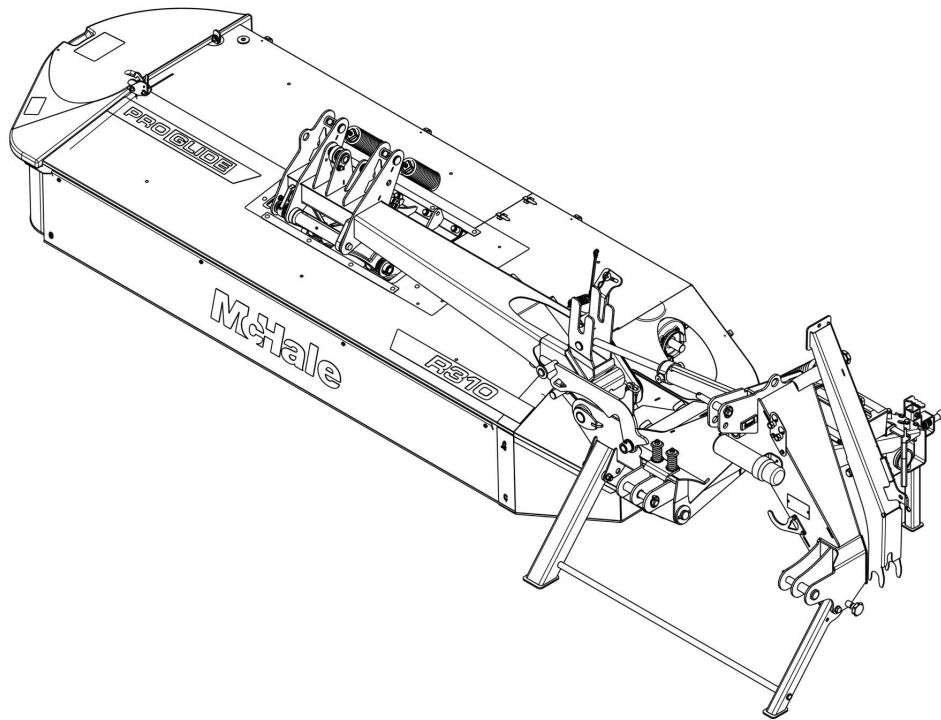


# McHale **PRO GLIDE**



## **Pro Glide R310 Rear Disc Mower Operator Instruction Manual Issue 2**

McHale  
Ballinrobe  
Co. Mayo  
F31 K138 Ireland

**Tel:** +353 94 9520300  
**Email:** [sales@mchale.net](mailto:sales@mchale.net)  
**Website:** [www.mchale.net](http://www.mchale.net)





**ENVIRONMENT: Reduce paper consumption**

Think before printing documents! Is a PDF on a laptop or tablet sufficient? If a printed copy is required, always select 'Print on both sides of paper' and always try to limit the number of printed pages by selecting a specific page range or just select 'Current page' if that is sufficient.

**This is the original operator manual with 'Original Instructions'. The English language version of the operator manual is the source document for all translations.**

If there is any conflict as to the accuracy or content, of any translation, the English source manual remains the authorised document.

No part of this manual may be reproduced, distributed or translated, in any form or by any means, without prior written permission by **McHale**.

## McHale Pro Glide R310 Rear Disc Mower

Thank you for buying this **McHale** machine, you have chosen wisely!  
Given proper care and attention, you can expect it to provide you with  
years of dependable service.

### Warranty/Guarantee

#### Attention End User!

Please ensure your machine is fully registered with **McHale**,  
by your dealer, at the time of delivery.  
Failure of the dealer to register the machine will render your warranty void!  
You can check the registration of your machine by visiting **www.mchale.net**.

It is important to quote the machine serial number when ordering spare parts or  
requesting technical assistance. Space is provided below to record machine details.  
(See 'Description of the serial number plate')

<b>Serial number:</b>	
<b>Year of manufacture:</b>	
<b>Date of delivery:</b>	

If you require further copies of this instruction manual,  
please quote part number: CLT01209

Due to a policy of continuous product development and improvement, **McHale**  
Engineering reserves the right to alter machine specifications, including the contents of  
this manual, without prior notice or any obligation to make changes or additions to the  
equipment previously sold. Images and screenshots used in this manual may differ in  
appearance from the actual product.

It is vital to replace defective parts of the machine immediately and to use only genuine  
**McHale** spare parts, as these are designed and manufactured to the same standard  
as the original machine. Spare parts can be obtained from your **McHale** dealer.

Throughout this manual there are links to other relevant sections of the manual, to  
guide the reader to additional information to convey the complete message. These  
links are in (*grey italic font*). See the example above i.e. the link to the description of  
the serial number plate. When you click on the link in the PDF document, the page will  
jump automatically to the linked section. With Adobe Reader, you can go back to the  
page on which you clicked the link, by clicking on the 'Previous view' button (or by  
holding 'Alt' and pressing the 'left arrow').

---

# Table of contents

---

<b>1</b>	<b>Introduction</b>	<b>6</b>
<b>2</b>	<b>Product information</b>	<b>7</b>
2.1	Designated use of the machine	7
2.2	Front view	8
2.3	General specifications	9
2.4	Tractor specifications	9
2.5	Machine specifications	9
<b>3</b>	<b>General safety</b>	<b>10</b>
3.1	Be aware of all safety information	10
3.2	Follow all safety instructions	10
3.3	Store all items carefully	11
3.4	Personal protective equipment (PPE)	11
3.5	In case of emergencies	11
3.6	Stay clear of rotating elements	11
3.7	Trained operator criteria	12
3.8	Operating the machine	12
3.9	In the event of a fire	13
3.10	General safety warnings	13
<b>4</b>	<b>Specific safety warnings</b>	<b>18</b>
4.1	Hydraulic safety warnings	18
4.2	Noise level	18
4.3	Fire precautions	19
4.4	Special safety devices/instructions	19
4.5	Safety instruction decal locations	20
4.6	Safety warnings & instructions explained	21
4.7	Description of the serial number plate	24
4.8	Machine lifting guidelines	24
4.9	Machine storage	25
<b>5</b>	<b>Tractor requirements &amp; preparation</b>	<b>26</b>
5.1	Tractor requirements	26
5.2	Attaching to linkage	27
5.3	Attaching the machine to the PTO	27
5.4	Making connections to the tractor	28
5.5	Machine and tractor stability	28
5.6	Lighting system	29
<b>6</b>	<b>Machine requirements &amp; preparation</b>	<b>30</b>
6.1	Side guard latch	30
6.2	Blade replacement	30
6.3	Gearbox oil	33

## McHale Pro Glide R310 Rear Disc Mower

6.4	Leg stands & parking	35
6.5	PTO Shaft adjustment & maintenance	39
<b>7</b>	<b>Road traffic safety &amp; operation</b>	<b>41</b>
7.1	Before travelling on any public roadway	41
<b>8</b>	<b>Field operation &amp; machine adjustments</b>	<b>43</b>
8.1	Cutting height	43
8.2	Suspension spring chain adjustment	45
8.3	Swath disc adjustment (Optional)	46
8.4	Lift/lower latch	47
8.5	Break-away safety latch	48
<b>9</b>	<b>Machine maintenance</b>	<b>49</b>
9.1	Maintenance intervals	49
9.2	Tightening torque values	53
<b>10</b>	<b>Storage</b>	<b>54</b>
10.1	End of season	54
10.2	Start of season	54
<b>11</b>	<b>Certification &amp; Warranty</b>	<b>56</b>
11.1	Declaration of Conformity	56
11.2	PDI form	56
11.3	Change of ownership pre-checks	56
11.4	Limited Warranty	56
<b>12</b>	<b>Appendix</b>	<b>61</b>
12.1	Adjusting the PTO shaft to the tractor	61
12.2	Unit conversion tables	62

# 1

---

## Introduction

---

The **McHale Pro Glide R310** is an innovative Rear Disc Mower. The design has been developed based on years of extensive research and development in the field of mowers and balers. Given proper care and attention, the machine will provide years of reliable and dependable performance.

Please do not assume that you know how to operate and maintain your machine before reading this manual carefully. In order to prevent misuse, damage and accidents, it is very important that everybody who will operate the machine is a fully trained operator. (See 'Trained operator criteria'). They must read and fully understand all of the contents of this manual, before operating the machine, paying particular attention to the following:

- Safety instructions
- Functions
- Controls (hydraulic & electrical)

It is highly recommended to get acquainted with any new machinery slowly. Take time to learn and understand all of the features of the machine. Proficiency will increase as more experience is obtained.

If you have any questions in relation to the instructions in the manual, please contact your **McHale** dealer. It is highly recommended that training be sought from your local **McHale** dealer.

The operator is solely responsible for the safe use and maintenance of the machinery, in accordance with this manual. Keep this manual safe and make sure it remains with the machine, at all times.



**ENVIRONMENT: Reduce paper consumption**

Think before printing documents! Is a PDF on a laptop or tablet sufficient? If a printed copy is required, always select 'Print on both sides of paper' and always try to limit the number of printed pages by selecting a specific page range or just select 'Current page' if that is sufficient.

# 2

---

## Product information

---

The machine is protected against many dangers to itself while being operated. However, it is of the utmost importance for the safety of the operator and for others, that the operator pays attention to all warnings and instructions given in this manual. In particular all safety devices, decals, guards and controls must be in place and in fully functioning condition. Never try to clear any malfunction when the tractor is switched on or while the machine is running. Keep the 'Danger Zone' (an area around the machine) free of all persons and animals at all times, while the machine is in operation (See 'Danger Zone'). This manual must be read and fully understood by anyone who will operate the machine.

### 2.1 Designated use of the machine

The machine is exclusively designed for normal use in agricultural applications. The machine has been designed to mow grass and other forage crops for agricultural harvesting. It transfers the mown crop into loose swaths. This designation includes the movement of the machine, between fields by track or road, incidental to the machine's main use. The field or pasture being mown should be even and smooth and free of stones. The manufacturer will not be held responsible for any loss or damage resulting from machine applications other than those specified above. Any other use the machine may be put to is entirely at the owner/operator's risk.

The designated use of the machine includes that:

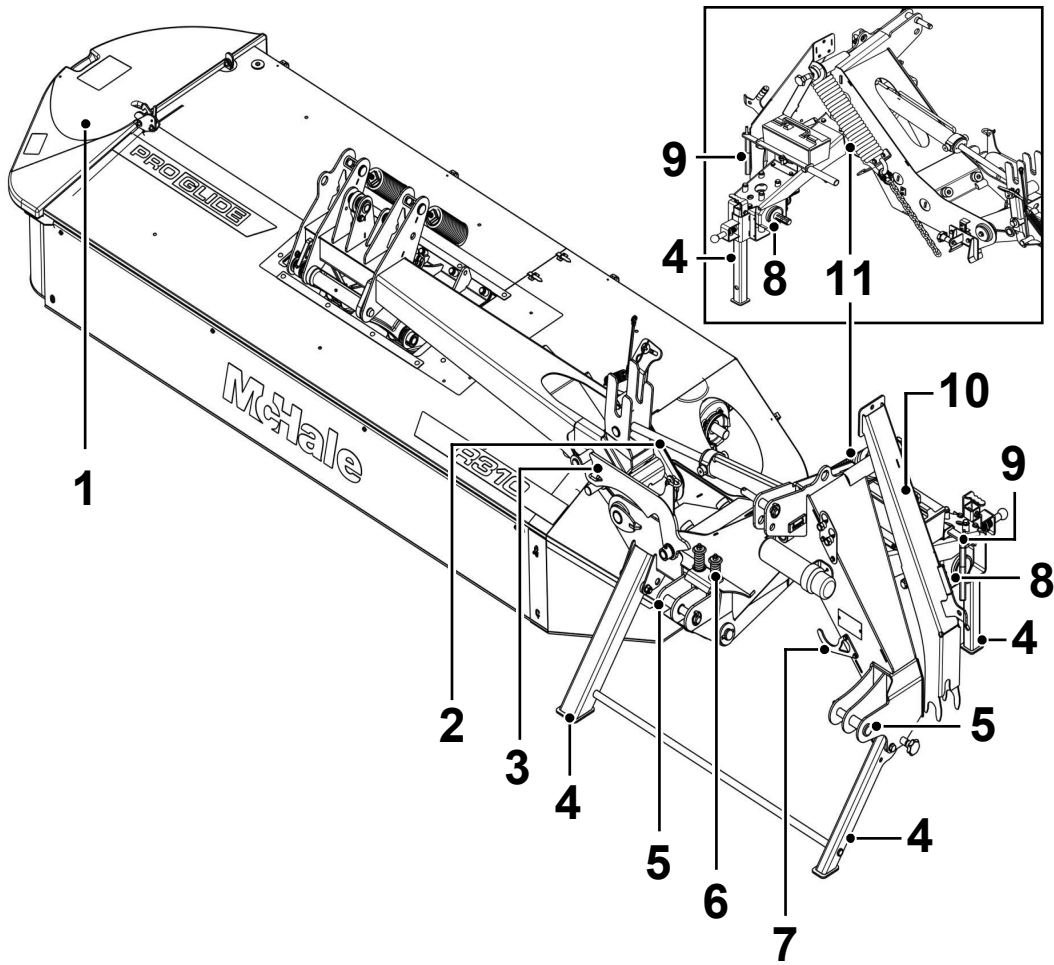
- The operating, maintenance and repair instructions given by the manufacturer will be strictly fulfilled
- Exclusively persons who are familiar with it and instructed about the risks are entitled to operate, maintain and/or repair the machine
- The relevant health and safety requirements, that may be in force in the country of use, will be strictly followed
- No other equipment or accessories, other than released by **McHale**, are installed in the machine. The use of any other equipment or accessory is entirely at the owner/operator's risk. In such cases, unauthorised modifications/changes exclude any liability of the manufacturer.



**WARNING: Loss of machine validity**

By any alteration of safety equipment, the declaration of conformity and the CE sign loses its validity for this machine.

## 2.2 Front view



No.	Machine function
1	Right hand guard & curtain
2	Lift ram
3	Lift/lower latch
4	Leg stands
5	CAT 2/3 lower link pins
6	Break-away safety latch
7	PTO stand
8	Right angle drive (1,000 / 540 rpm PTO)
9	Blade installation lever
10	Leg stand (Vertical storage)
11	Suspension spring & chain

## 2.3 General specifications

Units are given in both metric and UK imperial values, with the latter shown in brackets.

<b>Transport length</b>	1.5 m (59")
<b>Transport/working width</b>	1.9 m / 5.3 m (75" / 209")
<b>Transport height</b>	3.7 m (146") with lift arms set at 550 mm (22")*
<b>Working height</b>	1.4 m (55") with lift arms set at 650 mm (26")*
<b>Transport weight</b>	1,015 kg (2,238 lbs)

\*Measured from ground level

## 2.4 Tractor specifications

<b>Tractor capacity</b>	60 kW (80 HP) minimum
<b>Linkage</b>	CAT 2 or CAT 3 (rear) 3-point linkage
<b>PTO speed</b>	540 rpm / 1,000 rpm
<b>Hydraulic systems</b>	Double-acting hydraulic supply (minimum)
<b>Minimum pressure</b>	180 bar (2,610 psi)
<b>Minimum flow rate</b>	20 l/min (4.54 gal/min) @ 180 bar (2,610 psi)

## 2.5 Machine specifications

<b>Cutting width</b>	3.05 m (120")
<b>Swath width</b>	1.6 m - 2.3 m (63" - 91")
<b>Number of cutting discs</b>	7
<b>Total number of blades</b>	14 (2 x 7)
<b>Cutting height</b>	25 mm - 75 mm (1" - 3") (without skids)
<b>Cutting disc speed</b>	3,200 rpm
<b>Operation speed</b>	10 - 12 km/h (6 - 7 mph)
<b>Capacity</b>	3.5 ha/h (8.5 acres/h)

### Optional equipment

Swath guides

Light assembly

# 3

---

## General safety

---

### 3.1 Be aware of all safety information

Follow all safety precautions and practice safe operation of machinery, at all times.

#### Warning, caution, note & environment messages:

When reading this manual, pay particular attention when you see the symbols below i.e. warning, caution, note and environment. They will be used at various points in this manual and may also appear on safety decals on the machine. The purpose of these messages is to ensure that the most important information stands out from the rest of the text.



**WARNING:** This symbol indicates a potentially hazardous situation, that if not avoided could result in machinery damage, personal injury or even death.



**CAUTION:** This symbol indicates a potentially hazardous situation, that if not avoided could result in machinery damage or personal injury.



**NOTE:** This symbol is used to identify special instructions or procedures which, if not followed strictly, could result in machinery damage.



**ENVIRONMENT:** This symbol reminds you to respect the environment in relation to the correct disposal of waste material.

### 3.2 Follow all safety instructions



Using this manual, read all safety instructions and messages, and be aware of the meanings of all safety decals (*See 'Safety warnings & instructions explained'*). The spare part codes for each decal are also listed, which are available from your **McHale** dealer. If safety decals are damaged or missing due to wear and tear or component replacement, ensure that they are replaced.

As with all machinery, learn all operations and use controls by reading this manual thoroughly. Do not attempt to let anyone operate this machine without being fully instructed.

### 3.3 Store all items carefully



Store all attachments in a secure and safe manner so as to prevent items from falling. Keep storage areas clear of bystanders and children.

### 3.4 Personal protective equipment (PPE)



The following PPE should be worn, at all times, when carrying out maintenance work on this machine, to help prevent health and safety hazards:

- Safety glasses
- Ear muffs
- Safety boots
- Gloves
- Tight fitting clothing

Use of mobile phones or radio/music headphones are strictly forbidden while operating machinery and driving, as these impair the operator's attention.

### 3.5 In case of emergencies



In the event of any accident, emergency equipment should be kept close at hand. A first aid kit and fire extinguisher along with emergency phone numbers should always be available to machine operators.

### 3.6 Stay clear of rotating elements


Serious injury or death can result from entanglement of clothing or body parts with PTO shafts, drivelines and other rotating and moving components.

