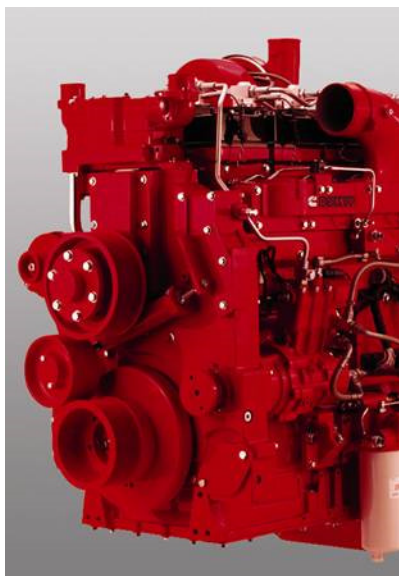




重庆康明斯柴油机简明操作保养指南

CCEC 客户支持



操作及维护保养指南- 概述

- 细心正确地使用发动机会延长其寿命、获得更佳的性能和更好的经济效益。
- 重庆康明斯公司推荐按照操作保养手册中给出的方法和规程进行操作和维护保养检查。
- 进行某一级别的保养时需重复前一保养级别的所有工作。
- 如果发动机的工作环境温度低于 -18°C [0°F] 或高于 38°C [100°F]，应缩短维护保养间隔时间。在多尘环境中工作，或者频繁停机，同样也需要缩短维护保养间隔时间。
- 某些维护保养程序需要专用工具，或必须由合格的技师进行。
- 使用纯在的康明斯保养耗材。
- 如果系统配备有非重庆康明斯公司生产或提供的零部件或附件，请参考相应零部件制造商的维护保养建议。



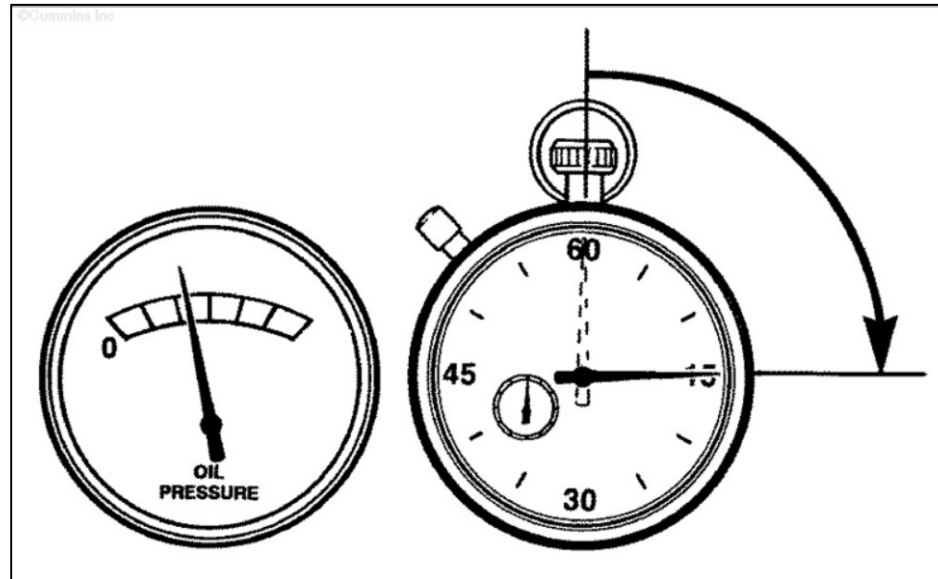
Operation and Maintenance Instruction - Overview

- Correct care of your engine will result in longer life, better performance, and more economical operation.
- CCEC recommends that the system be maintained according to the Maintenance Schedule in the O&M manual.
- At each scheduled maintenance interval, perform all previous maintenance checks which are due for scheduled maintenance.
- If the system is operating in ambient temperatures below -18°C [0°F] or above 38°C [100°F], perform maintenance at shorter intervals. Shorter maintenance intervals are also required if the system is operated in a dusty environment or if frequent stops are made.
- Some of these maintenance procedures require special tools or must be completed by qualified personnel.
- Always use Genuine Cummins maintenance material.
- If your system is equipped with a component or accessory not manufactured or supplied by CCEC, refer to the component manufacturer's maintenance recommendations.



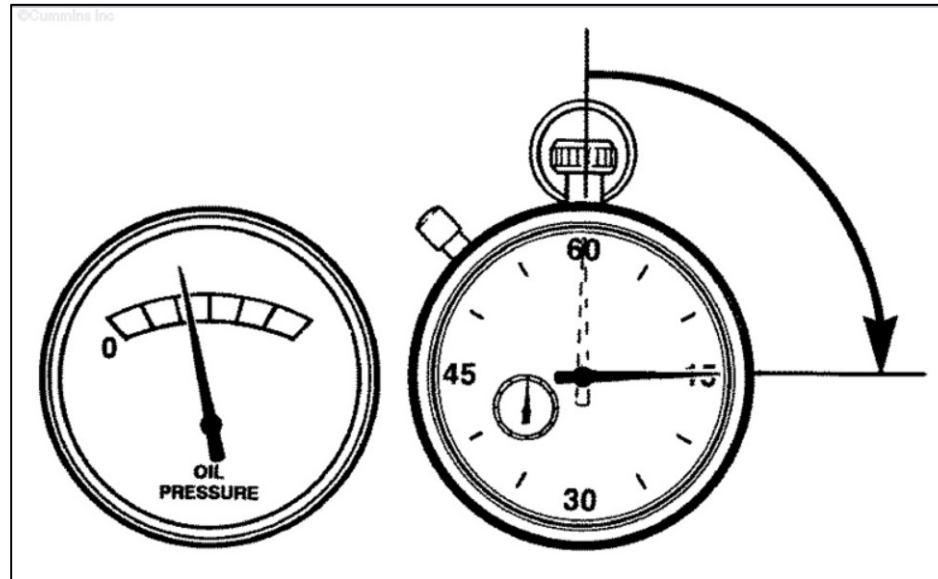
正常启动步骤

- 为了避免损坏启动马达，不要让启动马达持续工作超过 30 秒。两次启动之间要间隔 2 分钟。
- 启动后的 15 秒内，仪表上必须显示机油压力。如果 15 秒内机油压力没有显示，立即使发动机停机以避免其损坏。



