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wallas 95D dieselcooker trouble shooting and service instructions

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IMPORTANT - The fuel tank/fuel level must always lie well below the cooker bottom. Page 1

TROUBLE SHOOTING AND SERVICE INSTRUCTIONS FOR WALLAS 95D DIESEL COOKER

IMPORTANT - THE FUEL TANK / FUEL LEVEL must always absolutely lie below the cooker bottom. If the fuel level can even temporarily rise above the cooker bottom, - for example in the fuel tank filling tube, the fuel level regulator 30022-21 must be installed or a separate fuel tank (wallas 5, 10 or 30l) must be used.

FAULT — **REASONS and service measures** — **See the function failure indication chart, page 7**

1 Does not start, does not ignite

1 - **Power off,** - the yellow signal lamp on heaters control board does not light. - Check the 12V supply battery condition, power cable connections and the fuses.

2 -**Low voltage,** - the yellow signal lamp on control board blinks, -the reason is that the battery is outcharged or that the **battery cables are too weak.** The battery cable lead cross area requirement is minimum 4 mm2 (AWG 10) up to 4 m cable length and + 1 mm per every extra meter of cable, = 6 m cable so requires 6 mm2 lead (AWG 8) and so on. The low voltage off-switching limit is 10,8 V, but during the 270 sec start phase the start the off-switching is blocked ,-the start can go on.

3 - **Glow plug primer break.** The heater does not take the high start current, 20>8A under first 270 secs. = 4 1/2 min. . By exchange of the glow plug the glow cable contact nut shall not be driven too hard (max.5Nm torque mom) without contraholding the base disc under the contact with suitable pliers (jaw max5mm thick) **The right glow plug type is BOSCH 0 250 202 006 / 11 V**

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4 - **No fuel,** - check the fuel tank and fuel line connections to heater.

5 - **Fuel filter head** in the fuel tank is dirty and clogged. Exchange to new filter or clean the old.

6 -**The fuel line or its connections** between the cookers fuel pump and fuel tank leak so fuel pump is sucting air,- air bubles can be seen in fuel suction line. Exchange new fuel line/new connectors.

7 -**The fuel pump does not pump** and pulse. The reason can be that the pump piston or the valve plates are blocked. As first measure hit the pump in axial direction with a suitable tool. This can release the blocking. If not,excange the pump. The replacement shall have the nearly the same pulse time value (+/- 0,03 sec) as marked on the original pump (If for ex. 1,4 sec., = 1,37 - 1,43 s.) alternatively the pump pulse rate must adjusted to the value marked on the new pump. Adjustment is made by trimmer R13 - see page 4.

8 -**The fuel feeding needle** to burner is clogged and blocked.

Fuel feeding check.

The cooker shall be switched on abt 10 minutes before the check.
Lift the fuel suction line with suction filter head from the fuel and let it suct air a short time untill you can see air bubles in the fuel line. The air bubles should rise forward with sharp abt. 20 mm steps. If so, the fuel feeding and pump function is OK.

A - If the air bubles pulse step is clearly shorter or if the bubles glides backward between the forward steps, the pump is faulty (probably valve fault) and must excanged or repaired.

B - If the air bubles forward step is slow and shortened and not sharp and distinct, the fault is probably a dirty and blocked suction filter head in the fuel tank or a blocked fuel feeding needle in the burner.
The suction filter or the fuel feeding needle in the burner must then be exchanged.

Average fuel pump pulse rates. The pump pulse rate is in direct relation with fuel feeding.

The pump pulse rate is factory adjusted to correspond a **fuel feeding of 180-185 ml/h** with abt 60 - 80 cm fuel suction height. The respective, individual, max. effect pulse interval time is marked on the pump label.
The average values are:

		By maximum effect	by minimum effect	All values
Cooker type 95D	abt	1,4 s = 43 puls/min	2,9 s = 21 puls/min	with 10% tolerance.

Instructions for fuel feedig control and adjustment on page 4

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2. **Start is interrupted**

Red controllamp on the cookers control board and the green LED light on the PCB should light up in abt 90 - 180 s (1,5 - 3 min.) from the start. If they do not light by 270s (4,5 min) - the start is interrupted, the red control lamp starts to blink and the heater goes on 10 min aftercooling, whereafter the lamp goes out and the heater can be restarted again.
The **reason** can be some of the faults **2-3-4-5-6-7 or 8** on the first page.