Keep all guards in place at all times, only wear close fitting clothing and ensure that the tractor engine has stopped, the key has been removed and that the PTO has stopped turning before carrying out any adjustments, connections or cleaning of PTO driven equipment.

### 3.7 Trained operator criteria

Age related requirements		General requirements
18 +	The operator needs to be fully trained in the use of this machine and have a valid tractor driver's licence.	<ul style="list-style-type: none"> <li>■ The operator must be in full control of his/her senses and must not be under the influence of any alcohol or drugs, prescribed or otherwise.</li> <li>■ The operator must have read and understood all aspects of the operator manual in order to operate, maintain and clean the machine. Ideally, they should also receive training from their <b>McHale Dealer</b>.</li> <li>■ It is only acceptable to have more than one person in the tractor cab, if it has a second seat.</li> </ul>
16 - 18	An operator between the age of 16 and 18 years old must have a provisional licence and must be accompanied by an experienced driver/operator, at all times, even during maintenance and cleaning!	
< 16	Persons younger than 16 years of age are not allowed to operate, clean or carry out maintenance on this machine, under any circumstances!	


### 3.8 Operating the machine



**WARNING: Never clear a blockage while the machine is in operation!**  
 Never attempt to clear a blockage while the machine is in operation. You could be severely injured or pulled in by the rotating tines!

In order to avoid serious injury or even death by being pulled into the machine:

- Disengage the PTO, apply handbrake, shut the tractor engine off and remove the key from the ignition.



**WARNING: Stand well clear of the machine while it is in operation!**  
 Stand well clear of the machine and tractor when the machine is operating. Objects such as loose tines, stones and other debris may be discharged from the machine.

## 3.9 In the event of a fire



In the event of a fire, it is the operator's decision to determine the seriousness and hence the solution to the situation. The following is given only as a guideline procedure:

1. Move the tractor and machine away from the flammable material. Position the tractor upwind, in an open area to limit the fire spreading.
2. Disengage the PTO, turn off the tractor and remove the key from the ignition.
3. Remove all hosing and electrical looms from the machine, assuming it is safe to do so.
4. With all connections removed, disengage the machine from the tractor.
5. Drive the tractor away from the machine and park it upwind of the fire.
6. If safe to do so, use a suitable fire extinguisher to attempt to put out the flames. If unable to do so or if there is a risk of personal injury stand well clear and call the fire brigade.



### **WARNING: Fire prevention**

To reduce risk of fires it is recommended that the machine be kept reasonably clean and free of build-ups of crop, lubricants, etc. Clean the machine regularly ensuring the tractor engine is shut down.



### **WARNING: Do not risk personal injury**

If a fire is too far advanced, do not try to extinguish it. Avoid smoke inhalation and severe burns. Burning tyres or gas struts can explode unexpectedly.

## 3.10 General safety warnings

It is important to be aware of the potential hazards associated with the operation of farm machinery. Numerous research studies have shown that the majority of machinery-related accidents occur as the result of human negligence, including taking shortcuts to save time, lack of or improper maintenance, ignoring warnings, failing to read the operator's manual, lack of or improper instruction and failure to follow safety rules.

Read and understand this operator manual before using the machine. If any of the instructions appear unclear do not hesitate to contact your **McHale** dealer.

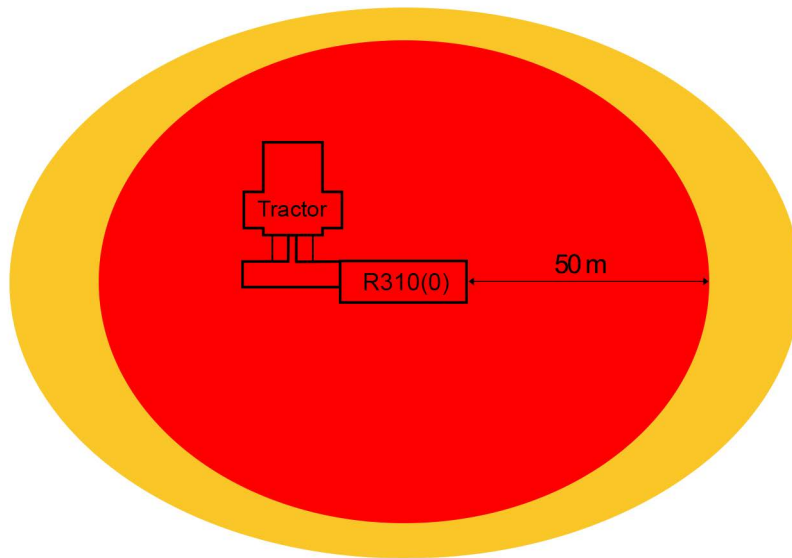
Only competent persons who have read and fully understood this manual are qualified to operate this machine. (See 'Trained operator criteria'). The owner of this machine is obliged, by law, to ensure that every operator understands all of the functions, controls, working processes and safety warnings, before operating the machine.

### **Safety devices**

- All safety devices such as guards, protection parts and safety controls must be in place and in fully functioning condition. It is forbidden to operate this machine with defective or incomplete safety devices.

## Danger Zone

- The 'Danger Zone' is the area all around the mower of 50 m radius.



**NOTE: 'Danger Zone' can vary in size**

The operator must be aware of the 'Danger Zone' which can vary in size, depending on operating conditions, i.e. hilly terrain.

- It is the operator's responsibility to ensure that there is no person in the 'Danger Zone' while operating the machine, especially during start up.

## Before repair or reassembly

- Safe lifting gear of sufficient capacity must be used for machine assembly. All chains and slings used must be in good condition.

## Before operation

- Never operate farm machinery while under the influence of drugs or alcohol. The physiological effects of drugs and alcohol impair performance and can lead to operators taking risks or putting others at risk. This includes over-the-counter cold/flu and allergy medications or prescription drugs that are not recommended to be taken whilst driving a car or operating machinery.
- The operator must ensure that the manufacturer's instructions for attaching and detaching the machine are followed. This includes the 3-point linkage, the hydraulic lines and in particular the lighting system.
- The operator must ensure that all covers are closed and all safety devices are in operating mode.
- The operator must ensure that there is no person in the 'Danger Zone'. (See 'Danger Zone')

## McHale Pro Glide R310 Rear Disc Mower

- Always be familiar with the health and safety requirements that may be in force in the country of use.

### During operation

- While operating this machine on hilly or sloping ground the operator must take extra precautions, in particular the 'Danger Zone' is increased in such conditions. (See 'Danger Zone')
- The operator must ensure that there is a minimum of 4 m clearance between the machine and any obstacle above, in particular electrical high voltage lines.
- Never operate the machine with guards or safety devices damaged or missing.
- Avoid contact with the knives/blades.
- Particular care must be taken, if the machine is left idle for any extended period, to ensure that all sensors and safety features are working correctly.



#### **WARNING: Do not carry people or animals on the machine**

The operator must ensure that no persons or animals are carried on the machine at any time or are hidden under the machine (on the tractor persons are only allowed to sit on the relevant seats).

### Before travelling on public roads

- The owner of this machine is obliged by law to ensure that every operator has a valid driving licence and is familiar with the road traffic regulations relating to the country of use.
- Always ensure that the hydraulic supply is switched off.
- Always ensure that the side guards are fully retracted.
- Ensure the machine is in the correct transport position.
- Ensure that additional lighting is provided if any of the tractor lights are hidden or obstructed by the machine.
- The machine is not suitable for towing at speeds above 40 km/h.
- The operator must ensure that there is a minimum of 1 m clearance between the machine and any obstacle above, like low bridges, arches or tunnels. But in the case of electrical high voltage lines a minimum clearance of 4 m should be allowed.

### Performing maintenance

- Maintenance and repair work on the machine should always be carried out in accordance with this manual.
- Maintenance and repair work exceeding the content of this manual should only be carried out by qualified persons or your **McHale** dealer.

## McHale Pro Glide R310 Rear Disc Mower

- When conducting maintenance work tie long hair behind your head. Do not wear a necktie, necklace, scarf or loose clothing when you work near the machine or moving parts. Rotating machinery parts can entangle loose clothing, long hair or dangling jewellery faster than a victim can react. If these items were to get caught, severe injury could result.
- Before working on this machine or altering any setting, the operator must ensure the following:
  - (a) The tractor has definitely stopped moving
  - (b) The hand brake is applied
  - (c) The engine is shut down
  - (d) The ignition key is removed
  - (e) PTO shaft is removed from PTO stub
  - (f) Hydraulic oil supply is switched off



### **CAUTION: Before carrying out work on this machine**

It is forbidden to open any safety guards or to carry out any work on the machine, unless the above specified precautions have been carried out.

- When conducting maintenance work always support the machine properly. Where possible, lower the attachment or implement to the ground before you work on the machine. If it is not possible to lower the machine or attachment to the ground, always securely support the machine or attachment. Do not work under a machine that is solely supported by a jack. Never support the machine with props that may break or crumble under continuous load.
- Never disable any electrical safety circuits, tamper with safety devices or carry out any unauthorised modification to the machine.
- Replace any electrical or hydraulic devices immediately, at the first sign of malfunction or failure, as these components affect the functionality, sequencing and thus safety of operation. Never use a machine where a malfunction exists! Contact your **McHale** dealer to achieve a solution. Always think 'Safety First'!
- Avoid heating near pressurised fluid lines, as pressurised lines can be accidentally damaged when heat goes beyond the immediate flame area.
- Regular clean down is recommended in order to maintain the machine in a safe and reliable working condition. **McHale** recommend that the machine be blown down with an air line, as opposed to a pressure washer, due to the dangers involved with pressure washing and to protect the overall paint work on the machine. If, despite our advice, a pressure washer is used then take extreme caution and operate from ground level only. Never climb onto any part of the machine, while pressure washing, due to the fact that all metal surfaces become extremely wet and slippery and always ensure that the tractor has been shut down, with the ignition key removed.

### During inspection

- If on the rare occasion that it is necessary for an inspection to be carried out within the 'Danger Zone' while the machine is running (**extremely dangerous and not recommended!**), there shall be a fully trained and competent second person operating both the tractor and machine controls. The tractor hand brake shall be applied and the controls shall be in manual mode. The machine shall be on level ground with all guards closed. Communication is key. The operator shall inform the inspector before any machine function is activated. The inspector shall remain in the field of vision of the operator at all times and inform the operator of their intended actions. If communication is lost with the operator, or they move within 1.1 m of moving parts or parts that have the potential to move, all tractor power shall be turned off immediately.

### Child safety on farms

- All adults working or present on farms are required, by law, to do everything reasonably practical to ensure the safety and health of children and young people on the farm.
- Children must be supervised at all times! Remember, farms are not playgrounds!
- Store farm machinery with safety & stability in mind.
- Always exclude children from potentially dangerous areas (they will often get into apparently inaccessible places). Do not allow them in farm yards on busy days. Contractors should always be made aware of the presence of children.
- Never leave children alone in a tractor cab as they can interfere with controls and many children have been killed falling from the door or rear window of a tractor.
- Children under 16 years of age should never operate power-driven machinery. Keys should be removed from vehicles and controls left in neutral. Lower any implements or loaders to the ground and apply the hand brake.
- Do not allow children to use bales of any description for playing. It is very easy to fall from stacked bales resulting in serious injury, or fall between them leading to suffocation. Make sure there is no evidence of children burrowing under stacked bales.
- Children under 16 should never handle chemicals. Always keep them in their correct containers and securely stored out of sight under lock and key.
- Keep matches in a safe place.

### Danger of lightning strike

- If there is a risk of lightning in the area, stop all work.
- If there is a risk of lightning when travelling, find a safe place to pull over and stop the tractor.
- Do not leave the tractor cab or start work until the risk of lightning has passed.

# 4

---

## Specific safety warnings

---

### 4.1 Hydraulic safety warnings

- The maximum pressure in the hydraulic system of this machine should not exceed 210 bar.
- Always ensure the system is not under pressure before working on the machine. Oil under pressure can penetrate the skin and cause injury. Beware of pipes under accumulator pressure, depressurise lines by unthreading connections extremely slowly.
- Hydraulically actuated devices must be blocked mechanically against movement, before working on the machine.
- If any hoses are removed or replaced ensure they are marked and re-installed to the correct position during re-assembly.
- Check hoses monthly for signs of leakage or wear. Use a piece of card when checking for leaks. Fine jets of hydraulic fluid can penetrate the skin. Never use your fingers or face to check for leaks. If in doubt always replace. The recommended maximum working time of hoses should not exceed 5 years. Only use exact specification **McHale** genuine replacement parts.
- Do not work on hydraulic systems unless you are qualified to do so. This work should only be carried out by qualified persons or your **McHale** dealer.

### 4.2 Noise level

- The European directive 2003/10/EC directs employers and employees to control the noise level at work. The noise level at field work may differ according to the tractor, ground, crops and other environmental conditions.
- In normal conditions, whilst driving the machine, the noise level to the driver's ear does not exceed 70 dB (A) with the rear screen of the tractor cabin open. The common noise level of the machine and the tractor is primarily influenced by the tractor noise (radio is an additional noise source). It is recommended to operate this machine with closed cabin windows.

## 4.3 Fire precautions

- Be aware that crops are easily inflammable.
- Do not smoke or make use of any open fire next to the machine.
- A functioning fire extinguisher should always be available on the tractor.
- The machine is to be kept clear of oil, grease, crops, string, plastic or any other flammable material at all times.
- Do not continue to work with overheated parts, cables or pipes, unless you have identified and eliminated the reason for overheating.
- Equipment being refuelled should have its engine turned off before refuelling. Personnel should be instructed on how to properly refuel equipment: do periodic maintenance checks on the tank, pump, hose and nozzle; and abide by safety rules, such as not smoking when around the refuelling area.

## 4.4 Special safety devices/instructions

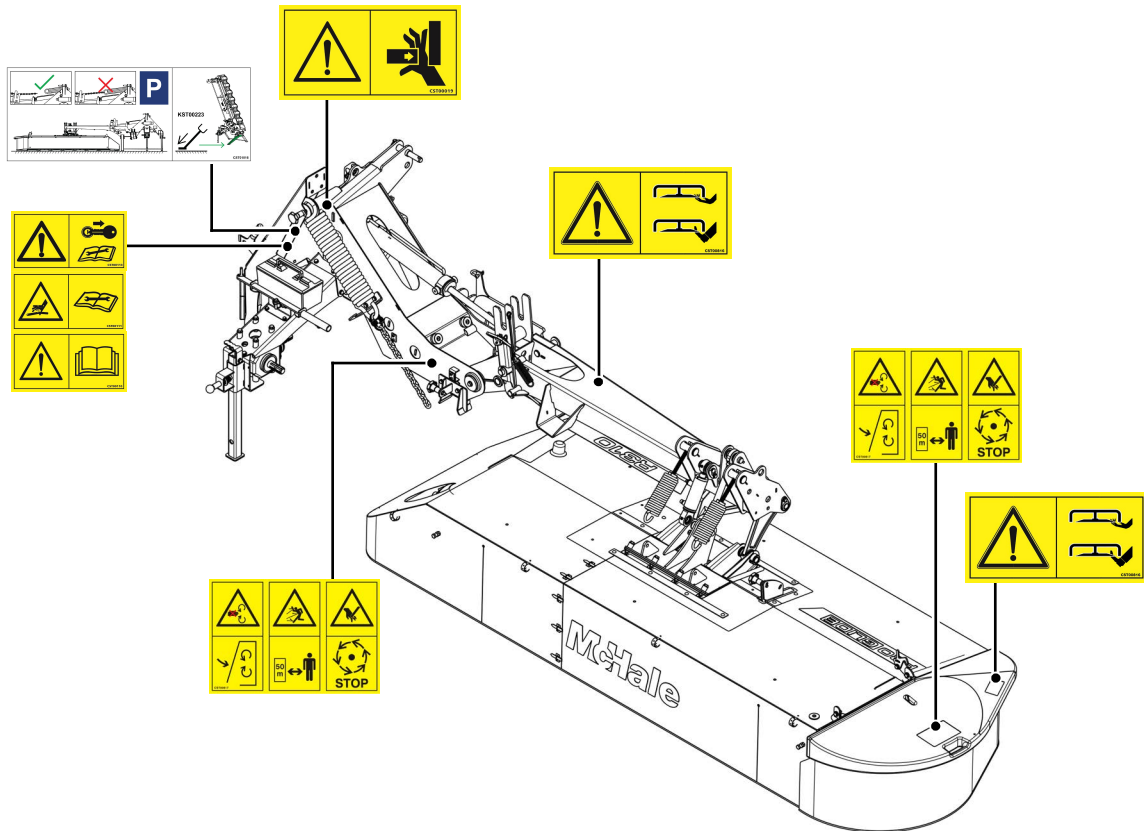
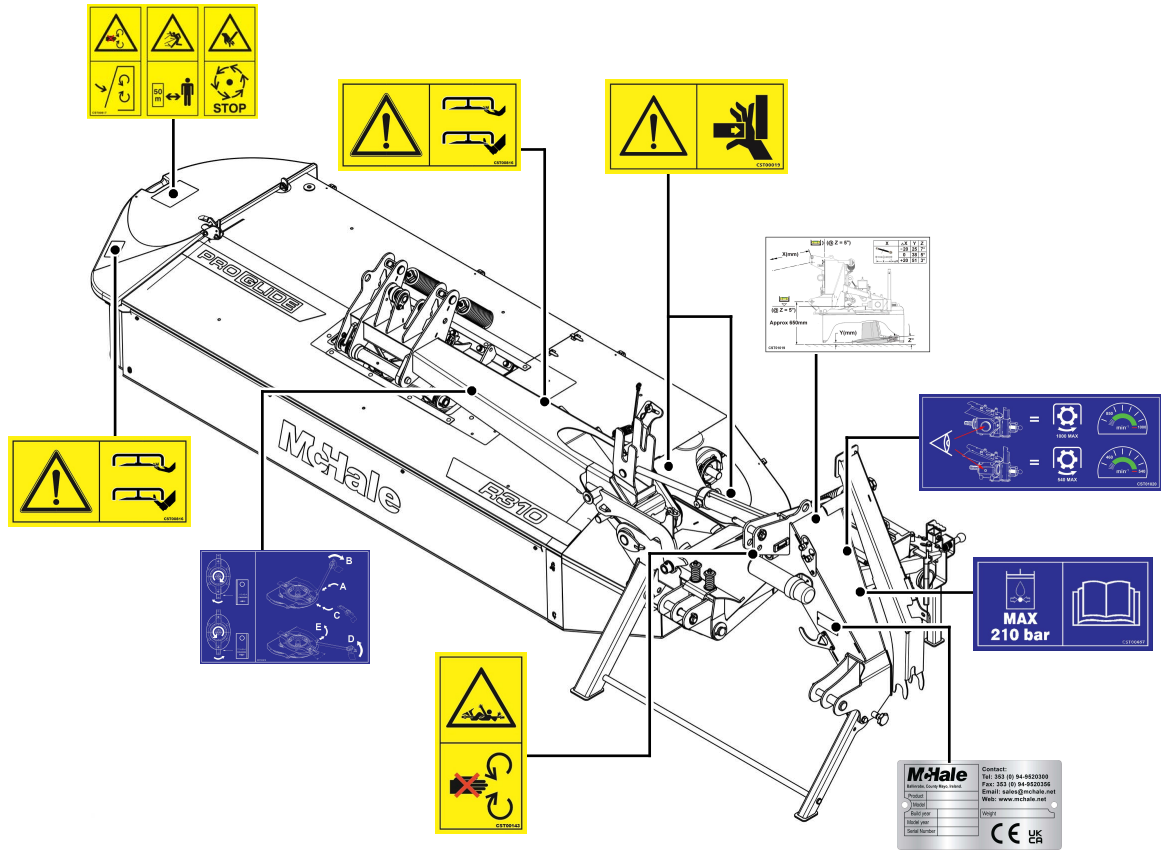
- When maintenance or repair work has to be carried out on the machine, the hand brake must be applied, engine shut down with ignition key removed. The PTO shaft must be removed from the PTO stub, with the hydraulic and electric power supply disconnected. It is forbidden to open any safety guards or carry out any work on the machine unless the specified precautions have been carried out.
- Always use protective clothing and gloves when working with blades or sharp objects.



