

**OPTUM® 270 CVT
OPTUM® 300 CVT
TIER 4B (FINAL)
Tractor**

PIN ZFEM01001 and above

SERVICE MANUAL

Part number 48193161

English

November 2017

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SERVICE MANUAL

OPTUM® 270 CVT - [ZFEM01001 - ZGEM02931], OPTUM® 270 CVT - [ZGEM02932 - ZGEM04528], OPTUM® 270 CVT - [ZGEM04529 -], OPTUM® 300 CVT - [ZFEM01001 - ZGEM02931], OPTUM® 300 CVT - [ZGEM02932 - ZGEM04528], OPTUM® 300 CVT - [ZGEM04529 -]

Link Product / Engine

| Product | Market Product | Engine |
|--|----------------|----------------|
| OPTUM® 270 CVT - [ZFEM01001 - ZGEM02931] | North America | F4DFE617M*B001 |
| OPTUM® 270 CVT - [ZGEM02932 - ZGEM04528] | North America | F4DFE617M*B001 |
| OPTUM® 270 CVT - [ZGEM04529 -] | North America | F4DFE617M*B001 |
| OPTUM® 300 CVT - [ZFEM01001 - ZGEM02931] | North America | F4DFE617L*B002 |
| OPTUM® 300 CVT - [ZGEM02932 - ZGEM04528] | North America | F4DFE617L*B002 |
| OPTUM® 300 CVT - [ZGEM04529 -] | North America | F4DFE617L*B002 |

Contents

INTRODUCTION

| | |
|--|------|
| Engine..... | 10 |
| [10.001] Engine and crankcase | 10.1 |
| [10.216] Fuel tanks | 10.2 |
| [10.202] Air cleaners and lines | 10.3 |
| [10.254] Intake and exhaust manifolds and muffler | 10.4 |
| [10.500] Selective Catalytic Reduction (SCR) exhaust treatment..... | 10.5 |
| [10.400] Engine cooling system | 10.6 |
| [10.414] Fan and drive | 10.7 |
| [10.310] Aftercooler..... | 10.8 |
| Clutch | 18 |
| [18.112] Slip clutch or flywheel damper | 18.1 |
| Transmission..... | 21 |
| [21.504] Continuously Variable Transmission (CVT) | 21.1 |
| [21.505] Continuously Variable Transmission (CVT) external controls..... | 21.2 |
| [21.506] Continuously Variable Transmission (CVT) hydraulic components | 21.3 |
| [21.507] Continuously Variable Transmission (CVT) internal components..... | 21.4 |
| Four-Wheel Drive (4WD) system | 23 |
| [23.202] Electro-hydraulic control | 23.1 |
| [23.314] Drive shaft..... | 23.2 |
| Front axle system | 25 |
| [25.100] Powered front axle | 25.1 |
| [25.102] Front bevel gear set and differential | 25.2 |
| [25.108] Final drive hub, steering knuckles, and shafts | 25.3 |
| [25.122] Axle suspension control..... | 25.4 |
| Rear axle system..... | 27 |

| | |
|---|-----------|
| [27.100] Powered rear axle..... | 27.1 |
| [27.106] Rear bevel gear set and differential..... | 27.2 |
| [27.120] Planetary and final drives | 27.3 |
| Power Take-Off (PTO)..... | 31 |
| [31.104] Rear electro-hydraulic control..... | 31.1 |
| [31.119] Four-speed rear Power Take-Off (PTO)..... | 31.2 |
| [31.142] Front Power Take-Off (PTO) control | 31.3 |
| [31.146] Front Power Take-Off (PTO) | 31.4 |
| Brakes and controls | 33 |
| [33.202] Hydraulic service brakes | 33.1 |
| [33.110] Parking brake or parking lock | 33.2 |
| [33.240] Emergency brake | 33.3 |
| [33.220] Trailer brake hydraulic control..... | 33.4 |
| [33.224] Trailer brake pneumatic control | 33.5 |
| [33.204] Front axle brake | 33.6 |
| [33.200] Brake cooling..... | 33.7 |
| [33.350] Anti-lock Brake System (ABS) | 33.8 |
| Hydraulic systems..... | 35 |
| [35.000] Hydraulic systems..... | 35.1 |
| [35.300] Reservoir, cooler, and filters..... | 35.2 |
| [35.106] Variable displacement pump | 35.3 |
| [35.230] Priority valves | 35.4 |
| [35.204] Remote control valves | 35.5 |
| [35.220] Auxiliary hydraulic pump | 35.6 |
| [35.114] Three-point hitch control valve | 35.7 |
| [35.116] Three-point hitch cylinder | 35.8 |
| [35.124] Three-point hitch hydraulic adjustment | 35.9 |
| [35.160] Front hitch controls and lines | 35.10 |

