


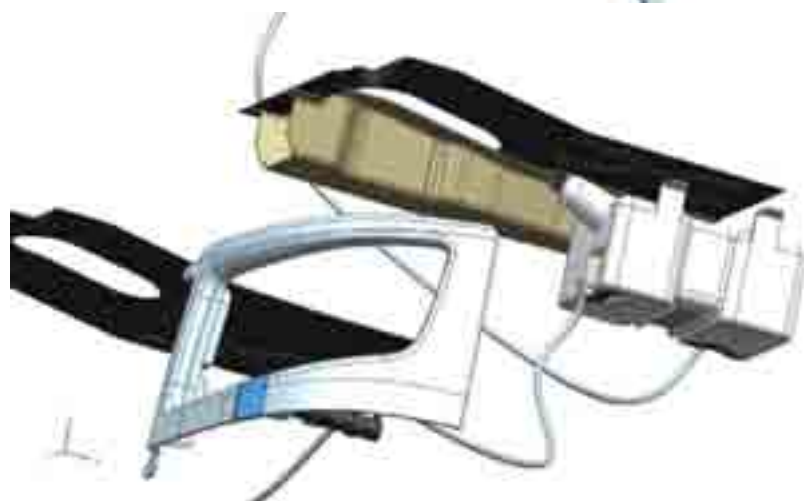
KAMAZ 前照灯清洗器及风窗玻璃洗涤器的技术描述

The technology description of headlamp washing nozzle system and windscreen syringe for KAMAZ

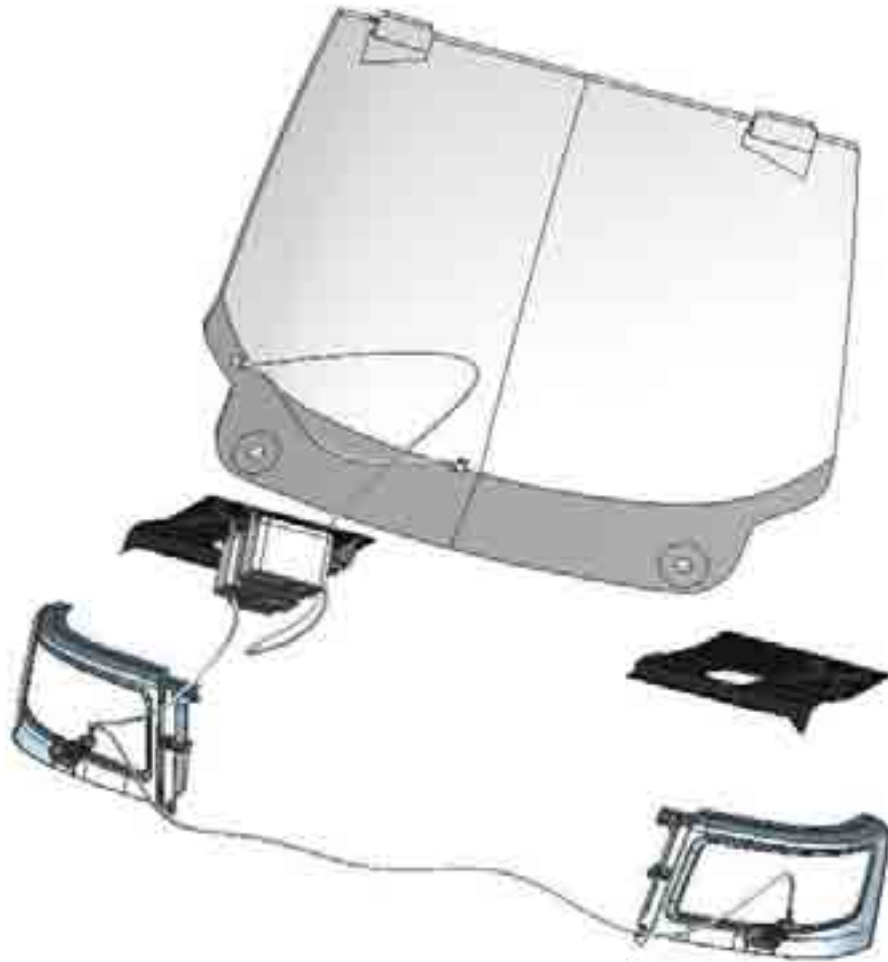
此款前照灯清洗器及风窗玻璃洗涤器是由盖特  工贸有限公司根据 KAMAZ 汽车机构特点设计与制造, 利用高压清洗液除尘原理对前照灯及风窗玻璃进行自动地清洗, 避免了汽车在夜晚或光线较暗的行驶过程中, 雨水和尘埃对前照灯照明度及风窗玻璃透明度的影响。并符合 GB21260-2007 《汽车用前照灯清洗器》及 GB 15085-1994 《汽车风窗玻璃刮水器、洗涤器的性能要求及试验方法》的相关规定。

