

Volvo Enthusiasts eXposing Egregious Design



Volvo Car Components Corporation <small>Volvo Cars AB, Regeneralsgatan, S-413 45, Göteborg, Sweden</small>		Document title/number of document Action Plan		Edition/Stage 1 (5)
96556, R. Axelsson, 765 07 97, HA2S		Date/Issue 00-03-22	Effect/Approach Plan/Action	Requesting No. Act00w12
Issue/Subject Quality item 121150				
<small>Initiator (and its name, tel. no./fax no./e-mail address)</small>				

Targets

To reduce the amount of changed ETM's (Electronic Throttle Module), both in Field and in the production (car plants).

Short description of on going/planned actions

Action	Time Follow up by
Changed design of the potentiometer contact tip (Tip Down Brush).	00w-27 R Axelsson
Service instruction concerning cleaning "dirty throttles".	QAC/Service
Throttle test equipment to TMA. First step is TMA in North America, later on maybe TMA world wide.	June 2000 Service (Marcell)
Log information in the car plants, in order to achieve more knowledge about fault conditions and other parameters that effect the fault code settings.	00w12-16 R Axelsson
To start a project with Sigma systems in order to examine VADIS and the throttle SW (calibration and fault conditions)	00w14 H Andersson

Problem areas

Start of Production 1998 week 20

0 km, faulty throttles in the car plants

Since SOP 98w20 we have had problems with faulty throttles in the car plants. There has been an increase of faulty throttles from the car plants the last 3 to 4 months.

Between 99w01 and 99w46 there was about 6 faulty throttles in average/week.

Between 99w47 and 00w10 there was about 9 faulty throttles in average/week.

Faulty throttles on the Field

Quite many throttles have been changed on the Field since SOP 98w20.

Until 00w10 there has been 4696 changed throttles in MY99.

Until 00w10 there has been 561 changed throttles in MY00.

The failure rates for MY99 and MY00 has decreased since SOP.

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<small>US-Adresse (Str. nr., adress, stn., geografisk placering, sigl/Postnr (dept, name, phone, sign)</small> 96556, R Axelsson, 765 07 97, HA2S	<small>Release Date</small> 00-03-22	<small>Bi-lagsskyltar/Bl</small>	<small>Flik/Sheet</small>	<small>Reg nr/Reg No</small> Act00w12
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<small>Mottagare (and nr., adress, geografisk placering)/Receiver (dept, name)</small>				

Actions/activities in order to decrease the amount of faulty throttles

Changed HW

Du to problems with instabil potentiometer signals, there is a change of the potentiometer contact tip, planned to 00w~27.

The present design of the contact tip (four finger rake) has a tendency to oscillate at high engine rpm's. This oscillations created an increased contact resistance and it often ends up in a fault, DTC 91A7.

The new design of the contact tip (Tip Down Brush) has shown good improvements in all aspects.

The planning is to introduce the TDB-potentiometers in Volvo production 00w~27.

The first step to solve the problem with "91A7" was taken 99w38 by releasing the SW "TPS3".

This SW cover most of the problems related to increased contact resistance. The real root cause, as explained above, is the design of the contact tip. By changing this design we get stabil potentiometer signals and a more robust control of the throttle.

Target

To reduce the amount of exchanged throttles due to instabil potentiometer signals.

"Dirty throttles"

We have found corrolations between oil/soot deposite in the evolutive profile zone area/throttle plate and instabil idle.

At the first moment we thought that we could expect the problems to occur first after 100 000 km's driving.

We have later realized that the problems with unstable idle due to "dirty throttles" could occur already after 10 000 km.

Oil-, gasoline quality and driving conditions seems to have greate impact on the degree of deposite.

We do not know the frequence of this problems at the field, but we have had some indications that is could be a quite serious problem.

We know that it is possible to solve the problem by cleaning the evolutive profile zone area/throttle plate.

QAC and Service have to define if it is possible to have a service instruction in this matter due to law regulations of ERC componenets.

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The Engine department has defined the problem with oil/soot deposits in the evolutive profile zone area/throttle plate and found a solution; Cleaning the throttle!
The Engine department will not take any further actions in this matter.

Target

To reduce the amount of exchanged throttles due to instabil idle caused by oil/soot deposite in the evolutive profile zone area/throttle plate.

Throttle test equipment to TMA In North America

Magneti Marelli's resident engineer in Göteborg, Pierluigi Poggi has constructed a compact "throttle tester".

The idea is to teach the engineers at TMA in North America, to test all "faulty" throttles that have been exchanged by dealers in USA.

Many of the "faulty" throttles that have been analysed by Marelli in Bologna, are classified as No Trouble Found.

We have indications that over 50%, maybe 70% of the returned "faulty" throttles are classified as No Trouble Found by Marelli!

It is not easy to give precise figures of the share NTF, but we have good reasons to suspect that many throttles are exchanged due to incorrect analysis by dealers.

Mr Poggi and Mr Ravaglia from Marelli will go to VNA 00w14, to introduce the "throttle tester". During the first visit they will analyse all the "faulty" throttles that has been piled up since last summer. They will also inform them selves about the handling of faulty throttles at the TMA and to speak to the engineers in matter to prepare for the writing of the throttle tester manual.

During Marelli's second visit at TMA VNA, that is planned to June 2000, they will educate the engineers to use the tester.

If the tester workes well and if VNA achieve good results, Service has planned to provide all TMA world wide with throttle testers.

Target

To reduce the amount of exchanged throttles due to an incorrect failure analysis by dealers.

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0 km, car plants

From the car plants do we also have quite many exchanged throttles that after analysis often ends up in No Trouble Found.

The "key" to move forward in the matter of reduce the amount of exchanged throttles, seems to be a better understanding of the fault conditions. It seems also important to get more knowledge about when and where the faults occurs in the production/car plants.

There is an action already started i the car plants to log the freeze frames when a throttle fault has occurred.

There will also be possibilities to log information stored in the throttle internal memory, 00w14-16.

We have also planned to use Flight recorders in purpose to record the behaviours during permanent throttle fault codes.

This activity is probably not possible to start before 00w16, due to lack of resources.

In addition to the above both Marelli and Volvo is working with fault tree analysis of the most frequent fault codes.

Target

To reduce the amount of exchanged throttles by investigating the fault conditions/fault causes and the correlation with the "environment" in the car plants.

VADIS, critical examination of the calibration of the throttle SW and fault conditions

Håkan Andersson 96555 is a consultant from Sigma Systems. Håkan has since 98w40 worked with the throttle SW.

His responsibilities have been node testing and "throttle problem analysis".

Håkan has also since late autumn 1999 looked into the VADIS, in purpose to examine the service instructions for throttle problems/DTC's.

Håkan has presented an idea to let Sigma Systems, by management of him self, start a project including analysis of VADIS, analysis of the ETM SW calibration and ETM SW fault conditions.

The planned project will start with a pilot study, in purpose to define targets and cost.

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The presentation of the project will be done by Håkan and Sigma systems on Wednesday 00w14.

Target

To reduce the amount of exchanged throttles by examine and modify the information in VADIS concerning throttle problems.

To optimize the throttle SW calibration and fault condities in purpose to reduce the amount of exchanged throttles.

Summary

We have been struggling with the throttle problems since SOP 98w20. We have noticed improvements in quality of the component, but we are still far from the quality targets.

The intention in the actions described above is trying to do "new things", to do things that gives us more/new information and knowledge.

By using the experinces and skillfulness among people that have worked with the throttle, we will have the best possibilities to achieve further improvements.

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