Basic instructions - Shop and Assembly

SHIMMING

For each adjustment operation, select adjusting shims and measure individually using a micrometer, then add up the recorded values. Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value indicated on each shim.

ROTATING SHAFT SEALS

For correct rotating shaft seal installation, proceed as follows:

- before assembly, allow the seal to soak in the oil it will be sealing for at least thirty minutes.
- thoroughly clean the shaft and check that the working surface on the shaft is not damaged.
- position the sealing lip facing the fluid; with hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will deviate the fluid towards the inner side of the seal.
- coat the sealing lip with a thin layer of lubricant (use oil rather than grease) and fill the gap between the sealing lip and the dust lip on double lip seals with grease.
- insert the seal in its seat and press down using a flat punch or seal installation tool. Do not tap the seal with a hammer or mallet.
- whilst inserting the seal, check that it is perpendicular to the seat; once settled, make sure that it makes contact with the thrust element, if required.
- to prevent damaging the seal lip on the shaft, position a protective guard during installation operations.

O-RING SEALS

Lubricate the O-RING seals before inserting them in the seats, this will prevent them from overturning and twisting, which would jeopardise sealing efficiency.

SEALING COMPOUNDS

Apply one of the following sealing compounds on the mating surfaces when specified: SILMATE® RTV1473, or **LOCTITE RTV 598** or **LOCTITE® INSTANT GASKET 587 BLUE**. Before applying the sealing compound, prepare the surfaces as directed on product container or as follows:

- remove any incrustations using a metal brush.
- thoroughly de-grease the surfaces using a locally approved cleaning agent such as safety solvent or brake parts cleaner.

SPARE PARTS

Only use "CNH Original Parts" or " CNH Parts".

Only genuine spare parts guarantee the same quality, duration and safety as original parts, as they are the same parts that are assembled during standard production. Only "CNH Original Parts" or " CNH Parts" can offer this guarantee.
When ordering spare parts, always provide the following information:

- machine model (commercial name) and serial number
- part number of the ordered part, which can be found in the "Microfiches" or the "Service Parts Catalogue", used for order processing

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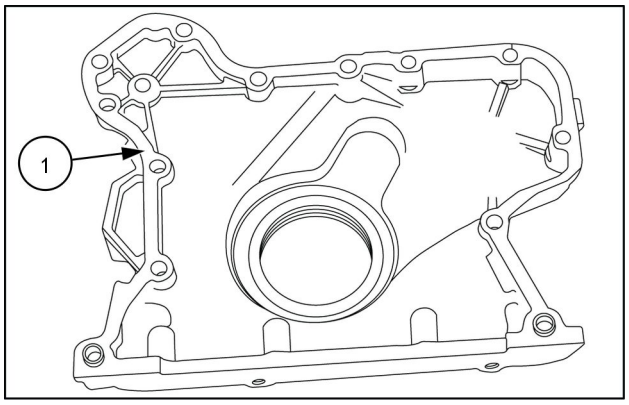
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Engine block cover Front - Install

F4HFE413A*A005	
F4HFE413C*A	
F4HFE413D*A008	
F4HFE413H*A	
F4HFE413J*A	
F4HFE413L*A007	
F4HFE413M*A005	
F4HFE413P*A001	
F4HFE6131*A	
F4HFE6132*A004	
F4HFE6138*A002	
F4HFE613F*A002	
F4HFE613G*A	
F4HFE613H*A	
F4HFE613J*A007	
F4HFE613J*A	
F4HFE613K*A	
F4HFE613P*A	
F4HFE613R*A	
F4HFE613T*A004	
F4HFE613T*A005	
F4HFE613U*A005	
F4HFE613U*A006	
F4HFE613V*A003	
F4HFE613X*A	
F4HFE613Y*A	
F4HFE613Z*A005	
F4HFE613Z*A006	
F4HFE614E*A001	

