

Document Title: Service	Function Group: 170	Information Type: Service Information	Date: 11/24/2020
Profile: L350H Volvo			

Service

Showing Selected Profile

Valid for serial numbers			
Model	Production site	Serial number start	Serial number stop
L350H Volvo			

For the machine to operate safely and at the lowest possible cost, it must receive thorough and complete maintenance. Intervals for maintenance and lubrication refer to normal operating and environmental conditions. Maintenance work is described in the Operator's Manual and the manual "Service and maintenance" as well as the Service Programme.

Service Programme

The checking boxes in the Service Programme show what type of service should be done for intervals from every 10 hours up to and incl. 4000 hours. The service intervals from and incl. 4500 hours only contain the additional service points that are to be done at each interval.

The additional service points that are to be done at the first 100 hours and 1000 hours are presented in the same way.

Time Guide

The Time Guide for service intervals for every 10 hours up to and incl. 4000 hours shows time for the total service. Intervals from and incl. 4500 hours only show time for the additional service points.

Example, 4500 hour interval:

Do all maintenance according to the standard interval every 500 hours and also do the extra interval 4500 hours.

Follow the same example at the first 100 and first 1000 hours.

Document Title: AdBlue®/DEF pump unit diagnostics, description	Function Group: 254	Information Type: Service Information	Date: 11/24/2020
Profile: L350H Volvo			

AdBlue®/DEF pump unit diagnostics, description

Showing Selected Profile

Valid for option/configuration			
Model	Option no.	Option	Configuration
L350H Volvo	86933	Engine	D16J EU Stage IV
L350H Volvo	86934	Engine	D16J US Tier 4 final
L350H Volvo	87719	Engine	D16J US Tier 4 final
L350H Volvo	87739	Engine	D16J EU Stage V

Valid for serial numbers			
Model	Production site	Serial number start	Serial number stop
L350H Volvo	Arvika	1001	1094
L350H Volvo	Arvika	1095	1300
L350H Volvo	Arvika	1301	3000

Introduction

This description has the purpose to deeper explain the diagnose and defrosting of the AdBlue®/DEF pump unit and shall only be used as a complement to the other descriptions related.

For more information, see:

- [Exhaust Aftertreatment System, description](#)

State diagram of the dosing control system

This shows the basic states of the dosing control system.

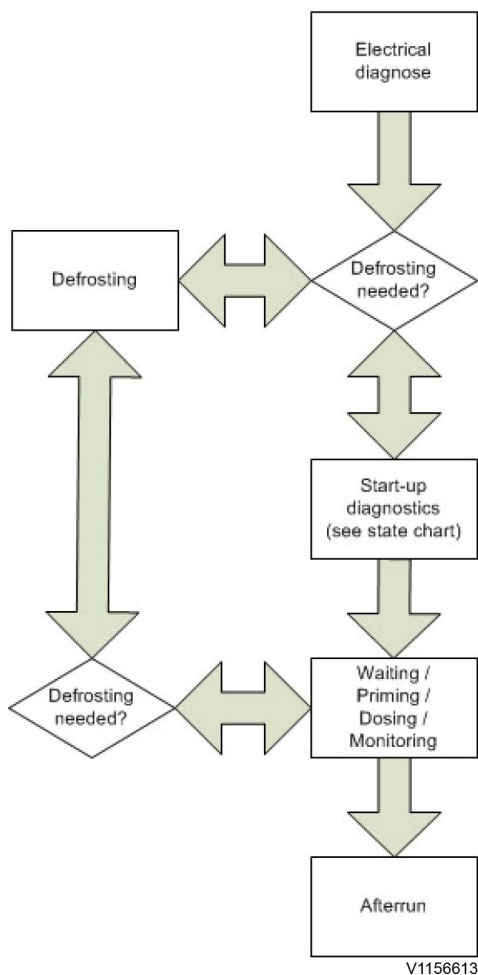


Figure 1

Simplified state chart of the dosing control system

Defrosting

Defrosting will start the electrical heaters and open the coolant valve. In order to run defrosting, the engine needs to run. As long as the system is in the defrosting state, no priming, dosing or start-up diagnostics will run.

One of these conditions needs to be true to start defrosting (AdBlue®/DEF is considered frozen):

- Ambient temperature below -7°C (19°F)
- AdBlue®/DEF pump temperature below -4°C (25°F)
- AdBlue®/DEF tank temperature below -9.5°C (15°F)

Defrosting can be activated several times if there are problems with getting enough AdBlue®/DEF pressure during priming.

