SERVICE MANUAL

NEF
Tier 4A (interim) and Stage IIIB
Engine

See the following page for engine model numbers

Part number 48076861
1st edition English
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SERVICE MANUAL

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

48076861 15/11/2016

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INTRODUCTION

Foreword

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances. Your CNH dealer can also provide assistance.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- Do not open the air-conditioning system yourself. It contains gases that should not be released into the atmosphere. Your CNH dealer or air-conditioning specialist has a special extractor for this purpose and can recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. CNH strongly recommends that you return all used batteries to a CNH dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.

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Mandatory battery recycling

NOTE: *The following requirements are mandatory in Brazil.*

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries

- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling

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.

Torque

Component	Size	Specification
Cylinder head and components		
Plug	¼"	**10 - 14 Nm (7.4 - 10.3 lb ft)**
	½"	**20 - 28 Nm (14.8 - 20.7 lb ft)**
	¾"	**31 - 41 Nm (22.9 - 30.2 lb ft)**
Grid heater	M6 Nut	**6 - 10 Nm (4.4 - 7.4 lb ft)**
Intake manifold	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Engine lifting bracket		
Rear	M12	**65 - 89 Nm (47.9 - 65.6 lb ft)**
Front	M8	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Cylinder head	**M12x1.75x130 mm**	
First phase		**30 - 40 Nm (22.1 - 29.5 lb ft)**
Second phase		**85 - 95 °**
Third phase		**85 - 95 °**
Cylinder head	**M12x1.75x150 mm**	
First phase		**50 - 60 Nm (36.9 - 44.3 lb ft)**
Second phase		**85 - 95 °**
Third phase		**85 - 95 °**
Rocker bracket		**31 - 41 Nm (22.9 - 30.2 lb ft)**
Rocker arm jam nuts		**20 - 28 Nm (14.8 - 20.7 lb ft)**
Exhaust manifold		**48 - 58 Nm (35.4 - 42.8 lb ft)**
Valve cover	M8 Nut	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Turbocharger		
6 Cylinder	M8 Screw	**6 - 8 Nm (4.4 - 5.9 lb ft)**
	M8 Nut	**37 - 49 Nm (27.3 - 36.1 lb ft)**
4 Cylinder	M8 Screw	**6 - 8 Nm (4.4 - 5.9 lb ft)**
	M8 Nut	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Front case		
Front cover	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Rear case		
Gear case	M12 Screw	**65 - 89 Nm (47.9 - 65.6 lb ft)**
	M10 Screw	**42 - 52 Nm (31.0 - 38.4 lb ft)**
	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Flywheel housing	M10	**75 - 95 Nm (55.3 - 70.1 lb ft)**
	M12	**44 - 54 Nm (32.5 - 39.8 lb ft)**
Cylinder block and crankshaft components		
Camshaft retaining plate	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Camshaft gear	M8 Screw	**32 - 40 Nm (23.6 - 29.5 lb ft)**
Crankcase plate	M10 Screw	**38 - 48 Nm (28.0 - 35.4 lb ft)**
Vibration damper and adapter	M12	
First phase		**45 - 55 Nm (33.2 - 40.6 lb ft)**
Second phase		**90 °**
Drive pulley	M10	**70.0 - 75.0 N·m (51.6 - 55.3 lb ft)**
Engine flywheel	M12	
First phase		**26 - 34 Nm (19.2 - 25.1 lb ft)**
Second phase		**55 - 65 °**
Main caps	M12	
First phase		**44 - 56 Nm (32.5 - 41.3 lb ft)**
Second phase		**74 - 86 Nm (54.6 - 63.4 lb ft)**
Third phase		**85 - 95 °**
Connecting rod caps		
First phase		**45.0 - 55.0 N·m (33.2 - 40.6 lb ft)**
Second phase		**55 - 65 °**
Lubrication system and components		

