General

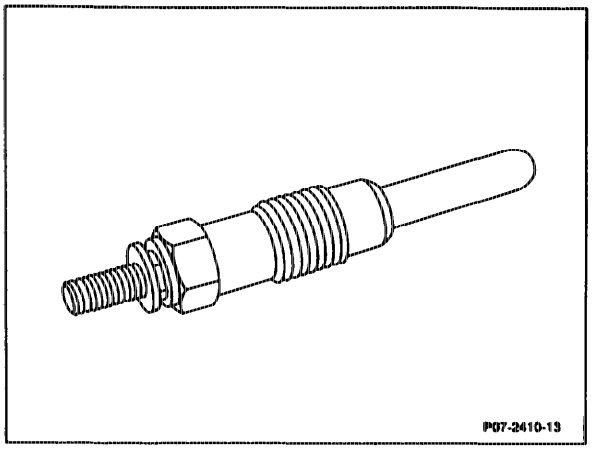
On a diesel engine, combustion occurs when the fuel is injected into the highly compressed and thus greatly heated combustion air and self-ignites.

When the engine is cold, the self-ignition temperature is not reached by compression alone. It is therefore necessary to provide a preglow system to raise the temperature of the compressed air, enabling the cold engine to start by igniting fuel particles on the glow plugs.

The duration of preglow depends on the ambient temperature.

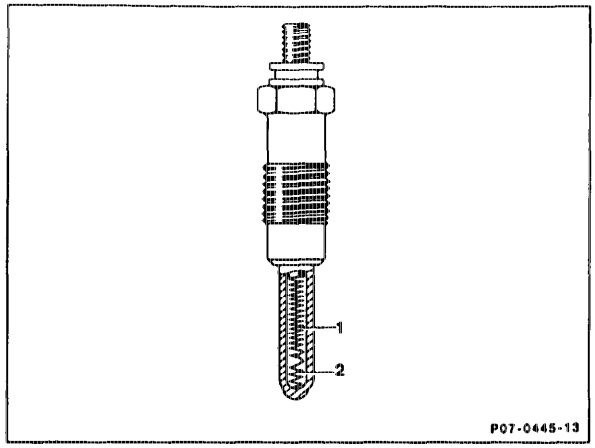
Design of the Quick-start Pencil-type Glow Plugs

The pencil-type glow plugs consist essentially of a housing with a M12 × 1.25 external thread and a heating element press-fitted into the housing.



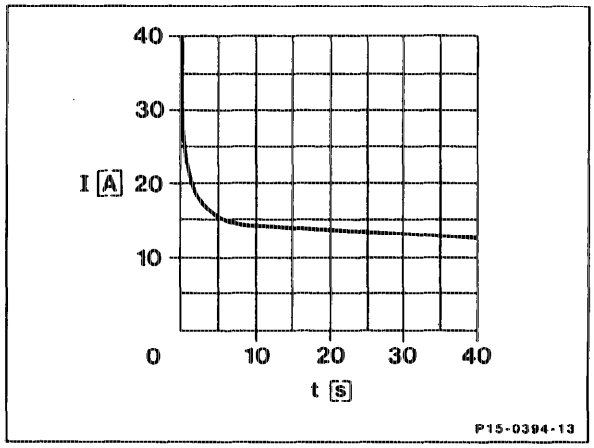
The single-pin connecting pin is screwed into the housing by a non-detachable brass round nut. The pencil-type glow plugs are designed for a voltage of 11.5 Volts and are connected in parallel.

The heating element consists of a series-connected heating and control winding.