**WARNING: Shut down engine before performing maintenance!**

Ensure the engine has been shut down and PTO has been disconnected before carrying out maintenance on the machine. Never attempt to go near the machine until it and the tractor have both come to a complete stop. This is extremely important when checking/replacing blades, where there is a risk of mutilation.




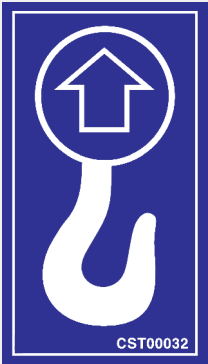
## 4.5 Safety instruction decal locations



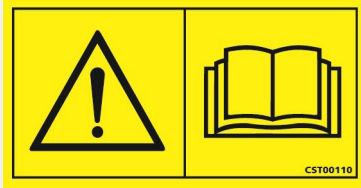
## 4.6 Safety warnings & instructions explained

Danger areas which cannot be protected by any devices are marked by yellow safety decals. Therefore it has to be ensured that all safety warnings and instructions are understood and followed. If any of the decals are damaged or missing, they are available from your **McHale** dealer. The relevant part numbers are shown in brackets.

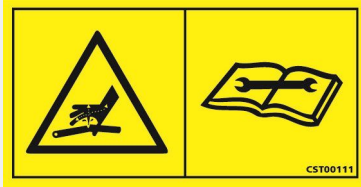
The decals featured on the machine are displayed with their meanings below:

	<p>Danger of rotating parts, foreign objects. Keep clear of machine while working. (CST00014)</p>
	<p>Keep hands clear of rotating rollers (CST00017)</p>
	<p>Keep hands out of crush area (CST00019)</p>
	<p>Lifting hook location (CST00032)</p>
	<p>Grease daily (CST00060)</p>

## McHale Pro Glide R310 Rear Disc Mower



Read instruction manual before use  
(CST00110)



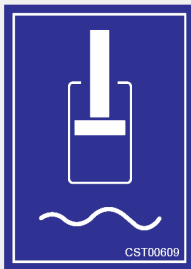
Beware of high-pressure hoses, even when the machine is switched off.  
Also, read and understand manual before working on any part of the hydraulic system.  
(CST00111)



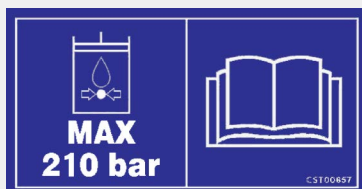
Turn off and remove key from tractor.  
Read and understand the manual before working on or performing maintenance on the machine.  
(CST00113)



Stay clear of the rotating PTO shaft. Never use the machine if the PTO guarding is missing or damaged. Entanglement in rotating drive line can cause serious injury or death. It is important to ensure that the rotating guard on the driveline rotates freely. Always stop the engine and ensure that driveline has stopped before making connections, adjustments or cleaning out PTO driven equipment. Ensure the safety chains on the PTO cover sleeves are attached to both machine and tractor to prevent them from spinning.  
(CST00143)



Float decal. Indicates that the control lever of the spool operating the machine, should be in the float position.  
(CST00609)



Maximum hydraulic pressure. This machine must not be connected to hydraulic systems with pressure higher than 200 bar.  
(CST00657)



Keep clear of high speed cutters. Close all covers and guards and keep out of danger zone.  
(CST00816)

## McHale Pro Glide R310 Rear Disc Mower



Close protective covers before operating the machine  
(CST00817)



Danger of projectiles. Keep clear of the 'Danger Zone'.  
Minimum of 50 m radius.  
(CST00817)



Ensure the machine has stopped rotating completely  
before carrying out any maintenance  
(CST00817)


## 4.7 Description of the serial number plate



The following is a description of the serial plate content:

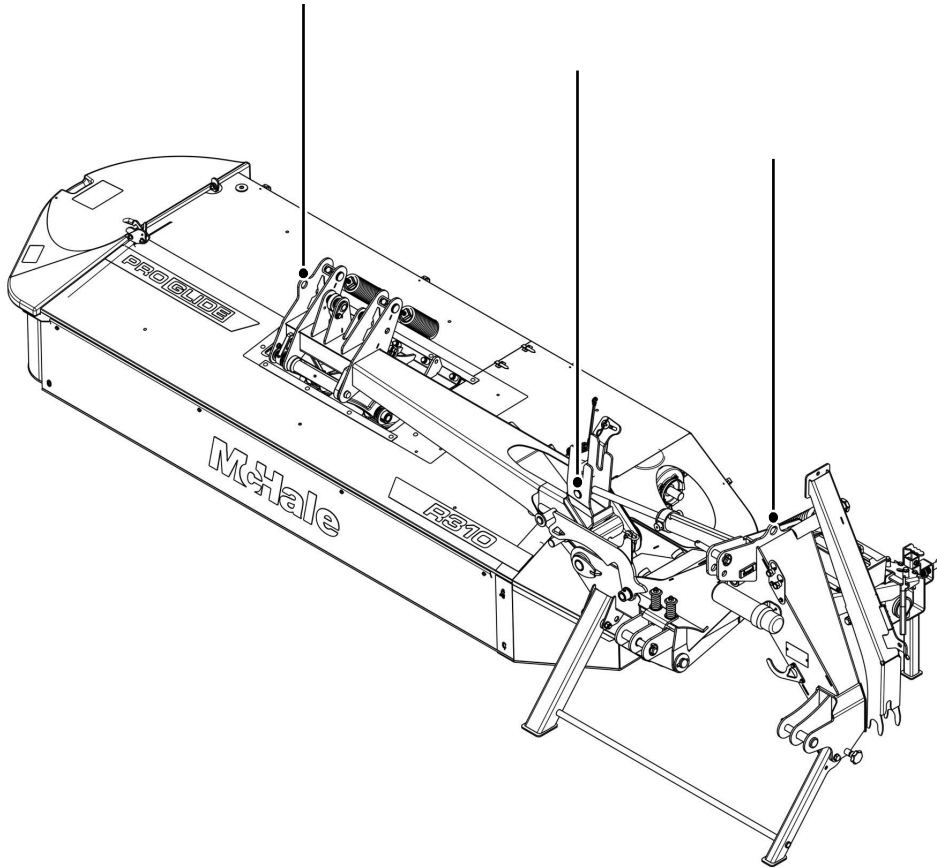
- A. Product description
- B. Model name/number of the machine
- C. Year of manufacture of the machine
- D. Model year of the machine
- E. Serial number of the machine
- F. Weight of the machine

## 4.8 Machine lifting guidelines

 **WARNING: Machine lifting**

- Only use chains or strapping that are rated for a minimum load of 0.7 tonne (700 kg) per chain or strap when using the three lift eye locations on the chassis, shown below
- The crane or lifting device must be capable of lifting a minimum load of 2 tonnes (2,000 kg)
- Never go under a suspended machine or attempt to try and stop it, if it is moving erratically, death or serious injury may result
- Always be observant of people and objects around the suspended machine and do not allow the machine to impact heavily on the ground after suspension or movement

## McHale Pro Glide R310 Rear Disc Mower



### 4.9 Machine storage

It is recommended that the mower be stored in the horizontal storage position, for safety and stability. If it is to be stored in a vertical position when space is limited, then the following conditions must be adhered to:

1. The additional rear leg stand shall be used for support.
2. It shall be placed indoors on a level concrete surface and never outdoors or in a field.

# 5

## Tractor requirements & preparation

### 5.1 Tractor requirements

The minimum recommended size of tractor for operating the machine comfortably depends mainly on the forage being cut. On flat ground **McHale** recommends a tractor size of at least 60 kW. On hilly ground or difficult conditions, an additional 10 to 15 kW is advisable.

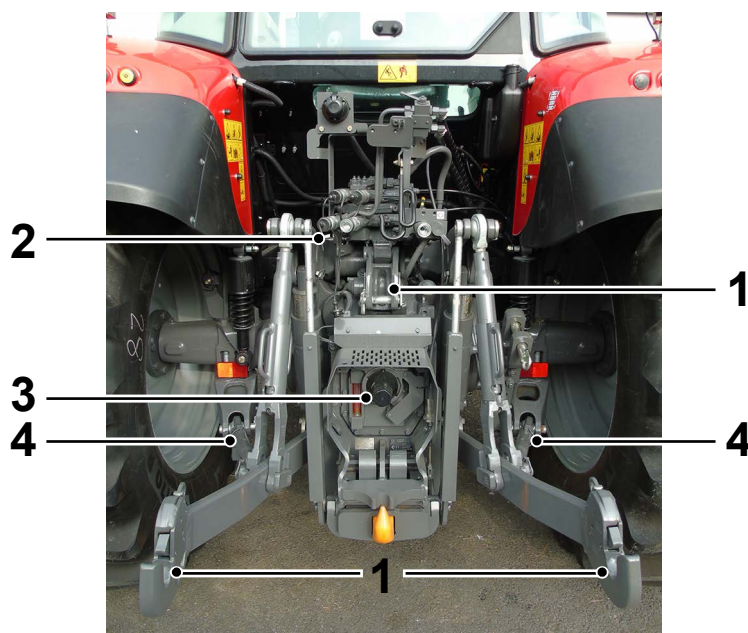


**NOTE: Use good quality oil**

Ensure that the tractor has clean, good quality, hydraulic/universal oil to avoid problems later on. Also, the hydraulic filters on the tractor should be changed regularly, according to the manufacturer's service instructions. Avoid dirt getting into the hydraulic couplings.

The following items on the tractor are required for attachment of the machine behind the tractor:

1. CAT 2/3 (rear) 3-point linkage
2. Double-acting hydraulic function with float (minimum 20 l/min @ 180 bar)
3. 1 3/8", 6-spline PTO shaft
4. Lower link stabilisers



## 5.2 Attaching to linkage

Ensure both lower link arms are adjusted equally in height. If you are using tractor couplers, secure the lower link balls onto the CAT 2 or 3 pins on the machine, using linch pins. Line up the tractor and reverse slowly until the lower link arms are aligned under the CAT 2 or 3 pins on the machine. Then, raise the lower link arms until they are latched securely on the quick couplers.

If quick couplers are not being used, line up the tractor with the machine and reverse slowly until the lower link arms are aligned within the link arm slots. Then adjust the height until they are in line with the locating holes and secure using the CAT 2 or 3 pins and linch pins.

Once the lower link arms are secure, the top link can be attached and adjusted to ensure that the machine is both secure and set to the required cutting height. The lower link stabilisers may require adjusting to make above connections and then tightened to ensure there is no lateral movement.

The PTO shaft may have to be altered the first time it is fitted to a specific tractor. Before connecting the PTO shaft to the tractor, raise the mower so that the PTO stubs of both the machine and the tractor are horizontal to each other. First, fit the PTO shaft to the machine and then check if the PTO can be connected to tractor stub. If not, then the PTO shaft is too long and must be altered.

## 5.3 Attaching the machine to the PTO

All mechanical functions are related to the correct PTO speed. Follow the instructions as supplied with the PTO unit for correct assembling of the PTO shaft to the tractor (*See 'PTO Shaft adjustment & maintenance'*). The default factory setting is for a PTO speed of 1,000 rpm. A PTO speed of 540 rpm can be used but first the right angle gearbox must be inverted. (*See 'Conversion to 540 rpm PTO speed'*)



**CAUTION: Ensure safety chains are attached to machine and tractor**

Ensure the safety chains on the PTO cover sleeves are attached to both machine and tractor to prevent them from spinning.



**CAUTION: Standard PTO of 1,000 rpm**

The machine should be driven with a standard PTO speed of 1,000 rpm. The maximum PTO speed allowed = 1,000 rpm. A PTO speed of 540 rpm can be used but first the right angle gearbox must be inverted. (*See 'Conversion to 540 rpm PTO speed'*)



**WARNING: Measure distance between PTO stub shafts first**

Never connect a PTO shaft on a new machine/tractor combination without first measuring the horizontal (shortest) distance between PTO stub shafts, otherwise severe damage can occur.

## 5.4 Making connections to the tractor



**WARNING: Turn off tractor before connecting hydraulic hosing**

When connecting hydraulic hosing to the tractor, ensure that the tractor engine is turned off and that the ignition key is removed. Ensure that all hydraulic connections are correctly tightened.

The following connections to the machine are required for attachment behind the tractor:

1. Double-acting hydraulic function with float (minimum 20 l/min @ 180 bar)
2. Pull cord for lift / lower latch

Route pull cord into the tractor cab. Connect the two lift ram hoses to a double-acting hydraulic function (with float).

## 5.5 Machine and tractor stability

In order to ensure the stability of the combination of machine and tractor, it may be necessary to add ballast to the tractor. If there is insufficient ballast the machine-tractor combination may become unstable. The ballast requirement ( $m_z$ ), which should be at least 20% of the unladen mass of the tractor on the front axle, can be calculated using the Formula.

$$m_z \geq (m_a \times (s_1 + s_2) - 0.2 \times m_t \times i) / (d + i)$$

Where:

$m_a = 1,015 \text{ kg}$

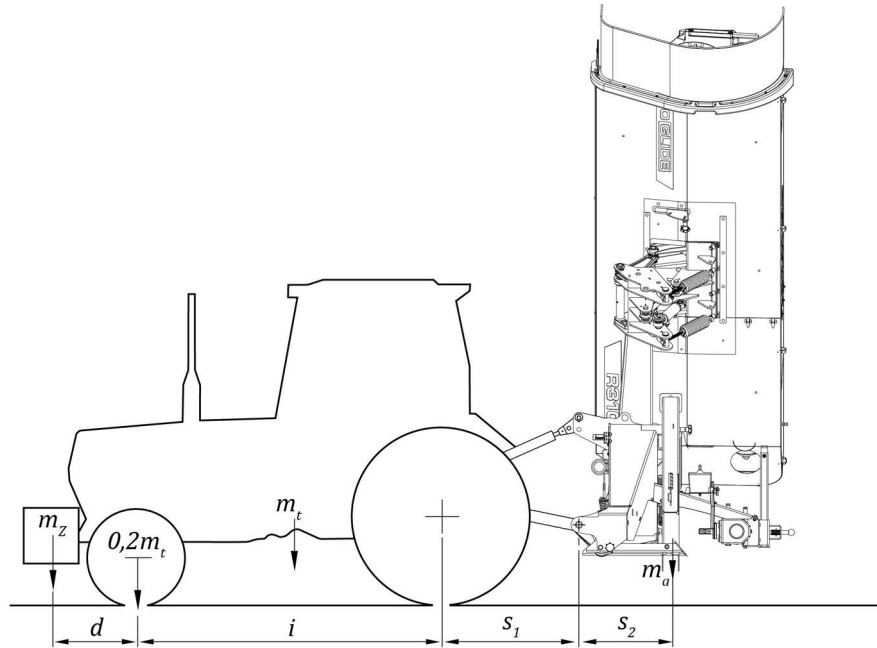
$s_2 = 0.5 \text{ m}$



**NOTE: Reference tractor operator manual**

Tractor's operator manual will need to be referenced to obtain the relevant figures.

## McHale Pro Glide R310 Rear Disc Mower



### Key:

$m_t$	Unladen mass of the tractor (kg)
$m_a$	Machine mass on the rear linkage (kg)
$m_z$	Front ballast (kg)
$d$	Distance from centre of gravity of front ballast to front axle centre (m)
$i$	Tractor wheelbase (m)
$s_1$	Distance from the rear axle centre to the centre of the lowest points of the three point linkage (m)
$s_2$	Distance from the centre of the lowest points of the three point linkage to the centre of gravity of the machine (m)



### **WARNING: The above calculations are a guide only**

Travelling over rough or sloping ground may require additional ballast to ensure machine-tractor stability.

## 5.6 Lighting system



### **NOTE: Check lighting system before travelling on the road**

Before travelling on a public road, the operator must ensure that the complete (tractor and machine) lighting system is in a fully functioning condition.

