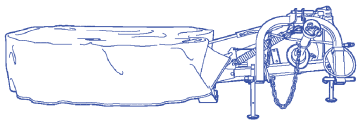


NEW HOLLAND

REPAIR MANUAL

HM234
HM235
HM236

NEW HOLLAND

SERVICE

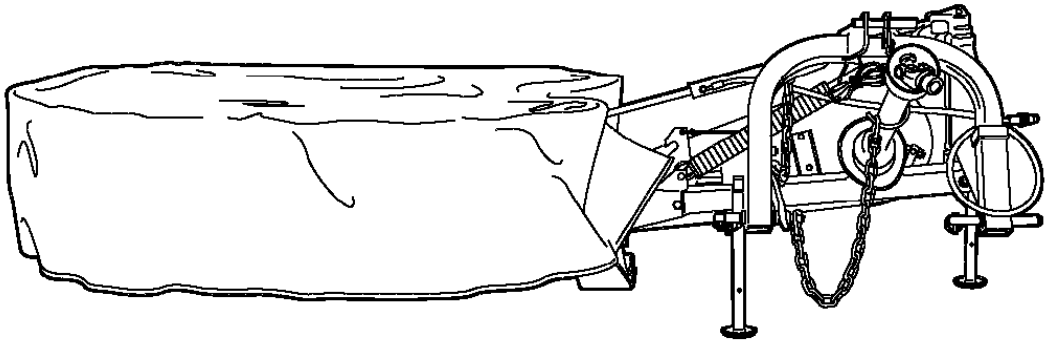
HM234, HM235, HM236 REPAIR MANUAL CONTENTS

The sections used through out all New Holland product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the HM234, HM235 and HM236 Disc Mowers.

NEW HOLLAND

REPAIR MANUAL



HM234
HM235
HM236

Contents

INTRODUCTION

Contents

INTRODUCTION

Legal advice (- A.10.A.10)

All repair and maintenance works 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 carries out the above operations without complying with the procedures shall be responsible for the 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 due to the anomalous behavior of parts and/or components not approved by the manufacturer himself, including those use 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 due to an anomalous behavior or 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, as well as the suit the law regulations of different countries.
In cast of disagreement, refer to your Sales and Service Networks.

International symbol (- A.10.A.20)

As a guide to the operation of the machine, various universal symbols have been utilized on the instruments, controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.

- Thermostart starting aid
- Alternator charge
- Fuel level
- Automatic Fuel shut-off
- Engine speed (rev/min x 100)
- Hours recorded
- Engine oil pressure
- Engine coolant temperature
- Coolant level
- Tractor lights
- Headlamp main beam
- Headlamp dipped beam
- Work lamps
- Stop lamps
- Horn
- Radio
- KAM Keep alive memory
- Turn signals
- Turn signals -one trailer
- Turn signals -two trailers
- Front wind-screen wash/wipe
- Rear wind-screen wash/wipe
- Heater temp-erature control
- Heater fan
- Air conditioner
- Air filter blocked
- Parking brake
- Brake fluid level
- Trailer brake
- Roof beacon
- Warning ! Corrosive substance
- PTO
- N Transmission in neutral
- Creeper gears
- Slow or low setting
- Fast or high setting
- Ground speed
- Differential lock
- Rear axle oil tem-perature
- Transmission oil pressure
- FWD engaged
- FWD dis-engaged
- Warning!
- Hazard warning lights
- Variable control
- Pressurized! Open carefully
- Position Control
- Draft Control
- Accessory socket
- Implement socket
- %age slip
- Hitch raise (rear)
- Hitch lower (rear)
- Hitch height limit (rear)
- Hitch height limit (front)
- Hitch dis-abled
- Hydraulic and transmission filters
- Remote valve extend
- Remote valve retract
- Remote valve float
- Malfunction! See Operator's Manual
- Malfunction! (alter-native symbol)

Safety rules Precautionary Statements (- A.50.A.10)

PRECAUTIONARY STATEMENTS

Personal Safety

Throughout this manual and on machine decals, you will find precautionary statements ("DANGER", "WARNING", and "CAUTION") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.

⚠ DANGER ⚠

This word "DANGER" indicates an immediate hazardous situation that, if not avoided, will result in death or serious injury. The color associated with Danger is RED. M1169

⚠ WARNING ⚠

This word "WARNING" indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. The color associated with Warning is ORANGE. M1170

⚠ CAUTION ⚠

This word "CAUTION" indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW . M1171

FAILURE TO FOLLOW THE "DANGER", "WARNING", AND "CAUTION" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

Machine Safety

The precautionary statement ("IMPORTANT") is followed by specific instructions. This statement is intended for machine safety.

IMPORTANT: *The word "IMPORTANT" is used to inform the reader of something they need to know to prevent minor machine damage if a certain procedure is not followed.*

Information

NOTE: *Instructions used to identify and present supplementary information.*

LEGAL OBLIGATIONS

Your machine may be equipped with special guarding or other devices in compliance with local legislation. Some of these require active use by the operator.

Therefore, check local legislation on the usage of this machine.

SAFETY REQUIREMENTS FOR FLUID POWER SYSTEMS AND COMPONENTS - HYDRAULICS (EUROPEAN STANDARD PR EM 982)

Flexible hose assemblies must not be constructed from hoses which have been previously used as part of a hose assembly.
Do not weld hydraulic piping.
When flexible hoses or piping are damaged, replace them immediately.
It is forbidden to modify a hydraulic accumulator by machining, welding or any other means.
Before removing hydraulic accumulators for servicing, the liquid pressure in the accumulators must be reduced to zero.