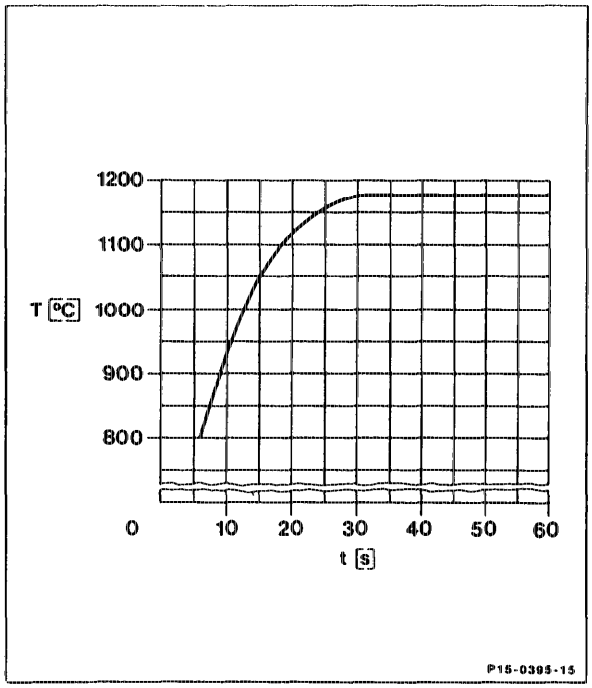
1 Control winding
2 Heating winding

When the glow system is switched on, a current of approx. 30 amperes flows to each glow plug. The heating winding heats the glow plug very rapidly. The control winding increases its resistance as the temperature rises and limits the current to approximately 8–15 amperes. The glow plug is thus protected against overload.

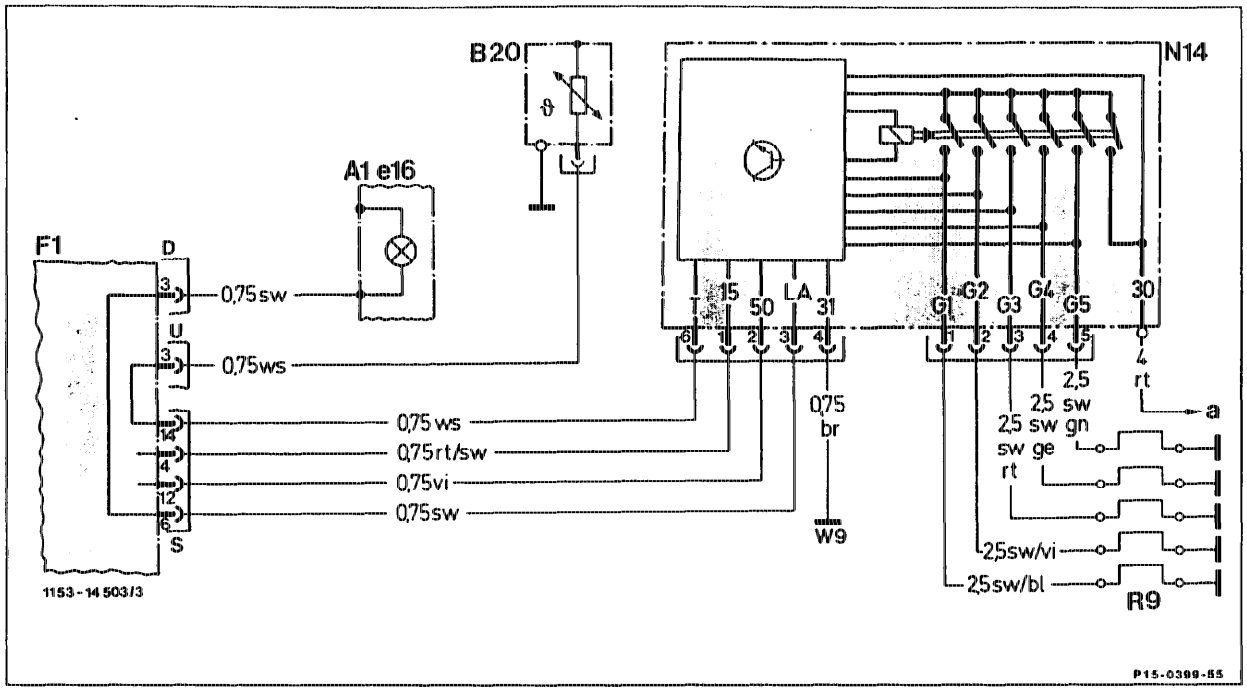


Current curve of quick-start pencil-type glow plug

After a glow period of 9 seconds, a heating element temperature of 900 °C is reached, the maximum temperature of 1180 °C being reached after 30 seconds.