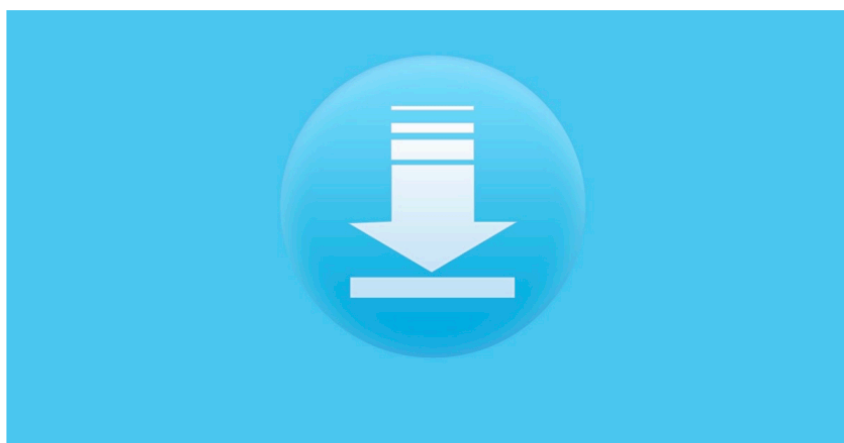
| | |
|--|-----------|
| [35.162] Front hitch cylinders and lines | 35.11 |
| Hitches, drawbars, and implement couplings..... | 37 |
| [37.100] Drawbars and towing hitches | 37.1 |
| [37.106] Automatic pickup hitch | 37.2 |
| [37.162] Front hitch | 37.3 |
| Frames and ballasting | 39 |
| [39.100] Frame | 39.1 |
| [39.140] Ballasts and supports | 39.2 |
| Steering..... | 41 |
| [41.101] Steering control | 41.1 |
| [41.106] Tie rods..... | 41.2 |
| [41.200] Hydraulic control components..... | 41.3 |
| [41.216] Cylinders | 41.4 |
| [41.432] Autoguidance steering | 41.5 |
| Wheels | 44 |
| [44.511] Front wheels..... | 44.1 |
| [44.520] Rear wheels | 44.2 |
| Cab climate control | 50 |
| [50.100] Heating | 50.1 |
| [50.104] Ventilation | 50.2 |
| [50.200] Air conditioning..... | 50.3 |
| Electrical systems | 55 |
| [55.045] Front axle control system | 55.1 |
| [55.000] Electrical system | 55.2 |
| [55.100] Harnesses and connectors..... | 55.3 |
| [55.015] Engine control system..... | 55.4 |
| [55.301] Alternator..... | 55.5 |