Pressure check on hydraulic accumulators shall be carried out by method recommended by the accumulator manufacturer.
Care must be taken not to exceed the maximum allowable pressure of the accumulator. After any check or adjustment there must be no leakage of gas.

ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of a non compliance to simple and fundamental safety regulations. For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of machines, regardless of how well the machine in question was designed and built.

A careful and informed service technician is the best guarantee against accidents.

Decisive awareness of the most basic safety rule is normally sufficient to avoid many serious accident

⚠ DANGER ⚠

Shut down the machine, remove key, be sure all moving parts have stopped and all pressure in the systems is relieved before cleaning, adjusting or lubricating the equipment. M871

SAFETY RULES

General guidelines

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wrist watches, jewelry, unbuttoned or loose articles of clothing such as: ties, torn clothing, scarves, open jackets or shirts with open zips which may remain entangled in moving parts. It is advised to wear approved safety clothing. For example: non-slip footwear, gloves, safety goggles, helmets, etc.
- Do not carry out repair operations with someone sitting in the driver's seat, unless the person is a trained technician who is assisting with the operation in question.
- Do not operate the machine or use any of the implements from different positions, other than the driver's seat.
- Do not carry out operations on the machine with the engine running, unless specifically indicated.
- Stop the engine and bleed off residual hydraulic pressure before removing components, caps, valves, covers or etc.
- All repair and maintenance operations must be carried out using extreme care and attention.
- Service steps and platforms used in the workshop or elsewhere should be built according to standard accident prevention regulations.
- Disconnect the Power Take Off (PTO) from the machine, and label all controls to indicate that the machine is being serviced. Any parts that are to be raised must be locked in position.
- Brakes are inoperative when manually released for repair or maintenance purposes. Use blocks or similar devices to control the machine in these conditions.
- Only use specified towing points for towing the machine. Connect parts carefully. Make sure that all pins and/or locks are secured in position before applying traction. Never remain near the towing bars, cables or chains that are operating under load.
- When loading or unloading the machine from the trailer (or other means of transport), select a flat area capable of sustaining the trailer or truck wheels. Firmly secure the machine to the truck or trailer and lock the wheels in the position used by the carrier.
- Electric heaters, battery-chargers and similar equipment must be powered only by auxiliary power supplies with efficient ground insulation to avoid electrical shock hazards.
- Always use suitable hoisting or lifting devices when raising or moving heavy parts.
- Take extra care if bystanders are present.
- Never use gasoline, diesel oil or other inflammable liquids as cleaning agents. Use non-flammable, non toxic commercially available solvents.

- Wear safety goggles with side guards when cleaning parts with compressed air.
- Reduce tire air pressure according to the local regulations in force.
- Do not run the engine in confined spaces without suitable ventilation.
- Never use open flames for lighting when working on the machine or checking for leaks.
- All movements must be carried out carefully when working under, on or near the machine. Wear protective equipment: helmets, goggles and special footwear.
- When carrying out checks with the engine running, request the assistance of an operator in the driver's seat. The operator must maintain visual contact with the service technician at all times.
- If operating outside the workshop, position the machine on a flat surface and lock in position. If working on a slope, lock the machine in position. Move to a flat area as soon as is safely possible.
- Damaged or bent chains or cables are unreliable. Do not use them for lifting or towing. Always use suitable protective gloves when handling chains or cables.
- Chains should always be safely secured. Make sure that the hitch-up point is capable of sustaining the load in question. Keep the area near the hitch-up point, chains or cables free of all bystanders.
- Maintenance and repair operations must be carried out in a CLEAN and DRY area. Eliminate any water or oil spillage immediately.
- Do not create piles of oil or grease-soaked rags as they represent a serious fire hazard. Always store rags in a closed metal container.
- Before engaging the machine, make sure that there are no persons within the machine or implement range of action.
- Empty your pockets of all objects that may fall accidentally unobserved into the machine inner compartments.
- In the presence of protruding metal parts, use protective goggles or goggles with side guards, helmets, special footwear and gloves.
- When welding, use protective safety devices: tinted safety goggles, helmets, special overalls, gloves and footwear. All persons present in the area where welding is taking place must wear tinted goggles. NEVER LOOK DIRECTLY AT THE WELDING ARC WITHOUT SUITABLE EYE PROTECTION.
- If welding in close proximity to a computer module, then the battery should be disconnected to cut the power, and also the module should be removed from the machine.
- Metal cables tend to fray with repeated use. Always use suitable protective devices (gloves, goggles, etc.) when handling cables.
- Handle all parts carefully. Do not put your hands or fingers between moving parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

Machine Start Up

- Never run the engine in confined spaces that are not equipped with adequate ventilation for exhaust gas extraction.
- Never place the head, body, limbs, feet, hands or fingers near rotating and moving parts.

Hydraulic systems

- A liquid leaking from a tiny hole may be almost invisible but, at the same time, be powerful enough to penetrate the skin. Therefore, NEVER USE HANDS TO CHECK FOR LEAKS but use a piece of cardboard or wood for this purpose. If any liquid penetrates skin tissue, call for medical aid immediately. Failure to treat this condition with correct medical procedure may result in serious infection or death.
- In order to check the pressure in the system use suitable instruments.

Wheels and Tires

- Make sure that the tires are correctly inflated at the pressure specified by the manufacturer. Periodically check the rims and tires for damage.
- Stand away from (at the side of) the tire when checking inflation pressure.
- Do not use parts of recovered wheels as incorrect welding brazing or heating may weaken and eventually cause damage to the wheel.
- Never cut or weld a rim mounted with an inflated tire.
- To remove the wheels, lock all wheels. After having raised the machine, position supports underneath, according to regulations in force.
- Deflate the tire before removing any objects that may be jammed in the tire tread.
- Never inflate tires using inflammable gases, as this may result in explosions and injury to bystanders.