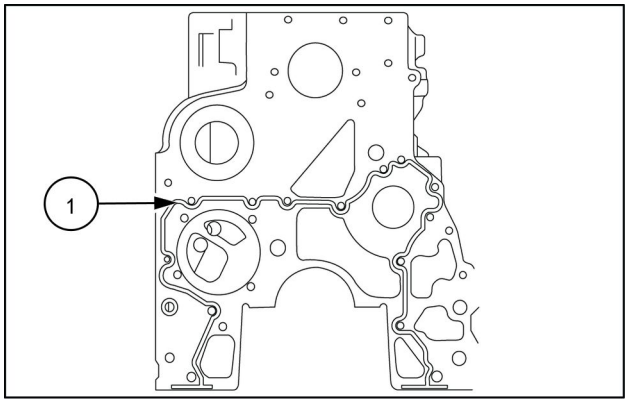
NOTICE: *The front crankshaft seal must be replaced once the cover is removed from the crankcase.*

1. Thoroughly clean the sealing surfaces **(1)** on the cover and the crankcase.



NHIL13ENG0318AA 1

2. Apply a consistent bead of **LOCTITE® 5205 (1)** or equivalent to the crankcase as shown.



NHIL13ENG0319AA 2

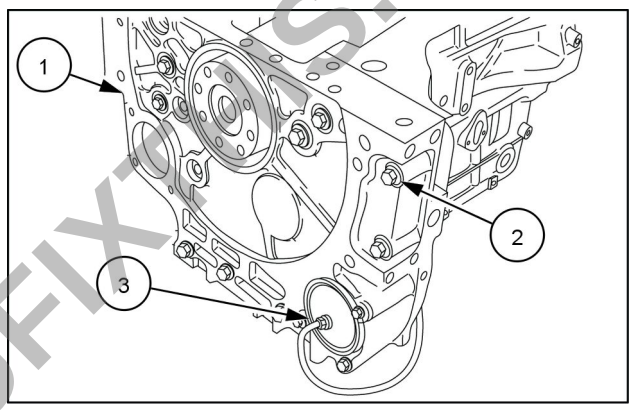
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Timing gear housing - Remove

F4DFE413A*A	
F4DFE413B*A	
F4DFE413C*A	
F4DFE413D*A	
F4DFE413E*A	
F4DFE6132*A	
F4DFE613A*A	
F4DFE613B*A	
F4DFE613C*A	
F4DFE613D*A	
F4DFE613E*A	
F4DFE613F*A	
F4DFE613G*A	
F4DFE613H*A	
F4DFE613J*A	
F4DFE613K*A	
F4DFE613L*A	

1. Disconnect the high pressure fuel pump stroke sensor **(3)**.
2. Remove the bolts **(2)** and remove the timing gear housing **(1)** from the engine block.



NHIL13ENG0335AA 1

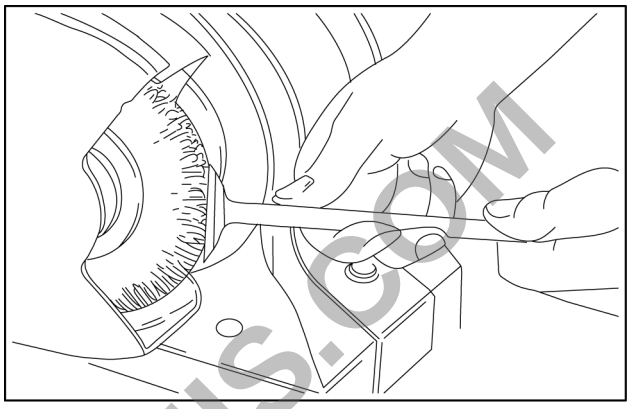
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Valves - Cleaning

Prior operation:
Valves - Remove (10.101)

1. Use the proper metal brush to remove carbon deposits from valves.
2. Check that the valves show no signs of seizing, scoring, or cracking.
3. If necessary, grind the valve seats, taking away the least amount of material possible.



NHIL13ENG0430AA 1

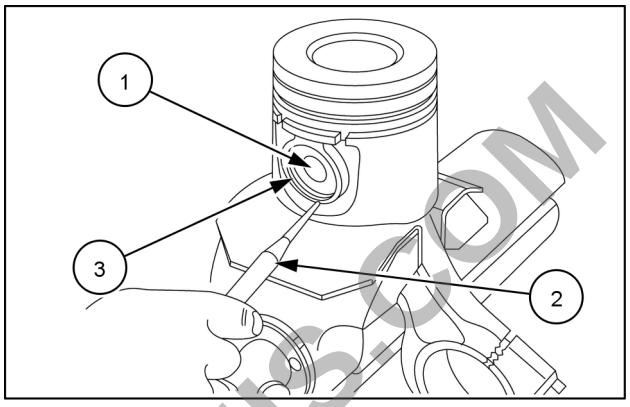
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Piston Pin - Remove