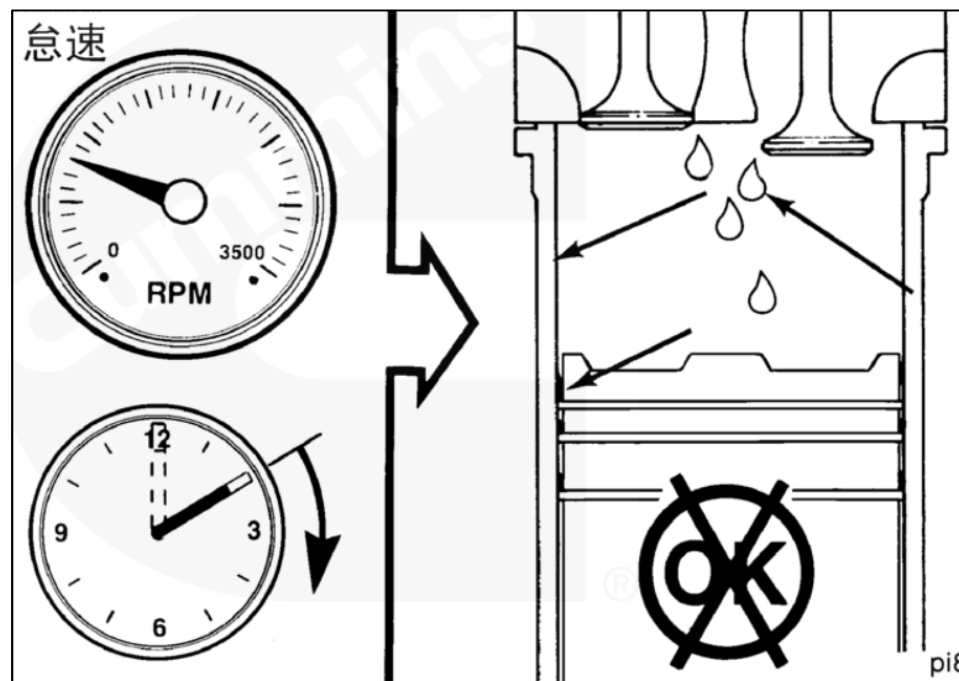
Normal starting procedure

- In order to avoid starting motor damage, please do not let the starting motor consistently crank over 30 seconds. Cranking interval should be at least 2 minutes.
- The engine must have adequate oil pressure within 15 seconds after starting. If the warning lamp indicating low oil pressure has not gone out or there is no oil pressure indicated on a gauge within 15 seconds, shut OFF the engine immediately to reduce the possibility of engine damage.



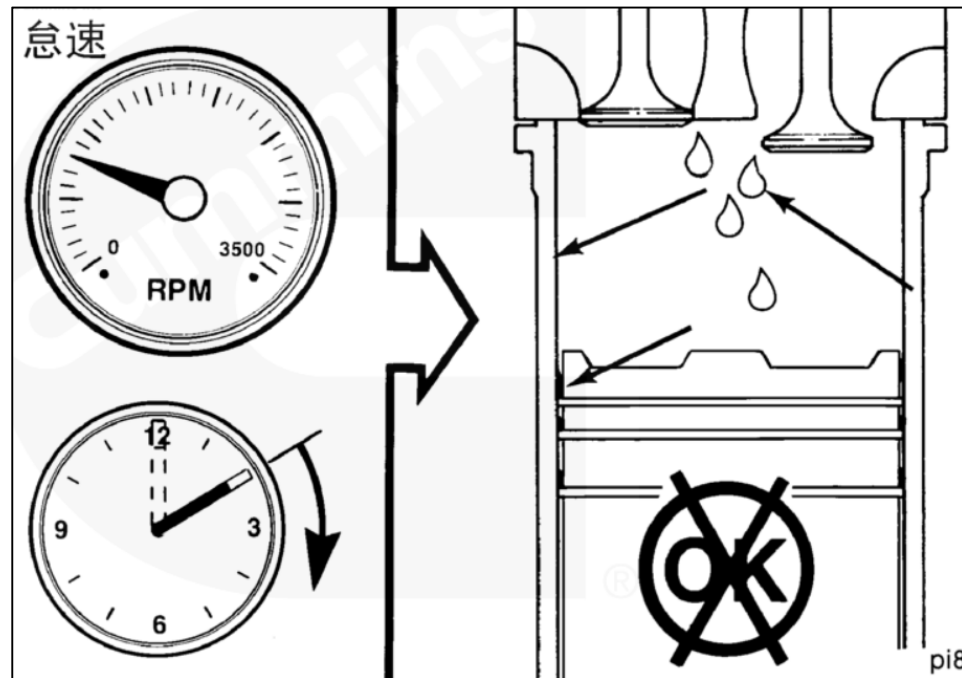
正常启动步骤

- 不要使发动机怠速运转过长时间。怠速运转时间过长（超过10分钟）可能会损坏发动机：
 - 排气管漏黑油
 - 机油被柴油稀释
 - 汽缸内积碳
 - 气门卡住



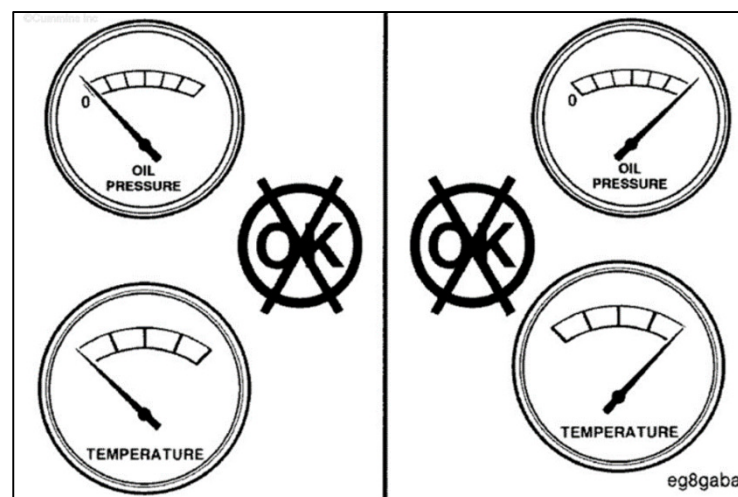
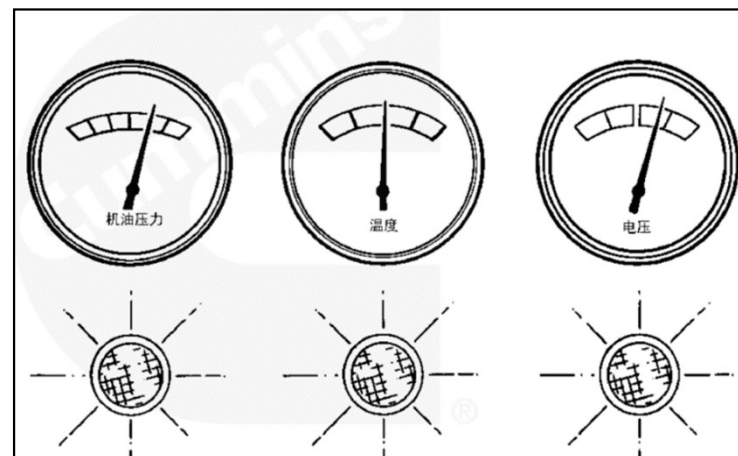
Normal starting procedure

- Do not idle the engine for excessively long periods. Long periods of idling, more than 10 minutes, can cause:
 - Black oil slobbering at exhaust manifold
 - Fuel dilution of the lubrication
 - Carbon buildup in the cylinder
 - Cylinder head valve sticking