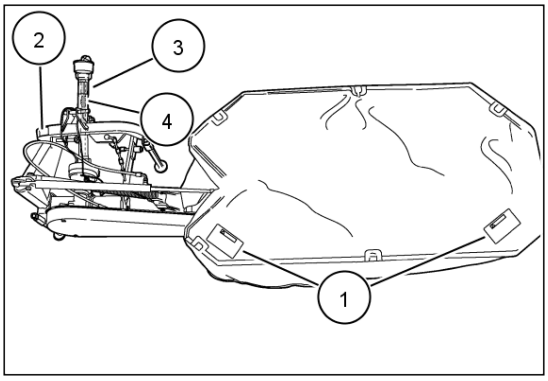
Removal and Install

- Lift and handle all heavy parts using suitable hoisting equipment. Make sure that parts are sustained by appropriate hooks and slings. Use the hoisting eyebolts for lifting operations. Extra care should be taken if persons are present near the load to be lifted.
- Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.
- Avoid twisting chains or metal cables. Always wear safety gloves when handling cables or chains.
- Never cause sparks to occur or smoke near batteries that are charging or have been recently charged.

Decals (- A.50.A.30)

Safety Decals

The following safety decals have been placed on the disc mower in the areas indicated. They are intended for your personal safety and for those working with you. Please take this manual and walk around the disc mower to note the content and location of these warning signs.



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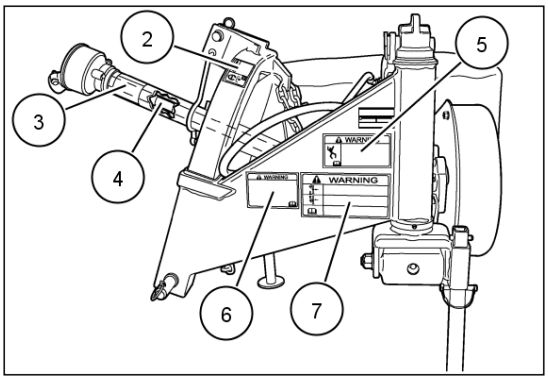


50051724none 2

20054309 3

Decal At Location 1

87041061 4

Decal At Location 2

849471 5

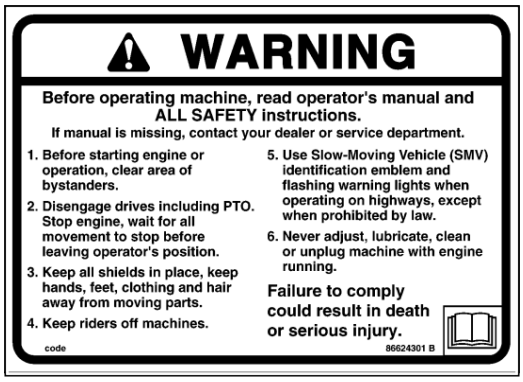
Decal At Location 3

849472 6

Decal At Location 4

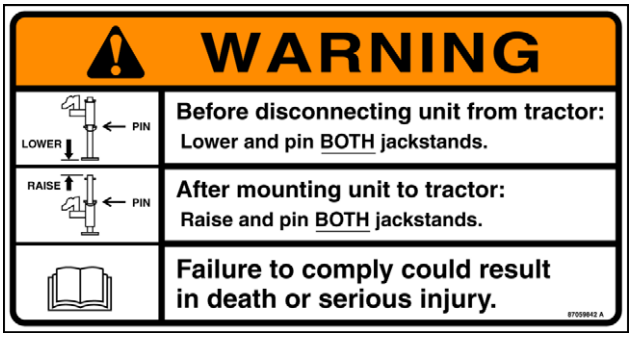
86624775 7

Decal At Location 5



86624301 8

Decal At Location 6



87059842 9

Decal At Location 7

Basic instructions How To Use and Navigate Through This Manual (- A.90.A.05)

Technical Information

This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through CDROM and in paper manuals. A coding system called ICE 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 customers machine. When a customer has a concern on his machine it is usually because a function or system on his machine is not working at all, is not working efficiently, or is not responding correctly to his commands. When you refer to the technical information in this manual to resolve that customers concern, you will find all the information classified using the new ICE coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system then you will 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 this new ICE coding into technical information , you will be able to search and retrieve just the right piece of technical information you need to resolve that customers 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 - is the component or function on the machine, that the piece of technical information is going to describe e.g. Fuel tank.
- INFORMATION TYPE - is 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 that would describe the amount of fuel held by the Fuel tank.
- PRODUCT - is the model that the piece of technical information is written for.

Every piece of technical information will have those 3 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 customers concern on his machine.

That information could be:

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

How to Use this Manual

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 a 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 and, assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components and assemblies.
- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components and assemblies.

- Service data (remove disassembly, assemble, install) for all the mechanical, electrical or hydraulic devices, components and assemblies.

Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a letter A, B, C etc. The amount of 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										
	A - Distribution Systems										
		B - Power Production									
			C - Power Train								
				D - Travelling							
					E - Body and Structure						
						F - Frame Positioning					
							G - Tool Positioning				
								H - Working Arm			
									J - Tools and Couplers		
										K - Crop Processing	
											L - Field Processing
PRODUCT											
Tractors	X	X	X	X	X	X		X	X		
Vehicles with working arms: backhoes, excavators, skid steers, ...	X	X	X	X	X	X	X	X	X		
Combines, forage harvesters, balers, ...	X	X	X	X	X	X	X	X	X	X	
Seeding, planting, floating, spraying equipment, ...	X	X	X	X	X	X	X		X		X
Mounted equipment and tools, ...					X	X	X		X		

Chapters

Each Chapter is identified by a letter and number combination e.g. Engine B.10.A The first letter is identical to the Section letter i.e. Chapter B.10 is inside Section B, Power Production.
CONTENTS
The Chapter Contents lists all the technical data (specifications), functional data (how it works), service data (remove, install adjust, etc..) and diagnostic data (fault codes and troubleshooting) that have been written in that Chapter for that function or system on the machine.

Contents

POWER PRODUCTION
ENGINE _ 10.A

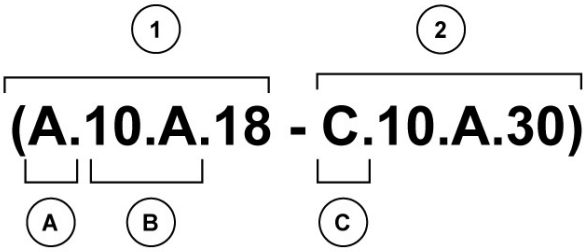
INDEX
The Chapter Index lists in alphabetical order all the types of information (called Information Units) that have been written in that Chapter for that function or system on the machine.

Index

Information Units and Information Search

Each chapter is composed of information units. Each information unit has the ICE code shown in parentheses which indicates the function and the type of information written 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	Stack valve - Sectional View (A.10.A.18 - C.10.A.30)				
Information Unit ICE code	A	10.A	18	C	10.A.30
ICE code classification	Distribution systems	Primary hydraulic power	Stack valve	Functional data	Sectional view



CRIL03J033E01 1

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

- **(1)** Function and **(2)** Information type.
- **(A)** corresponds to the sections of the repair manual.
  (B) corresponds to the chapters of the repair manual.
  (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 ALPHA-NUMERIC 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, Section or Chapter.
- Version reference for that publication.
- Publication date
- Section, chapter and page reference e.g. A.10.A / 9

Torque Specification Tables (- A.90.A.10)

Standard Bolt Hardware & Hydraulic O Ring Face Seal (ORFS) Connector Torques, Specifications and Information

This specification establishes general torque values to be used in bolted joints for metric and inch hardware. This specification is assumed to apply unless another specification (standard or specified requirement) is indicated in the repair manual.

NOTE: These Standards do not include electrical or hydraulic components, they are referred to in their specific charts or tables.

INCH 'NON-FLANGED' HARDWARE AND LOCKNUTS {MINIMUM HARDWARE TIGHTENING TORQUES}

IN NEWTON-METERS (FOOT-POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS								
	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS	
Nominal Size	Unplated or Plated Silver	Plated w/ZnCr Gold	Unplated or Plated Silver	Plated w/ZnCr Gold	Unplated or Plated Silver	Plated w/ZnCr Gold	Gr.B w/Gr5 Bolt	Gr.C w/Gr8 Bolt
1/4	6.2 (55)*	8.1 (72)*	9.7 (86)*	13 (112)*	14 (121)*	18 (157)*	8.5 (75)*	12.2 (109)*
5/16	13 (115)*	17 (149)*	20 (178)*	26 (229)*	28 (250)*	37 (324)*	17.5 (155)*	25 (220)*
3/8	23 (17)*	30 (22)*	35 (26)*	46 (34)*	50 (37)*	65 (48)*	31 (23)*	44 (33)*
7/16	37 (27)*	47 (35)*	57 (42)*	73 (54)*	80 (59)*	104 (77)*	50 (37)*	71 (53)*
1/2	57 (42)*	73 (54)*	87 (64)*	113 (83)*	123 (91)*	159 (117)*	76 (56)*	108 (80)*
9/16	81 (60)*	104 (77)*	125 (92)*	163 (120)*	176 (130)*	229 (169)*	111 (82)*	156 (115)*
5/8	112 (83)*	145 (107)*	174 (128)*	224 (165)*	244 (180)*	316 (233)*	153 (113)*	215 (159)*
3/4	198 (146)*	256 (189)*	306 (226)*	397 (293)*	432 (319)*	560 (413)*	271 (200)*	383 (282)*
7/8	193 (142)*	248 (183)*	495 (365)*	641 (473)*	698 (515)*	904 (667)*	437 (323)*	617 (455)*
1	289 (213)*	373 (275)*	742 (547)*	960 (708)*	1048 (773)*	1356 (1000)*	654 (483)*	924 (681)*

NOTE: Torque values shown with * are inch pounds.

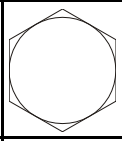
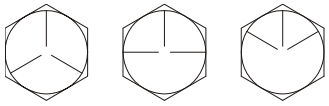
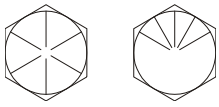
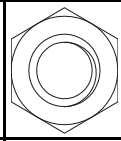
IMPORTANT: *Values shown on these charts are minimum hardware tightening torques unless otherwise stated.*

