average	Maximum	Unit
Voltage	8,5	-	15	V
Glow plug current	-	-	200	A
Indicator lamp current	-	0,15	0,4	A
Temperature	-30	-	85	°C

Timing Values

	Minimum	Average	Maximum	Unit
Indicator lamp "ON" time (at 25°C)	5,4	6	6,6	Seconds
Heating after indicator lamp "OFF"	3,6	4	4,4	Seconds

Relay Endurance

All electromechanical relays have an internal resistance due to body material, contact material and contact size. Therefore a small voltage drop is observed on all relays connected to electrical load.

In relays carrying high currents, electrical arcs occur on the contacts in every make/break operation. These arcs wear out contacts over time, which increases the total internal resistance of the relay, thus increasing the voltage drop on the relay and causing heat which eventually leads to relay breakdown.

To obtain an idea about the contact life of a preheating relay, a wear out experiment can be implemented. The voltage drop between terminals 1 and 5 is measured on a new preheating relay while heating four glow plugs. Then the same device is operated minimum 10.000 times with a full battery and same glow plugs. The voltage between terminals 1 and 5 should not exceed 350 mV after the experiment. (PSA Technical Specification B25 2190)

	New	After experiment⁽²⁾	Unit
Voltage drop between terminals 1 and 5 with 4 glow plugs load at 50A ⁽¹⁾	90 ±5	102 ±5	mV

⁽¹⁾ At 25°C with 12V battery

⁽²⁾ A TENU Preheating Relay has been operated 12.796 times to energize 4 glow plugs with 200A peak current during wear out experiment in April-May 2005

Estimated Relay Life

	<i>Electrical (With glow plugs)</i>	<i>Mechanical (Without glow plugs)</i>	<i>Unit</i>
Minimum	30.000	100.000	Operations

Dimensions (mm)