| | |
|--|-----------|
| [55.302] Battery..... | 55.6 |
| [55.988] Selective Catalytic Reduction (SCR) electrical system | 55.7 |
| [55.640] Electronic modules | 55.8 |
| [55.513] Cab transmission controls..... | 55.9 |
| [55.024] Transmission control system | 55.10 |
| [55.020] Transmission speed sensors..... | 55.11 |
| [55.021] Transmission pressure sensors | 55.12 |
| [55.022] Transmission temperature sensors | 55.13 |
| [55.023] Transmission position sensors and switches | 55.14 |
| [55.048] Rear Power Take-Off (PTO) control system | 55.15 |
| [55.049] Front Power Take-Off (PTO) control system | 55.16 |
| [55.519] Cab brake controls | 55.17 |
| [55.031] Parking brake electrical system | 55.18 |
| [55.512] Cab controls..... | 55.19 |
| [55.035] Remote control valve electric control | 55.20 |
| [55.051] Cab Heating, Ventilation, and Air-Conditioning (HVAC) controls..... | 55.21 |
| [55.050] Heating, Ventilation, and Air-Conditioning (HVAC) control system..... | 55.22 |
| [55.047] Steering control system | 55.23 |
| [55.130] Rear three-point hitch electronic control system | 55.24 |
| [55.160] Front hitch electronic control system..... | 55.25 |
| [55.911] Satellite navigation systems..... | 55.26 |
| [55.404] External lighting | 55.27 |
| [55.510] Cab or platform harnesses and connectors..... | 55.28 |
| [55.408] Warning indicators, alarms, and instruments | 55.29 |
| [55.550] Tire Pressure Monitoring System (TPMS) | 55.30 |
| [55.350] Anti-lock Brake System (ABS) electrical system..... | 55.31 |
| [55.DTC] FAULT CODES..... | 55.32 |
| Platform, cab, bodywork, and decals..... | 90 |
| [90.150] Cab..... | 90.1 |

| | |
|---|------|
| [90.156] Cab windshield and windows | 90.2 |
| [90.100] Engine hood and panels | 90.3 |

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INTRODUCTION

Contents

INTRODUCTION

| | |
|---|----|
| Foreword - How to use and navigate through this manual | 3 |
| Foreword - Important notice regarding equipment servicing | 8 |
| Torque | 9 |
| Torque - Standard torque data for hydraulic connections | 14 |
| Capacities | 21 |
| Consumables | 22 |

Foreword - How to use and navigate through this manual

This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through web delivery (eTIM), DVD, and paper manuals. A coding system called SAP has been developed to link the technical information to other Product Support functions, e.g., Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customer's machine. When a customer has a concern on their machine it is usually because a function or system on their machine is not working at all, is not working efficiently, or is not responding correctly to their commands. When you refer to the technical information in this manual to resolve that customer's concern, you will find all the information classified using the SAP coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system, you will then find all the mechanical, electrical or hydraulic devices, components, assemblies, and sub assemblies for that function or system. You will also find all the types of information that have been written for that function or system: the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting), and the service data (remove, install adjust, etc.).

By integrating SAP coding into technical information, you will be able to search and retrieve just the right piece of technical information you need to resolve that customer's concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - the component or function on the machine, that the piece of technical information is going to describe (e.g., Fuel tank).
- INFORMATION TYPE - the piece of technical information that has been written for a particular component or function on the machine (e.g., Capacity would be a type of Technical Data describing the amount of fuel held by the fuel tank).
- PRODUCT - the model for which the piece of technical information is written.

Every piece of technical information will have those three categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customer's concern on their machine.

That information could be:

- the procedure for how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

Manual content

This manual is divided into Sections. Each Section is then divided into Chapters. Contents pages are included at the beginning of the manual, then inside every Section and inside every Chapter. An alphabetical Index is included at the end of each Chapter. Page number references are included for every piece of technical information listed in the Chapter Contents or Chapter Index.

Each Chapter is divided into four Information types:

- Technical Data (specifications) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Service Data (remove disassemble, assemble, install) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.

Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a number (00, 35, 55, etc.). The Sections included in the manual will depend on the type and function of the machine that the manual is written for. Each Section has a Contents page listed in alphabetic/numeric order. This table illustrates which Sections could be included in a manual for a particular product.