This headlamp washing nozzle system and syringe of windscreen are designed and manufactured by GAT Industry Co.,ltd. according to the characteristics of KAMAZ automobile bodies, washing and dusting the headlamp and windscreen automatically in accordance with the principle of high pressure cleaning lotion, to avoid the influence to intensity of illumination of headlamp and diaphaneity of windscreen from the rain water and dust during the process of running at night and low light. And accord with the relevant provisions of GB21260-2007 《Motor Headlamp Cleaner》 and GB 15085-1994 《Motor vehicles--Windshield wipers and washer systems--Performance requirements and test methods》.

满 意 创 造 价 值



满



前照灯清洗器 *headlamp washing nozzle system*

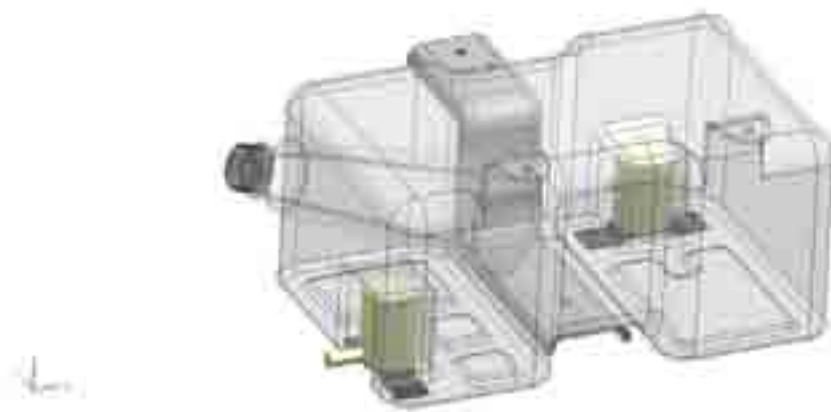
一、本款高压清洗系统清洗效果主要取决于喷嘴与配光镜之间的距离、喷水的水滴大小、接触角落、喷水速度以及喷水量。汽车前大灯清洗器的典型部件如下：The cleanout effect of this high pressure-washing nozzle system is mainly lied on: the distance between nozzle and lens,the bulk of spewed drip,corner contacted,speed and volume of spewed water.The key parts of the headlamp washing nozzle system as follows:



1、水箱（清洗液箱）Water Tank (cleaning lotion tank)

本款设计中为减少零部件及空间，前照灯清洗液与前玻璃清洗系统共用一个水箱。但是为了保证清洗液在清洗时足够使用，法规规定，水箱里必须有 25 次或者 50 次清洁循环的水的储存量，如果与其他清洗液共用，则在满足以上要求的基础上还至少要有 1L 的空间余量，因此我们设计的容量为 6L 足以满足要求。