8 - **Reason: The combustion temperature sensor (T4)** does not give high enough combustion temperature signal to proceed the start or the **signal level** requirement is **adjusted too high** with trimmer R65 (see the attached circuit diagrams) **This fault is indicated by** that the green T4 LED light on the circuit board will not light within 1 - 4,5 minutes from switching on the heater.

This fault is often **cleared by restart** of the cooker. **If not,-** a correction is to be made by readjustment of the T4 signal level by turning the T4 trimmer R65 slowly anti-clockvise back untill the green T4 LED lights abt. 1 1/2 - 2 1/2 min from switching on the cooker

Check also that the **T4** temperature sensor is properly connected to the screw terminal X8 **with right polarity** as marked on the leads and the board.

3. After-cooling does not stopp in time (abt.12-15 min)

Reason 1: **3.1 T4 temp.sensor signal level** is adjusted too low. Check that the green T4 LED on the PCB does not light up before 1 1/2 min from start and below 4 mV signal level, measured at poles 1 - 2 on screw terminal X8.

Measure: Adjust to light up at 4 mV with trimmer R65 on the PCB.

Reason 2: **3.2 T4 temp.sensor makes contact** with burner case or the sensors **ceramic insulator leaks.**

Measure: Disconnect the T4 leads (cold cooker) from X8 terminal and measure with an Ohm-meter that there is no contact betveen the T4 and cooker body.

General instruction in this case is that both the T4 temperature sensor and the PCB (circuit board) are to be excanged , - the circuit board to the new version marked 95DX-2, which is unsensitive to the T4 ground leak.

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4. Decreased cooking effect.

Reason 1: **1.5** Dirty and blocked fuel **suction filter** in the fuel tank.
1.7 Defect **fuel pump**
1.8 Clogged and blocked burner **fuel feeding needle**

Measure: See page 1 ; Fuel feeding check.

Reason 2: **2.1** The fuel feeding **pump pulse rate** is adjusted too low. Check pump pulse rate and measure the real fuel feeding rate with 50 , 100 or 200 ml measuring glass. See page 4.

Measure: Adjusted the real fuel feeding to 180 - 185 ml/h.

Reason 3: **3.1** The **burner is carbonized.**
In this case the burner trends to produce smoke.
Check with soot test pump and C02 analyzer.

Measure: The carbonized burner must be decarbonized and cleaned.

The decarbonization proceeding is following:

1. Detach the fuel feeding needle, glow plug and T4 temp. sensor from burner house.
2. Dismount the burner house bottom lock and detach the burner
3. The radiator cupole inside the burner cylinder is detached by pressing in the small spring blades locking the lower cupole ring.
4. The burner cylinder is now decarbonized and cleaned so that all small air hole edges are quite free of deposits. The bottom matt is detached and has the excanged to new one.
5. Remounting and assembly in reverse order.

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4. The heating goes out — **The most probable reasons are:** — 4

1	Fault 1.2	**Low voltage**	Page 1
2	1.4	**No fuel**	1
4	4.12	**Overheating**	

The T3 overheating cut-out switch has reacted and switched off the fuel pump and combustion. The cut-out switch resets itself automatically after the cooker is cooled.

The reason for overheating;

- Too long use on max. effect without cooling cooking blower lid on
- The cooker is mounted so that there is no cooling ventilation of the cooker (95DU: through a 10 mm ventilation outlet slot behind the cookeer and min. 30-40 cm2 intake openings at front below the cooker) as described in the installation instructions.
- The fuel feeding rate is adjusted too high, over 200 ml/h
- The fuel level in fuel tank is too high.

The reason for overheating must be cleared out before re-start of the heater.

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5 FUEL CONSUMPTION and control and adjustment of fuel feeding.

General: The amount of injected fuel and the heating effect is directly proportional to the fuel pump pulse rate, the faster the pulse rate, the higher the heating effect. If the pulse interval time is shortened with 10% and pulse rate so increased with 11% , the fuel feeding and heating effect is also rised with 11%. See page 1.