| SECTION | PRODUCT | | | | | |
|--|---|---|---|---|---|--|
| | Tractors | | | | | |
| | Vehicles with working arms: backhoes, excavators, skid steers, | | | | | |
| | Combines, forage harvesters, balers, | | | | | |
| | Seeding, planting, floating, spraying equipment, | | | | | |
| | Mounted equipment and tools, | | | | | |
| 00 - Maintenance | X | X | X | X | X | |
| 05 - Machine completion and equipment | X | X | X | X | X | |
| 10 - Engine | X | X | X | X | | |
| 14 - Main gearbox and drive | X | X | X | X | | |
| 18 - Clutch | X | X | X | | | |
| 21 - Transmission | X | X | X | X | | |
| 23 - Four wheel drive (4WD) system | X | X | X | X | | |
| 25 - Front axle system | X | X | X | X | | |
| 27 - Rear axle system | X | X | X | X | | |
| 29 - Hydrostatic drive | X | X | X | X | | |
| 31 - Power Take-Off (PTO) | X | | X | | | |
| 33 - Brakes and controls | X | X | X | X | | |
| 35 - Hydraulic systems | X | X | X | X | | |
| 36 - Pneumatic system | X | X | X | X | | |
| 37 - Hitches, drawbars and implement couplings | X | | X | X | | |
| 39 - Frames and ballasting | X | X | X | X | X | |
| 41 - Steering | X | X | X | X | | |
| 44 - Wheels | X | X | X | X | | |
| 46 - Steering clutches | | | | | | |
| 48 - Tracks and track suspension | X | X | X | | | |
| 50 - Cab climate control | X | X | X | X | | |
| 55 - Electrical systems | X | X | X | X | X | |
| 56 - Grape harvester shaking | | | | | | |
| 58 - Attachments/headers | | | X | | | |
| 60 - Product feeding | | | X | | | |

INTRODUCTION

| | | | | | |
|---|---|---|---|---|---|
| 61 - Metering system | | | | X | |
| 62 - Pressing - Bale formation | | | X | | |
| 63 - Chemical applicators | | | | X | |
| 64 - Chopping | | | X | | |
| 66 - Threshing | | | X | | |
| 68 - Tying/Wrapping/Twisting | | | X | | |
| 69 - Bale wagons | | | | | |
| 70 - Ejection | | | X | | |
| 71 - Lubrication system | X | X | X | X | X |
| 72 - Separation | | | X | | |
| 73 - Residue handling | | | X | | |
| 74 - Cleaning | | | X | | |
| 75 - Soil preparation/Finishing | | | | | |
| 76 - Secondary cleaning / Destemmer | | | | | |
| 77 - Seeding | | | | X | |
| 78 - Spraying | | | | X | |
| 79 - Planting | | | | X | |
| 80 - Crop storage / Unloading | | | X | | |
| 82 - Front loader and bucket | X | X | | | |
| 83 - Telescopic single arm | X | X | | | |
| 84 - Booms, dippers and buckets | X | X | | | |
| 86 - Dozer blade and arm | X | X | | | |
| 88 - Accessories | X | X | X | X | X |
| 89 - Tools | X | X | X | X | X |
| 90 - Platform, cab, bodywork and decals | X | X | X | X | |

Chapters

Each Chapter is identified by a number e.g. Engine - Engine and crankcase - 10.001. The first number is identical to the Section number i.e. Chapter 10.001 is inside Section 10, Engine. The second number is representative of the Chapter contained within the Section.

CONTENTS

The Chapter Contents lists all the technical data (specifications), functional data (how it works), diagnostic data (fault codes and troubleshooting), and service data (remove, install, adjust, etc.), that have been written in that Chapter for that function or system on the machine.

Contents

| | | |
|--|--|----|
| | ENGINE | |
| | ENGINE - Engine and crankcase – 10.001 | |
| TECHNICAL DATA | | |
| ENGINE - Engine and crankcase - General specification (10.001 - D.40.A.10) | | 4 |
| FUNCTIONAL DATA | | |
| ENGINE - Engine and crankcase - Dynamic description (10.001 - C.30.A.10) | | 6 |
| SERVICE | | |
| ENGINE - Engine and crankcase - Remove (10.001 -F.10.A.10) | | 8 |
| DIAGNOSTIC | | |
| ENGINE - Engine and crankcase - Troubleshooting (10.001 - G.40.A.10) | | 10 |

INDEX

The Chapter Index lists in alphabetical order all the types of information (called information units) that have been written in that Chapter for that function or system on the machine.