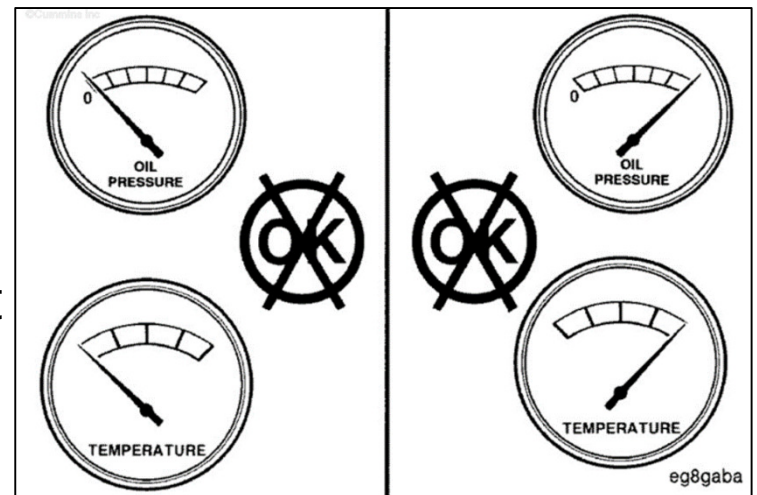
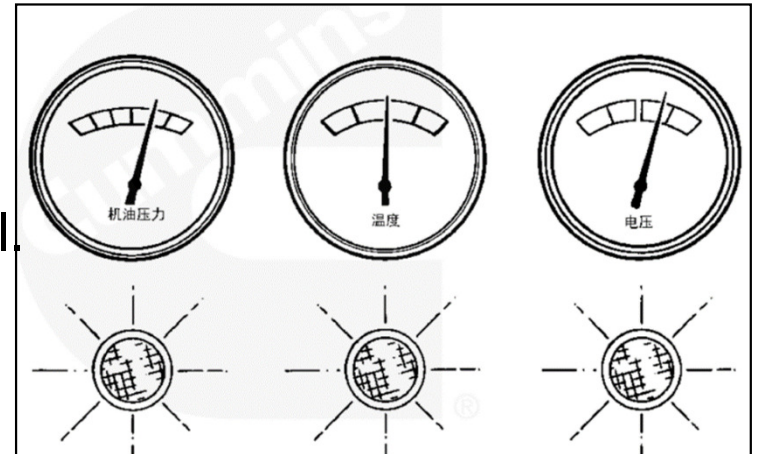
操作发动机

- 每日通过 OEM 面板检查机油压力、冷却液温度及其他发动机参数，以确保它们工作正常。检查面板上有任何警报信息。采取适当的行动以修正警报状态或联系最近的重庆康明斯经销商。
- 要经常查看OEM 面板的读数。如果压力或温度**不符合技术规范**，立即关闭发动机。



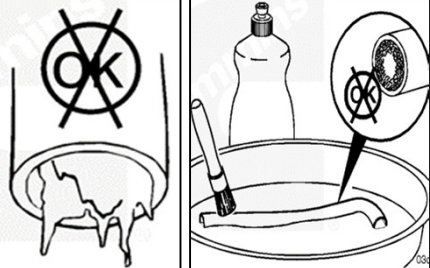
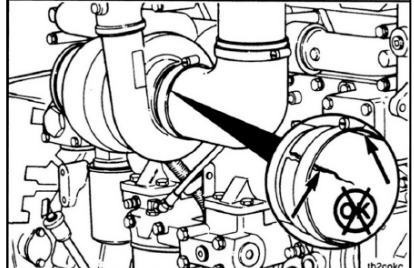
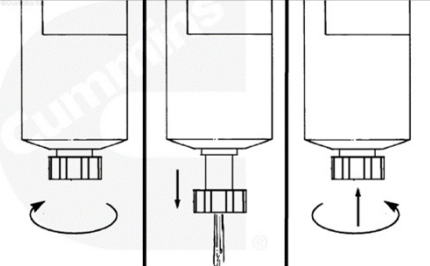
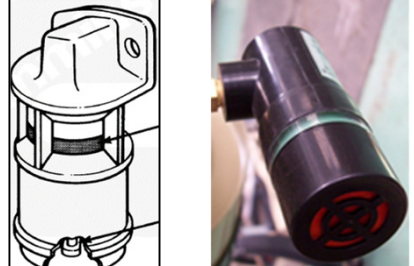
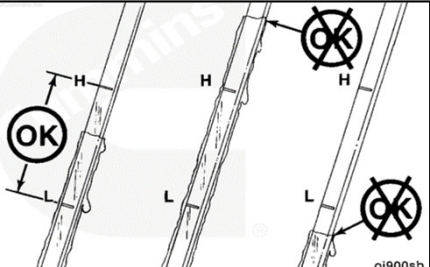
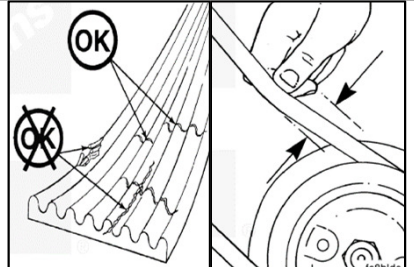
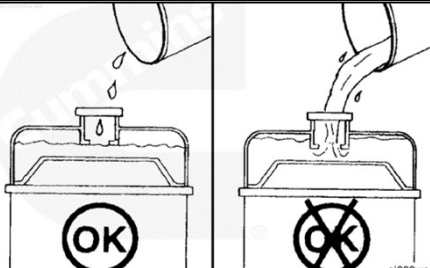
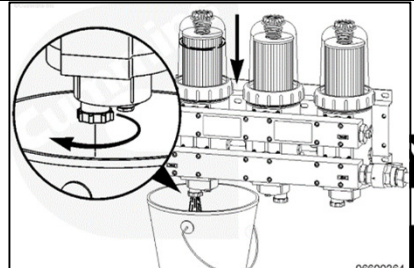
Operating the engine

- Check the oil pressure, coolant temperature, and other engine parameters daily via the OEM front panel to make sure they are operational. Check the panel regularly for any alarm messages. Take appropriate action to rectify the alarm condition or contact your nearest Authorized CCEC Repair Location.
- If equipped, monitor the oil pressure and coolant temperature gauges frequently. Shut off the engine if any pressure or temperature does **not** meet engine specifications.



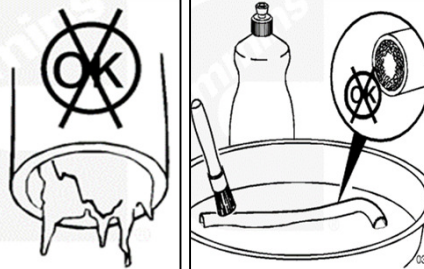
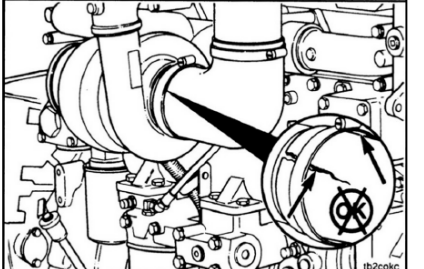
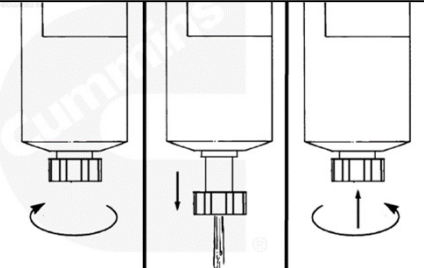
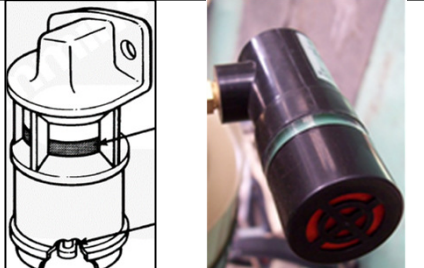
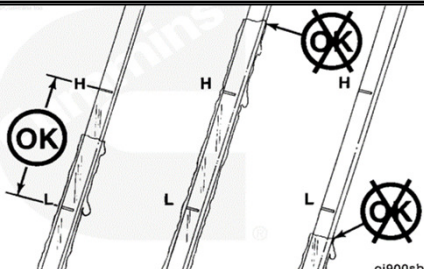
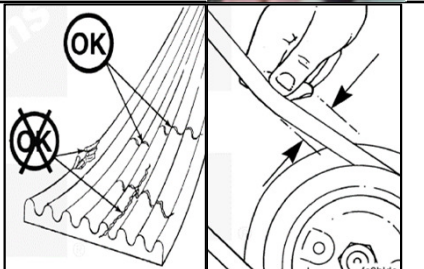
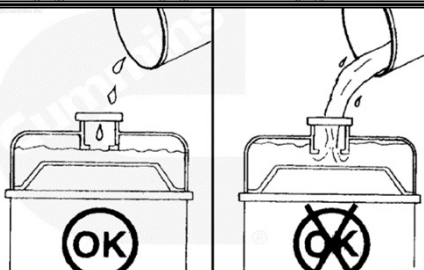
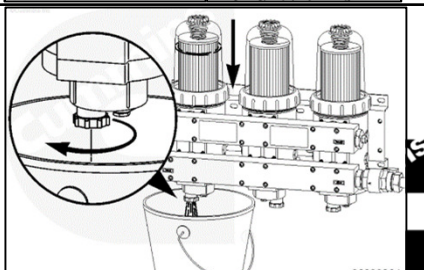
维护保养规程