METRIC 'NON-FLANGED' HARDWARE AND LOCKNUTS {MINIMUM HARDWARE TIGHTENING TORQUES}

IN NEWTON-METERS (FOOT-POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS							
	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCK-NUTS
Nominal Size	Unplated	Plated w/ZnCr	Unplated	Plated w/ZnCr	Unplated	Plated w/ZnCr	Cl.8 w/Cl8.8 Bolt
M4	1.7 (15)*	2.2 (19)*	2.6 (23)*	3.4 (30)*	3.7 (33)*	4.8 (42)*	2.3 (20)*
M6	5.8 (51)*	7.6 (67)*	8.9 (79)*	12 (102)*	13 (115)*	17 (150)*	7.8 (69)*
M8	14 (124)*	18 (159)*	22 (195)*	28 (248)*	31 (274)*	40 (354)*	19 (169)*
M10	28 (21)*	36 (27)*	43 (32)*	56 (41)*	61 (45)*	79 (58)*	38 (28)*
M12	49 (36)*	63 (46)*	75 (55)*	97 (72)*	107 (79)*	138 (102)*	66 (49)*
M16	121 (89)*	158 (117)*	186 (137)*	240 (177)*	266 (196)*	344 (254)*	164 (121)*
M20	237 (175)*	307 (226)*	375 (277)*	485 (358)*	519 (383)*	671 (495)*	330 (243)*
M24	411 (303)*	531 (392)*	648 (478)*	839 (619)*	897 (662)*	1160 (855)*	572 (422)*

NOTE: Torque values shown with * are inch pounds.

SAE HARDWARE IDENTIFICATION CHART

Grade	1 or 2	5	8
SAE Markings for Bolts and Cap Screws			
SAE Markings for Hex Nuts			
Grade A-B-C Locknuts	A (No Notches)	B (Three Marks)	C (Six Marks)

METRIC HARDWARE IDENTIFICATION CHART

Class	5.8	8.8	10.9
			
Hex Cap Screw and Carriage Bolts	Located on the face or flat, on the cap of the bolt	Located on the face or flat, on the cap of the bolt	Located on the face or flat, on the cap of the bolt
Hex Nuts and Locknuts	Located on the face or flat of the nut	Located on the face or flat of the nut	Located on the face or flat of the nut

DEFINITIONS:

1. Break Away Torque - Torque measured in the direction of tightening, the moment before the bolt/nut starts to turn.
2. Clamping Force - Force equal to the tension in the fastener that clamps the parts together.
3. Stabilized Torque - Torque measured on a joint that has had a settling time after fastener installation, and the torque is measured in the direction of tightening, the moment after the bolt/nut begins to turn.
4. Proof Load - Safe test load for fasteners, approximately 10% below the yield load.
5. Torque - Force on the wrench handle times the handle length.
6. Torque and Turn - Bolting method utilizing a torque sufficient to close the joint, followed by rotation of a specific angle to obtain the desired bolt stretch.
7. Torque to Yield - Bolting method that tightens the joint until 0.2% yield is detected. Generally requires a computer monitored tightening tool.
8. Target Torque - Torque specified by engineering, generally nominal torque.
9. Ultimate Load - Load when bolt failure occurs.
10. Yield Load - Load when 0.2% deformation occurs.

NOTE: Metric cap screws and nuts are identified by the grade number stamped on the head of the cap screw or on the surface of the nuts. U.S. customary cap screws are identified by radial lines stamped on the head of the cap screw.

NOTE: Tightening the joint to the proper torque will keep it leak free, and prevent it from damaging the hose or fitting.

NOTE: Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. When replacing cap screws, always use a cap screw of the same measurement and strength as the cap screw being replaced.

NOTE: Make sure the fasteners threads are clean, and that thread engagement is started. This will prevent them from failing when being tightened. Assure that joints that utilize threaded fasteners are properly tightened, and that they remain tight during the period of their intended usage.

NOTE: Tighten plastic insert or crimped steel-type lock nuts to approximately 50 % of their torque, applied to the nut, not the bolt head. Tighten toothed or serrated type lock nuts to their full torque value.

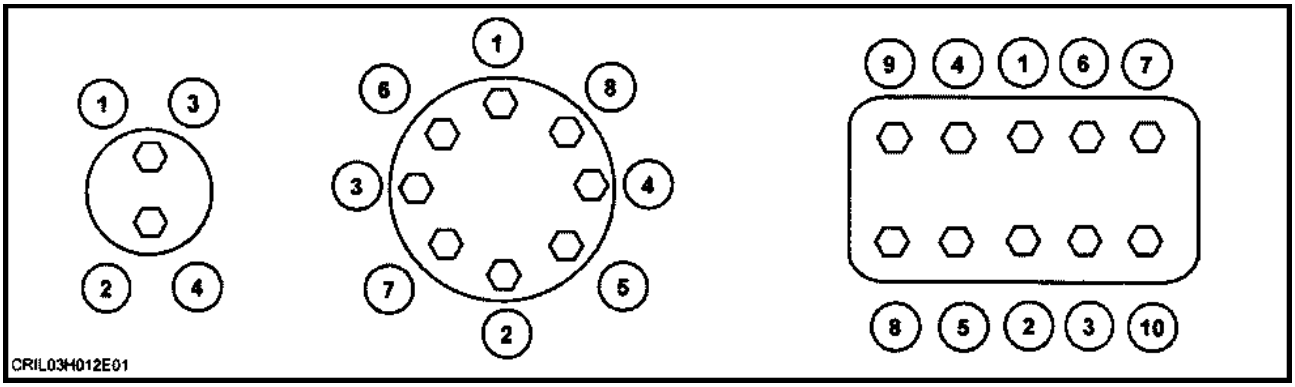
NOTE: Always use the torque values listed in the supplied charts in this section when values are not supplied in a procedure.

NOTE: DO NOT use these torque values when values are given in a specified procedure.

NOTE: Reuse of fasteners. Fasteners that have been tightened above yield point during assembly should not be reused after disassembly. They have been permanently deformed and the elastic range has been shifted closer to the ultimate tensile point.

NOTE: Torque and Turn is a recommended procedure for manufacturing and service when sophisticated tools are not available, especially for large diameter fasteners.