# 6

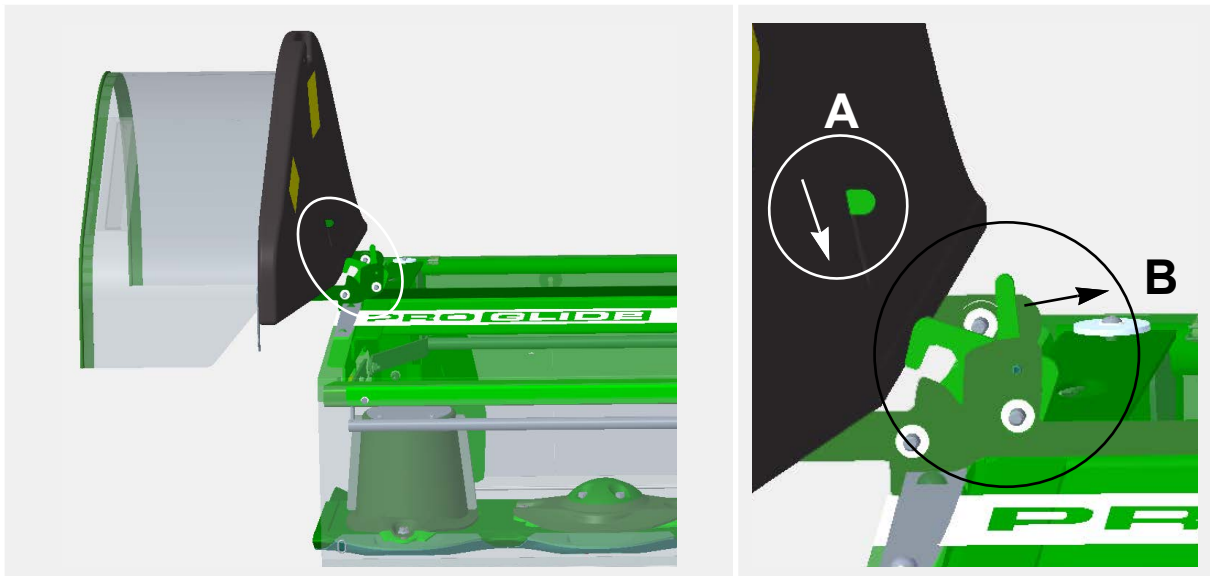
## Machine requirements & preparation

### 6.1 Side guard latch

The side guard must be elevated and latched before raising the mower into the transport position, or when replacing blades or carrying out maintenance.

The safety latch (**A**) must be retracted in order to raise the side guard but latches automatically when lowered.

The transport latch (**B**) is the opposite in that it latches automatically when the side cover is raised but must be retracted in order to lower. However, once the mower is raised fully into the transport position the latch will automatically disengage, when the mower is lowered back down into the working position.



### 6.2 Blade replacement



**WARNING: Ensure the tractor is shut down**

Ensure that the tractor engine has been shut down, the key removed and the brakes applied before carrying out the following procedure.

## McHale Pro Glide R310 Rear Disc Mower

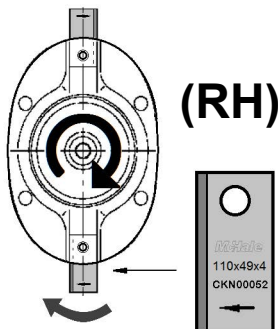


### **CAUTION: Wear proper safety equipment & follow all instructions**

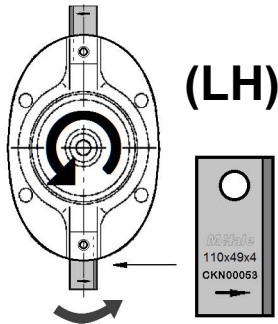
Always wear protective clothing and gloves, beware of sharp edges! Ensure rotors have come to a complete stop before raising all access panels and curtains.

Blade replacement should be carried out in the following way:

1. Lower the mower to the ground and make sure it is secure.
2. Shut down the tractor, remove the key and apply the parking brake.
3. Ensure rotors have come to a complete stop before raising all access panels and curtains.

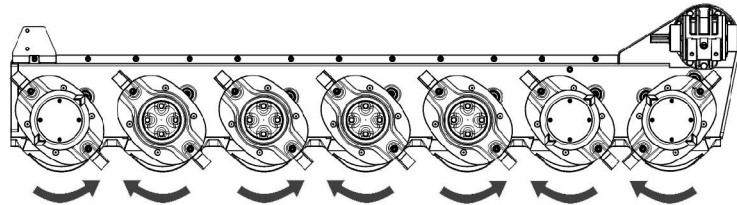


**(RH)**



**(LH)**

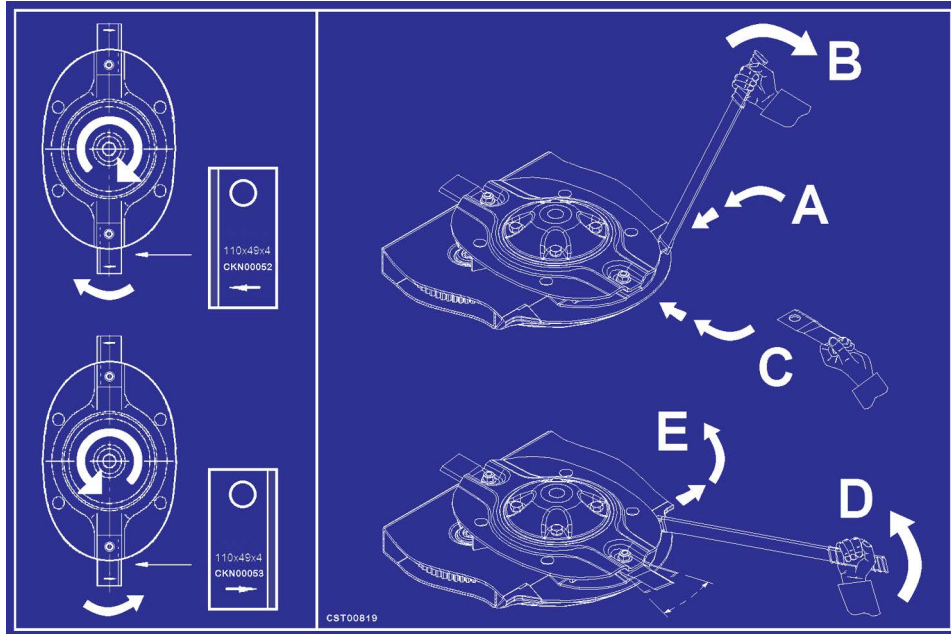
The blades come in both right-hand (RH) and left-hand (LH) and must be fitted correctly to each disc depending on the direction of rotation. Typically the blades have two chamfered cutting edges and once the cutting edge becomes dull, they can be simply inverted, exposing the second sharp cutting edge. If a shudder is felt in the mower, then there is an imbalance which is usually caused by a broken or missing blade. If even a slight shudder is noticed, then work should stop immediately to investigate the cause! After the tractor has been shut down, do not leave the tractor cab until the mower discs have come to a complete stop.



**Blade installation lever**

Remove the linch pin from the blade installation lever in its storage position. Then using the lever, follow steps A through E, as shown. Ensure the correct RH blade (CKN00052) or LH blade (CKN00053) is used to suit direction of rotation, for each cutting disc.

## McHale Pro Glide R310 Rear Disc Mower



Rotate each disc being worked on so that the blades are centred and facing forward.

- A. Then slide the installation lever in fully from the right-hand side, just behind the blade.
- B. Push down fully on the lever, until the old worn blade can be removed. If the opposite side of the blade is good, then simply invert it so that the new sharp cutting edge is exposed.
- C. Otherwise, install a new replacement blade, whilst continuing to hold the lever down.
- D. Allow the lever to return back up to neutral and check the blade to ensure it is free to rotate, but is securely locked on the disc stub.
- E. Remove the installation lever from the right-hand side and continue onto the next one until all mower blades have been inverted or replaced.

On completion, return the installation lever to its storage position and secure with the linch pin, so it cannot become loose.

Ensure all access panels and curtains are lowered and secured.

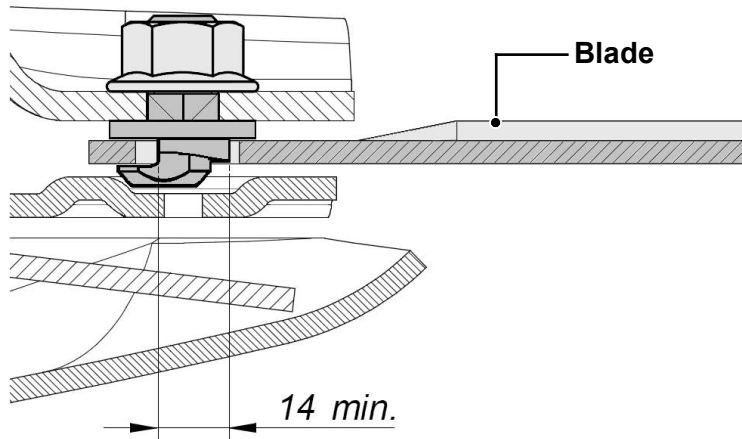


**WARNING: Replace damaged or missing blades immediately!**

Replace damaged or missing blades immediately; ideally as a complete set to prevent dangerous imbalanced rotation. Badly bent blades spinning rapidly can cause irreparable damage to the mower bed.


### 6.2.1 Blade pin replacement

Over time the blades will cut into the blade holder pins and once the pins reach 14 mm, as shown, they must be replaced. Check this dimension regularly for excessive wear and when worn, the full set of mower bolt pins should be replaced. Allowing the pins to wear beyond this point could lead to potential hazard from sudden fracture.




### 6.3 Gearbox oil


There are several gearboxes on the machine.



**WARNING: Ensure the tractor is shut down before changing oil**  
 Ensure that the tractor engine has been shut down, the key has been removed from the ignition and the brakes have been applied before changing oil.



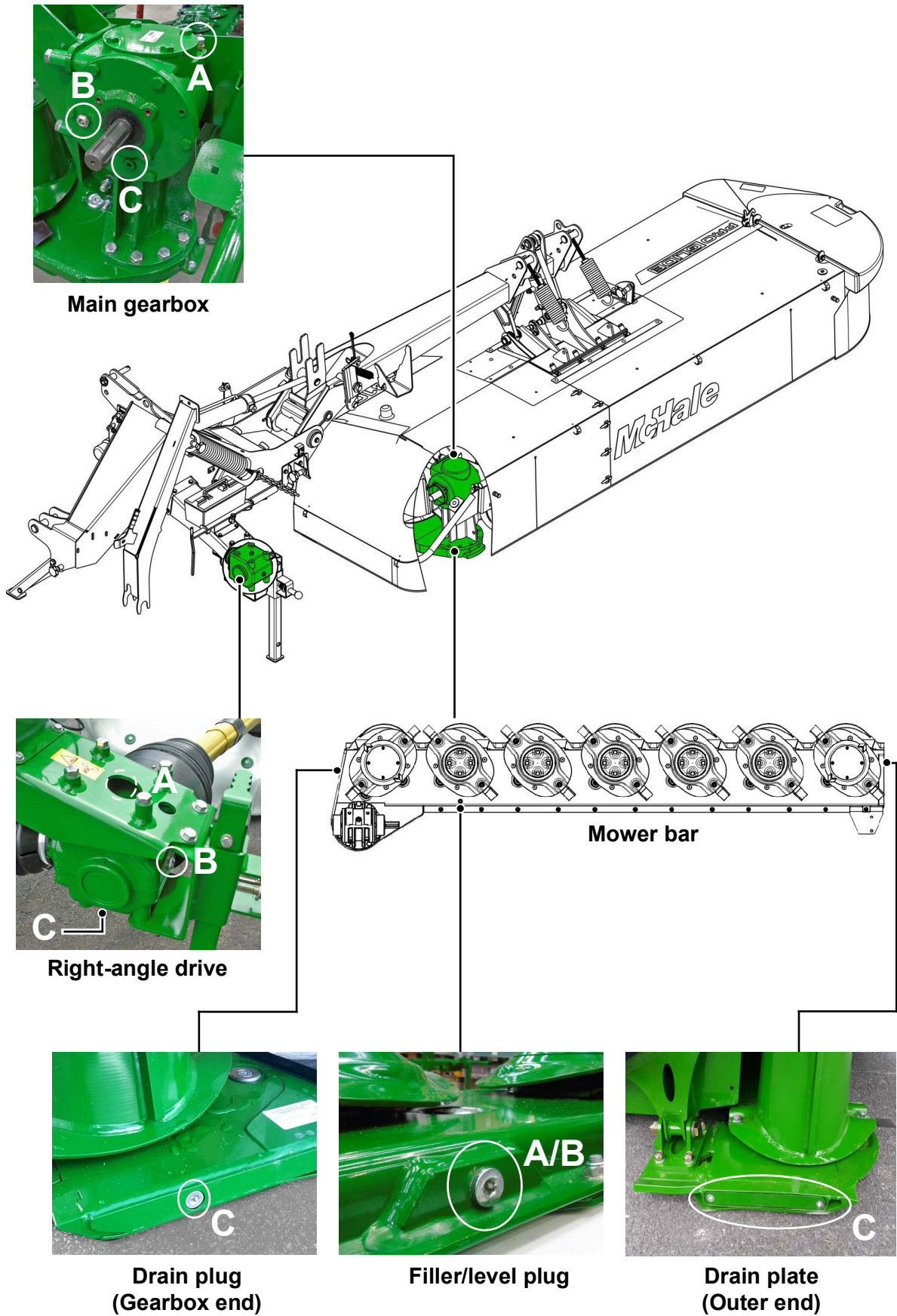
**NOTE: Oil must be drained & filled after the first 50 hours of use**  
 After the first 50 hours of use, the gearbox oil must be completely drained and filled with 80W/90 API-GL 5 grade oil.



**ENVIRONMENT: Safe disposal of oil**  
 Respect the environment! Never spill oil or grease on the ground, never pour them down the drain and never discard them where they can pollute the environment. Always take waste materials to a recycling centre.

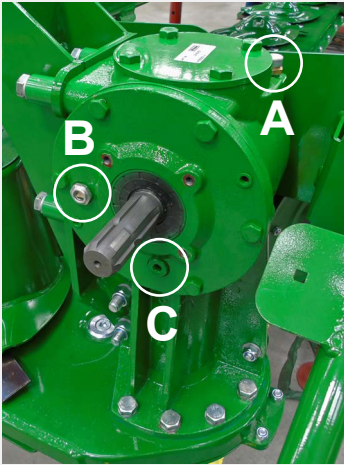
Gearbox	Capacity	A (A/F Hex)	B (A/F Hex)	C (A/F Hex key)
PTO right-angle	1.2 L	19 mm breather	22 mm sight glass	8 mm
Main gearbox	1.2 L	19 mm breather	22 mm sight glass	8 mm
Mower bar	6 L	8 mm key	(Same as A)	8 mm (x2) Drain plate

### 6.3.1 Gearbox locations



## McHale Pro Glide R310 Rear Disc Mower

To drain and add oil to the main gearbox, carry out the following procedure:



1. Remove the drain plug (C) and drain oil into a suitable container. This is best carried out while the oil is still warm, i.e. soon after use. Replace the drain plug (C), tighten and dispose of waste oil responsibly.
2. Remove the breather plug (A). Add approx. 1.2 L of 80W/90 API-GL 5 grade oil or until oil is visible midway on the sight gauge (B) when the correct quantity of oil is added. (After this replace the oil once per season or once per 250 hours, whichever comes first)
3. Replace the breather plug (A) and tighten securely.

The procedure above is similar for the others, except for the mower bar as follows.

### Mower bar with filler plug on side



On this mower bar the filler plug (A) also acts as the level plug (B). Set the headstock level vertically and ensure the mower bar is set level longitudinally. Add 6 litres of 80W/90 API-GL 5 grade oil or until oil begins to seep out. Note: With the headstock set level vertically the mower bar sits at a forward slope of approximately 5°.

When draining oil from the mower bar, the mower must be attached to a tractor, with the mower bar supported on both ends. The outer end should be elevated 300 mm higher approx. than the inner gearbox end to allow the warm oil to drain freely.

On older mower beds without the drain plug (C) fitted, the drain plate on the outer end of the mower bar must be removed. In this case the arrangement is the opposite where the outer end of the mower bar is set and supported 300 mm lower approx. than the inner end. The lower end in each case, must have sufficient clearance underneath to allow a low profile drain tray to catch and contain at least 6.5 litres of oil once the drain plug (C), or drain plate is removed.

On completion, always ensure all plugs are installed and tightened securely. After this replace the oil once per season or once per 250 hours, whichever comes first.

## 6.4 Leg stands & parking

Your machine should only be set on a hard level surface in a secure location with safety and stability in mind. The leg stands are to be used every time the machine is disconnected from the tractor.