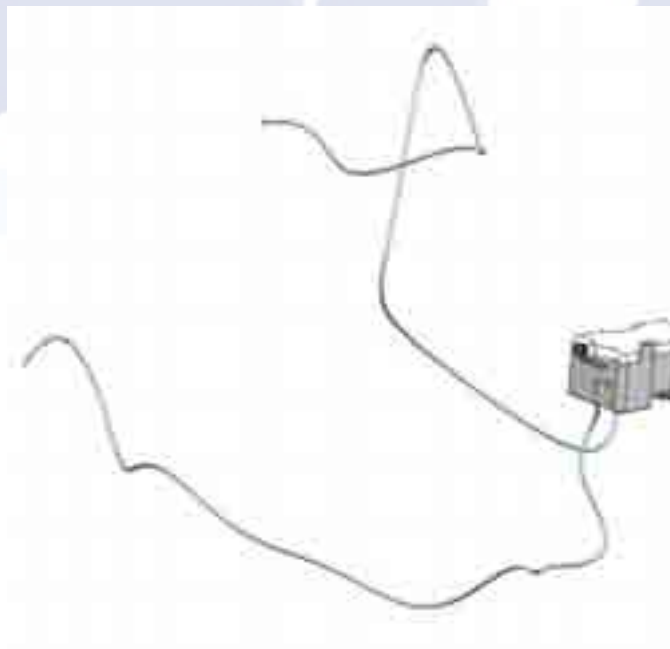
In order to reduce the components and space in this design, it's the same water tank used by headlamp cleaning lotion and windscreen washing system. However, in order to insure that the cleaning lotion is enough to use when washing, there is must be 25 or 50 times of the cleaning circle water, if shared with other lotion, there is 1L margin of the space at least except for meeting above requirements. so the capacity we design is 6L to meet the requirements.



2、清洗泵 Washing Pump

在前照灯清洗系统中，有一个结构简单的电动循环清洗液泵。循环液通过清洗泵的喷孔将清洗液喷射到前大灯上。

There is a simple cleaning lotion pump circled electrically in the headlamp washing nozzle system. The circled lotion spew out on the headlamps through the aperture of the washing pump.



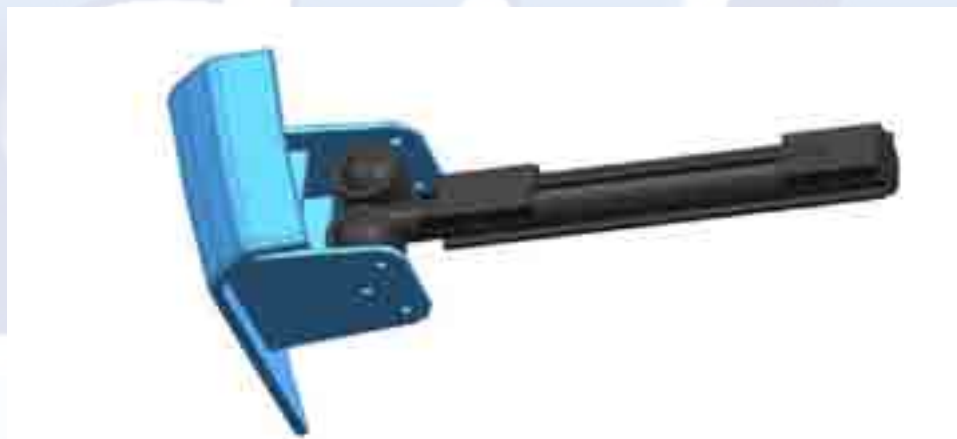
3、连接软管 Joint Tube

对于清洗系统来说，软管是一个极其重要的组件，其伸缩性必须与短期脉冲长度精确地匹配。总长度一般不得超过 2.5m（具体尺寸

需根据车体而定)。软管的伸缩性允许其在一定的压力下伸张。在标准 SAE J1037 标准中已对软管的硬度、拉伸强度、扯断伸长率、爆破压力、耐加热老化和耐臭氧等特性作出了详细的技术要求。

Tube is a very important part of washing nozzle system, its retractility must match accurately to the length of short-term pulse. Its total length not more than 2.5m (the size should according to bodywork). The retractility of the tube be allowed to elongate according to stated pressure. The standard SAE J1037 has list detailed specifications of tube's rigidity, extend intensity, break elongate rate, blow up pressure, prevent heat up & aging and ozone prevention.