--每日一次的维护保养步骤 (A级保养)

曲轴箱呼吸器管 -- 检查有无泥污、碎屑或结冰。		进气管路 -- 检查，如有破损、卡箍松动，更换或拧紧卡箍。	
燃油/水分离器 -- 排放分离器中的水，直到看见清洁的燃油		空气滤清器阻力 -- 检查	
机油油位 -- 检查		驱动皮带 -- 检查是否破损 -- 检查调整张紧力。	
冷却液液位 -- 检查		远程安装燃油滤清器(电控发动机) -- 排放系统中的蓄水	

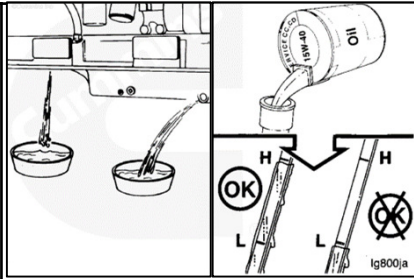
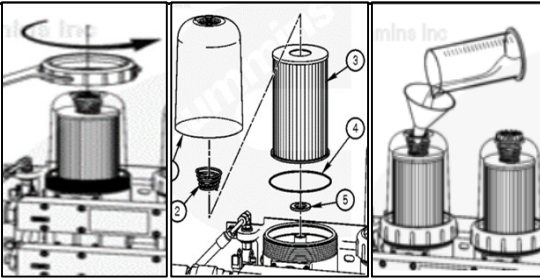
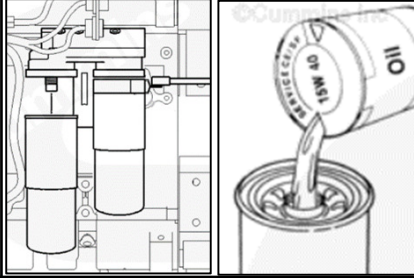
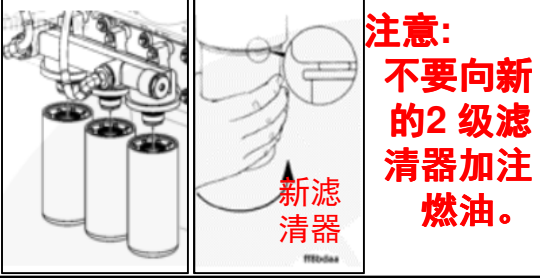
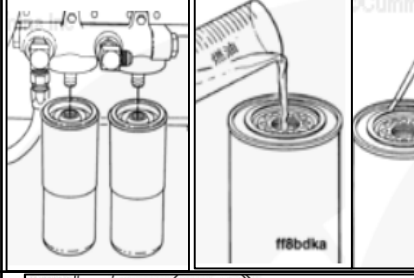
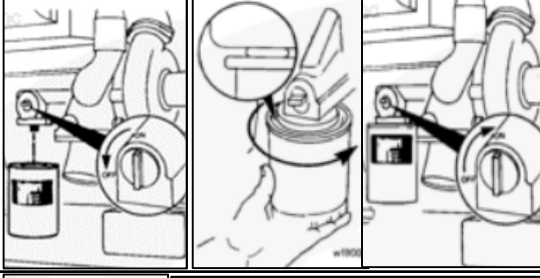
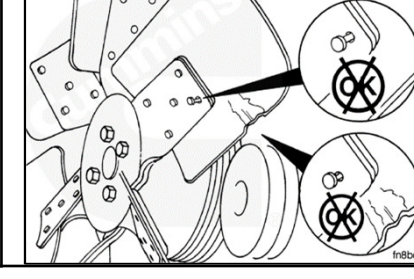
Maintaince Schedule

--Daily Maintenance Procedures (Level A Maintaince)

Crankcase breather tube – Check for dirt, debris or freeze		Air Intake Piping – Check for damage or clamp loose	
Fuel-Water Separator - Drain until clean fuel can be seen		Air Cleaner Restriction - Check	
Lubricating Oil Level - Check		Drive Belts – Check for damage or loose	
Coolant Level - Check		-- Fuel Filter, Remote Mounted - Check and Drain	

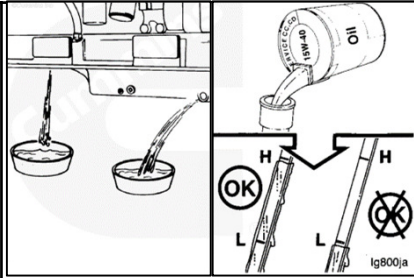
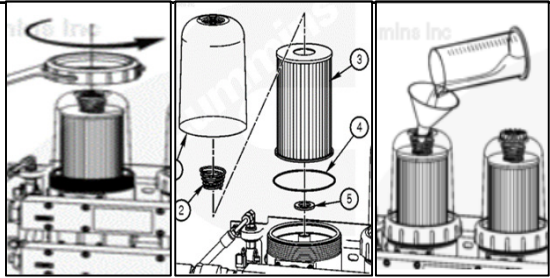
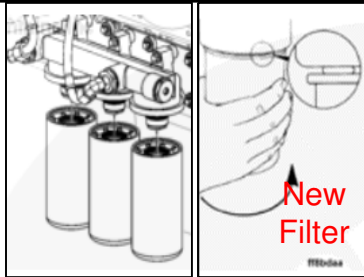
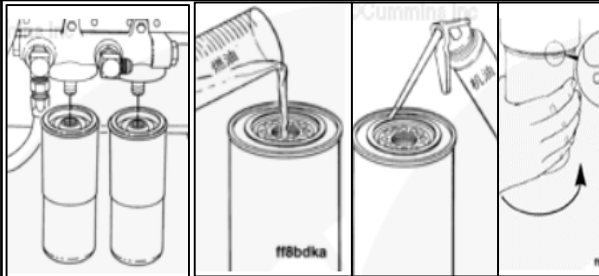
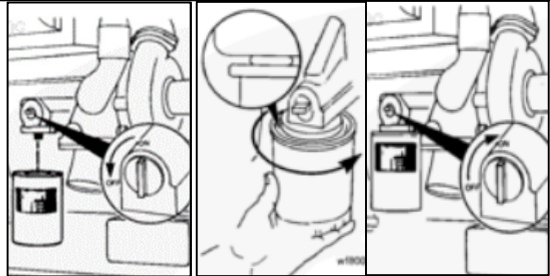
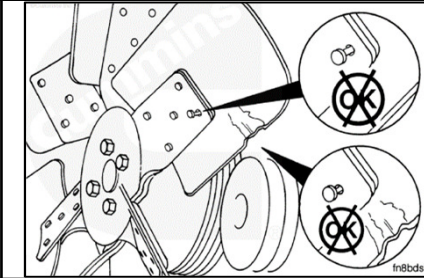
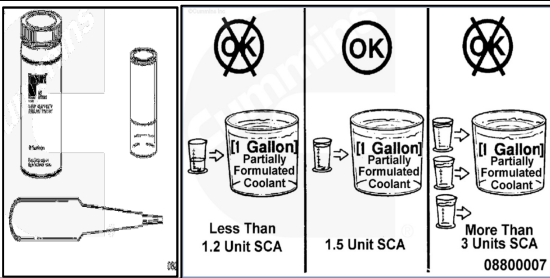
维护保养规程