## McHale Pro Glide R310 Rear Disc Mower



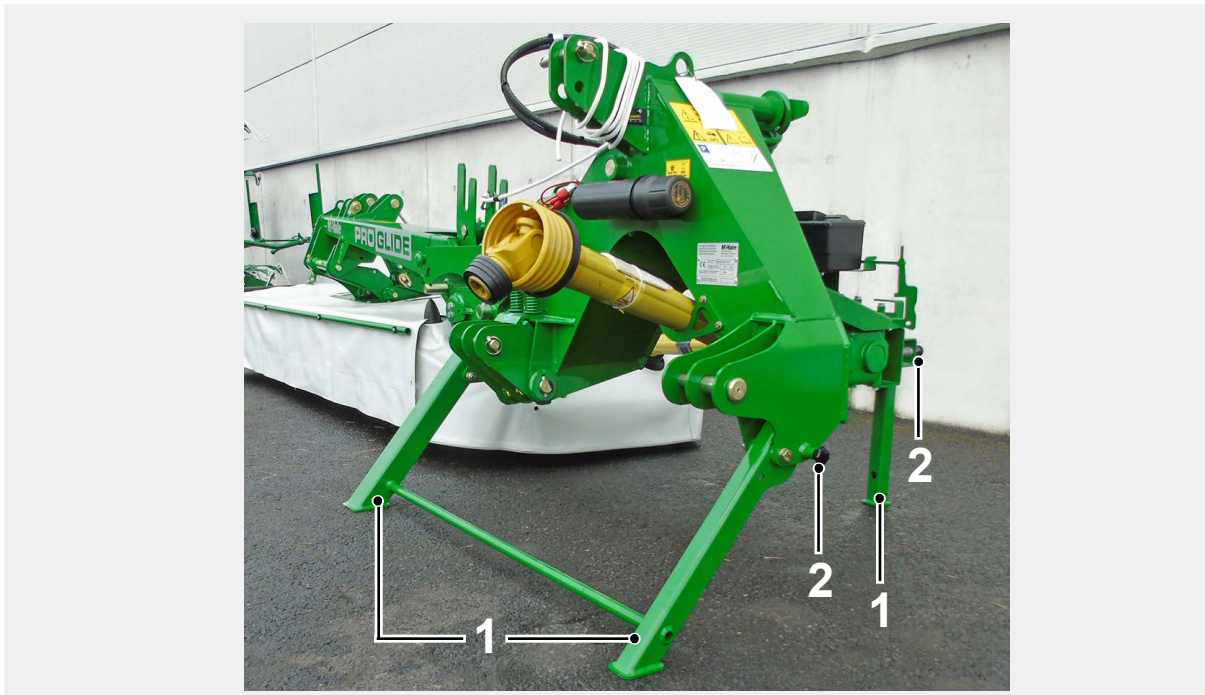
### **CAUTION: All stands must be rested on a solid footing**

The machine and stands must be rested on a solid footing, on level ground and pinned securely before disconnecting from the tractor.

The stands consists of a wide swing down leg-stand on the front and a vertical sliding leg-stand on the rear and must only be used with the mower bed resting horizontally. Both stands are fitted with spring loaded lock-pins. The lock-pin must be retracted momentarily to disengage but latch automatically when raised or lowered fully, to prevent the stand from collapse.

Before disconnecting from the tractor, lower both leg stands ensuring the lock pins are positively engaged in the storage position.

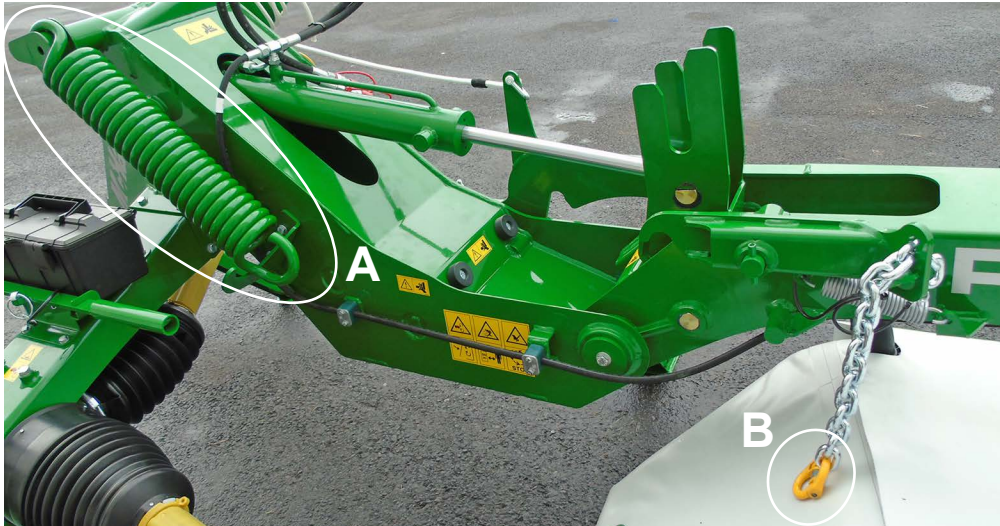
Ensure that the stand lock pins (2) are properly secured in the lowered position to prevent the stand from collapse. While using the machine, ensure that the stands (1) are fully elevated against the main frame with the lock pins (2) secured in the raised position.



**Mower bed & leg stands down (storage position)**

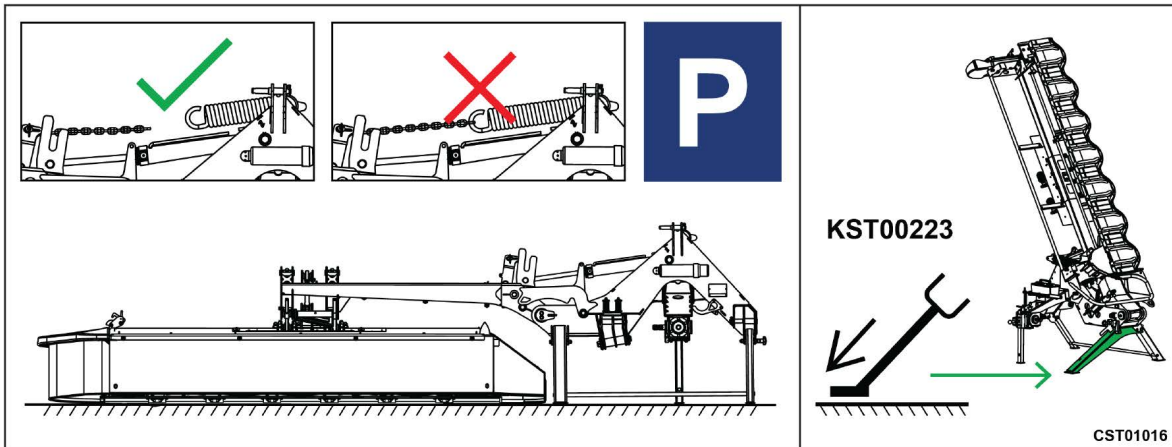
When the mower is being removed from the tractor it is very important to release the suspension spring (A). This is done while the mower is still in the transport position. First lower the leg stands and secure them in the storage position. Then disconnect the suspension spring chain attachment link (B) completely from the spring. Ensure the mower bed is unlatched and lowered to the ground for stability.

## McHale Pro Glide R310 Rear Disc Mower



### **CAUTION: Ensure the mower bed is stable before disconnection**

Before disconnecting the mower from the tractor, detach the suspension spring chain while in the transport position and always ensure the mower bed is lowered to the ground for stability.



After the suspension spring chain is released and the mower lowered to the ground, disconnect all hydraulic lines from the tractor. Finally disconnect the PTO shaft followed by the top-link and lift arms and drive away from the mower.

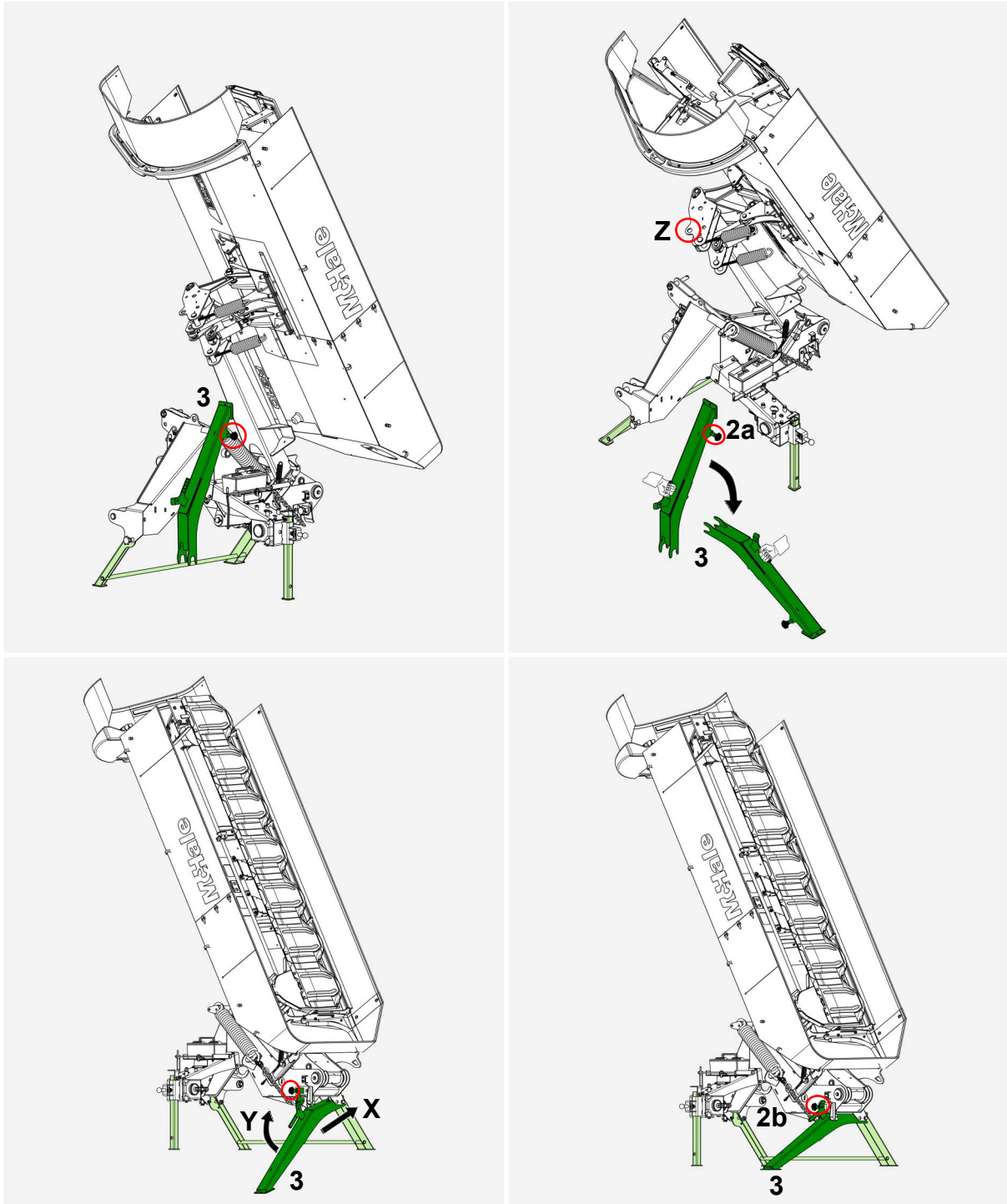
### **6.4.1 Vertical storage (using leg-stand KST00223)**

It is recommended that the mower be stored in the horizontal storage position, for safety and stability. When space is limited the mower can be stored indoors in the vertical position, using the vertical leg-stand (3), providing it's positioned on a perfectly level hard concrete floor. It should be positioned in the back corner of a shed, away from movement and personnel, with additional cross-bracing for safety and stability.

If the mower is stored vertically in an outdoors setting, using the vertical leg-stand (3), which is not recommended, it must be positioned in a yard on a hard level surface and never in a field, and must be tied down with a counterweight from the tie-down point (Z) for safety and stability. Furthermore it can only be in a vertical storage position in an outdoor setting on a temporary basis when there is no bad weather forecast and should ideally be stored in a corner with walls to the rear and right hand side, away from movement and personnel.

## McHale Pro Glide R310 Rear Disc Mower

Before disconnecting from the tractor, lower both leg stands ensuring the lock pins are positively engaged in the storage position. These are the same steps as outlined for normal horizontal storage, previously. Next remove the vertical leg stand (3) from its storage position on the headstock, by retracting the lock pin (2a). The leg stand should be held by the handle and inverted before guiding it into position. Push the U-slot end forward until it is engaged fully with the right hand pivot of the front swing down stand (X). Then while keeping forward pressure, swing the leg stand upwards (Y) until it is latched positively by lock pin (2b). The mower can now be lowered fully onto a level concrete surface. Attach a tether or strap from the tie-down point (Z) to an external counterweight before disconnecting from the tractor. There is no need to disconnect or release the suspension spring chain for vertical storage.



## 6.5 PTO Shaft adjustment & maintenance



**CAUTION: Ensure the tractor is shut down**

Ensure that the tractor engine has been shut down, the key removed and the brakes applied before carrying out the following procedure.



**WARNING: Measure distance between PTO stub shafts first**

Never connect a PTO shaft on a new machine/tractor combination without first measuring the horizontal (shortest) distance between PTO stub shafts, otherwise severe damage can occur.

The length of the PTO shaft is suitable for all known tractor conditions. However the PTO shaft must be checked/altered to suit the tractor combination it is being fitted to. Before connecting the PTO shaft to the tractor, raise the mower so that the PTO stubs of both the machine and the tractor are horizontal to each other.

First, fit the PTO shaft to the machine and then check if the PTO can be connected to tractor stub. If not, then the PTO shaft is too long and must be altered. After measuring carefully, the PTO shaft halves should be cut equally so that the PTO shaft assembly is kept as long as possible, whilst just allowing enough room for its removal, when in a horizontal position. This will ensure that a maximum overlap (ideally 200 mm minimum) is maintained, when extended, as the machine is lowered fully. The angle of operation should never exceed 25° misalignment, otherwise permanent damage will result. (See *'Adjusting the PTO shaft to the tractor'*)



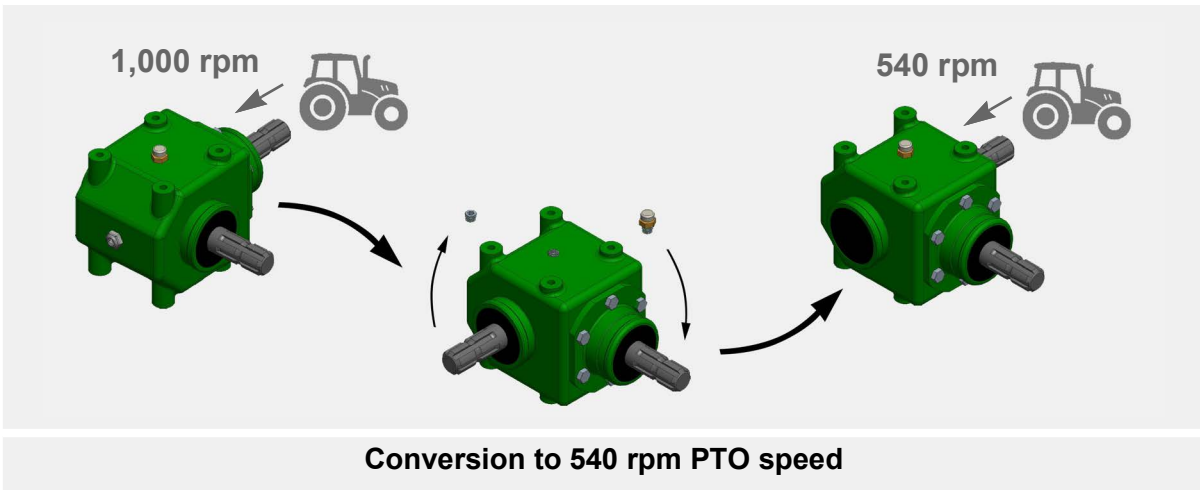
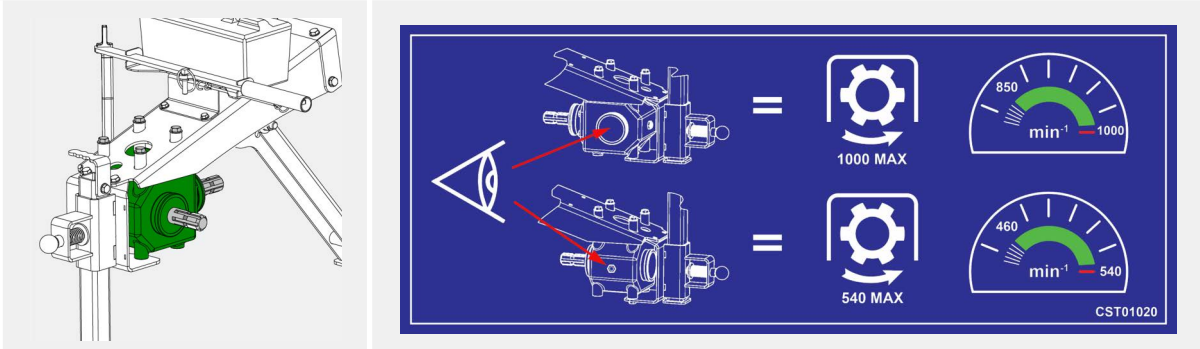
**CAUTION: Ensure safety chains are attached to machine and tractor**

Ensure the safety chains on the PTO cover sleeves are attached to both machine and tractor to prevent them from spinning.

### 6.5.1 Conversion to 540 rpm PTO speed

The factory default setting for the mower is for a 1,000 rpm tractor PTO speed. For tractors having a PTO speed of 540 rpm only the right angle drive gearbox must be inverted as shown. The bolted gearbox flange faces the tractor for a 1000 rpm PTO setup and faces the mower for a 540 rpm PTO setup. Ensure the mower is resting on the ground and sitting firmly on the leg stands (or mounted on a tractor, with the engine shutdown, the ignition key removed and the handbrake applied). The PTO shafts must be disconnected first and then remove all mounting bolts, four on the top and two on the bottom using a 19 mm spanner or socket. Use a suitable sling or lifting device to support the weight of the gearbox and transfer to a suitable workbench. The filler breather on the top and the drain plug at the bottom must now switch positions. Ensure there is sufficient gear oil and top up if necessary. The inverted gearbox can now be fitted to the mower using the same six bolts which must be torqued to 80 Nm.

# McHale Pro Glide R310 Rear Disc Mower



# 7

---

## Road traffic safety & operation

---

### 7.1 Before travelling on any public roadway



**WARNING: Complete a full inspection before travelling on the road**

Ensure that a full inspection is completed every time before attempting to go on to a public roadway, always think and practice safety!