Defrosting is aborted if both these conditions below are met (AdBlue®/DEF not considered frozen) or the time has elapsed, but periodic or continuous heating will still continue to avoid freezing of the system:

- AdBlue®/DEF pump temperature above 15°C (59°F)
- AdBlue®/DEF tank temperature above -5°C (23°F)

or

- Max. 40 minutes elapsed time after defrost is activated
- Max. 5 minutes elapsed time, following times defrosting is activated (max. five times).

Start-up diagnostics

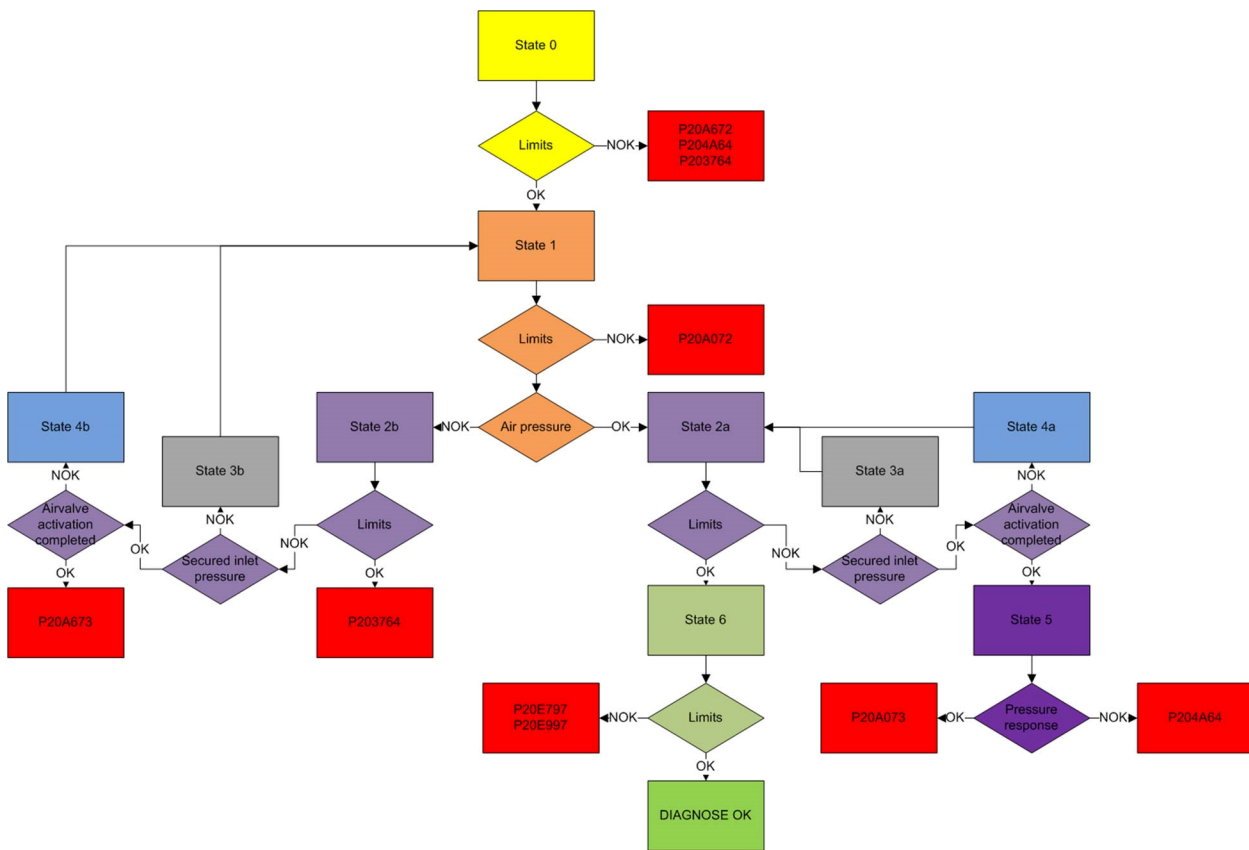
The start-up diagnostics is performed according to the schematic picture below.

To prevent any misdetection that may be caused by a too cold AdBlue®/DEF system, the exhaust gas temperature before the DPF needs to be above 200 °C (392 °F) to initiate the start-up diagnostics.

If an error is encountered that may be possible to cure, the system will perform a restart attempt after waiting a while. Before next try, all actuators will be fully activated in order to condition the system and cure any possible error.

NOTE!

Updates has been made in the software to improve the diagnostic function and the following values and functions correspond only fully to the latest software.



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Figure 2

Simplified state chart of the start-up diagnostics

State 0

First both the AdBlue®/DEF pressure and AdBlue®/DEF pump unit air pressure is checked for reliability without activating anything. The expected pressure on both sensors is close to zero, or an error code is set.

If both pressure sensors read a high value, it sets [P20A672](#).

If only the AdBlue®/DEF pressure is high, it sets [P204A64](#).