--每 250 小时或 6个月的维护保养步骤(B级保养)

机油 -- 更换		1级燃油滤清器（共轨系统） -- 更换	
机油滤清器 -- 更换		2级燃油滤清器(共轨系统) -- 更换	 注意: 不要向新的2级滤清器加注燃油。
燃油滤清器（机械发动机） -- 更换		冷却液滤清器 -- 更换	
冷却风扇 -- 检查		冷却液添加剂 (SCA) -- 检查	 测试条瓶 小塑料容器 SCA浓度测试包CC 2602 注液器 小于 1.2 个单位的 SCA 1.5 个单位的 SCA 大于 3 个单位的 SCA

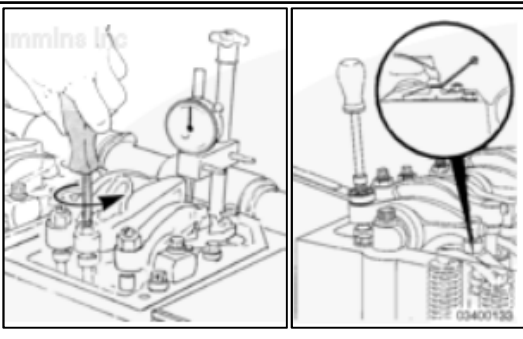
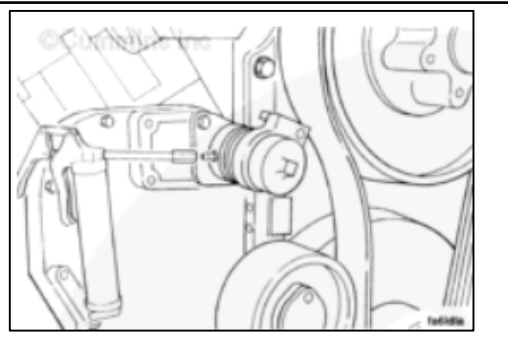
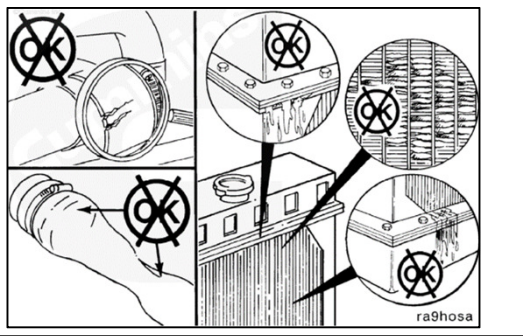
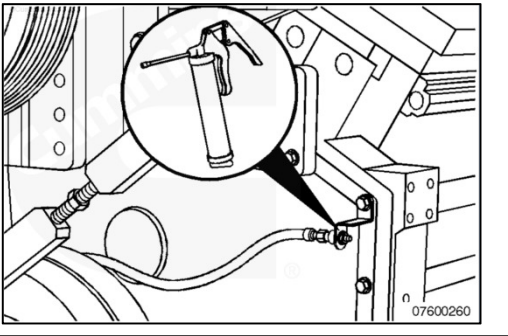
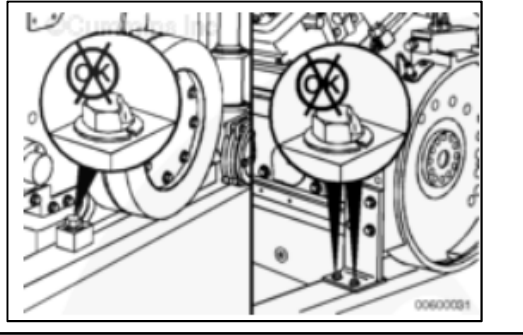
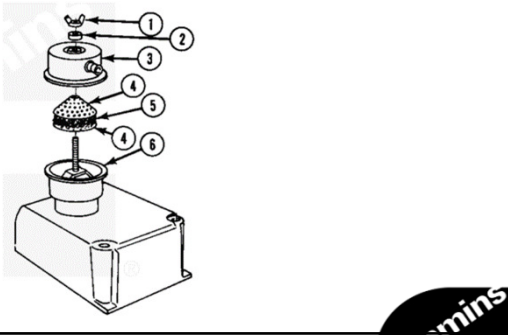
Maintaince Schedule

--Every 250 Hours or 6 Months procedure (Level B maintaince)

Lubricating Oil - Change			Stage 1 fuel filter (ECM engine) -- Change	
Lubricating Oil Filter (Spin-On) - Change			Stage 2 fuel filter (ECM engine) -- Change	 Note: Do not fill the stage 2 filters with fuel.
Fuel Filter (Spin-On Type) - Change			Coolant Filter - Change	
Fan, Cooling - Inspect			Supplemental Coolant Additive (SCA) - Check	

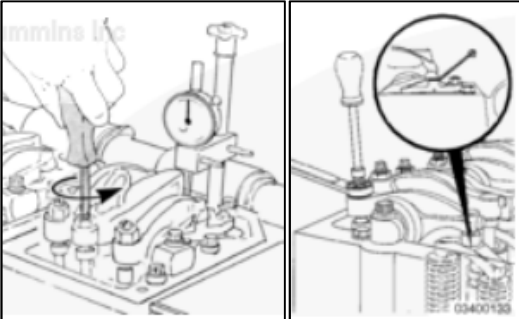
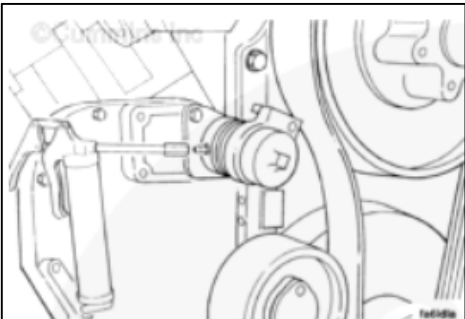
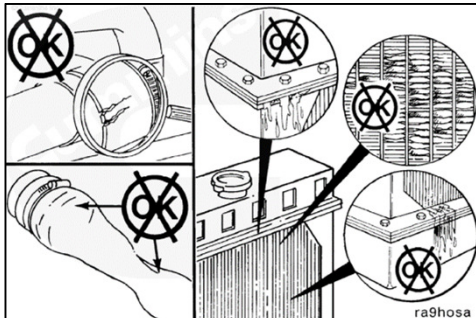
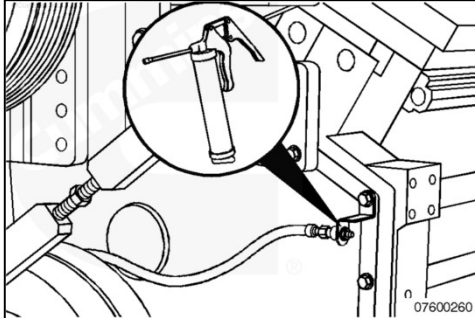
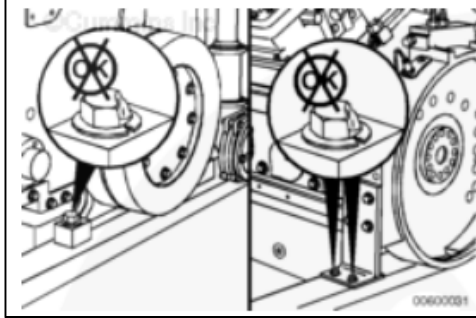
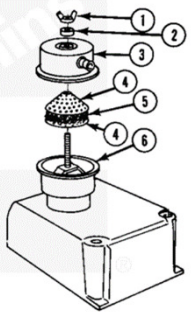
维护保养规程