NOTE: Large diameter fasteners, unless specifically stated, should be tightened in sequence using the related torque chart below, at a low torque that is sufficient until the joint is closed. Each bolt is then rotated 90 degrees in sequence. Each bolt is then rotated another 90 degrees in sequence. The result is a clamp load above the yield point. This procedure results in a consistent clamp load. The fasteners should not be reused after disassembly.



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NOTE: Shown above is the suggested initial torque tightening sequences for general applications, tighten in sequence from item 1 through to the last item of hardware.

Hydraulic Hoses and Tubes

Always replace hoses and tubes with damaged cone ends or the end connections.
When installing a new hose, loosely connect each end and make sure the hose fits its desired location, without kinking or twisting, before tightening the connection. Tighten non-swivel end of hose first if applicable. Tighten the hose clamps enough to hold the hose without chafing but not so tight as to crush the ends.
Keep the hoses and tubes clear of moving parts and replace any hoses and fittings that have moved from their original positions over time. A hose with a chafed outer cover will allow moisture to get into the system. Concealed corrosion of the wire reinforcement will then occur along the hose length and result in hose failure.
Ballooning of the hose indicates internal leakage as the hose deteriorates. This condition can rapidly lead to hose failure.
Kinked, crushed, stretched or damaged hoses generally suffer internal structural damage that restricts fluid flow, reduces performance and ultimately causes the hose to fail.
Do not allow free moving, unsupported hoses or tubes to touch each other or related working surfaces. This causes chafing and reduces line life.

National Pipe Thread (NPT) Fittings

Before installing and tightening pipe fittings, clean the threads with a cleaning solvent or Loctite® Brand cleaner. Apply the appropriate Loctite® Brand sealant to all fittings including stainless steel, unless as otherwise stated. Generally Loctite® Brand 567 can be used for all fittings including stainless steel. Loctite® Brand 565 is used for most metal fittings. For high filtration/zero contamination systems use Loctite® Brand 545.

NPT PIPE FITTING TORQUE CHART

Thread Size	Torque (Maximum)
1/8" - 27	**13 Nm** (**10 lb ft**)
1/4" - 18	**16 Nm** (**12 lb ft**)
3/8" - 18	**22 Nm** (**16 lb ft**)
1/2" - 14	**41 Nm** (**30 lb ft**)
3/4" - 14	**54 Nm** (**40 lb ft**)

PIPE FITTING

Nom. SAE Dash Size	Thread Size	TFFT (Turns For Finger Tight)
-2	1/8 - 27	2.0 - 3.0
-3	1/8 - 27	2.0 - 3.0
-4	1/8 - 27	2.0 - 3.0
-5	1/8 - 27	2.0 - 3.0
-6	1/4 - 18	1.5 - 3.0
-8	3/8 - 18	2.0 - 3.0
-10	1/2 - 14	2.0 - 3.0
-12	3/4 - 14	2.0 - 3.0
-14	3/4 - 14	2.0 - 3.0
-16	1 - 11-1/2	1.5 - 2.5
-20	1-1/4 - 11-1/2	1.5 - 2.5
-24	1-1/2 - 11-1/2	1.5 - 2.5
-32	2 - 11-1/2	1.5 - 2.5

Apply sealant/lubricant to male pipe threads. The first two threads should be left uncovered to avoid system contamination. Screw pipe fitting into female pipe port to the finger tight position. Wrench tighten fitting to the appropriate turns from finger tight (TFFT) shown in table above, making sure the tube end of an elbow or tee fitting is aligned to receive incoming tube or hose fitting.

Installation of Adjustable Fittings in Straight Thread O Ring Bosses

1. Lubricate the O ring by coating it with light oil or petroleum jelly. Install the O ring in the groove adjacent to the metal backup washer which is assembled at the extreme end of the groove.
2. Install the fitting into the SAE straight thread boss until the metal backup washer contacts the face of the boss.
   NOTE: Do not over tighten and distort the metal backup washer.

3. Position the fitting by turning out (counter clockwise) up to a maximum of one turn. Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face of the boss.
Hydraulic O Ring Face Seal (ORFS).

Using Port Thread Tables 1 & 2
The "Into Steel" torque values listed are intended for steel connectors into steel ports. This combination will give a minimum port pressure rating of 21 MPa (3046 psi) . See individual port specification for maximum pressure rating of the port. The "Into Aluminum" torque values listed are intended for steel connects into aluminum ports with a maximum system pressure of 21 MPa (3046 psi) . Due to issues like manifold integrity and impulse frequency, connections into ports larger than M33 or -16 with a pressure greater than 14 MPa (2030 psi) should have application specific testing.
When hose ends or connectors are made of materials other than steel, different torque values may be required.

Table 1: METRIC PORT THREAD (Port Connector to ORFS Connector)

			Assembly Torque	
Thread Size	**Nominal Tube OD**	**Wrench Size**	**Into Steel**	**Into Aluminum**
	mm	**mm**	**mm**	**mm**
M10x1	5	14	20-22	12-14
M12x1.5	6	17	35-39	21-23
M14x1.5	8	19	45-50	27-30
M16x1.5	10	22	55-61	33-36
M18x1.5	12	24	70-77	42-46
M22x1.5	16	27	100-110	60-66
M27x2	20	32	170-187	102-112
M30x2	22	36	215-235	129-141
M33x2	25	41	310-341	186-205
M42x2	32	50	330-363	198-218
M48x2	38	55	420-462	252-277
M60x2	50	65	500-550	300-330

The above Table uses SAE J2244-2/ISO 6149-2 metric straight thread o-ring port connector recommended torque levels for use with SAE J1453/ISO 8434-3 ORFS connectors.