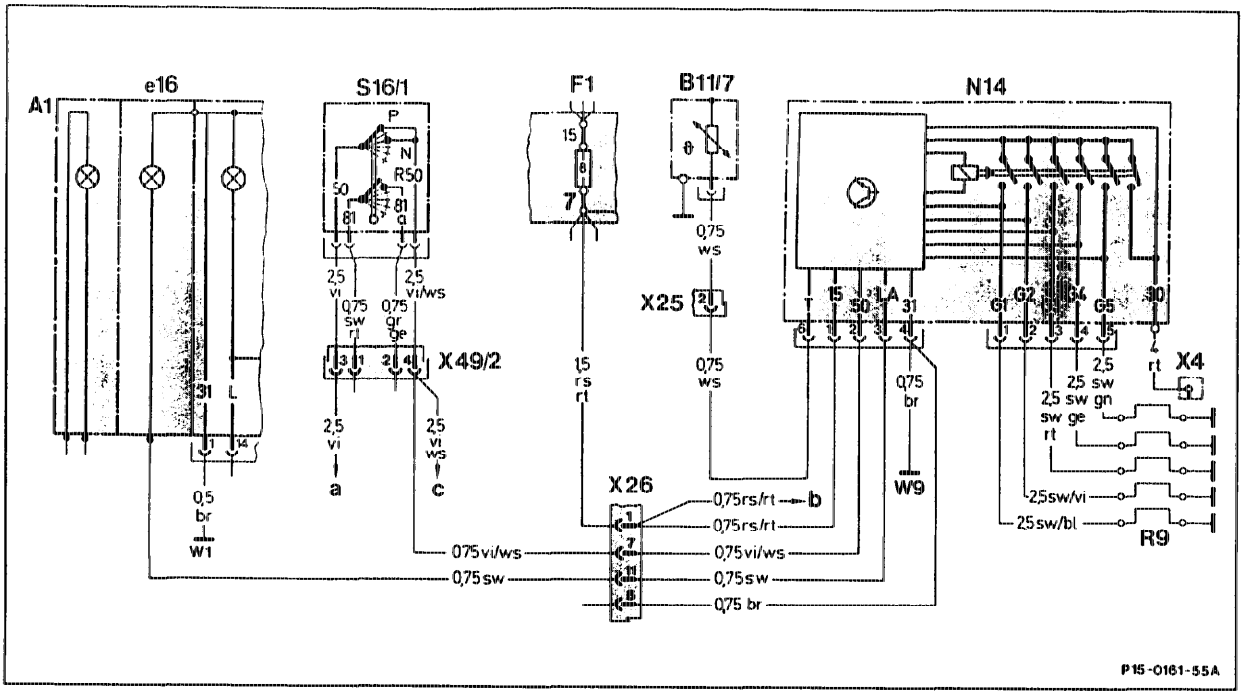


Temperature curve of quick-start pencil-type glow plug



Wiring Diagram Engine 602.961, Model 201.128

A1e16	Instrument cluster, preglow indicator	R9	Glow plugs
B20	Temperature sensor (preglow)	W9	Ground, front left (next to lamp unit)
F1	Electrical centre	a	X35 terminal block, terminal 30
N14	Preglow time relay		



Wiring Diagram Engine 602.962, Model 124.128

A1e16	Instrument cluster, preglow indicator	X4	Terminal block, terminal 30 (fuse and relay box)
B11/7	Temperature sensor (preglow)	X25	Plug connector, preglow wiring harness
F1	Fuse and relay box	X26	Plug connector, interior/engine 12-pin
N14	Preglow time relay	X49/2	Plug connector, starter lockout and reversing light switch
R9	Glow plugs		
S16/1	Starter lockout and reversing light switch (with automatic transmission only)	a	S2/2 glow start switch terminal 50
		b	K1 Relay, overvoltage protection contact 3 (with air-conditioning system only)
W1	Main ground (behind instrument cluster)		
W9	Ground, front left (next to lamp unit)	c	X27 plug connector, starter wiring harness contact 2

Table of assignment of preglow time relay – engine – model

Engine	Model	Control unit Part no.	Version of injection system/preglow system	Remarks
602.96	124	007 545 99 32	Oblique injection, precombustion chamber 5°/180°, 60 s afterglow up to max. 25 °C coolant temperature	as of 02/89 (USA) 1990
	201	008 545 01 32		
	124	001 545 98 32 002 545 06 32	Vertical injection without afterglow	up to 01/89
	201	003 545 10 32 003 545 60 32		
	201	006 545 22 32		Standard and (USA)
			Oblique injection, precombustion chamber 5°, 15 s afterglow up to max. 60 °C coolant temperature	
603.96	124	007 545 16 32	Oblique injection, precombustion chamber 5°/180°, 60 s afterglow up to max. 25 °C coolant temperature	as of 02/89
		005 545 45 32		up to 01/89
		006 545 91 32	Vertical injection without afterglow	(J) 1988 (CH) 1988
			Oblique injection, precombustion chamber 5°, 15 s afterglow up to max. 60 °C coolant temperature	
	124 126	005 545 45 32	Vertical injection without afterglow	(USA) 1986/87
	126	007 545 16 32		(USA) 1990
			Oblique injection, precombustion chamber 5°/180°, 15 s afterglow up to max. 60 °C coolant temperature	