Prior operation:
Connecting rod and piston - Remove (10.105)

1. Use a scriber **(2)** to remove the snap rings **(3)**.
2. Remove the piston pin **(1)**.



NHIL13ENG0471AA 1

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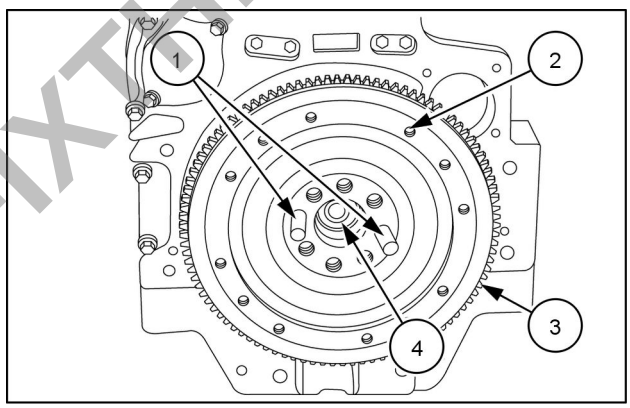
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Engine flywheel - Install

F4DFE413A*A	
F4DFE413B*A	
F4DFE413C*A	
F4DFE413D*A	
F4DFE413E*A	
F4DFE6132*A	
F4DFE613A*A	
F4DFE613B*A	
F4DFE613C*A	
F4DFE613D*A	
F4DFE613E*A	
F4DFE613F*A	
F4DFE613G*A	
F4DFE613H*A	
F4DFE613J*A	
F4DFE613K*A	
F4DFE613L*A	

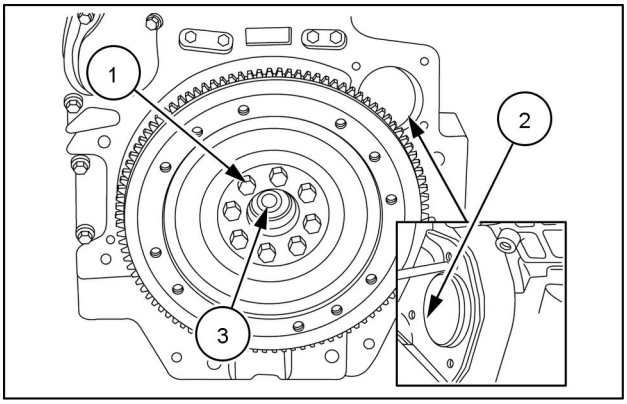
Prior operation:
Engine flywheel - Check (10.103)

1. Install two bolts of medium length into the engine flywheel at holes **(2)**.
2. Install two guide pins **(1)** with suitable length into the engine crankshaft holes as shown.
3. Use the proper sling and hoist to install the flywheel **(3)** onto the engine crankshaft **(4)**.



NHIL13ENG0488AA 1

4. Secure the engine flywheel retaining bolts **(1)** onto the engine crankshaft **(3)**.
5. Install the flywheel rotation locking tool **380000988** to the flywheel housing **(2)** to stop the rotation of the flywheel.



NHIL13ENG0487AB 2

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Contents

Engine - 10

Balancer and damper - 110

SERVICE

Balancer
- Remove 3
- Install 4

Crankshaft damper
- Remove (*) 5
- Install (*) 6
- Remove (*) 7
- Install (*) 8

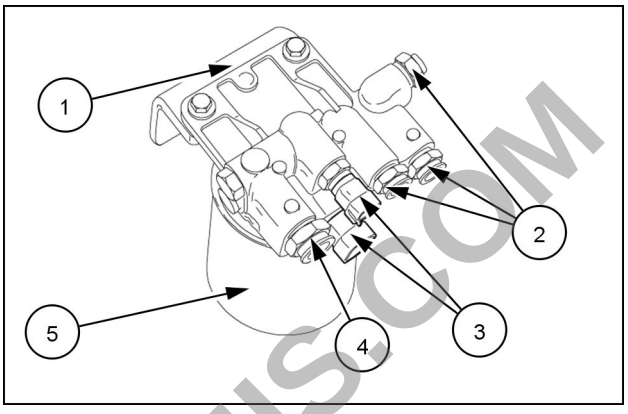
(*) See content for specific models

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Fuel filters - Remove

Prior operation:
Fuel supply lines Low pressure - Disconnect (10.210)