Table 2: INCH PORT THREAD (Port Connector to ORFS Connector)

			Wrench Size		Assembly Torque	
Thread Size	**SAE DASH Size**	**Nominal Tube OD**	**Non-adjustable**	**Adjustable (w/locknut)**	**Into Steel**	**Into Aluminum**
		inch	**inch**	**inch**	**Nm**	**Nm**
3/8-24	-3	3/16	1/2	9/16	10-12	5-7
7/16-20	-4	1/4	9/16	5/8	20-22	9-15
1/2-20	-5	5/16	5/8	11/16	25-28	14-18
9/16-18	-6	3/8	11/16	3/4	33-35	23-34
3/4-16	-8	1/2	7/8	15/16	68-78	34-54
7/8-14	-10	5/8	1	1-1/16	98-110	41-75

1-1/16-12	-12	3/4	1-1/4	1-5/16	170-183	75-108
1-3/16-12	-14	7/8	1-3/8	1-1/2	215-245	108-129
1-5/16-12	-16	1	1-1/2	1-5/8	270-300	115-163
1-5/8-12	-20	1-1/4	1-7/8	1-7/8	285-380	163-224
1-7/8-12	-24	1-1/2	2-1/8	2-1/8	370-490	183-258

The above Table uses SAE J1926-2 inch straight thread o-ring port connector recommended torque levels for use with SAE J1453/ISO 8434-3 ORFS connectors.

O Ring Face Seal (ORFS) Fittings

Observe the following procedures when repairing O ring face seal connections:
1. Release the fittings and separate the hose or tube assembly, then remove and discard the O ring seal from the fitting.
2. Prior to installation, dip a new O ring seal into clean hydraulic fluid or coat with petroleum jelly. Install the o ring into the fitting.
3. Install the new hose or tube and tighten the fitting finger tight while holding the assembly to keep it from turning.
4. Use two suitable wrenches and tighten the fitting tot he proper torque based on the chart below.

Table 3: O RING FACE SEAL (ORFS) CONNECTIONS

Metric		**English**				
Nominal Tube OD	**Tube Nut Size**	**Nominal Tube OD**	**DASH Size**	**Tube Nut Size**	**Thread**	**Assembly Torque**
mm	**mm**	**inch**		**inch**		**Nm**
6 and 8	17	1/4	-4	11/16	9/16-18	14-16 (1)
10	22	3/8	-6	13/16	11/16-16	24-27 (1)
12	24	1/2	-8	15/16	13/16-16	43-47 (1)
16	30	5/8	-10	1-1/8	1-14	60-68
20	36	3/4	-12	1-3/8	1-3/16-12	90-95
25	41	1	-16	1-5/8	1-7/16-12	125-135
30	50	1-1/4	-20	1-7/8	1-11/16-12	170-190
38	60	1-1/2	-24	2-1/4	2-12	200-225

(1) Torque level shown is for maximum pressure rating of .**42 MPa** (**6092 psi**) . The above Table uses SAE J1453/ISO 8434-3 o ring face seal connectors recommended torque levels for O Ring Face Seal (ORFS) tube assemblies, hose assemblies, and connectors.

SPLIT FLANGE MOUNTING BOLTS

Size	**Newton meters**	**lb/in**	**lb/ft**
5/16 - 18	20 to 27	180 to 240	
3/8 - 16	27 to 34	240 to 300	
7/16 - 14	47 to 61	420 to 540	
1/2 - 13	74 to 88		55 to 65
5/8 - 11	190 to 203		140 to 150

O RING BOSS END FITTING OR LOCK NUT

Nom. SAE Dash Size	**Thread Size**	**Newton meters**	**lb/in**	**lb/ft**
-6	9/16 - 18	48 to 54	432 to 480	
-8	3/4 - 16	70 to 78	612 to 684	
-10	7/8 - 14	102 to 114		75 to 84
-12	1-1/16 - 12	142 to 160		105 to 117
-16	1-5/16 - 12	237 to 254		175 to 187

37° DEGREE FLARE FITTING (STEEL HYDRAULIC FITTINGS)

Nom. SAE Dash Size	Tube OD/Hose ID		Thread Size	Newton meters	lb/in	lb/ft
-2			5/16 - 24	8 to 9	72 to 84	
-3			3/8 - 24	11 to 12	96 to 108	
-4	6.4 mm	1/4 inch	7/16 - 20	14 to 16	120 to 144	
-5	7.9 mm	5/16 inch	1/2 - 20	18 to 21	156 to 192	
-6	9.5 mm	3/8 inch	9/16 - 18	27 to 33	240 to 300	
-8	12.7 mm	1/2 inch	3/4 - 16	46 - 56	408 to 504	
-10	15.9 mm	5/8 inch	7/8 - 14	77 to 85	684 to 756	
-12	19.0 mm	3/4 inch	1-1/16 - 12	107 to 119		79 to 88
-14	22.2 mm	7/8 inch	1-3/16 -12	127 to 140		94 to 103
-16	25.4 mm	1.0 inch	1-5/16 - 12	131 to 156		97 to 117
-20	31.8 mm	1-1/4 inch	1-5/8 - 12	197 to 223		145 to 165
-24	38.1 mm	1-1/2 inch	1-7/8 - 12	312 to 338		230 to 250

