

Motorhome Maintenance and Operation

X12, ISX12, ISM, M11 Engines (450–525 hp)



Quick Reference Guide

Maintenance Intervals*	M11/ISM Built 1998-2009		ISX11.9/ISX12 Built 2010-2012		ISX12 Built 2013-2018		X12 Built 2019-2020		X12 Built 2021+	
	time (mo.)	miles	time (mo.)	miles	time (mo.)	miles	time (mo.)	miles	time (mo.)	miles
Check Fluid Levels	daily	n/a	daily	n/a	daily	n/a	daily	n/a	daily	n/a
Coolant Testing	6	n/a	6	n/a	6	25,000	6	25,000	6	30,000
Oil and Oil Filter***	6	15,000	12	15,000	6	20,000	18	20,000	18	40,000
Fuel Filters***	6	15,000	6	25,000	6	30,000	18	30,000	12	60,000*
Valve Lash Check	24	120,000	60	500,000	24	250,000	n/a	250,000	n/a	300,000
Vibration Damper	36	240,000	24	125,000	24	250,000	n/a	250,000	n/a	125,000
Crankcase Breather**	n/a	150,000	n/a	125,000	n/a	150,000	n/a	150,000	n/a	n/a
Coolant Filter	n/a	50,000	n/a	optional	n/a	optional	n/a	optional	n/a	optional
Diesel Particulate Filter	n/a	optional	n/a	200,000	n/a	200,000	n/a	200,000	n/a	300,000
DEF Filter†	n/a	optional	n/a	200,000	n/a	300,000	n/a	300,000	n/a	300,000

* Intervals reflect whichever occurs first in months or miles

** Crankcase Breather Elements began on 2007 built ISM engines

*** Fuel filter and oil drain intervals are dependent upon fuel mpg; see QSOL for more information

† DEF filter began on 2010 built engines

Filter Part Numbers	M11 Built 84-97	ISM11 Built 98-06	ISM11 Built 07-09	ISX11.9/12 Built 10-18	X12 Built 19+
Lubricating Oil Filter	LF9070	LF9070	LF9070	LF14000NN	LF14000NN
Fuel Filter (Pressure)	n/a	n/a	n/a	FF5776	FF5825
Fuel Water Separator++	OEM	OEM	OEM	OEM	OEM
Crankcase Breather	n/a	n/a	CV50633	CV50626	n/a
DEF Dosing Filter	n/a	n/a	n/a	5303604	5417706
Oil Recommendation	CK-4 15W40	CK-4 15W40	CK-4 15W40	CK-4 15W40	CK-4 15W40

++ Fuel water separators vary by chassis manufacturer

Customer Support

- The most up to date and complete information for your engine can be found on QSOL at quickserve.cummins.com.
- To find your nearest Cummins authorized location, go to locator.cummins.com or call 1-800-CUMMINS (1-800-286-6467).
- Having the Engine Serial Number (ESN) available ensures correct information. The ESN can be found on top of the engine.

Storage

- Store with a full tank of fuel from a high volume fuel retailer to prevent condensation and microbial growth in fuel tank.
- Completing annual maintenance prior to storage will remove corrosive elements in the engine oil and potential microbes in the fuel filter.
- Monthly exercise prolongs engine life. A 30-40 minute drive is best. If driving is not possible, operate the engine until coolant reaches 150 degrees to recharge system batteries and lubricate internal components. Engage fast idle in park by turning cruise control on and pressing cruise set switch.

Operation

- Engine warm up – operate with light throttle until engine reaches 150 degrees.
- Engine cool down – allow 3-5 minutes before shutting the engine off after full load operation.
- The X12 compression brake can produce up to 390 braking horsepower. Engine brake will not activate until oil temperature reaches 149 degrees. Turn engine exhaust brake off when road conditions are slippery.
- Amber “check engine” light indicates the need for the driver to check the vehicle before continuing to operate.
- Red “stop engine” light indicates the need to pull over as soon as it is safely possible. If light is flashing, the engine will shut down within 30 seconds.
- A complete guide to dash lamps related to the engine is contained in Cummins Bulletin 4971518 which can be found on cummins.com/brochures.
- Fuel economy can be improved by reducing vehicle speed, using cruise control, keeping tires properly inflated, reducing weight, keeping air conditioning system charged, and keeping the radiator clean.