The following should be inspected every time, before travelling on a public road:

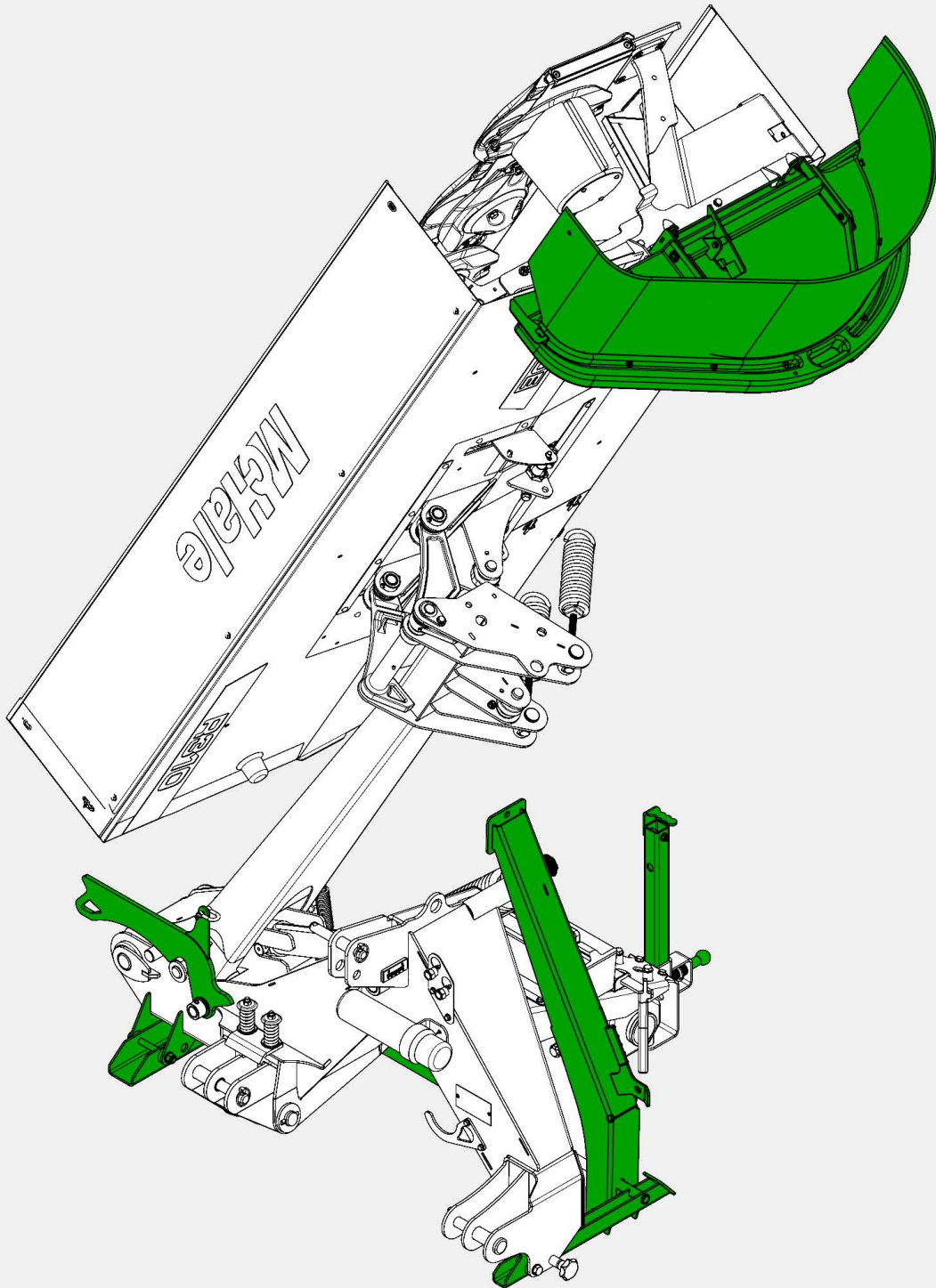
- The mower must be raised fully until latched in the upright position, as shown.
- The PTO shaft must be fixed safely to the tractor PTO stub shaft.
- Ensure that additional lighting is provided if any of the tractor lights are hidden or obstructed by the machine.
- The hydraulic supply must be turned off and protected from accidental activation.
- The leg stands must be raised and secured in the transport position, using the pins provided.
- The machine must be safely cleared of all loose forage. To carry this out, firstly turn off the tractor and fully isolate the machine by disconnecting all of the connections to the tractor unit.
- Ensure that all the national road traffic regulations relating to the country are fulfilled i.e. the use of safety chains is mandatory in EU countries when air brakes are not installed. The safety chain must be attached in such a way that if the coupling breaks, the hitch or drawbar cannot make contact with the ground.
- Ensure the side guard is latched open to reduce the overall transport height as shown. The rear lift arms should be lowered approximately 100 mm, keeping the overall transport height under 4 m, while maintaining sufficient ground clearance.
- Ensure the safety chains on the PTO cover sleeves are attached to both machine and tractor to prevent them from spinning.



**WARNING: Height clearance**

The operator must ensure that there is a minimum of 1 m clearance between the machine and any obstacle above, like low bridges, arches or tunnels. But in the case of electrical high voltage lines a minimum clearance of 4 m should be allowed.

## McHale Pro Glide R310 Rear Disc Mower



**Road transport position**  
(Mower bed latched in the upright position with side guard latched open and leg stands raised)

# 8

## Field operation & machine adjustments

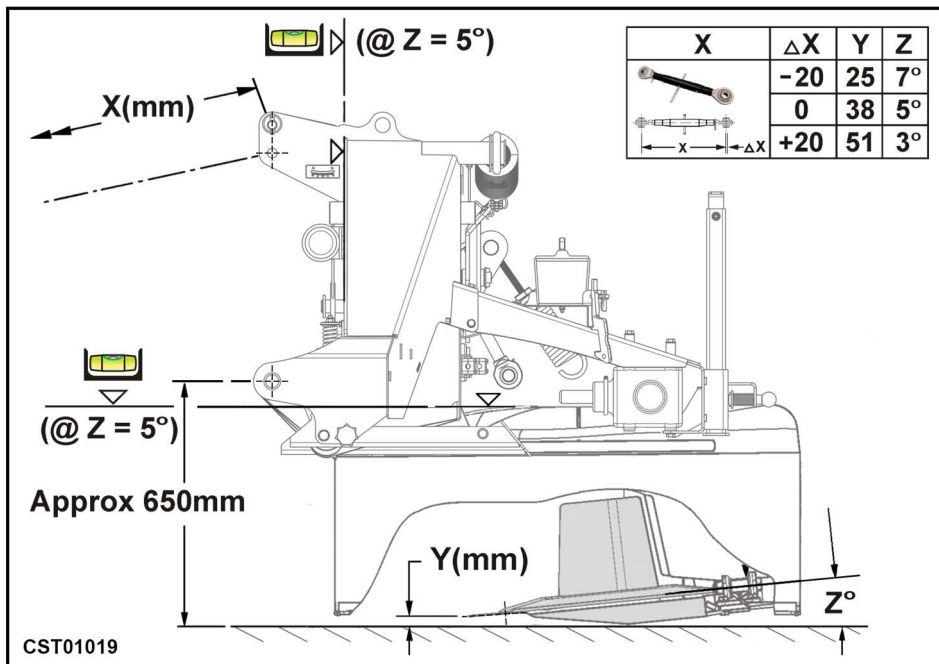
Detailed instructions on how to operate the machine are outlined in the following pages. These should be used along with learning the precise functionality of each adjustment.

### 8.1 Cutting height

The machine is fitted with an inclinometer to assist in setting the correct levels/angles and cutting height.



Adjust the top link and lift arms until the front of the main frame is vertical, with the lower link-arm holes, approximately 650 mm off the ground. The lift arms can now be set in that position and the lift ram is then used to raise and lower the mower while operating.



## McHale Pro Glide R310 Rear Disc Mower

All adjustment regarding cutting height (Y) is achieved by varying the top link (X) on top of the mower frame, which alters the angle of inclination (Z). When the frame is level vertically then  $Z = 5^\circ$ . Reducing dimension (X) increases the slope or angle (Z) of the cutting discs, which lowers the cutting height (Y) and vice versa.

When the mower frame is set level vertically with the lift arms set, as shown, the cutter bar angle  $Z = 5^\circ$ , giving an approximate cutting height of 38 mm. Shortening the top link by 20 mm will reduce the cutting height to 25 mm, while lengthening the top link by 20 mm will increase the cutting height to 51 mm.



**NOTE: Skid heights must be taken into account when fitted**

There are two skid height options available; +25 mm and +50 mm and the specific skid height fitted must be added to the above 'Y' values to determine the actual cutting height.

The leg stands must be returned to the raised position and pinned securely, either for working or transportation. Ensure all curtains and side guards are lowered fully when in the working position. To lower or raise the mower the lift/lower latch must be released by pulling on the latch cord temporarily. The mower is then lowered using lift ram spool and set in a float position. Then engage PTO at a speed of 540/1,000 rpm and drive forward at approximately 10 km/h, checking swath width and cutting height. The float setting allows the mower bed to follow ground contours, dips and depressions. Another option is to lower or extend the mower lift-ram completely which has the same effect as setting the tractor hydraulics in float position.

If adjustments are necessary, then shut down PTO and tractor and ensure all motion has ceased before approaching the mower.



**WARNING: Check before starting or moving the machine**

Before starting or moving the machine, ensure there is nobody in the vicinity, especially children, that may be out of view.



**ENVIRONMENT: Begin mowing at the centre of the field**

Where possible begin mowing from the centre of the field and work from the inside out. This gives wildlife a chance to escape as they try to remain under cover. Using a conventional approach means they get trapped in the centre!

## 8.2 Suspension spring chain adjustment

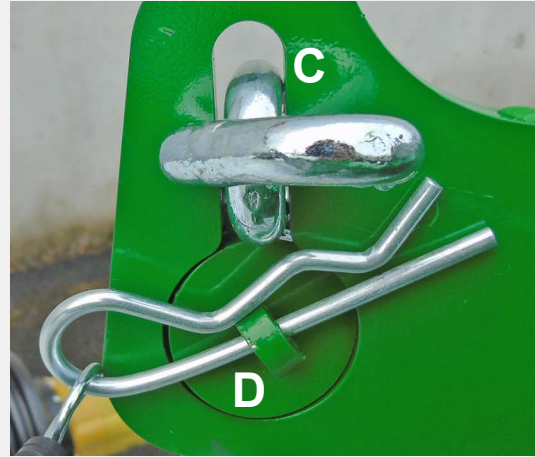
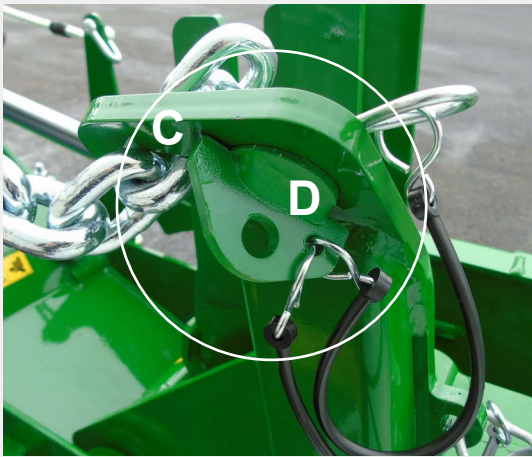


**CAUTION: Ensure the tractor is shut down**

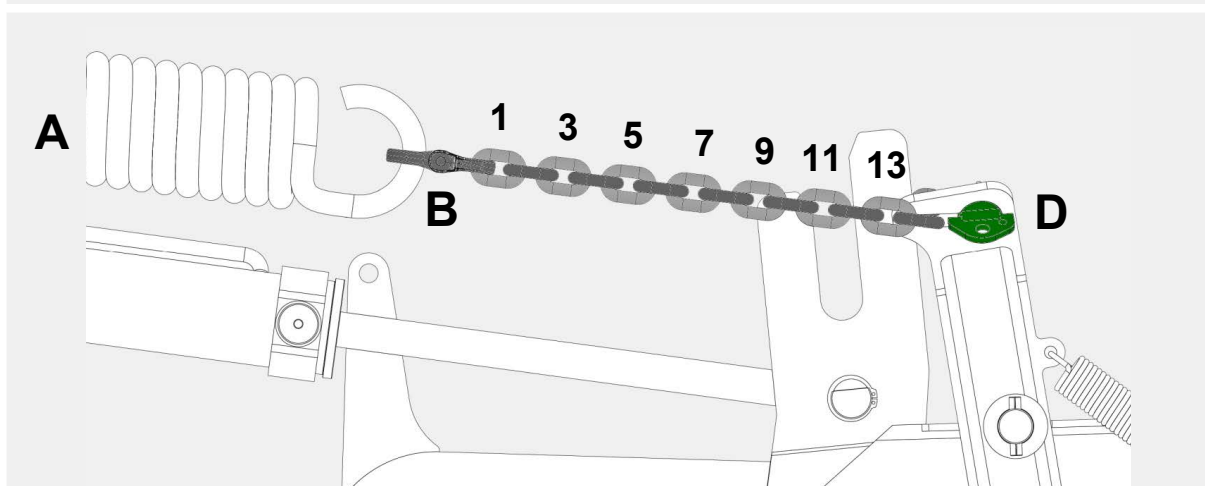
Ensure that the tractor engine has been shut down, the key removed and the brakes applied before carrying out the following procedure.

The suspension spring chain can only be connected/disconnected or adjusted with the mower attached to the tractor and raised into the transport position. To connect the chain the first time or to adjust the mower suspension, the chain is passed through the keyhole slot (C) in the toggle arm and the desired link engaged within the slot. **McHale** recommends link No 14 or 15 for normal applications which equates to approximately 300 kg of ground pressure on the mower bed as it glides over the ground.

Alternatively link No 12 or 13 can be used, where more spring tension is required, to make the mower lighter on the ground. Once the chain is attached with the desired link engaged, the retainer plug (D) is secured through the hole with R-clip as shown. From this point on the attachment link (B) on the other end of the chain is used to reconnect or disconnect the suspension spring (A). When the mower is being removed from the tractor the spring must always be released, in the transport position, before lowering to the ground.



Suspension chain adjustment



## 8.3 Swath disc adjustment (Optional)

Typically this mower is used without any swath discs fitted, allowing an unrestricted full width swath. However if a controlled swath width is desired, then swath discs are available as an option.

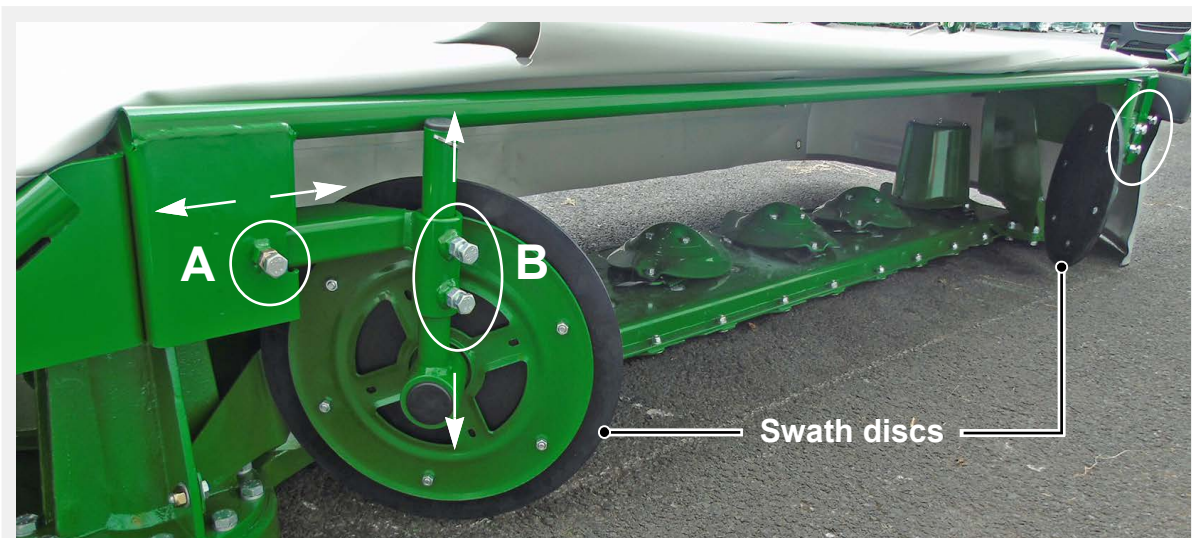


**CAUTION: Ensure the tractor is shut down**

Ensure that the tractor engine has been shut down, the key removed and the brakes applied before carrying out the following procedure.

With swath discs fitted, the swath width can be adjusted between 1.6 m and 2.3 m approximately. The swath width is governed by two adjustable angled discs at the rear. These should be set clear of the ground and able to spin freely when the mower is in the cutting position. All adjustments are made using a single 19 mm spanner or socket, turning anti-clockwise to loosen and clockwise to tighten. Lateral adjustment is achieved using lock-bolts (A) and sliding the complete assembly in or out to directly alter the swath width.

The height and angle positions are altered using lock-bolts (B) which allow the wheels to be raised or lowered and rotated. Where possible all lateral, angle and height adjustments should be equal and balanced each side to keep the swath central. Once the desired setting is reached, then all the lock-bolts should be tightened securely using the 19 mm spanner or socket.



**Swath disc adjustment (optional)**

Other factors like crop conditions and cutting speed can also affect the swath width and the swath discs can even be removed completely to allow an unrestricted swath.

## 8.4 Lift/lower latch

The lift/lower latch must be operated when changing from transport position to working position. Before lowering the lift ram spool, the latch cord must be pulled to release the top hook from the pin, allowing the mower to go down. When in the working position, it also limits the mower from being raised too high, when turning at headlands, etc. In order to raise the mower fully back up into the transport position, the latch cord must be pulled to release the bottom hook from the pin. Once past this point, the latch cord can be released and the mower will latch automatically, into the top hook, when fully elevated.



When work is complete, always detach the suspension spring chain, while still in the transport position. Before disconnecting the mower from the tractor, always ensure the mower bed is first lowered to the ground for stability, with the leg stands secured in the storage position.