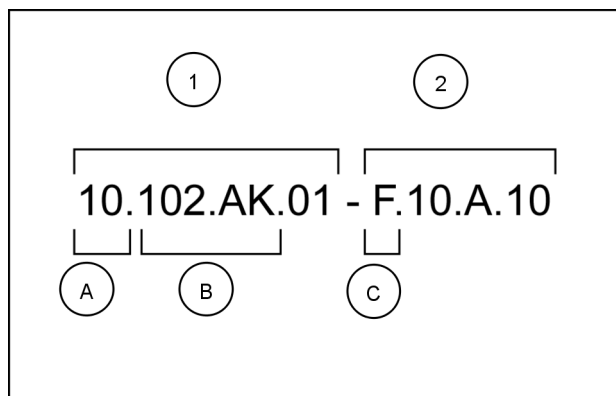
Index

| | | |
|--|-------------|----|
| | ENGINE - 10 | |
| | ENGINE | |
| ENGINE - Engine and crankcase - Dynamic description (10.001 - C.30.A.10) | | 6 |
| ENGINE - Engine and crankcase - General specification (10.001 - D.40.A.10) | | 4 |
| ENGINE - Engine and crankcase - Remove (10.001 -F.10.A.10) | | 8 |
| ENGINE - Engine and crankcase - Troubleshooting (10.001 - G.40.A.10) | | 10 |

Information units and information search

Each chapter is composed of information units. Each information unit has the SAP code shown in parentheses. This indicates the function and type of information in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

| | | | | | | |
|---------------------------|--|----------------|--------------------|-------|--------------|---------|
| Example information unit | Engine block cover - Front – Remove (10.102.AP.01 - F.10.A.10) | | | | | |
| Information Unit SAP code | 10 | 102 | AK | 01 | F | 10.A.10 |
| SAP code classification | Engine | Pan and covers | Engine block cover | Front | Service data | Remove |



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Navigate to the correct information unit you are searching for by identifying the function and information type from the SAP code.

- **(1)** Location and **(2)** Information type.
- **(A)** corresponds to the sections of the service manual.
(B) corresponds to the chapters of the service manual. After **(B)** there may be some additional information. In this case it shows “.01”, which represents the “Front” block cover. These options may be front/rear, left/right, hydraulic/mechanical etc.
(C) corresponds to the type of information listed in the chapter contents: Technical Data, Functional Data, Diagnostic, or Service.
(A) and **(B)** are also shown in the page numbering on the page footer.
 THE REST OF THE CODING IS NOT LISTED IN ALPHANUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.
 You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

Page header and footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references:

- Publication number for that Manual.
- Version reference for that publication.
- Publication date
- Section, chapter, and page reference e.g. 10.102 / 9

Foreword - 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 manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

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

Torque

NOTE: In the metric tables, nominal sizes M4 through M8 hardware torque specifications are shown as a Newton meters (pound-inches) numerical value.

Nominal sizes M10 through M24 hardware torque specifications are shown as a Newton meters (pound-feet) numerical value.

Metric hex head (non-flange) hardware

Plain (PLN) – an unplated hardware finish with residual manufacturing oils

Zinc-dichromate (ZND) – a yellow colored chemical plating formula yellow applied to the hardware

| Nominal size | Class (CL) 8.8 bolt and Class (CL) 8 nut | Class (CL) 10.9 bolt and Class (CL) 10 nut | Locknut CL 8 w/CL 8.8 bolt | Locknut CL 10 w/CL 10.9 bolt |
|--------------|--|--|----------------------------|------------------------------|
| | PLN and ZND | PLN and ZND | ZND | ZND |
| | N·m (lb in) | N·m (lb in) | N·m (lb in) | N·m (lb in) |
| M4 | 3.5 (31) | 5.0 (44) | 1.4 (13) | 2.8 (25) |
| M5 | 7.0 (62) | 10 (88) | 2.9 (26) | 5.5 (49) |
| M6 | 11.8 (104) | 17 (150) | 4.9 (43) | 9.4 (83) |
| M8 | 28.8 (255) | 41.3 (366) | 11.9 (105) | 23 (204) |
| | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) |
| M10 | 57 (42) | 82 (60) | 24 (17) | 45 (33) |
| M12 | 100 (74) | 143 (105) | 41 (30) | 79 (38) |
| M14 | 159 (117) | 227 (168) | 66 (48) | 125 (92) |
| M16 | 248 (183) | 354 (261) | 102 (75) | 195 (144) |
| M18 | 352 (260) | 487 (359) | 145 (107) | 268 (198) |
| M20 | 500 (369) | 690 (509) | 206 (152) | 380 (280) |
| M24 | 865 (638) | 1195 (882) | 357 (263) | 657 (485) |