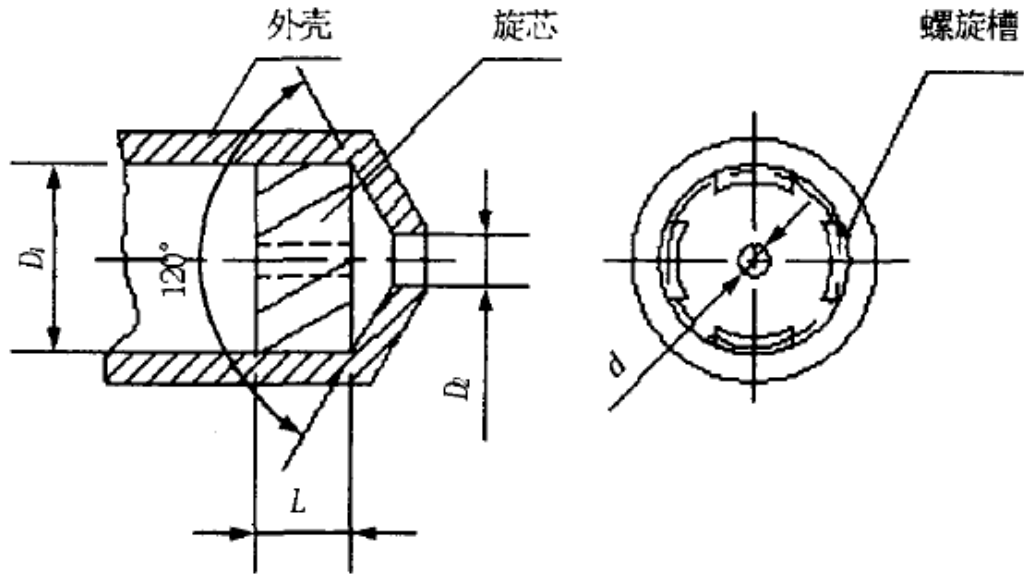
4、喷嘴 Nozzle



喷嘴是前照灯清洗系统中重要的零部件。采用旋芯雾化喷嘴，由喷嘴外壳和旋芯组成。在旋芯的外圆上有四条螺旋槽，中间有通孔，水在压力作用下通过会形成五股并联水流，然后克服液体的表面张力，把液流撕成细微的雾滴，达到雾化目的。喷嘴的主要参数为：进口直径 6mm，出口直径 1.3mm，螺旋槽，螺旋角等等。

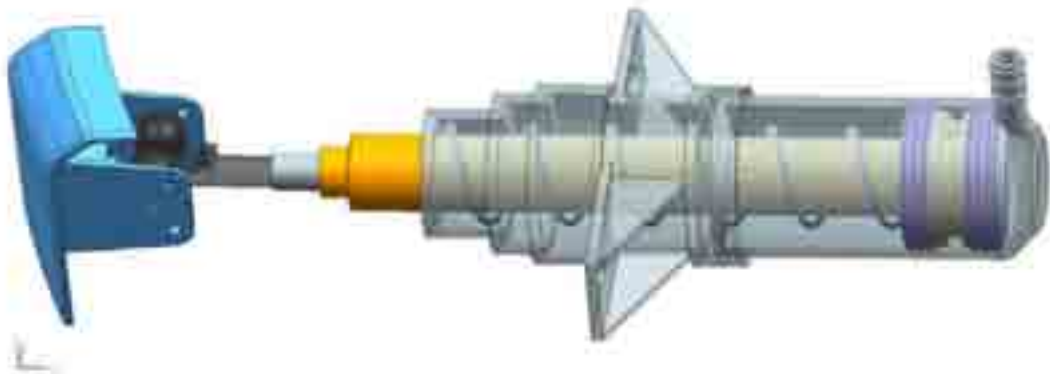
Nozzle is important part of headlight washing system. Adopted circle core fog-like nozzle, constitute by nozzle crust and circle core. There are four screw groove in the circle core's outer round, a hole in the middle and will be formed 5 parallel connection stream on the water's pressure. Then conquer the liquid surface extend, the liquid was tore to small fogdrop and achieved to atomized purpose. Nozzle's main parameter: enter dia.6mm, exit

dia.1.3mm, screw groove, screw angle and etc.