If only the AdBlue®/DEF pump unit air pressure is high, it sets [P203764](#).

State 1

This state serves to check the non-return valve for leakage. The AdBlue®/DEF pump unit air valve is activated with a 35% PWM duty cycle which should increase the air pressure, but not open the non-return valve which opens at around 200 kPa (29 psi). If the AdBlue®/DEF pressure increases as well, the non-return valve is suspected to be opened, or leaking and sets [P20A072](#). If the AdBlue®/DEF pump air pressure is too low, further tests are needed in order to draw a conclusion (state 2b will be entered).


If no error encounters, the sequence continues with state 2a.


State 2

The AdBlue®/DEF pump unit air valve is activated with a 100% PWM duty cycle which should set the air pressure around 300 kPa (44 psi) and open the non-return valve with an expected pressure increase at the AdBlue®/DEF pressure sensor.

State 2a: If the air pressure was ok in state 1, and the pressure at the AdBlue®/DEF pressure sensor still is low, first the sequence wait for air pressure (state 3a) is entered, and if the pressure still is low, a conditioning of the air valve is performed (state 4a). Then the theory is that it could either be a fault on the AdBlue®/DEF pressure sensor, or that the non-return valve is remained closed. To draw that conclusion, a priming test is performed (state 5).

If no error encounters from 2a, the sequence continues with state 6.

State 2b: If there was a previous fault on the air side in state 1 and the AdBlue®/DEF pressure is ok at this state, an error code is set  [P203764](#).

If the sequence wait for air pressure (state 3b) was entered, but the pressure still is low, a conditioning of the air valve is performed (state 4b). If the pressure at the AdBlue®/DEF pressure sensor still is low, state 2b, an error code is set  [P20A673](#).

State 3


This is the wait for air pressure state. It is 3 minutes. Depending on 3a or 3b it then returns to state 2a or 1.

State 4

This is a state for conditioning the AdBlue®/DEF pump unit air valve with 100% PWM duty cycle for one second. This state can be performed max. twice each sequence. Depending on 4a or 4b it then returns to state 2a or 1.

State 5


This state is reached from state 2a, if the AdBlue®/DEF pressure value is still low. It activates the AdBlue®/DEF pump in order to check the AdBlue®/DEF pressure response, in case the pressure sensor is faulty or the non-return valve remains closed. The state performs max. 5 times priming trials of each 10 seconds of pump activation.


Sets  [P20A073](#) if there is a pressure response from the AdBlue®/DEF pressure sensor.

Sets  [P204A64](#) if there is not a pressure response from the AdBlue®/DEF pressure sensor.

State 6

This state is reached to check clogging of the air hose and the AdBlue®/DEF hose from the AdBlue®/DEF pump unit including the nozzle. The AdBlue®/DEF pump unit air valve is activated with a 100% PWM duty cycle and then shut off. At first the pressure must increase to a high level and then drop fast as the valve is shut off. If this is not met, the cycle repeats every 60 seconds (up to 15 minutes, or 20 minutes if defrosting has been performed earlier). If the conditions are met, the start-up diagnoses of the AdBlue®/DEF pump unit has completed without error.


Sets  [P20E997](#) if there is a fault on the AdBlue®/DEF side.

Sets  [P20E797](#) if there is a fault on the air side.

Priming

The AdBlue®/DEF pump is started in order to fill the AdBlue®/DEF suction line and prepare the system for dosing after the AdBlue®/DEF pump unit has been verified ok in the start-up diagnose and when dosing is demanded. During priming the AdBlue®/DEF pump unit air valve is closed. Priming waits for a pressure peak when activating the AdBlue®/DEF pump in 10 second intervals (one second wait in between) for max. 6 minutes, or max. 4 times of 3 minutes if defrosting has been performed earlier. Defrosting is run in between the periods in order to thaw the AdBlue®/DEF.


Priming can also again be triggered if there is an AdBlue®/DEF pressure decrease, for example due to a clogged suction filter. The accumulated time spent in priming is counted and if the counter reaches 200 seconds it sets an error code. The counter slowly decreases if the AdBlue®/DEF pressure is again ok.


Sets  [P218F92](#) when the timers has elapsed if no pressure response is detected during priming.

Sets also  [P20B992](#) if defrosting has been active.

Pressure monitoring during dosing

The AdBlue®/DEF pump unit air valve duty cycle is monitored for detecting clogging or leakage in the hoses and pump unit. If there is a clogging, the duty cycle control decrease the duty cycle since the air pressure increases and if there is a leak, the duty cycle increases in order to increase the air pressure.

Sets  [P20CA00](#) if there is a suspected leakage on the air side.

Sets  [P20E797](#) if there is a suspected clogging on the air side.

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