Component	Size	Specification
Oil pump		
First phase	M8	**7 - 9 Nm** (**5.2 - 6.6 lb ft**)
Second phase	M8	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Oil pressure relief valve	M22	**72 - 88 Nm** (**53.1 - 64.9 lb ft**)
Oil cooler and oil filter base	M8 Screw	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Oil Filter		Contact + ¾ Turn
Connection on filter base for turbo oil supply	1 ⅛"	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Turbo lubrication pipe	M12 Nut	**8 - 12 Nm** (**5.9 - 8.9 lb ft**)
Turbo lubrication pipe adapter	M12	**30 - 40 Nm** (**22.1 - 29.5 lb ft**)
Oil pan		**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Piston spray nozzles	M8	**12 - 18 Nm** (**8.9 - 13.3 lb ft**)
Electrical components		
Camshaft sensor	M6 Studs	**6 - 10 Nm** (**4.4 - 7.4 lb ft**)
	M6 Nut	**8 - 12 Nm** (**5.9 - 8.9 lb ft**)
	M6 Screw	**6 - 10 Nm** (**4.4 - 7.4 lb ft**)
Wiring bulkhead	M6 Screw	**8 - 12 Nm** (**5.9 - 8.9 lb ft**)
Support bracket for injector wiring	M8 Screw	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Injector wiring		**1.25 - 1.75 Nm** (**0.92 - 1.29 lb ft**)
ECU cooling plate	M6 Screw	**8 - 12 Nm** (**5.9 - 8.9 lb ft**)
	M8 Screw	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Fuel outlet	M12	**10 - 14 Nm** (**7.4 - 10.3 lb ft**)
Fuel inlet	M12	**10 - 14 Nm** (**7.4 - 10.3 lb ft**)
Crankshaft speed sensor	M6 Screw	**6 - 10 Nm** (**4.4 - 7.4 lb ft**)
Coolant temperature sensor	M14 Screw	**17 - 23 Nm** (**12.5 - 17.0 lb ft**)
Oil pressure / Temperature sensor	M5 Screw	**5 - 7 Nm** (**3.7 - 5.2 lb ft**)
Fuel pressure sensor		**30 - 40 Nm** (**22.1 - 29.5 lb ft**)
Fuel temperature sensor	M14	**17 - 23 Nm** (**12.5 - 17.0 lb ft**)
Air pressure / Temperature sensor		**5 - 7 Nm** (**3.7 - 5.2 lb ft**)
Engine oil level sensor	M12	**10 - 14 Nm** (**7.4 - 10.3 lb ft**)
Alternator support bracket	M10 Screw	**37 - 49 Nm** (**27.3 - 36.1 lb ft**)
Alternator tension bracket	M10 Screw	**37 - 49 Nm** (**27.3 - 36.1 lb ft**)
Starter		**37 - 49 Nm** (**27.3 - 36.1 lb ft**)
Fuel system and components		
Feed pump	M8 Studs	**10 - 14 Nm** (**7.4 - 10.3 lb ft**)
High pressure pump gear	M18 Nut	**100 - 110 Nm** (**73.8 - 81.1 lb ft**)
Fuel pump	M8 Nut	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Injector		
First phase	M6x1x35	**3.5 N·m** (**31 lb in**)
Second phase	M6x1x35	**25 °**
Third phase	M6x1x35	**25 °**
Fourth phase	M6x1x35	**25 °**
Injector feed connector		**45 - 55 Nm** (**33.2 - 40.6 lb ft**)
Common rail	M8 Screw	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
High pressure fuel line	M14 Fitting	**18 - 22 Nm** (**13.3 - 16.2 lb ft**)
High pressure pipe connector	M8 Screw	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Fuel filter bracket	M12 Screw	**71 - 85 Nm** (**52.4 - 62.7 lb ft**)
Fuel filter holder	M8 Screw	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Fuel filter		Contact + ¾ Turn
Cooling system and components		

Component	Size	Specification
Engine coolant inlet	M10 Screw	**37 - 49 Nm** (**27.3 - 36.1 lb ft**)
Fitting on coolant inlet	**90 °** Elbow	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Compressor cooling pipe		**20 - 24 Nm** (**14.8 - 17.7 lb ft**)
Engine coolant drain collector	M6 Screw	**8 - 12 Nm** (**5.9 - 8.9 lb ft**)
Water pump	M8 Screw	**20 - 28 Nm** (**14.8 - 20.7 lb ft**)
Belt tensioner	M10	**37 - 49 Nm** (**27.3 - 36.1 lb ft**)
Idler pulleys	M10	**37 - 49 Nm** (**27.3 - 36.1 lb ft**)

Basic instructions - Important notice regarding equipment servicing

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The information in this manual is up-to-date at the date of the publication. It is the policy of the manufacturer for continuous improvement. Some information could not be updated due to modifications of a technical or commercial type, or changes to the laws and regulations of different countries.