--每 1500 小时或 1 年时的维护保养步骤(C级保养)

喷油器行程、 气门间隙 -- 调整		冷却风扇 皮带张紧器 --加注润滑脂	
散热器及软管 -- 检查能否 重新使用		发动机前 支架 --加注润滑脂	
前后支架安 装螺栓 --检查		曲轴箱呼 吸器 -- 清洗、检 查能否继 续使用	

Maintaince Schedule

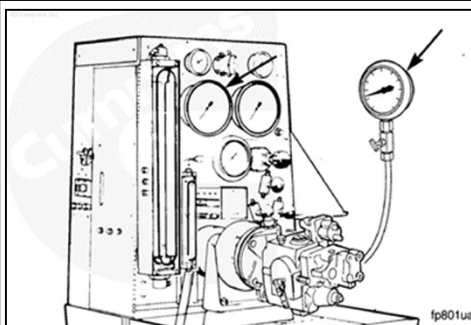
--Every 1500 Hours or 1 year maintaince procedure(Level C maintaince)

Overhead- Setting		Fan Drive Idler Arm Assembly —Add grease	
Radiator and hoses -- Check for reusable		Engine front support --Add grease	
Front and rear support bracket --Check		Crankcase breather -- Clean and check for reusable	

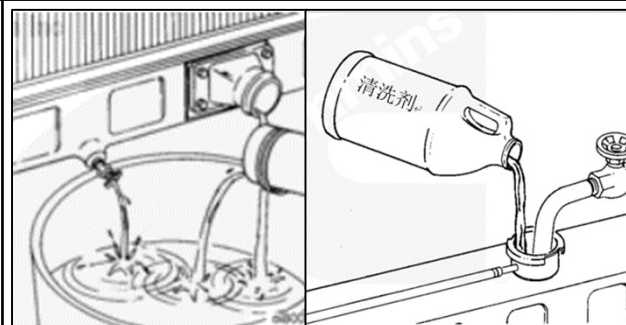
维护保养规程

--每 6000 小时或 2 年时的维护保养步骤(D级保养)

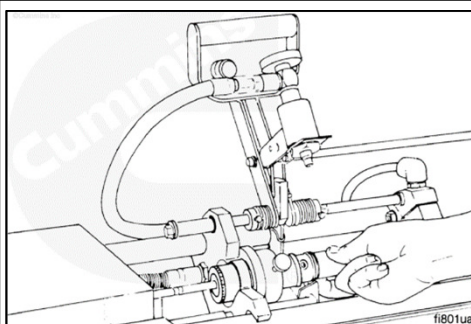
燃油泵
-- 标定



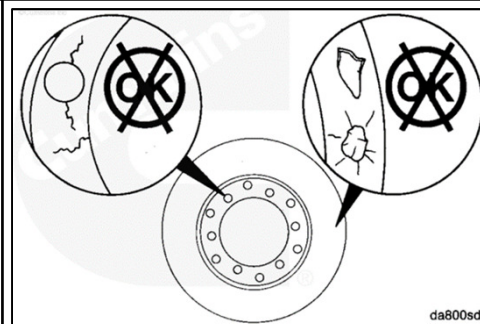
冷却系统
-- 冲洗



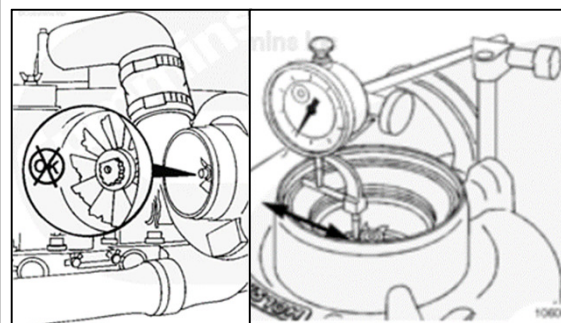
喷油器
-- 标定



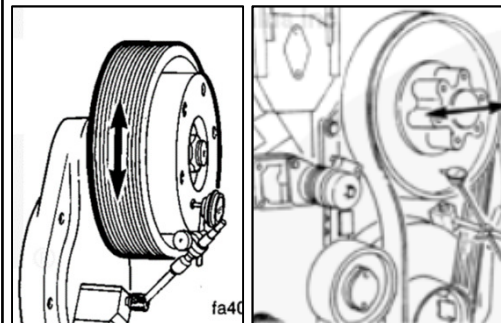
硅油减振器
-- 检查



涡轮增压器
-- 检查能否
继续使用

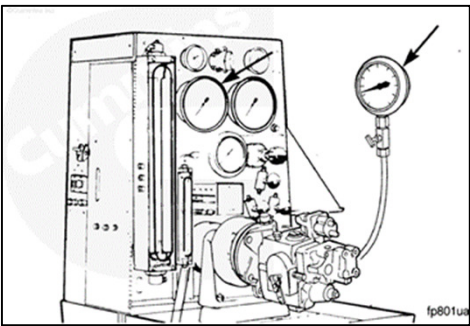
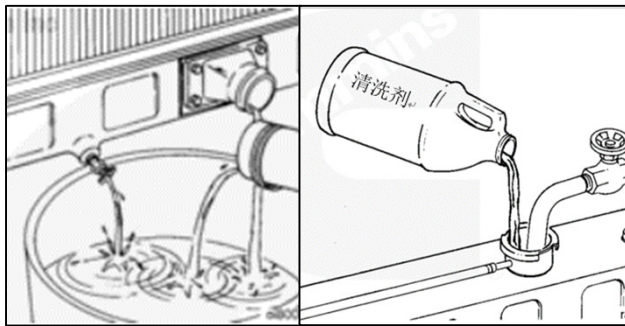
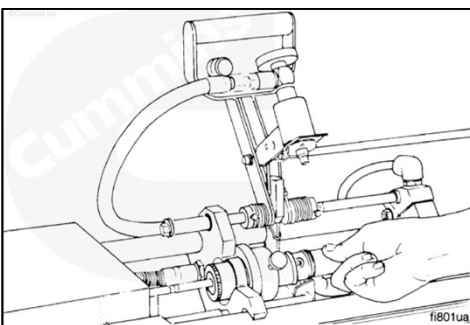
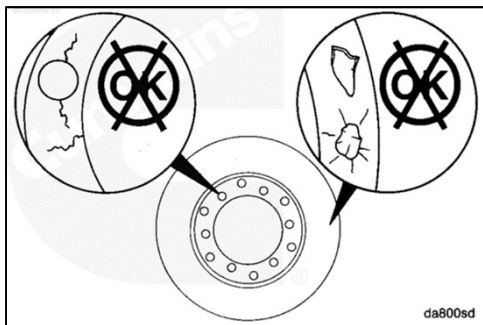
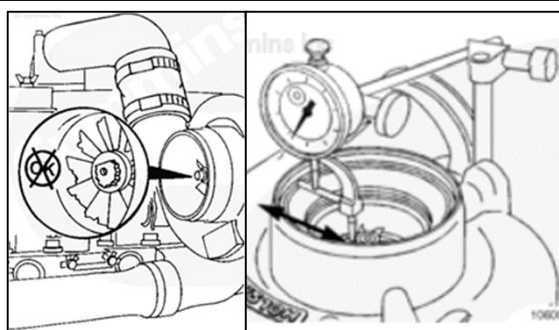
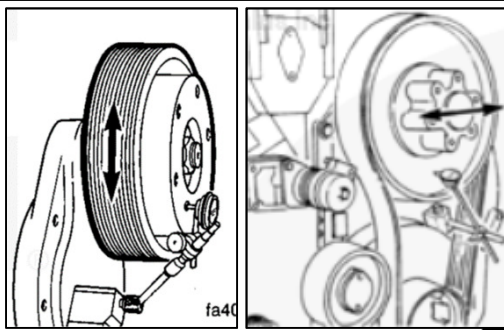