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Cooling System

- Check coolant level before each trip.
- Coolant should be tested for freeze protection and dilution twice per year. A refractometer (e.g. Fleetguard CC2806) is much more accurate than floating ball hydrometers. Test strips are also available.
- Maintain coolant according to the chassis manufacturers recommendations. Some coolants require regular addition of Supplemental Coolant Additives. Most coolants require replacement at 5 years of service.
- When having your motorhome serviced, insist on using the coolant that was originally used by the chassis manufacturer or equivalent.
- There are many formulations of coolant. It is ideal to use the coolant formulation that the motorhome was originally filled with.
- Mixing coolant formulations can result in loss of protection of the engine and other components in the cooling system.
- All coolants used in the M11, ISM, ISX12, or X12 must meet the Cummins CES14603 or CES14439 specification.
- Engine Coolant formulations include:
 - Older traditional Heavy Duty Coolants are typically green in color. These require testing for SCA concentration at least twice per year. 3 way test strips are available from Fleetguard (CC2602B).
 - Fill for Life Coolants (e.g. Fleetcharge) are typically pink in color. These coolants require testing for SCA concentration and adding chemical as needed.
 - Organic Additive Technology Coolants (e.g. Fleetguard Compleat ES OAT, Final Charge, Shell Rotella ELC) can vary in color and may require addition of a chemical extender before the change interval is reached. Ask your chassis manufacturer.
 - Coolant filters may contain chemical additives. Buying “blank” non-chemical filters and using liquid additives if needed is recommended.

Fuel System

- Purchase fuel from high volume fuel retailers to avoid issues with water or microbes.
- Engines built since 2002 can use up to B20 biodiesel. Pre 2002 engines can use up to B5 biodiesel.
- It is best to avoid storing your motorhome with biodiesel.
- Cummins engines are designed to run on commercially available diesel fuel with no need for additives.
- A biocide can help when fuels are prone to contamination (black slime).
- Cummins Bulletin 3379001 on QSOL contains a comprehensive explanation of Fuel Recommendations.

Air System

- Not maintaining your air system is the most expensive mistake you can make.
- Change air filter based on chassis manufacturer time recommendation or more frequently if operating in dusty conditions as indicated by the air restriction indicator.
- The air restriction indicator should not be solely relied upon for air filter replacement.
- Loose or broken clamps, hoses, or piping can lead to dirt entry into the engine requiring engine overhaul.

Oil System

- Check oil level before each trip.
- The M11, ISM, ISX12, and X12 require two gallons to move the level on the dipstick from add to full.
- For normal engine operation, Cummins recommends the use of a high quality 15W40 or 10W30 engine oil that meets the requirements of Cummins CES20086 specification (API classification CK-4). API classification FA-4 oils are NOT recommended for motorhomes.
- The use of synthetic oils is allowed but does NOT justify the extension of the oil drain interval.
- Break-in period oil changes are not required on Cummins engines.
- Cummins engines are designed to run on commercially available oils without the need for supplemental additives. Cummins does NOT recommend or require supplemental oil additives.
- Oil analysis can be helpful in detecting contaminants, but does NOT justify the extension of the oil drain interval.

Diesel Exhaust Fluid (DEF)

- Cummins engines built since 2010 require the use of DEF. DEF equipped engines achieve greater fuel economy.
- DEF is non-toxic, non-polluting, and non-flammable.
- DEF fluid must meet ISO 22241-1 specification.
- For maximum shelf life (18 months) store DEF in a sealed container at temperatures below 78F (26C).
- DEF will freeze at 11F (-12C) but will not degrade when frozen. Tanks and lines are designed to accommodate freezing.



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Bulletin 5600463 Produced in U.S.A. Rev. 3/22
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