In case of questions, refer to your CNH Sales and Service Networks.

Torque - Minimum tightening torques for normal assembly

METRIC NON-FLANGED HARDWARE

NOM. SIZE	CLASS 8.8 BOLT and CLASS 8 NUT		CLASS 10.9 BOLT and CLASS 10 NUT		LOCKNUT CL.8 W/CL8.8 BOLT	LOCKNUT CL.10 W/CL10.9 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr		
M4	2.2 N·m (19 lb in)	2.9 N·m (26 lb in)	3.2 N·m (28 lb in)	4.2 N·m (37 lb in)	2 N·m (18 lb in)	2.9 N·m (26 lb in)
M5	4.5 N·m (40 lb in)	5.9 N·m (52 lb in)	6.4 N·m (57 lb in)	8.5 N·m (75 lb in)	4 N·m (36 lb in)	5.8 N·m (51 lb in)
M6	7.5 N·m (66 lb in)	10 N·m (89 lb in)	11 N·m (96 lb in)	15 N·m (128 lb in)	6.8 N·m (60 lb in)	10 N·m (89 lb in)
M8	18 N·m (163 lb in)	25 N·m (217 lb in)	26 N·m (234 lb in)	35 N·m (311 lb in)	17 N·m (151 lb in)	24 N·m (212 lb in)
M10	37 N·m (27 lb ft)	49 N·m (36 lb ft)	52 N·m (38 lb ft)	70 N·m (51 lb ft)	33 N·m (25 lb ft)	48 N·m (35 lb ft)
M12	64 N·m (47 lb ft)	85 N·m (63 lb ft)	91 N·m (67 lb ft)	121 N·m (90 lb ft)	58 N·m (43 lb ft)	83 N·m (61 lb ft)
M16	158 N·m (116 lb ft)	210 N·m (155 lb ft)	225 N·m (166 lb ft)	301 N·m (222 lb ft)	143 N·m (106 lb ft)	205 N·m (151 lb ft)
M20	319 N·m (235 lb ft)	425 N·m (313 lb ft)	440 N·m (325 lb ft)	587 N·m (433 lb ft)	290 N·m (214 lb ft)	400 N·m (295 lb ft)
M24	551 N·m (410 lb ft)	735 N·m (500 lb ft)	762 N·m (560 lb ft)	1016 N·m (750 lb ft)	501 N·m (370 lb ft)	693 N·m (510 lb ft)

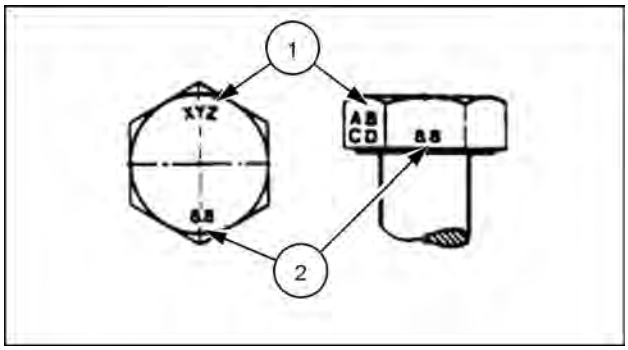
NOTE: *M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.*