喷嘴的结构简图

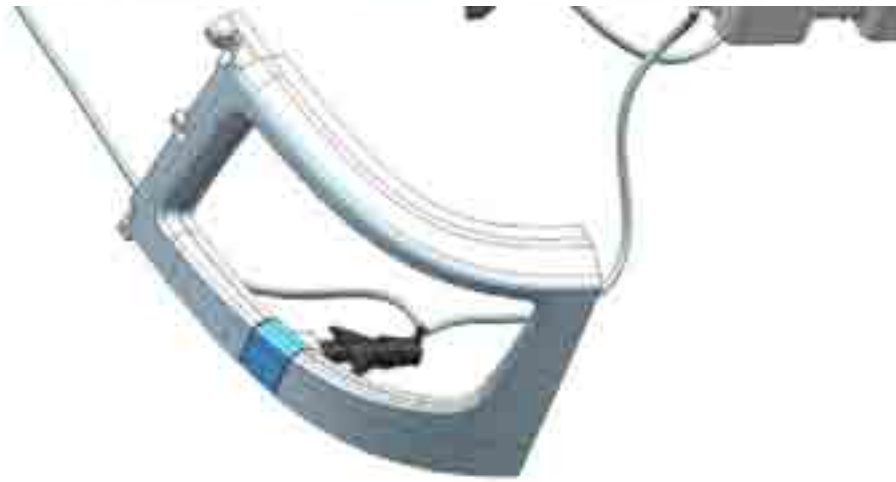
二、清洗工作过程: Washing work process



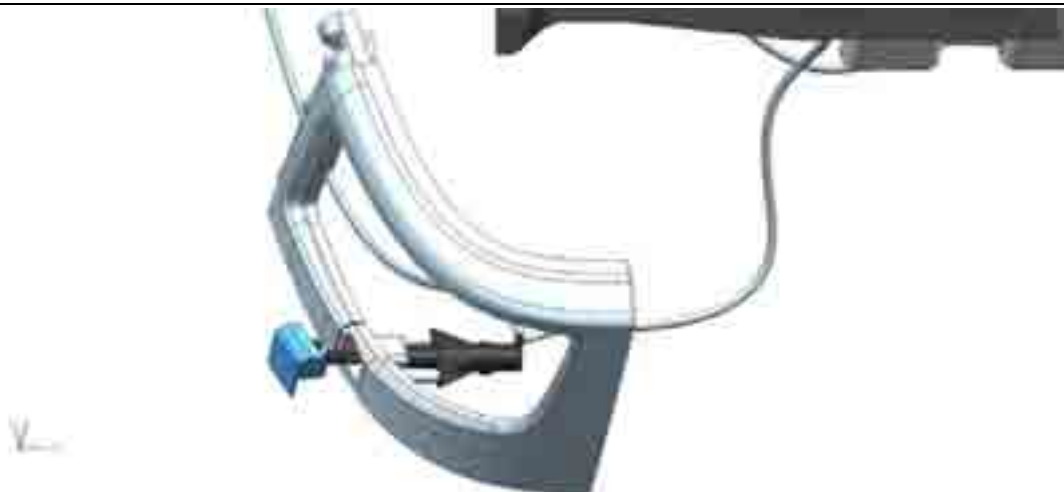
充液工作筒为筒状结构, 充液工作筒内设有与其内平面相配合的单向阀, 拉伸弹簧的两段分别固定在单向阀的阀芯吊耳和弹簧固定座上, 压缩弹簧的两端分别固定在充液工作筒的端部和外壳的端部。当清洗液从底座的清洗液进口进入清洗液内部, 清洗液压力克服压缩弹簧的弹力推动充液工作筒、单向阀和喷嘴一起运动, 当充液工作筒运动到极限位置后, 充液工作筒停止运动, 此时阀芯在清洗液压力的作

用下被打开，形成了完整的清洗器的工作回路。当清洗工作完毕，由于清洗液压力消失，在拉伸弹簧和压缩弹簧的共同作用下，阀芯关闭，充液工作筒缩回外壳中，直至恢复到初始位置，整个清洗过程结束。