1. Use the fuel filter wrench **34591-00100** to loosen the fuel filter **(5)** and remove it from the support **(1)**.
2. Disconnect the electrical connections **(3)** from the support **(1)** including the connection for the fuel heater.
3. Disconnect the fuel low pressure fuel lines **(2)** from the support **(1)**.
4. Disconnect the fuel line **(4)** from the support **(1)**.
5. Remove the sustaining support bracket **(1)** from the engine block.



4442596398GHDC 1

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Common rail Relief valve - Remove

⚠ WARNING

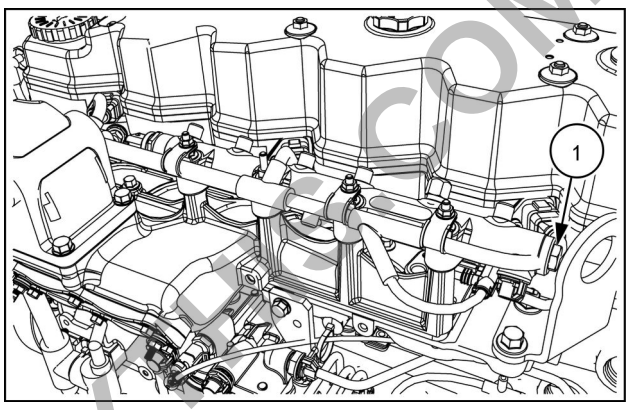
Hot liquid under pressure!
Fuel in the high pressure fuel line is still under pressure immediately after you shut down the engine. Before performing any maintenance or inspection, wait for 2 minutes after engine shutdown to allow the pressure to drop.
Failure to comply could result in death or serious injury.

W0249A

1. Clean the area around the pressure relief valve **(1)** with de-greaser, than dry with compressed air.
2. Detach the low-pressure connection. See **Common rail lines - Disconnect (10.218)**.

NOTE: *Collect any escaping fuel.*

3. Slowly loosen the pressure relief valve **(1)** to allow the pressure in the fuel system to drop to ambient pressure.
4. Remove the pressure relief valve.
5. If the pressure relief valve is used with a gasket, remove the gasket.
6. Clean the threads and the sealing surface of the common rail.
7. Cap the common rail orifice after you remove the pressure relief valve.
8. If the pressure relief valve will be reused, carefully remove the sealing ring.



NHIL13ENG1349AA 1

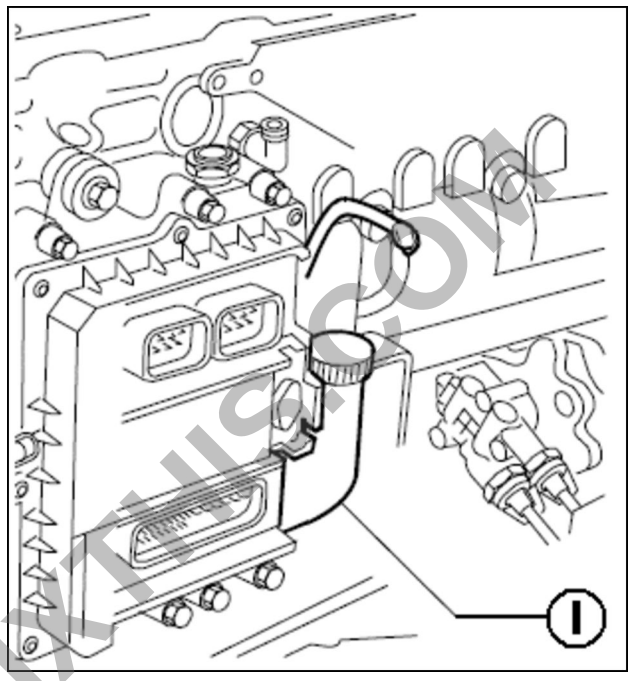
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Turbocharger oil supply line - Install

Oil Fill Tube

1. Install a new O-ring on the oil fill tube **(1)**.
2. Attach the oil fill tube **(1)** to the engine block using the three M12x25 bolts.