METRIC FLANGED HARDWARE

NOM. SIZE	CLASS 8.8 BOLT and CLASS 8 NUT		CLASS 10.9 BOLT and CLASS 10 NUT		LOCKNUT CL.8 W/CL8.8 BOLT	LOCKNUT CL.10 W/CL10.9 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr		
M4	2.4 N·m (21 lb in)	3.2 N·m (28 lb in)	3.5 N·m (31 lb in)	4.6 N·m (41 lb in)	2.2 N·m (19 lb in)	3.1 N·m (27 lb in)
M5	4.9 N·m (43 lb in)	6.5 N·m (58 lb in)	7.0 N·m (62 lb in)	9.4 N·m (83 lb in)	4.4 N·m (39 lb in)	6.4 N·m (57 lb in)
M6	8.3 N·m (73 lb in)	11 N·m (96 lb in)	12 N·m (105 lb in)	16 N·m (141 lb in)	7.5 N·m (66 lb in)	11 N·m (96 lb in)
M8	20 N·m (179 lb in)	27 N·m (240 lb in)	29 N·m (257 lb in)	39 N·m (343 lb in)	18 N·m (163 lb in)	27 N·m (240 lb in)
M10	40 N·m (30 lb ft)	54 N·m (40 lb ft)	57 N·m (42 lb ft)	77 N·m (56 lb ft)	37 N·m (27 lb ft)	53 N·m (39 lb ft)
M12	70 N·m (52 lb ft)	93 N·m (69 lb ft)	100 N·m (74 lb ft)	134 N·m (98 lb ft)	63 N·m (47 lb ft)	91 N·m (67 lb ft)
M16	174 N·m (128 lb ft)	231 N·m (171 lb ft)	248 N·m (183 lb ft)	331 N·m (244 lb ft)	158 N·m (116 lb ft)	226 N·m (167 lb ft)
M20	350 N·m (259 lb ft)	467 N·m (345 lb ft)	484 N·m (357 lb ft)	645 N·m (476 lb ft)	318 N·m (235 lb ft)	440 N·m (325 lb ft)
M24	607 N·m (447 lb ft)	809 N·m (597 lb ft)	838 N·m (618 lb ft)	1118 N·m (824 lb ft)	552 N·m (407 lb ft)	

IDENTIFICATION

Metric Hex head and carriage bolts, classes 5.6 and up



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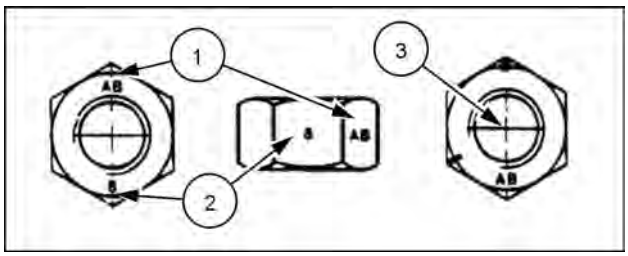
1. Manufacturer's Identification
2. Property Class

Metric Hex nuts and locknuts, classes 05 and up



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1. Manufacturer's Identification
2. Property Class
3. Clock Marking of Property Class and Manufacturer's Identification (Optional), i.e. marks **60 °** apart indicate Class 10 properties, and marks **120 °** apart indicate Class 8.

INCH NON-FLANGED HARDWARE

NOMINAL SIZE	SAE GRADE 5 BOLT and NUT		SAE GRADE 8 BOLT and NUT		LOCKNUT GrB W/ Gr5 BOLT	LOCKNUT GrC W/ Gr8 BOLT
	UN-PLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UN-PLATED or PLATED SILVER	PLATED W/ZnCr GOLD		
1/4	**8 N·m (71 lb in)**	**11 N·m (97 lb in)**	**12 N·m (106 lb in)**	**16 N·m (142 lb in)**	**8.5 N·m (75 lb in)**	**12.2 N·m (109 lb in)**
5/16	**17 N·m (150 lb in)**	**23 N·m (204 lb in)**	**24 N·m (212 lb in)**	**32 N·m (283 lb in)**	**17.5 N·m (155 lb in)**	**25 N·m (220 lb in)**
3/8	**30 N·m (22 lb ft)**	**40 N·m (30 lb ft)**	**43 N·m (31 lb ft)**	**57 N·m (42 lb ft)**	**31 N·m (23 lb ft)**	**44 N·m (33 lb ft)**
7/16	**48 N·m (36 lb ft)**	**65 N·m (48 lb ft)**	**68 N·m (50 lb ft)**	**91 N·m (67 lb ft)**	**50 N·m (37 lb ft)**	**71 N·m (53 lb ft)**
1/2	**74 N·m (54 lb ft)**	**98 N·m (73 lb ft)**	**104 N·m (77 lb ft)**	**139 N·m (103 lb ft)**	**76 N·m (56 lb ft)**	**108 N·m (80 lb ft)**
9/16	**107 N·m (79 lb ft)**	**142 N·m (105 lb ft)**	**150 N·m (111 lb ft)**	**201 N·m (148 lb ft)**	**111 N·m (82 lb ft)**	**156 N·m (115 lb ft)**
5/8	**147 N·m (108 lb ft)**	**196 N·m (145 lb ft)**	**208 N·m (153 lb ft)**	**277 N·m (204 lb ft)**	**153 N·m (113 lb ft)**	**215 N·m (159 lb ft)**
3/4	**261 N·m (193 lb ft)**	**348 N·m (257 lb ft)**	**369 N·m (272 lb ft)**	**491 N·m (362 lb ft)**	**271 N·m (200 lb ft)**	**383 N·m (282 lb ft)**
7/8	**420 N·m (310 lb ft)**	**561 N·m (413 lb ft)**	**594 N·m (438 lb ft)**	**791 N·m (584 lb ft)**	**437 N·m (323 lb ft)**	**617 N·m (455 lb ft)**
1	**630 N·m (465 lb ft)**	**841 N·m (620 lb ft)**	**890 N·m (656 lb ft)**	**1187 N·m (875 lb ft)**	**654 N·m (483 lb ft)**	**924 N·m (681 lb ft)**