Liquid-supply working canister is canister shape structure. A unilateralism valve match to inner plane of liquid-supply working canister. Extending spring's two endings fixup to unilateralism valve's valve core suspend ear and spring fastness holds separately. Compress spring's 2 endings fixup to liquid-supply working canister's ending and crustaceous ending separately. When washing lotion enter to washing system from import on the base, washing lotion pressure conquered compress spring's bounce drive the liquid-supply working canister, unilateralism valve and nozzle move altogether. When liquid-supply working canister move to the limited position, it will be stopped moving, now the valve core was opened by the pressure of the washing lotion and formed the whole washing system's working loop. When washing work finished, because the washing lotion pressure disappeared, in the effect of extending spring and compress spring, valve core closed and liquid-supply working canister retract to crust till to resume the beginning position, the whole washing process finished.



清洗之前 Before washing process



清洗时 In washing

三、安装位置: Installation position

此前照灯清洗装置安装在前保险杠上,采用的是隐藏式设计,保证了前照灯及保险杠的美观。按下前照灯清洗键,高压清洗液所产生的压力会将喷头推出,并在极短时间内喷射,完成清洗去污,喷射完成后,喷头自动回缩。

Headlamp washing nozzle system is installed in front bumper. Adopt the hidden design and ensure the beauty view of the headlamp and bumper. Press the button of headlamp washing, the high pressure washing lotion's will extrusion the nozzle and spraying in little time, after finished the working of cleanout and spraying the nozzle will retract in automatic.

四、该前照灯清洗装置的主要性能参数如下: The main performance parameter of the headlight washing nozzle system as follows:

1. 基本电气性能: 操作电压为 11.5 ~ 15V; Basic electric performance: operation voltage is 11.5-15V.

2. 使用环境: $-10^{\circ}\text{C} \sim +35^{\circ}\text{C}$, 且在 $0 \sim 130\text{km/h}$ 的车速或最高时速时, 均可正常使用; Using environment: $-10^{\circ}\text{C} \sim +35^{\circ}\text{C}$ and between $0 \sim 130\text{km/h}$ speed or in tiptop speed, it can working normally.

3. 清洗反应速度: $\leq 8s$; Washing response speed: $\leq 8s$.
4. 清洁效果要求: 至少达到 70% 以上; Washing effect requirement: at least achieve above 70%.
5. 耐久性能: $\geq 20\ 000$ 次; Durability: $\geq 20\ 000$
6. 水花 (喷雾) 要求: 在一定压强下的清洗液, 会形成一股由不同大小的微滴组成的测试压力 $\geq 200kPa$ 水柱, 同一股水柱必须不能有任何明显的间隙。Spray requirement: the washing lotion of the stated pressure, can form a water column with different size of tiny drop which test pressure is $\geq 200kPa$. The same water column must not have any obvious gap.

风窗玻璃洗涤器 *Windscreen syringe*

风窗玻璃洗涤器与前照灯清洗器共用一个水箱, 由单独的水泵提供动力进行供水清洗。连接软管长度不大于 2.5M (具体尺寸视车身而定), 通过车身与雨刮器连接, 安置在雨刮器内部。要求能将 A 区域 60% 以上面积清洗干净, 并且满足强度试验, 冻结强度试验, 高温试验等 GB 15085-1994 《汽车风窗玻璃刮水器、洗涤器的性能要求及试验方法》的相关规定。Wind screen syringe use the same water tank with the headlight and supply water from individual water pump. Joint tube length not more than 2.5m (the size should according to bodywork) and connect to rain wiper via bodywork, installed inside the rain wiper. Required washing cleanly above 60% area on A zone and fulfilled intensity test, frost intensity test and high temperature test according to GB 15085-1994.

设计制造出合格的前照灯清洗器及风窗玻璃洗涤器需要建立在大量的试验基础之上, 我们采用 DOE 设计, 流体流动的 CFD 分析等方法进行设计验证, 保证产品的高品质, 高效率, 满足客户的需求。

Design and produce eligible headlight washing nozzle system and wind screen syringe should have a foundation on mass tests. We use DOE design and CFD analyse of liquid flowing to validate, ensure high quality and high efficiency of the product to be fulfilled the customer's requirement.