The fuel pump pulse rate is pre-adjusted at the final 2 hours burning and heating test in the factory. The fuel feeding rate is adjusted with 0,7 fuel suction height and the adjusted pump pulse rate on max. effect is markedon the fuel pump. **By fuel pump exchange the fuel pulse rate must re-adjusted to the max. rate value (x) marked on the label on the new fuel pump.**

The influence and effect of suction depth. The suction depth increase has a certain effect on the fuel feeding. By 0,2 - 1 m suction deptht (level difference between maximum fuel level and heater foot plate) no compensation adjustment is necessary. With greater suction deptht a compensation adjustment is recommended. If the suction deptht exeeds 1 m an 5% increase in pulse rate is recommended.

by 1,5 m 7% "
by 2 m 10% "

Check and measurement of fuel consumption.

The fuel consumption can be measured by letting the cooker suct fuel from a measuring glass (100 or 200 ml) in for ex 10 min time (multiply 10 min consumption by 6 x for l/h value) or longer time from larger measuring glass. Observe that by check of the ml-start level / measure level the suction tube must be out from the measuring glass.

The measurement must be made by the same suction height as the actual installation and not before 15 min from the start -cooker effect setting on max. effect.

Adjustment of fuel feeding.

The fuel feeding and pump pulse rate can be adjusted with the trimmer R13 on left low corner of the circuit board. For adjustment the time is taken for example for 10 pulse intervals (first pulse zero, second 1, - - - -10) If a 10% reduction in fuel feeding is wanted, - the time for 10 pulses is extended with 10%,
- if an increase in feeding is wanted, the time is proportionally shortened.
The adjustment shall not be done before 15 min from the start.

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6. FUEL QUALITY requirements and fuel quality effect.

A Only good quality light Diesel oil shall be used.

The required quality main specifications are following:

1. Destillation, 95 % evaporated		300°C	max. 350°C
2. Density		0,800 - 0,830	
3. Carbon residue on 10% distillation residue	wt-%	≤ 0,10	max 0,15
6. Aromatics	vol-%	< 20	

With this quality with 95%/300°C destillation value a clean combustion time on 3000 hours or more can be expected without need of decarbonization of the burner.
When the destillation temp. value increases to 95%/350°C the expected time for clean burning can be reduced with 50%.

SPECIAL RECOMMENDATIONS WHEN A OWN SEPARATE FUEL TANKIS USED:

B As a preventive measure against carbonization of the burner and for cleaning of burner and fuel system it is recommended that about 10 litres illumination Paraffine (Kerosene) is burned after every 100 - 200 liter Diesel oil burning.

C To prevent function failures and damages by water condensation in fuel it is recommended to mix 1 - 3 % de-iceing carburettor alchol in the fuel tank, every 1 - 6 months, depending on climate conditions.
This carburettor alcohol shall be of Isopropyl / Isopropanol based quality to mix and solve water effectively.