OILFILLH2 1

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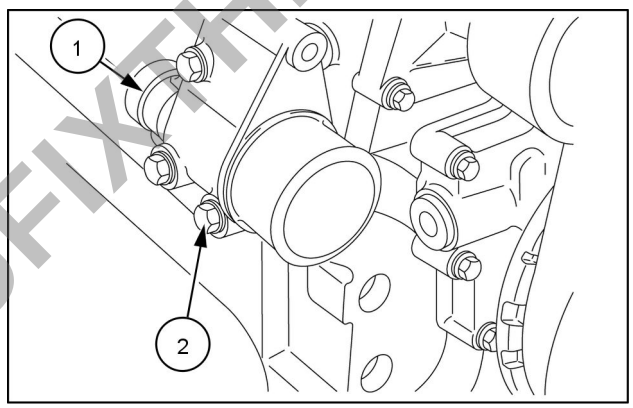
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Water pump Water manifold - Remove

F4DFE413A*A	
F4DFE413B*A	
F4DFE413C*A	
F4DFE413D*A	
F4DFE413E*A	
F4DFE6132*A	
F4DFE613A*A	
F4DFE613B*A	
F4DFE613C*A	
F4DFE613D*A	
F4DFE613E*A	
F4DFE613F*A	
F4DFE613G*A	
F4DFE613H*A	
F4DFE613J*A	
F4DFE613K*A	
F4DFE613L*A	

Prior operation:
Alternator - Remove (55.301)

1. Remove the bolts **(1)** securing the water manifold **(2)**.
2. Remove the water manifold **(1)** from the block.



NHIL13ENG0639AA 1

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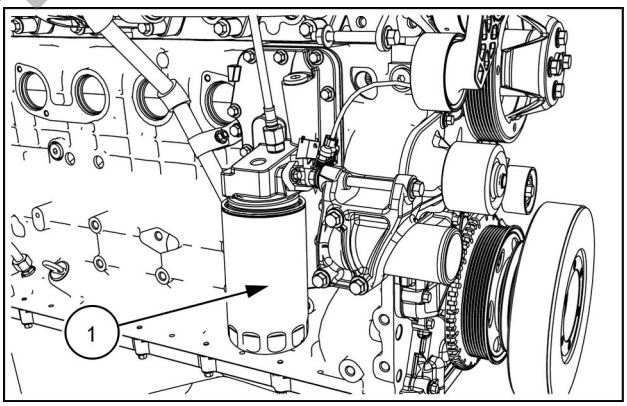
Engine oil filter - Remove

F4HFE413A*A005	
F4HFE413C*A	
F4HFE413D*A008	
F4HFE413H*A	
F4HFE413J*A	
F4HFE413L*A007	
F4HFE413M*A005	
F4HFE413P*A001	
F4HFE6131*A	
F4HFE6132*A004	
F4HFE6138*A002	
F4HFE613F*A002	
F4HFE613G*A	
F4HFE613H*A	
F4HFE613J*A007	
F4HFE613J*A	
F4HFE613K*A	
F4HFE613P*A	
F4HFE613R*A	
F4HFE613T*A004	
F4HFE613T*A005	
F4HFE613U*A005	
F4HFE613U*A006	
F4HFE613V*A003	
F4HFE613X*A	
F4HFE613Y*A	
F4HFE613Z*A005	
F4HFE613Z*A006	
F4HFE614E*A001	

1. Use the oil filter wrench tool **380000670** to remove the oil filter **(1)**.

NOTE: *The oil filter is equipped with an internal check valve to minimize the amount oil loss when removing the filter.*

NOTE: *Be sure that the oil filter gasket is removed with the filter.*



NHIL13ENG1357AA 1

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Contents

Engine - 10

Oil cooler and lines - 408

SERVICE

Engine oil cooler

Remove (*) 3

Install (*) 4

Remove (*) 5

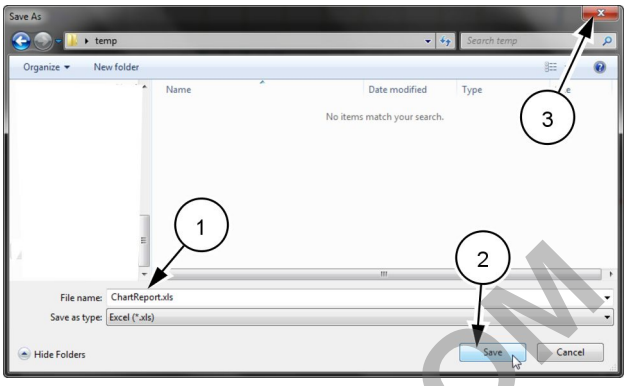
Install (*) 6

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(*) See content for specific models

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21. Name the file **(1)**, select the desired location, and click “Save” **(2)**.
22. Click X **(3)** to close the graph and continue recording data as needed.