37° DEGREE FITTINGS

TUBE NUTS FOR 37° DEGREE FLARED FITTINGS								**O RING BOSS PLUGS ADJUSTABLE FITTING LOCKNUTS, SWIVEL JIC-37 SEATS**			
				TORQUE				**TORQUE**			
Size	Tubing OD		Thread Size	Newton Meters		Foot Pounds		Newton Meters		Foot Pounds	
	mm	in.		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
4	6.4	1/4	7/16-20	12	16	9	12	8	14	6	10
5	7.9	5/16	1/2-20	16	20	12	15	14	20	10	15
6	9.5	3/8	9/16-18	29	33	21	24	20	27	15	20
8	12.7	1/2	3/4-18	47	54	35	40	34	41	25	30
10	15.9	5/8	7/8-14	72	79	53	53	47	54	35	40
12	19.1	3/4	1-1/ 16-12	104	111	77	82	81	95	60	70
14	22.2	7/8	1-3/ 16-12	122	136	90	100	95	109	70	80
16	25.4	1	1-5/ 16-12	149	163	110	120	108	122	80	90
20	31.8	1-1/4	1-5/8-12	190	204	140	150	129	158	95	115
24	38.1	1-1/2	1-7/8-12	217	237	160	175	163	190	120	140
32	50.8	2	2-1/2-12	305	325	225	240	339	407	250	300

These torques are not recommended for tubes of **12.7 mm** (**0.5 in**) OD and larger with wall thickness of **0.8899 mm** (**0.035 in**) or less. The torque is specified for **0.8899 mm** (**0.035 in**) wall tubes on each application individually. Before installing and torquing 37° degree flared fittings, clean the face of the flare and threads with a cleaning solvent or Loctite® Brand cleaner, and apply hydraulic sealant Loctite® Brand 569 to the 37° degree flare and the threads. Install fitting, and torque to specified torque, loosen fitting and re-torque to specifications.

General specification Disc Mower Specifications (- A.92.A.10)

Model	HM234	HM235	HM236
Cutter Bar			
Cutting width	**1.7 m** (**66 in**)	**2.1 m** (**81 in**)	**2.4 m** (**95 in**)
Cutting height	**16 to 60 mm** (**0.63 to 2.36 in**)	**16 to 60 mm** (**0.63 to 2.36 in**)	**16 to 60 mm** (**0.63 to 2.36 in**)
Cutter bar tilt angle	**0 to - 8 °**	**0 to - 8 °**	**0 to - 8 °**
Cutter bar operating range	**18 to - 30 °**	**18 to - 30 °**	**18 to - 30 °**
Breakaway angle	**21 °**	**21 °**	**21 °**
Type of cutter bar	Enclosed Gear Drive	Enclosed Gear Drive	Enclosed Gear Drive
Number of discs	4	5	6
Knives per disc	2	2	2
Disc cutting diameter	**520 mm** (**20.47 in**)	**520 mm** (**20.47 in**)	**520 mm** (**20.47 in**)
Disc drive	Spur gear drive in common sump	Spur gear drive in common sump	Spur gear drive in common sump
Disc speed	**3154 RPM**	**3154 RPM**	**3154 RPM**
Driveline			
Minimum PTO horsepower required **	**26.1 kW** (**35 PTO Hp**)	**29.8 kW** (**40 PTO Hp**)	**37.3 kW** (**50 PTO Hp**)
Input speed	**540 RPM**	**540 RPM**	**540 RPM**
Driveline protection	Belt drive to cutter bar	Belt drive to cutter bar	Belt drive to cutter bar
Overrunning clutch	On PTO shaft	On PTO shaft	On PTO shaft
Belt tension	Adjustable drawbolt **20 mm** (**0.75 in**)	Adjustable drawbolt **20 mm** (**0.75 in**)	Adjustable drawbolt **20 mm** (**0.75 in**)
Hydraulics and Hitch			
Hydraulic circuits required	One remote	One remote	One remote
Minimum relief pressure required	**160 bar** (**2320 psi**)	**160 bar** (**2320 psi**)	**160 bar** (**2320 psi**)
Hitch	Category 1 or 2	Category 1 or 2	Category 2
Dimensions and Weight			
Overall width	**3410 mm** (**134.25 in**)	**3790 mm** (**149.21 in**)	**4530 mm** (**178.35 in**)
Overall length	**1380 mm** (**54.33 in**)	**1380 mm** (**54.33 in**)	**1380 mm** (**54.33 in**)
Height - transport position *	**2350 mm** (**92.52 in**)	**2730 mm** (**107.48 in**)	**3110 mm** (**122.44 in**)
Weight	**373 kg** (**822 lb**)	**411 kg** (**905 lb**)	**489 kg** (**1077 lb**)

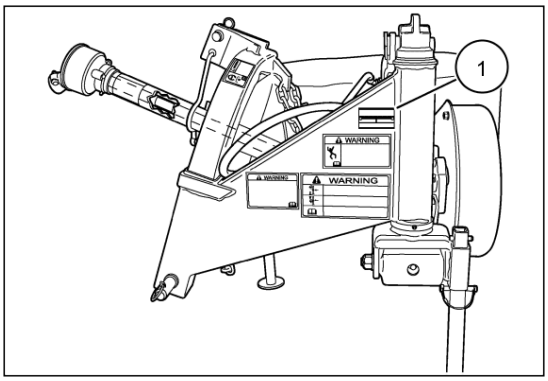
* Transport height is based on **500 mm** (**19.7 in**) hitch-pin height above ground.

** Cab tractor required.

Product identification PIN Plate Location (- A.80.A.10)

NOTE: *The left and right are determined by standing behind the unit, looking in the direction of travel.*

The PIN/model number plate **(1)** is located on the left side of the main frame.



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NEW HOLLAND

POWER PRODUCTION - B

PTO POWER IN - 90.A

HM234
HM235
HM236

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