风扇轮毂
-- 检查



Maintaince Schedule

--Every 6000 Hours or 2 year maintaince procedure(Level D maintaince)

Fuel pump -- Calibration		Cooling system -- Flush	
Injector -- Calibration		Vibration Damper, Viscous - Check	
Turbocharger -- Check for reusable		Fan Hub, Belt Driven - Check	

维护保养技术规范—燃油系统

- 柴油：0 # 轻柴油（GB252）

燃油滤清器零件号一览表							
发动机系列(机械喷油器)	新滤清器 ¹			旧滤清器			
	弗列加型号	康明斯零件号	过滤精度	弗列加型号	康明斯零件号	过滤精度	
	M11	FS1000	3329289	10um	FS1212	3315843	25um
	NT855	FS1000	3329289		FS1212	3315843	
	K19	FS1000	3329289		FS1050	3315847	
K38/50	FS1006	3089916	FS1216		3313304		
1：用户需用新零件号的柴油滤清器替代旧滤清器做保养。							
发动机系列(电控喷油器)	一级滤清器			二级滤清器			
	弗列加型号	康明斯零件号	过滤精度	弗列加型号	康明斯零件号	过滤精度	
	QSK	FS19763	FS19763	7um	FF5644	4964234	3um
QSNT	FS36220	4297154	10um	FF5851	4297132	3um	

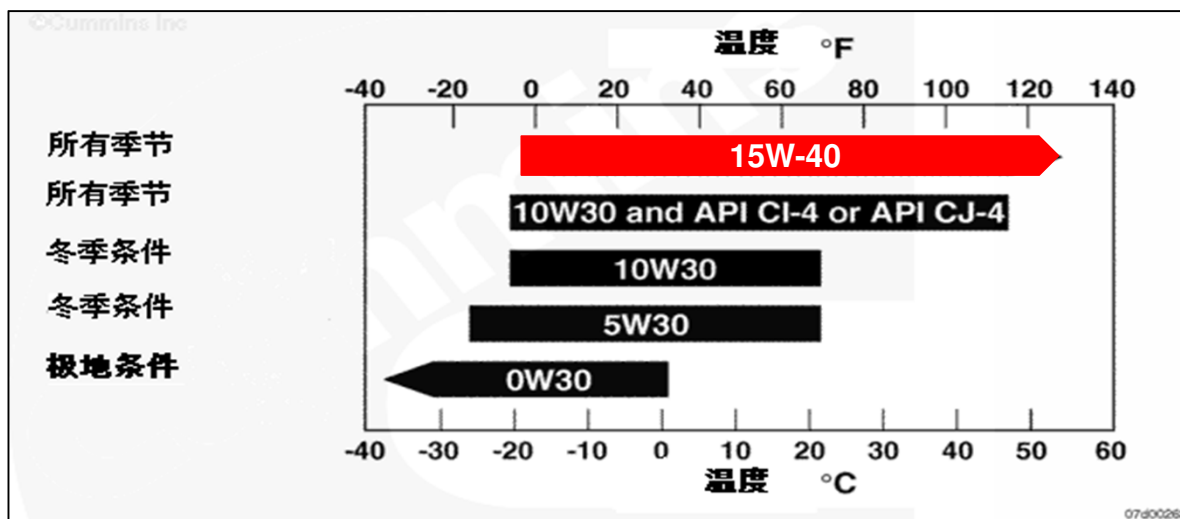
Maintaince Specification —Fuel System

- Diesel: 0 # Light diesel (GB252)

Parts Number of Fuel Filter						
Engine Family (Mechanic injector)	New fuel filter ¹			Old Fuel filter		
	Fleetguard PN	Cummins PN	Spec.	Fleetguard PN	Cummins PN	Spec.
M11	FS1000	3329289	10um	FS1212	3315843	25um
NT855	FS1000	3329289		FS1212	3315843	
K19	FS1000	3329289		FS1050	3315847	
K38/50	FS1006	3089916		FS1216	3313304	
1 : Use the new fuel filter while carrying out maintaince.						
Engine Family (Electronic injector)	Stage 1 fuel filter			Stage 2 fuel filter		
	Fleetguard PN	Cummins PN	Spec.	Fleetguard PN	Cummins PN	Spec.
QSK	FS19763	FS19763	7um	FF5644	4964234	3um
<u>QSNT</u>	FS36220	4297154	10um	FF5851	4297132	3um

维护保养技术规范—润滑系统

--机油



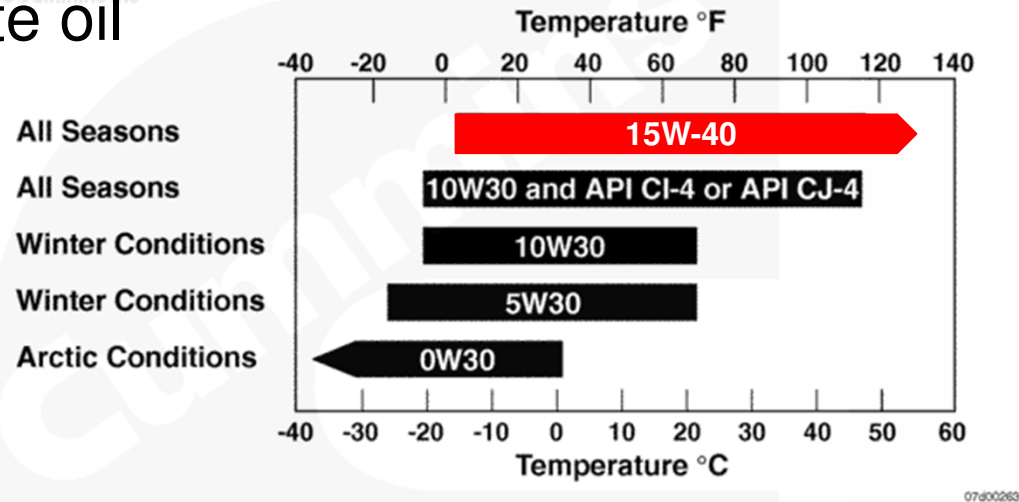
使用SAE黏度级别为15W-40，且API级别为CF-4或以上机油。

API 级别	CCEC 级别		M11	NT855	K19	K38/50	QSNT*	QSK19/38
CF-4	F级	用油	规定	规定	规定	规定	允许	允许
		周期（小时）	250	250	250	250	150-250	250*
CH-4	H级	用油	推荐	推荐	推荐	推荐	规定	规定
		周期（小时）	400	400	400	400	250-400	400
CI-4	I级	用油	推荐	推荐	推荐	推荐	推荐	推荐
		周期（小时）	500	500	500	500	275-500	500

* QSNT换油周期依据机油的API级别和发动机实际平均燃油消耗是否大于57L/h确定。

Maintaince Specification—Lubrication System

--Lubricate oil



CCEC primary prescription is for the use of 15W40 multigrade for normal operation at ambient temperatures above -15° C [5° F].