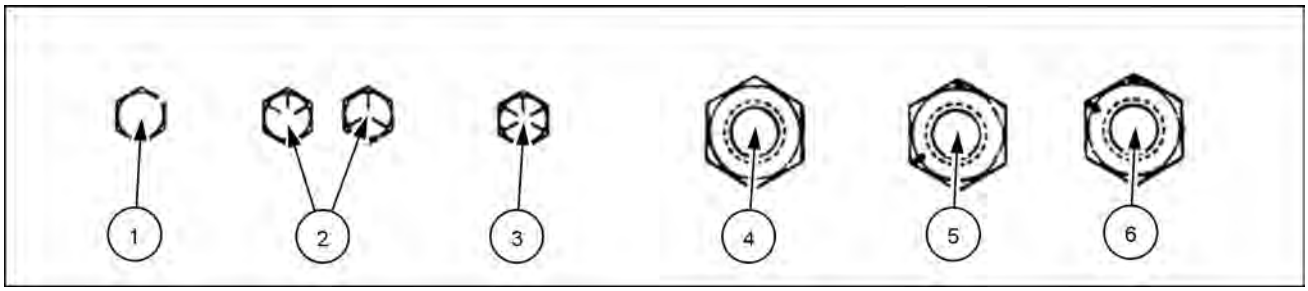
NOTE: *For Imperial Units,* ***1/4 in*** *and* ***5/16 in*** *hardware torque specifications are shown in pound-inches.* ***3/8 in*** *through* ***1 in*** *hardware torque specifications are shown in pound-feet.*

INCH FLANGED HARDWARE

NOM-INAL SIZE	SAE GRADE 5 BOLT and NUT		SAE GRADE 8 BOLT and NUT		LOCKNUT GrF W/ Gr5 BOLT	LOCKNUT GrG W/ Gr8 BOLT
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD		
1/4	9 N·m (80 lb in)	12 N·m (106 lb in)	13 N·m (115 lb in)	17 N·m (150 lb in)	8 N·m (71 lb in)	12 N·m (106 lb in)
5/16	19 N·m (168 lb in)	25 N·m (221 lb in)	26 N·m (230 lb in)	35 N·m (310 lb in)	17 N·m (150 lb in)	24 N·m (212 lb in)
3/8	33 N·m (25 lb ft)	44 N·m (33 lb ft)	47 N·m (35 lb ft)	63 N·m (46 lb ft)	30 N·m (22 lb ft)	43 N·m (32 lb ft)
7/16	53 N·m (39 lb ft)	71 N·m (52 lb ft)	75 N·m (55 lb ft)	100 N·m (74 lb ft)	48 N·m (35 lb ft)	68 N·m (50 lb ft)
1/2	81 N·m (60 lb ft)	108 N·m (80 lb ft)	115 N·m (85 lb ft)	153 N·m (113 lb ft)	74 N·m (55 lb ft)	104 N·m (77 lb ft)
9/16	117 N·m (86 lb ft)	156 N·m (115 lb ft)	165 N·m (122 lb ft)	221 N·m (163 lb ft)	106 N·m (78 lb ft)	157 N·m (116 lb ft)
5/8	162 N·m (119 lb ft)	216 N·m (159 lb ft)	228 N·m (168 lb ft)	304 N·m (225 lb ft)	147 N·m (108 lb ft)	207 N·m (153 lb ft)
3/4	287 N·m (212 lb ft)	383 N·m (282 lb ft)	405 N·m (299 lb ft)	541 N·m (399 lb ft)	261 N·m (193 lb ft)	369 N·m (272 lb ft)
7/8	462 N·m (341 lb ft)	617 N·m (455 lb ft)	653 N·m (482 lb ft)	871 N·m (642 lb ft)	421 N·m (311 lb ft)	594 N·m (438 lb ft)
1	693 N·m (512 lb ft)	925 N·m (682 lb ft)	979 N·m (722 lb ft)	1305 N·m (963 lb ft)	631 N·m (465 lb ft)	890 N·m (656 lb ft)