NHIL15GEN0029AA 17

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Index

Electrical systems - 55

Alternator - 301

Alternator - Install 4
Alternator - Remove 3

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CONSUMABLES INDEX

Consumable	Reference	PAGE
Loctite® 5205	Engine block cover Front - Cleaning	10.2 / 10
Loctite® 5205	Engine block cover Front - Install	10.2 / 11
Loctite® 5205	Engine block cover Rear - Cleaning	10.2 / 17
Loctite® 518™ Gasket Eliminator®	Engine block cover Rear - Cleaning	10.2 / 21
Loctite® 5205	Timing gear housing - Cleaning	10.2 / 24
Molykote® G-N Metal assembly paste	Cylinder head - Install	10.4 / 12
Mobilux® EP 023	Common rail Relief valve - Install	10.11 / 39
Mobilux® EP 023	Common rail Relief valve - Install	10.11 / 39
Loctite® 5999™	Intake manifold - Install	10.13 / 8

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Contents

INTRODUCTION

Engine 10

[10.001] Engine and crankcase 10.1

[10.102] Pan and covers 10.2

[10.106] Valve drive and gears 10.3

[10.101] Cylinder heads 10.4

[10.105] Connecting rods and pistons 10.5

[10.103] Crankshaft and flywheel 10.6

[10.110] Balancer and damper 10.7

[10.114] Pump drives 10.8

[10.210] Lift pump and lines 10.9

[10.206] Fuel filters 10.10

[10.218] Fuel injection system 10.11

[10.250] Turbocharger and lines 10.12

[10.254] Intake and exhaust manifolds and muffler 10.13

[10.500] Selective Catalytic Reduction (SCR) exhaust treatment 10.14

[10.400] Engine cooling system 10.15

[10.414] Fan and drive 10.16

[10.304] Engine lubrication system 10.17

[10.408] Oil cooler and lines 10.18

Electrical systems 55

[55.015] Engine control system 55.1

[55.201] Engine starting system 55.2

[55.301] Alternator 55.3

[55.202] Cold start aid 55.4

[55.010] Fuel injection system 55.5

[55.014] Engine intake and exhaust system 55.6

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Safety rules

Personal safety



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual and on machine decals, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

⚠ DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

⚠ WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

⚠ CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation which, if not avoided, could result in machine or property damage. The color associated with Notice is BLUE.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information which clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

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CNH NEF Tier 4A (interim) and Stage IIIB Engine, F4DFE413A*A, F4DFE413B*A, F4DFE413C*A, F4DFE413D*A, F4DFE413E*A, F4DFE6132*A, F4DFE613A*A, F4DFE613B*A, F4DFE613C*A, F4DFE613D*A, F4DFE613E*A, F4DFE613F*A, F4DFE613G*A, F4DFE613H*A, F4DFE613J*A, F4DFE613K*A, F4DFE613L*A, F4HFE413A*A005, F4HFE413C*A, F4HFE413D*A008, F4HFE413H*A, F4HFE413J*A, F4HFE413L*A007, F4HFE413M*A005, F4HFE413P*A001, F4HFE6131*A, F4HFE6132*A004, F4HFE6138*A002, F4HFE613F*A002, F4HFE613G*A, F4HFE613H*A, F4HFE613J*A007, F4HFE613J*A, F4HFE613K*A, F4HFE613P*A, F4HFE613R*A, F4HFE613T*A004, F4HFE613T*A005, F4HFE613U*A005, F4HFE613U*A006, F4HFE613V*A003, F4HFE613X*A, F4HFE613Y*A, F4HFE613Z*A005, F4HFE613Z*A006, F4HFE614E*A001 Service Manual

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