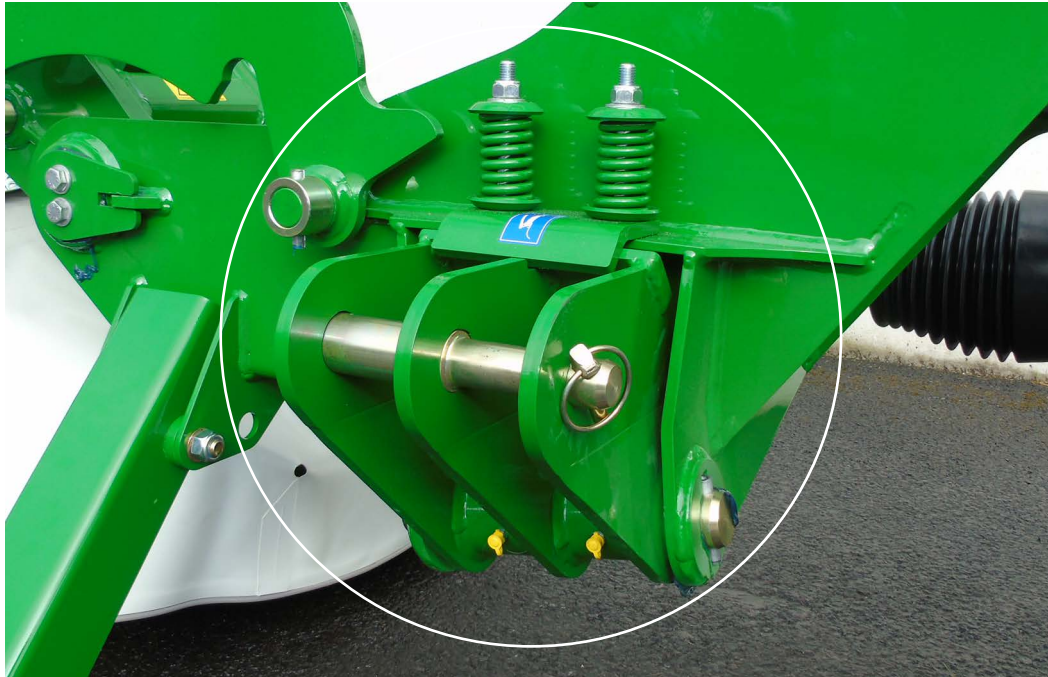


**CAUTION: Ensure the mower bed is stable before disconnection**

Before disconnecting the mower from the tractor, detach the suspension spring chain while in the transport position and always ensure the mower bed is lowered to the ground for stability.

## 8.5 Break-away safety latch

The break-away safety latch is designed to protect the mower should an immovable object be encountered while travelling forward. The latch allows the mower to swing back, giving the driver a chance to come to an abrupt stop, without causing damage.



If the latch is activated, disengage the PTO drive immediately! The break-away safety latch resets itself automatically once it's clear of the obstacle that triggered it. Shut down the tractor, remove the key and apply the parking brake. Then, check the cause of the latch going off and the condition of all blades and mower bed.



**WARNING: Break-away safety latch must not be jammed or tightened**

It is very important that the break-away safety latch is never jammed or tightened as it will no longer protect the mower as intended.

# 9

---

## Machine maintenance

---

To maintain the machine in good working order it is necessary to carry out preventative maintenance regularly. The following section gives details of how this may be carried out and how often it will be required.

Replace any electrical or hydraulic devices immediately, at the first sign of malfunction or failure, as these components affect the functionality, sequencing and thus safety of operation. Never use a machine where a malfunction exists! Contact your **McHale** dealer to achieve a solution. Always think 'Safety First'!



**CAUTION: Wear proper safety equipment & follow all instructions**

Ensure to wear proper safety equipment at all times when working with the machine, such as gloves, eye protection, etc. and follow all safety decals and instructions.



**WARNING: Inspections in the 'Danger Zone' with the machine running, shall only occur with a trained operator at the controls**

Entering the 'Danger Zone' while the machine is running is not recommended. If it is to be carried out, a fully trained operator shall be at the controls. The tractor hand brake shall be applied and the controls shall be in manual mode. The operator shall remain in communication with the inspector throughout. If communication is lost with the inspector, or they move within 1.1 m of moving parts or parts that have the potential to move, all tractor power shall be turned off immediately.

### 9.1 Maintenance intervals

The following intervals should be adhered to, in order to ensure a long and efficient life for the machine and maximum safety of personnel. They assume constant working during the harvesting season.

#### First 5 working hours

- Check all nuts and bolts for tightness and tighten, if necessary
- Check sufficient oil level in the gearbox(s)

#### Every day

- Check all guards and safety devices
- Check for any oil leaks and damaged pipes

## McHale Pro Glide R310 Rear Disc Mower

- Grease PTO shafts and all other grease points
- Check cutting blades

### Every week

- Grease ram pivots

### Every month

- Grease rotor bearings
- Check blade pin diameter for excessive wear
- Check sufficient oil level in the gearbox(s)

### Every year

- Clean and lubricate all moving parts
- Drain and change gearbox oil (*See 'Gearbox oil'*)

At the end of the season the machine should be washed and cleaned.

Carefully clean all machine sections, inside and out. Dirt and foreign objects are likely to draw moisture and cause rusting of steel components. **McHale** recommend that the machine be blown down with an air line, as opposed to a pressure washer, due to the dangers involved with pressure washing and to protect the overall paint work on the machine. If, despite our advice, a pressure washer is used then take extreme caution and operate from ground level only. Do not point pressurized water at or near electrical components, pivots points, valves or bearings. Never climb onto any part of the machine, while pressure washing, due to the fact that all metal surfaces become extremely wet and slippery and always ensure that the tractor has been shut down, with the ignition key removed.

Any damaged paintwork should be touched up. Any maintenance or repairs should be carried out at this stage. The exposed hydraulic cylinder rod should be greased. The cutting device area should be cleaned and lubricated. (*See 'Storage'*)



#### **ENVIRONMENT: Health and safety rules for the environment**

It is vitally important to observe health and safety rules in order to avoid unnecessary environmental damage or danger to anybody near the machine. This especially applies to the responsible disposal of oil. Never spill pollutants (oil, grease, filters, etc.) on the ground, never pour them down the drain and never discard them where they can pollute the environment. Never throw away or burn waste net or plastic. Burning plastics is toxic as they release dioxins and furans. To inhale dioxins or to be exposed to its fumes can cause deadly results. Respect the environment! Always take waste materials to a recycling centre.

When the mower is being removed from the tractor it is very important to release the suspension spring. This is done while the mower is still in the transport position. First lower the leg stands and secure them in the storage position. Then disconnect the suspension spring chain attachment link completely from the spring. Ensure the mower bed is unlatched and lowered to the ground for stability.

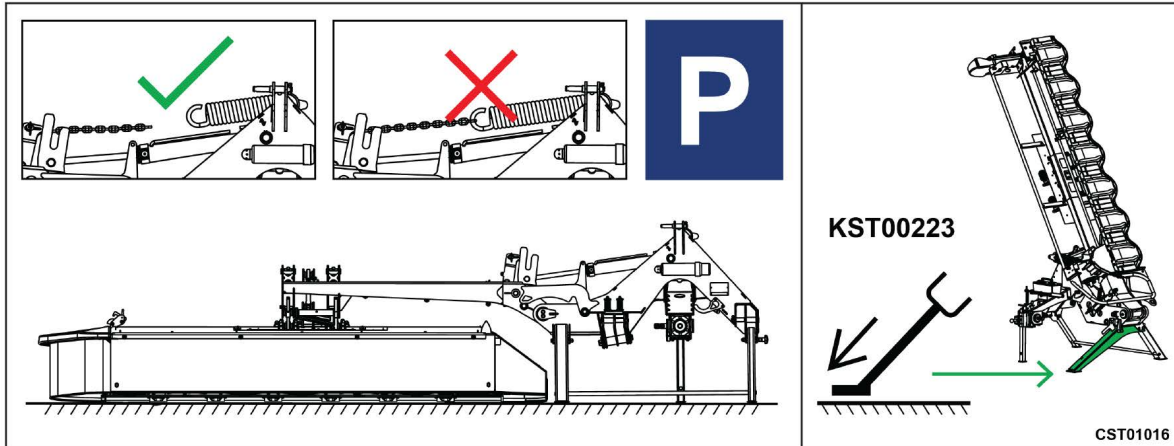
## McHale Pro Glide R310 Rear Disc Mower

After the suspension spring chain is released, disconnect all hydraulic lines from the tractor. Finally disconnect the PTO shaft followed by the top-link and lift arms and drive away from the mower.



### **CAUTION: Ensure the mower bed is stable before disconnection**

Before disconnecting the mower from the tractor, detach the suspension spring chain while in the transport position and always ensure the mower bed is lowered to the ground for stability.

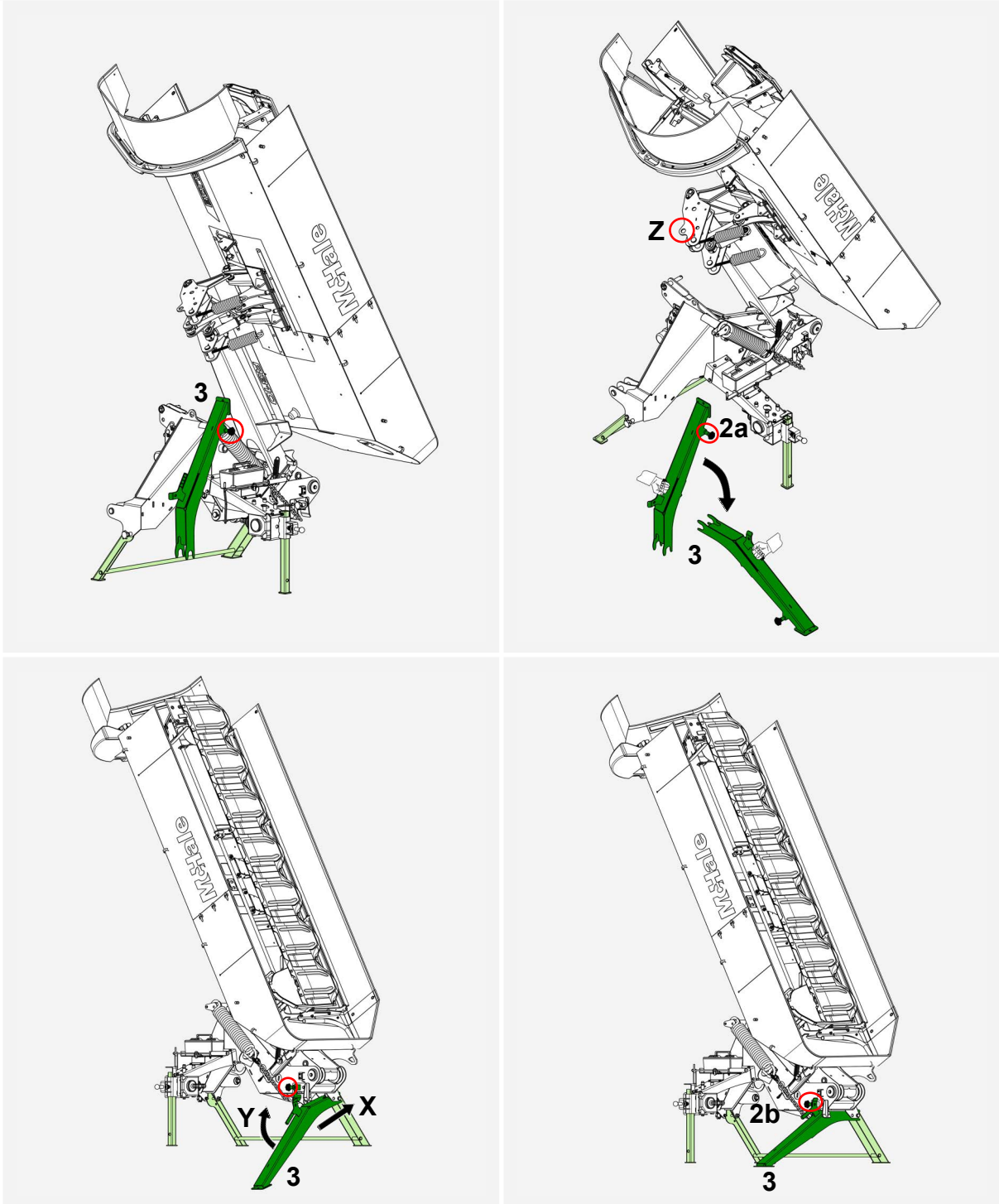


It is recommended that the mower be stored in the horizontal storage position, for safety and stability. When space is limited the mower can be stored indoors in the vertical position, using the leg-stand, providing it's positioned on a perfectly level hard concrete floor. It should be positioned in the back corner of a shed, away from movement and personnel, with additional cross-bracing for safety and stability.

If the mower is stored vertically in an outdoors setting, using the leg-stand, which is not recommended, it must be positioned in a yard on a hard level surface and never in a field, and must be tied down with a counterweight from the tie-down point shown for safety and stability. Furthermore it can only be in a vertical storage position in an outdoor setting on a temporary basis when there is no bad weather forecast and should ideally be stored in a corner with walls to the rear and right hand side, away from movement and personnel.

Before disconnecting from the tractor, lower both leg stands ensuring the lock pins are positively engaged in the storage position. These are the same steps as outlined for normal horizontal storage, previously. Next remove the vertical leg stand (3) from its storage position on the headstock, by retracting the lock pin (2a). The leg stand should be held by the handle and inverted before guiding it into position. Push the U-slot end forward until it is engaged fully with the right hand pivot of the front swing down stand (X). Then while keeping forward pressure, swing the leg stand upwards (Y) until it is latched positively by lock pin (2b). The mower can now be lowered fully onto a level concrete surface. Attach a tether or strap from the tie-down point (Z) to an external counterweight before disconnecting from the tractor. There is no need to disconnect or release the suspension spring chain for vertical storage.

# McHale Pro Glide R310 Rear Disc Mower



## 9.2 Tightening torque values

It is important that the correct torques for fasteners are adhered to. Below are tables of recommended torques for these. These are to be used unless torques are otherwise specified. These values are for general use only. Check tightness of all fasteners periodically. Torque values are in Nm (Newton metres).

Nuts and bolts		Black, Phosphated or Galvanized		
Grade marking		8.8	10.9	12.9
	Dimensions	Metric standard thread		
<b>Hex. bolts</b>	M4	2.7	3.8	4.6
<b>DIN 931</b>	M5	5.5	8	9.5
<b>DIN 933</b>	M6	10	14	16
	M8	23	33	40
<b>Socket head</b>	M10	45	63	75
<b>Cap screws</b>	M12	78	110	130
<b>DIN 912</b>	M14	122	175	210
	M16	195	270	325
<b>Hex. nuts</b>	M18	260	370	440
<b>DIN 934</b>	M20	370	525	630
	M22	510	720	870
	M24	640	900	1,080
	M27	980	1,400	1,650
	M30	1,260	1,800	2,160
	Dimensions	Metric fine thread		
<b>Hex. bolts</b>	M8 x 1	25	35	42
<b>DIN 960</b>	M10 x 1.25	48	67	80
<b>DIN 961</b>	M12 x 1.25	88	125	150
	M12 x 1.5	82	113	140
<b>Hex. nuts</b>	M14 x 1.5	135	190	225
<b>DIN 934</b>	M16 x 1.5	210	290	345
	M18 x 1.5	300	415	505
	M20 x 1.5	415	585	700
	M22 x 1.5	560	785	945
	M24 x 2	720	1,000	1,200
	M27 x 2	1,050	1,500	1,800
	M30 x 2	1,450	2,050	2,500
<b>NOTE:</b>	For nuts and bolts from different materials and/or surface finishes a torque value must be used that is lower than the value stated above.			

# 10

---

## Storage

---

### 10.1 End of season

- When work is complete, always detach the suspension spring chain, while still in the transport position. Before disconnecting the mower from the tractor, always ensure the mower bed is first lowered to the ground for stability.
- Carefully clean all machine sections, inside and out. Dirt and foreign objects are likely to draw moisture and cause rusting of steel components. **McHale** recommend that the machine be blown down with an air line, as opposed to a pressure washer, due to the dangers involved with pressure washing and to protect the overall paint work on the machine. If, despite our advice, a pressure washer is used then take extreme caution and operate from ground level only. Do not point pressurized water at or near electrical components, pivots points, valves or bearings. Never climb onto any part of the machine, while pressure washing, due to the fact that all metal surfaces become extremely wet and slippery and always ensure that the tractor has been shut down, with the ignition key removed.
- Grease the discs/blades to prevent rusting, use extreme caution when carrying out this operation, always wear protective clothing and gloves!
- Lubricate all pivot points and apply a thin layer of grease to all adjustment bolt threads and exposed ram rods.
- Any components from which paint has become worn should be touched up or coated with grease to prevent rusting.
- Remove all dirt from the disc mower bed and blow dry using compressed air and apply grease to prevent rusting.
- Apply grease to all bearings, ram-pivots, and PTO shaft.

### 10.2 Start of season

- Fully review this operators instruction manual.
- Check and fill gearbox oil level, if necessary. (*See 'Gearbox oil'*)
- Lubricate all pivot points.
- Tighten all bolts, nuts and setscrews. (*See 'Tightening torque values'*)
- Inspect and modify, if necessary, all machine adjustments. (*See 'Field operation & machine adjustments'*)

## **McHale Pro Glide R310 Rear Disc Mower**

- Remove the grease from the discs/blades, use extreme caution when carrying out this operation, always wear protective gloves and clothing!
- Check blade pin diameter for excessive wear.
- Replace any blunt or damaged blades.

# 11

---

## Certification & Warranty

---

### 11.1 Declaration of Conformity

The Declaration of Conformity is provided by **McHale**. It certifies the new machine under all the relevant provisions of the EC machinery directive and the national laws and regulations adopting this directive.

The declaration gives a description of the machine and its function, along with the model and serial number details. *(See 'Declaration of Conformity')*

By any alteration of the machine, the Declaration of Conformity, as well as the CE sign on the machine, loses its validity.