NOTES

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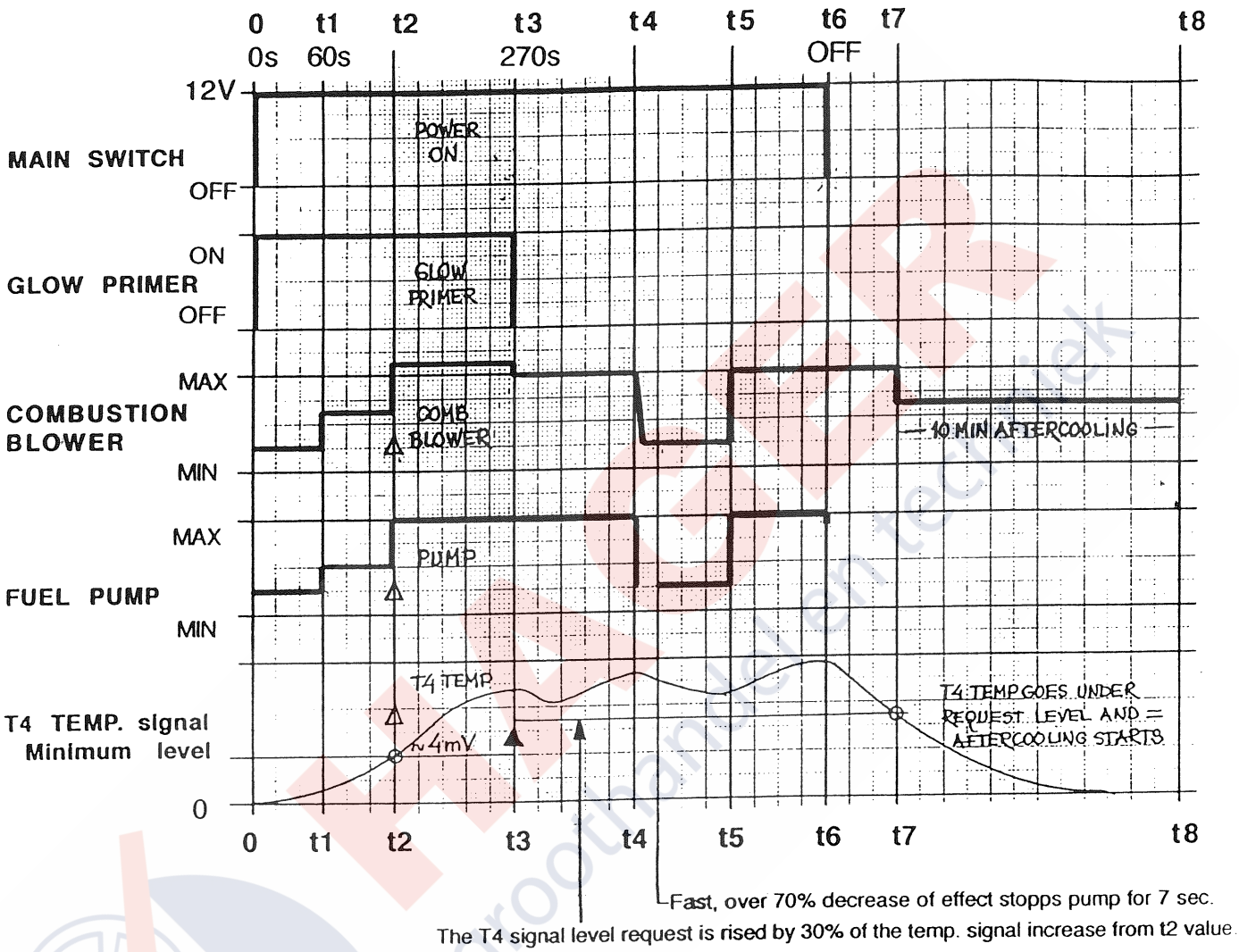
wallas 95D diesel cooker
START AND FUNCTION DIAGRAM & SPECIFICATIONS



FUNCTIONS 0 = START. Glow primer is switched ON, combustion blower and fuel pump starts with reduced effect.

t1 Fixed time abt 60 s. Combustion blower and fuel pump speeds are increased.

t2 When T4 signal has reached adjusted (R65) reaction level, the green LED on PCB and the red on control box lights and the combustion blower goes on 110% and pump on 100% effect. This shall occur by 90 - 180 secs., 1,5 - 3 minutes. If not by 270 s, the red LED on control box starts to blink and the heater goes on aftercooling.

t3 Glow primer is switched off by fixed time 270 s and combustion blower and fuel pump goes on to manually selected effect. The T4 signal level request is increased by 30% of the temp.rise from t2

t4 Effect is suddenly decreased over 70% = the pump then stopps for 7 secs to avoid noise disturbanc

t5 Effect is increased to 100 %.

t6 Cooker is switched OFF. Fuel pump stopps immediately. Combustion blower goes on selected effect,- untill the T4 temp. signal has gone under the request level t7.

t7 The blower then goes on 10 minutes fixed time aftercooling with reduced speed and the red lamp on control box blinks untill

t8 10 min is passed and the blower is switced off. Re-start is not possible before this.

SPECIFICATIONS

Average values		**Max effect**	**Min effect**
	Fuel consumption	180 - 185 ml/h	95 - 100 ml/h
	Fuel pump pulse interval	1,4 - 1,36 s	2,7- 2,8 s (not critical)
	Combustion blover voltage	8,4V ±5%	5,7 V ± 5%
	Co2	6 - 7 %	4 - 5 %

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95D DIESEL COOKER - WIRING DIAGRAM 95DX/2