Metric flange head hardware

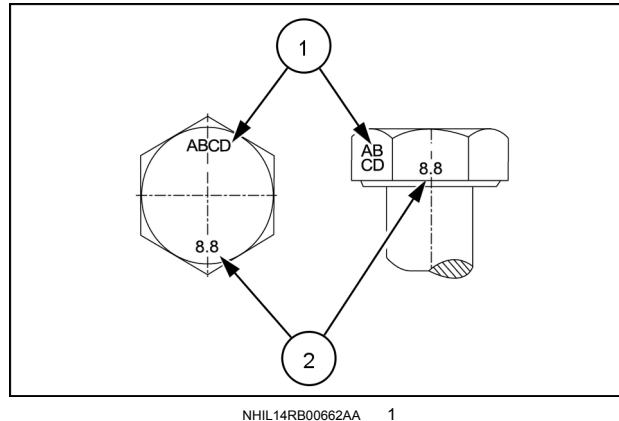
Plain (PLN) – an unplated hardware finish with residual manufacturing oils

Zinc-dichromate (ZND) – a yellow colored chemical plating formula yellow applied to the hardware

| Nominal size | Class (CL) 8.8 bolt and Class (CL) 8 nut | Class (CL) 10.9 bolt and Class (CL) 10 nut | Flange locknut CL 8 w/CL 8.8 bolt | Flange locknut CL 10 w/CL 10.9 bolt |
|--------------|--|--|-----------------------------------|-------------------------------------|
| | PLN and ZND | PLN and ZND | ZND | ZND |
| | N·m (lb in) | N·m (lb in) | N·m (lb in) | N·m (lb in) |
| M4 | 3.8 (34) | 5.5 (49) | 4.2 (37) | 6.1 (54) |
| M5 | 7.7 (68) | 11 (97) | 8.5 (75) | 12 (106) |
| M6 | 13 (115) | 18.7 (166) | 14.3 (127) | 20.6 (182) |
| M8 | 31.7 (281) | 45.5 (403) | 35 (310) | 50 (443) |
| | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) |
| M10 | 63 (47) | 90 (66) | 69 (51) | 99 (73) |
| M12 | 110 (81) | 157 (116) | 121 (89) | 173 (128) |
| M14 | 175 (129) | 250 (184) | 193 (142) | 275 (202) |
| M16 | 272 (201) | 389 (287) | 299 (221) | 428 (316) |
| M18 | 387 (286) | 535 (395) | 426 (315) | 589 (435) |
| M20 | 550 (406) | 759 (560) | 605 (447) | 835 (616) |
| M24 | 951 (702) | 1315 (970) | 1046 (772) | 1447 (1067) |

Identification markings

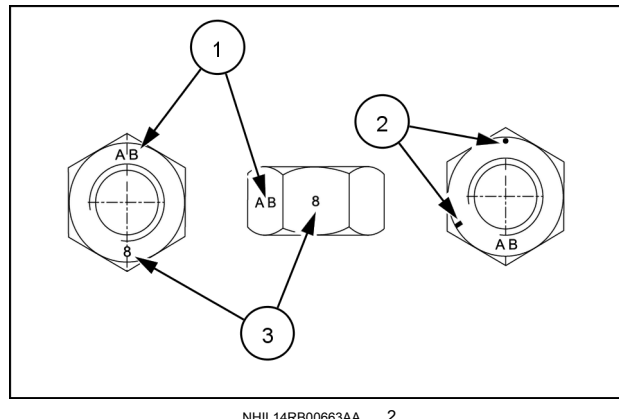
Metric hex head, flange hex head and carriage bolts, Classes (CL) 5.6 and upward



Metric bolt identification markings

1. Manufacturer's identification
2. Property class

Metric hex nuts and locknuts, Classes (CL) 05 and upward



Metric hex nut identification markings

- (1) – Manufacturer's identification
- (3) – Property class
- (2) – Clockwise type markings indicate property class and may include manufacturer identification (if applied), Example: property marks **240°** apart (shown) at the eight o'clock position indicate a Class 8 property, and marks **300°** apart at the ten o'clock position indicate a Class 10 property.