IDENTIFICATION

Inch Bolts and free-spinning nuts



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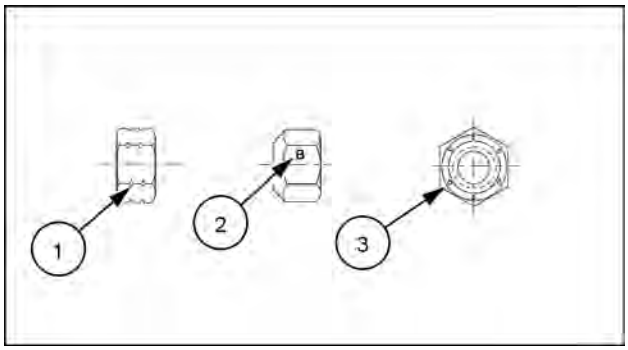
Grade Marking Examples

SAE Grade Identification			
1	Grade 2 - No Marks	4	Grade 2 Nut - No Marks
2	Grade 5 - Three Marks	5	Grade 5 Nut - Marks **120 °** Apart
3	Grade 8 - Five Marks	6	Grade 8 Nut - Marks **60 °** Apart

Inch Lock Nuts, All Metal (Three optional methods)



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Grade Identification

Grade	Corner Marking Method (1)	Flats Marking Method (2)	Clock Marking Method (3)
Grade A	No Notches	No Mark	No Marks
Grade B	One Circumferential Notch	Letter B	Three Marks
Grade C	Two Circumferential Notches	Letter C	Six Marks

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

PROTECTING THE ELECTRONIC/ ELECTRICAL SYSTEMS DURING CHARGING OR WELDING

To avoid damage to the electronic/electrical systems, always observe the following:

1. Never make or break any of the charging circuit connections, including the battery connections, when the engine is running.
2. Never short any of the charging components to ground.
3. Always disconnect the ground cable from the battery before arc welding on the combine or on any header attached to the combine.
   - position the welder ground clamp as close to the welding area as possible
   - if welding in close proximity to a computer module, then the module should be removed from the combine
   - never allow welding cables to lay on, near or across any electrical wiring or electronic component while welding is in progress
4. Always disconnect the negative cable from the battery when charging the battery in the combine with a battery charger.

NOTICE: *If welding must be performed on the unit, either the combine or the header (if it is attached), the battery ground cable must be disconnected from the combine battery. The electronic monitoring system and charging system will be damaged if this is not done.*

Remove the battery ground cable. Reconnect the cable when welding is completed.

⚠ WARNING ⚠

Battery acid causes severe burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote - EXTERNAL: flush with water. INTERNAL: drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetables oil. Call physician immediately. EYES: flush with water for 15 minutes and get prompt medical attention.

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TOOLS

The tools that CNH suggests and illustrate in this manual have been:

- specifically researched and designed for use with CNH machines
- essential for reliable repair operations
- accurately built and rigorously tested so as to offer efficient and long-lasting operation

By using these tools, repair personnel will benefit from:

- operating in optimal technical conditions
- obtaining the best results
- saving time and effort
- working in safe conditions

NOTE: *The terms "front", "rear", "right-hand" and "left-hand" (when referred to different parts) are determined from the rear, facing in the direction of travel of the machine during operation.*