### 11.2 PDI form

The PDI (pre-delivery inspection) form is filled out on the commissioning of every new machine, by the **McHale** dealer. The following checks are completed and signed off:

- All parts and accessories are provided to the customer, with the machine
- Machine is reassembled correctly
- Hydraulics, electrics and lighting are working
- New owner has been instructed on how to operate & maintain the machine

The PDI is included in this operator manual. *(See 'Pre-delivery inspection form')*

### 11.3 Change of ownership pre-checks

The PDI (pre-delivery inspection) form that is filled out on the commissioning of every new machine, should also be used during the transfer of ownership of a **McHale** machine. The same check list must be completed and any areas requiring attention addressed before the re-sale of the machine should occur. Pay particular attention to all safety related areas. Take time to familiarise the new owner with machine operation, maintenance and all its safety features.

### 11.4 Limited Warranty

Limited Warranty conditions are supplied with each **McHale** product. They cover the terms & conditions associated with abnormal failure under normal working conditions. *(See 'McHale Limited Warranty')*

# Declaration of Conformity



## DECLARATION OF CONFORMITY

We hereby certify that the machinery stipulated below complies with all the relevant provisions of the EC Machinery Directive 2006/42/EC and the national laws and regulations adopting this directive. Modifications to the machine, without prior approval from the undersigned, will render this declaration null and void.

**Machine description and function:** Mower for mowing (and conditioning) grass and other forage crops for agricultural harvesting.

**Model: (Pro Glide)** \_\_\_\_\_ **Serial Number:** \_\_\_\_\_

**Name of manufacturer:** McHale Engineering  
**Address:** Ballinrobe, Co. Mayo, Ireland, F31 K138

**Is also in conformity with the provisions of the following other EU directives:**  
2014/30/EU - Electromagnetic compatibility (EMC)


**Technical file compiled by:** James Heaney  
c/o McHale Engineering  
Ballinrobe, Co. Mayo, Ireland, F31 K138

- Harmonised standards applied:**
- EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction
  - EN ISO 4254-1:2015/ A1:2021 Agricultural machinery - Safety - Part 1: General requirements
  - ISO 17103 Agricultural Machinery - Rotary disc mowers, rotary drum mowers and flail mowers - Test methods and acceptance criteria for protective skirts
  - ISO 17101-1 Agricultural Machinery - Thrown-object test and acceptance criteria - Part 1: Rotary mowers
  - EN ISO 4254-12:2012 Agricultural machinery - Safety - Part 12: Rotary disc and drum mowers and flail mowers

**Signed:**   
**Date:** ..... **Place:** Ballinrobe, Co. Mayo, Ireland, F31 K138  
**Name:** James Heaney  
**Position:** Design Office Manager



## Pre-delivery inspection form

 <b>PRE-DELIVERY INSPECTION (PDI)</b>	
Dealer:..... Full address:..... ..... Fitter:..... <b>Customer:</b> ..... Full address:..... ..... .....	Model: Pro Glide Serial No:..... Date delivered:..... Date inspected:..... Tel:..... Mobile:..... E-mail:.....
ENSURE THAT THE TRACTOR IS OF THE CORRECT SPECIFICATION FOR THIS MACHINE. REFER TO THE OPERATOR INSTRUCTION MANUAL BEFORE MAKING ANY ADJUSTMENTS!	
<b>This machine must be registered on <a href="http://www.mchale.net">www.mchale.net</a> by the dealer in order to qualify for warranty!</b>	
1. Check that all accessories are with the owner/operator. Check operators instruction manual and parts lists.	8. Check all manual & hydraulic functions.
2. Ensure machine is re-assembled correctly. (Refer to all assembly instructions supplied)	9. Check for hydraulic leaks, both internal (Creep) and external.
3. Ensure that all items are properly installed and check all bolts & nuts are torqued correctly.	10. Check for smooth operation of all moving parts. Ensure correct LH or RH cutting blades are used for each disc.
4. Use correct sized link pins and adjustable top link when coupling the machine to a suitably sized tractor.	11. Use extreme caution when working around sharp blades and tine-points. Always wear protective clothing and gloves!
5. Ensure guards, lights and hydraulic hoses are fitted correctly, before coupling the machine to a tractor.	12. The operator must be fully aware of all hazards, controls (hydraulic), all functions & safety features of both the machine and the tractor.
6. When mounted on a tractor check that the main mower frame is vertical. Then adjust the top link to set the required cutting height.	13. Ensure that the owner/operator reads the operator instruction manual and understands fully all safety & operating aspects of the machine, as described.
7. Connect hydraulic hosing to the tractor and ensure proper hydraulic setup. Main lift ram hydraulic supply must have float.	14. Instruct operator on maintenance i.e. check mountings, adjustments and areas to be greased daily along with other routine functions.
I am satisfied that the above checks have been carried out, and that the machine is complete with all accessories and manuals.	
Signed:..... (Dealer) Date:..... Signed:..... (Owner) Date:.....	
<b>A signed copy of this form is to be retained by both the dealer and the customer!</b>	

## McHale Limited Warranty

**McHale** Engineering, Ballinrobe, Co. Mayo, Ireland (hereinafter called 'the company') warrants to the original retail purchaser that new products sold and registered with the company, shall be, at the time of delivery, free from defects in material and workmanship, and that such equipment is covered under Limited Warranty providing the machine is used and serviced in accordance with the recommendations in the operator's manual.

This Limited Warranty covers the equipment for 10,000 bales, or a period of one year starting from the date the equipment is commissioned, whichever comes first.

The online submission of the pre-delivery inspection (PDI) form by the dealer (importer) is taken as evidence of the delivery of the machine to the original retail purchaser. This is compulsory, and is required to record the machine in the **McHale** warranty system.

### **These conditions are subject to the following exceptions:**

- Parts of the machine which are not of **McHale** manufacture, such as tyres, PTO shafts, slip clutches, hydraulic cylinders, etc. are not covered by this Limited Warranty, but are subject to the warranty of the original manufacturer. Warranty claims applying to these types of parts must be submitted in the same way as if they were parts manufactured by **McHale**. However, compensation will be paid in accordance with the warranty agreement of the manufacturer concerned.
- This Limited Warranty does not apply to failure through normal wear and tear, to damage resulting from negligence or from lack of inspection, from misuse, from lack of maintenance and/or if the machine has been involved in an accident, lent out or used for purposes other than those for which it was intended by the company.
- This Limited Warranty will not apply to any product that has been altered or modified in any way without the express permission of the company, or if parts not approved by **McHale** are used in repair.
- The company take no responsibility for any additional costs, including loss of oil and/or consumables incurred during the failure and repair of a product.
- The company cannot be held responsible for any claims or injuries to the owner or to the third party, nor to any resulting responsibility.
- Also, on no account can the company be held liable for incidental or consequential damages (including loss of anticipated profits) or for any impairment due to failure, a latent defect or a breakdown of a machine.

### **The customer will be responsible for the following costs:**

- Normal maintenance such as greasing, maintenance of oil levels, minor adjustments, etc. as specified in the operator's manual.
- Labour charges other than originally agreed, incurred in the removal and replacement of components.
- Dealer's travel time and travel costs to and from the machine.
- Parts defined as normal wear items such as, but not limited to PTO shafts, chains, tyres, bearings, belts, blades, knives, tines, tine bars, slip clutches, nylon chain runners and slides, etc. that are not covered under the Limited Warranty.

## McHale Pro Glide R310 Rear Disc Mower

### The importer will be responsible for the following costs:

- All warranty labour charges.

### The warranty is dependent on the strict observance of the following:

- The machine has been put in service by the **McHale** dealer according to our instructions.
- The online pre-delivery inspection (PDI) form has been correctly completed by the dealer.
- A printed version of the PDI form has been signed and dated by the original retail purchaser. This copy is to be stored by the dealer and made available to **McHale** when requested.
- The warranty claim is submitted using the **McHale** online claims system.
- The warranty claim must be submitted by the original retailing **McHale** dealer only.
- The decision of the company in all cases is final.
- Warranty parts must be held by the dealer for a period of two years from the date the warranty claim is submitted to **McHale**, or until a return request has been issued within the two years.
- When **McHale** issue a return request, parts must have the claim number written clearly on each individual part. These parts must be free from dirt and oil. If a part is returned in an unfit state, the claim will be refused.
- If damaged parts have been returned to the company and warranty is refused, the dealer is allowed a period of one month from the date of receiving our notification to request the return of the damaged parts to the dealer site.

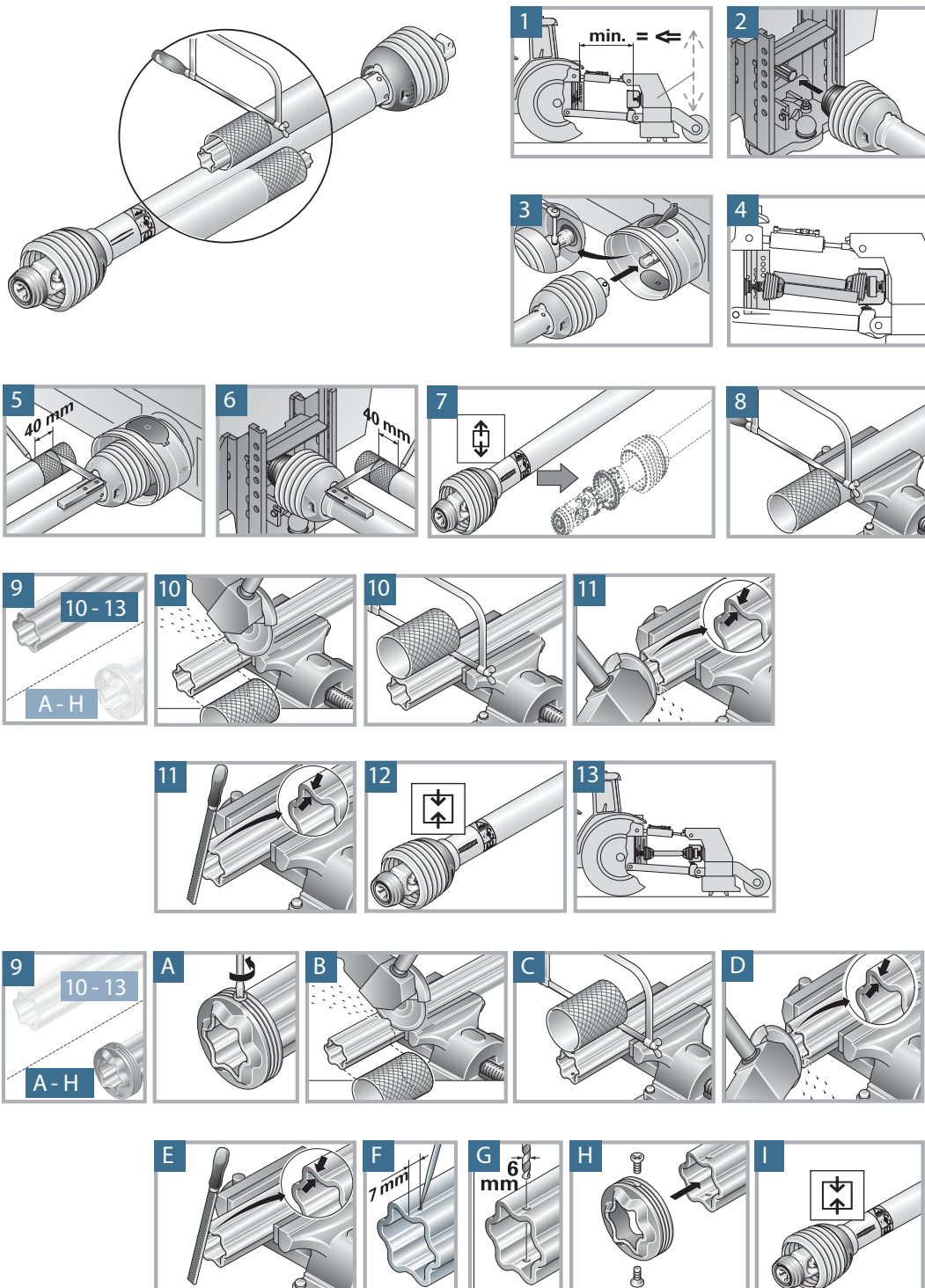
### Further conditions - limits of application and responsibility:

- This Limited Warranty cannot be assigned or transferred to anyone without the prior written consent of the company.
- **McHale** dealers have no right or authority to assume any obligation or take any decision on the company's behalf, whether expressly or tacitly.
- Technical assistance given by the company or its agents for repairing or operating equipment does not lead to any responsibility on the company's behalf and cannot under any circumstances bring novation or derogation to the conditions of the present Limited Warranty.
- The company reserves the right to incorporate changes in its machines without prior notice and without obligation to apply these changes to machines previously manufactured.
- The present Limited Warranty excludes any other responsibility, whether legal or conventional, express or implied, and there are no warranties extending beyond those defined herein.

# 12

## Appendix

### 12.1 Adjusting the PTO shaft to the tractor



## 12.2 Unit conversion tables

### Length

mm	cm	m	km	inch (in)	foot (ft)	yard (yd)	mile (mi)
1	0.1	0.001	0.000001	0.03937	0.003281	0.001094	6.21e-07
10	1	0.01	0.00001	0.393701	0.032808	0.010936	0.000006
1000	100	1	0.001	39.37008	3.28084	1.093613	0.000621
1000000	100000	1000	1	39370.08	3280.84	1093.613	0.621371
25.4	2.54	0.0254	0.000025	1	0.083333	0.027778	0.000016
304.8	30.48	0.3048	0.000305	12	1	0.333333	0.000189
914.4	91.44	0.9144	0.000914	36	3	1	0.000568
1609344	160934.4	1609.344	1.609344	63360	5280	1760	1

### Area

mm <sup>2</sup>	cm <sup>2</sup>	m <sup>2</sup>	in <sup>2</sup>	ft <sup>2</sup>	yd <sup>2</sup>
1	0.01	0.000001	0.00155	0.000011	0.000001
100	1	0.0001	0.155	0.001076	0.00012
1000000	10000	1	1550.003	10.76391	1.19599
645.16	6.4516	0.000645	1	0.006944	0.000772
92903	929.0304	0.092903	144	1	0.111111
836127	8361.274	0.836127	1296	9	1

### Volume

cm <sup>3</sup> (ml)	m <sup>3</sup>	litre (l)	in <sup>3</sup>	ft <sup>3</sup>	US gal	Imp. gal	US barrel
1	0.000001	0.001	0.061024	0.000035	0.000264	0.00022	0.000006
1000000	1	1000	61024	35	264	220	6.29
1000	0.001	1	61	0.035	0.264201	0.22	0.00629
16.4	0.000016	0.016387	1	0.000579	0.004329	0.003605	0.000103
28317	0.028317	28.31685	1728	1	7.481333	6.229712	0.178127
3785	0.003785	3.79	231	0.13	1	0.832701	0.02381
4545	0.004545	4.55	277	0.16	1.20	1	0.028593
158970	0.15897	159	9701	6	42	35	1

### Mass

gram (g)	kg	tonne	US ton	Imp. ton	pound (lb)	ounce (oz)
1	0.001	0.000001	0.000001	9.84e-07	0.002205	0.035273
1000	1	0.001	0.001102	0.000984	2.204586	35.27337
1000000	1000	1	1.102293	0.984252	2204.623	35273.96
907200	907.2	0.9072	1	0.892913	2000	32000
1016000	1016	1.016	1.12	1	2240	35840
453.6	0.4536	0.000454	0.0005	0.000446	1	16
28	0.02835	0.000028	0.000031	0.000028	0.0625	1

## Flow rate

l/sec	l/min	m <sup>3</sup> /h	ft <sup>3</sup> /min	ft <sup>3</sup> /h	gal/min	US brl/day
1	60	3.6	2.119093	127.1197	15.85037	543.4783
0.016666	1	0.06	0.035317	2.118577	0.264162	9.057609
0.277778	16.6667	1	0.588637	35.31102	4.40288	150.9661
0.4719	28.31513	1.69884	1	60	7.479791	256.4674
0.007867	0.472015	0.02832	0.01667	1	0.124689	4.275326
0.06309	3.785551	0.227124	0.133694	8.019983	1	34.28804
0.00184	0.110404	0.006624	0.003899	0.2339	0.029165	1

## Pressure

bar	psi	kPa	MPa	kgf/cm <sup>2</sup>	mm Hg	atm
1	14.50326	100	0.1	1.01968	750.0188	0.987167
0.06895	1	6.895	0.006895	0.070307	51.71379	0.068065
0.01	0.1450	1	0.001	0.01020	7.5002	0.00987
10	145.03	1000	1	10.197	7500.2	9.8717
0.9807	14.22335	98.07	0.09807	1	735.5434	0.968115
0.001333	0.019337	0.13333	0.000133	0.00136	1	0.001316
1.013	14.69181	101.3	0.1013	1.032936	759.769	1

## Speed

m/s	m/min	km/h	ft/s	ft/min	mi/h
1	60	3.6	3.28084	196.8504	2.237136
0.01667	1	0.060007	0.054692	3.281496	0.037293
0.2778	16.66467	1	0.911417	54.68504	0.621477
0.3048	18.28434	1.097192	1	60	0.681879
0.00508	0.304739	0.018287	0.016667	1	0.011365
0.447	26.81464	1.609071	1.466535	87.99213	1

## Torque

Nm	kgfm	ftlb	inlb
1	0.101972	0.737561	8.850732
9.80665	1	7.233003	86.79603
1.35582	0.138255	1	12
0.112985	0.011521	0.083333	1

## Temperature conversion formulas

<b>Degree Celsius (°C)</b>	$(^{\circ}\text{F} - 32) \times 5/9$	$(\text{K} - 273.15)$
<b>Degree Fahrenheit (°F)</b>	$(^{\circ}\text{C} \times 9/5) + 32$	$(1.8 \times \text{K}) - 459.67$
<b>Kelvin (K)</b>	$(^{\circ}\text{C} + 273.15)$	$(^{\circ}\text{F} + 459.67) \div 1.8$