NOTE: In the Imperial units tables, the nominal sizes, **1/4 (0.25) in (inch)** and **5/16 (0.3125) in (inch)** hardware torque specifications are shown as a Newton meters (pound-inches) numerical value.
Nominal sizes **3/8 (0.375) in (inch)** through **1 (1.0) in (inch)** hardware torque specifications are shown as a Newton meters (pound-feet) numerical value.

Inch hex head (non-flange) hardware

Plain (PLN) – an unplated hardware finish with residual manufacturing oils

Zinc-dichromate (ZND) – a yellow colored chemical plating formula yellow applied to the hardware

| Nominal size | SAE Grade (GR) 5 bolt and nut | SAE Grade (GR) 8 bolt and nut | Locknut GR B w/ GR 5 bolt | Locknut GR C w/ GR 8 bolt |
|-------------------------|-------------------------------|-------------------------------|---------------------------|---------------------------|
| | PLN and ZND | PLN and ZND | ZND | ZND |
| | N·m (lb in) | N·m (lb in) | N·m (lb in) | N·m (lb in) |
| 1/4 (0.25) in | 13 (115) | 18 (159) | 7.2 (64) | 10 (89) |
| 5/16 (0.3125) in | 27 (239) | 38 (336) | 14.9 (132) | 21 (186) |
| | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) |
| 3/8 (0.375) in | 47 (35) | 67 (49) | 26 (19) | 37 (27) |
| 7/16 (0.4375) in | 76 (56) | 107 (79) | 42 (31) | 59 (44) |
| 1/2 (0.50) in | 116 (85) | 164 (121) | 64 (47) | 90 (67) |
| 9/16 (0.5625) in | 167 (123) | 236 (174) | 92 (68) | 130 (96) |
| 5/8 (0.625) in | 231 (170) | 326 (240) | 127 (94) | 179 (132) |
| 3/4 (0.75) in | 410 (302) | 578 (426) | 226 (166) | 318 (234) |
| 7/8 (0.875) in | 660 (486) | 931 (687) | 363 (267) | 512 (378) |
| 1 (1.0) in | 989 (729) | 1396 (1030) | 544 (401) | 768 (567) |

Inch flange head hardware

Plain (PLN) – an unplated hardware finish with residual manufacturing oils

Zinc-dichromate (ZND) – a yellow colored chemical plating formula yellow applied to the hardware

| Nominal size | SAE Grade (GR) 5 bolt and nut | SAE Grade (GR) 8 bolt and nut | Flange locknut GR F w/ GR 5 bolt | Flange locknut GR G w/ GR 8 bolt |
|-------------------------|-------------------------------|-------------------------------|----------------------------------|----------------------------------|
| | PLN and ZND | PLN and ZND | ZND | ZND |
| | N·m (lb in) | N·m (lb in) | N·m (lb in) | N·m (lb in) |
| 1/4 (0.25) in | 14 (124) | 20 (177) | 15.4 (136) | 22 (195) |
| 5/16 (0.3125) in | 29 (257) | 42 (372) | 32 (283) | 46 (407) |
| | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) | N·m (lb ft) |
| 3/8 (0.375) in | 52 (38) | 74 (54) | 57 (42) | 81 (9) |
| 7/16 (0.4375) in | 84 (62) | 118 (87) | 92 (68) | 130 (96) |
| 1/2 (0.50) in | 127 (94) | 180 (133) | 140 (103) | 198 (146) |
| 9/16 (0.5625) in | 184 (136) | 259 (191) | 202 (150) | 285 (210) |
| 5/8 (0.625) in | 254 (187) | 358 (264) | 279 (206) | 394 (290) |
| 3/4 (0.75) in | 450 (332) | 636 (469) | 495 (365) | 700 (516) |
| 7/8 (0.875) in | 725 (535) | 1024 (755) | 798 (589) | 1126 (831) |
| 1 (1.0) in | 1088 (802) | 1536 (1133) | 1197 (882) | 1690 (1246) |