API Classification	CCEC Oil Grade		M11	NT855	K19	K38/50	QSNT*	QSK19/38
CF-4	F级	Oil used	<u>Prescribe</u>			<u>Permit</u>		
		Interval(hours)	<u>250</u>			<u>150-250</u>		
CH-4	H级	Oil used	<u>Recommend</u>			<u>Prescribe</u>		
		Interval(hours)	<u>400</u>			<u>250-400</u>		
CI-4	I级	Oil used	<u>Recommend</u>			<u>Recommend</u>		
		Interval(hours)	<u>500</u>			<u>275-500</u>		

* QSNT oil change interval is based on the API classification of the oil used and engine fuel consumption rate.

维护保养技术规范—润滑系统

--机油滤清器

发动机 系列	复合式滤清器		Full flow filter		By-pass filter	
	Fleetguard PN	Cummins PN	Fleetguard PN	Cummins PN	Fleetguard PN	Cummins PN
M11	LF9009	3401544	N/A			
NT855	LF9009	3401544	N/A			
K19	LF9009	3401544	LF670	3889310	LF777	3889311
K38	N/A		LF670	3889310	LF777	3889311
K50	N/A		LF3325	3310169	LF777	3889311
QSNT	LF9009	3401544	N/A			
QSK19	LF9080	4331005	N/A			
QSK38	LF9050	4920071	N/A			

Maintaince Specification—Lubrication System

--Lubricate oil filter

Engine Family	Combination filter		Full flow filter		By-pass filter	
	Fleetguard PN	Cummins PN	Fleetguard PN	Cummins PN	Fleetguard PN	Cummins PN
M11	LF9009	3401544	N/A			
NT855	LF9009	3401544	N/A			
K19*	LF9009	3401544	LF670	3889310	LF777	3889311
K38	N/A		LF670	3889310	LF777	3889311
K50	N/A		LF3325	3310169	LF777	3889311
QSNT	LF9009	3401544	N/A			
QSK19	LF9080	4331005	N/A			
QSK38	LF9050	4920071	N/A			

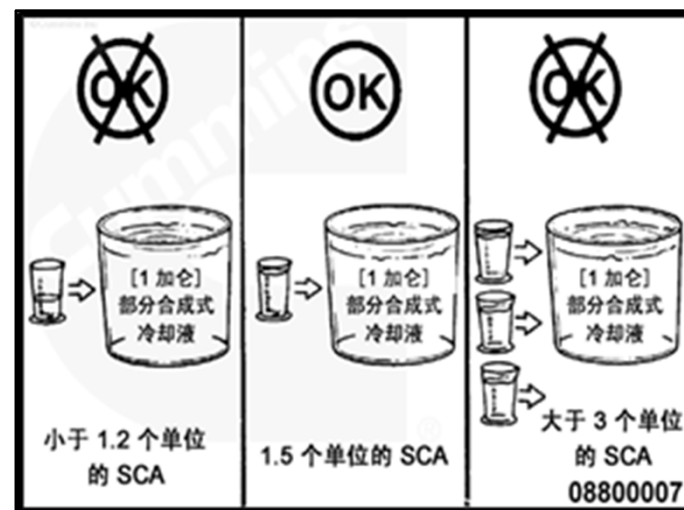
Notes: Some K19 engines use combination filters, some use full-flow filters and by-pass filters.

维护保养技术规范—冷却系统

- 使用 50/50 的优质水和完全按配比的防冻液，或完全按配比的冷却液的混合液。

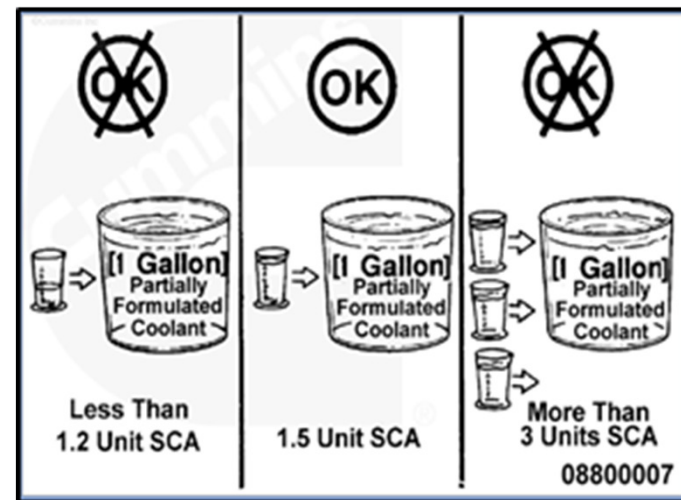
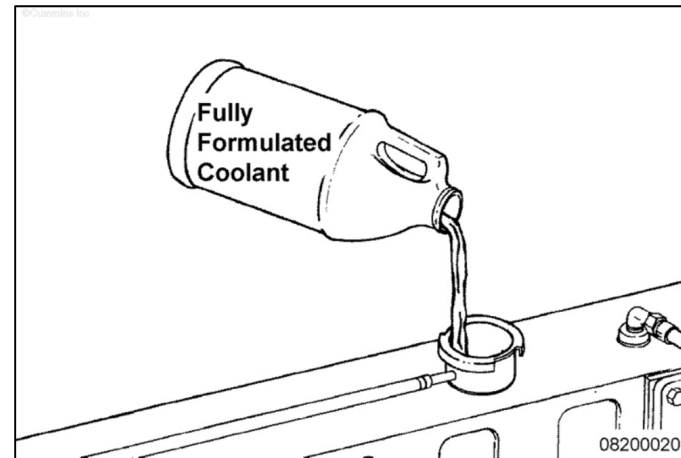


- 保持SCA浓度介于每 3.8 升 [1 加仑] 1.2 到 3 个单位之间。
[0.3-0.8单位/升]



Maintaince Specification—Cooling system

- CCEC recommends using either a 50/50 mixture of good-quality water and fully formulated antifreeze, or fully formulated coolant when filling the cooling system.
- The SCA concentration **must not** fall below 1.2 units or exceed 3 units per 3.8 liters [1 gal] of cooling system capacity.



维护保养技术规范—冷却系统

冷却液滤清器零件号

SCA 单位	康明斯号	弗列加号
2	3100303	WF2070
4	3100304	WF2071
6	3100305	WF2072
8	4058964	WF2073
12	3100307	WF2074
15	3100308	WF2075
23	4058965	WF2076
None	3827423	WF2077



冷却液添加剂DCA 4 零件号

SCA 单位	容量	弗列加号
5	0.47 升 [1 品脱]	DCA60L
20	1.89 升 [2 夸脱]	DCA65L
40	3.78 升 [1 加仑]	DCA70L
200	18.9 升 [5 加仑]	DCA75L
2200	208 升 [55 加仑]	DCA80L



Maintaince Specification—Cooling system

Coolant filter Part Number		
SCA Units	Cummins PN	Fleetguard PN
2	3100303	WF2070
4	3100304	WF2071
6	3100305	WF2072
8	4058964	WF2073
12	3100307	WF2074
15	3100308	WF2075
23	4058965	WF2076
None	3827423	WF2077



Standard Service Interval Fleetguard® Liquid Additive Part Numbers		
SCA Units	Capacity	DCA 4 PN
5	0.47 升 [1 pint]	DCA60L
20	1.89 升 [2 pints]	DCA65L
40	3.78 升 [1 gal.]	DCA70L
200	18.9 升 [5 gals.]	DCA75L
2200	208 升 [55 gals.]	DCA80L



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