

PANDROL



CD300 EC

**OPERATION AND MAINTENANCE
MANUAL**

ENG_OMM_CD300_EC_P03

2023-08-17

Partners in excellence

1. Preface

**Thank you for choosing CD300 EC!
You are now the owner of a quality
product from Pandrol.**

This manual aims to help you get to know your new CD300 EC, to use it in the best way and to maintain it properly for a long lifetime. It also presents important safety regulations and warnings.

The manual is intended for people who handle and operate CD300 EC. It is originally written in Swedish and then translated into the local language by Pandrol AB.

Pandrol AB reserves the right to change specifications, equipment, instructions and maintenance guidelines without prior notice.

The manual contains instructions about the following topics:

1. Installation
2. Operation
3. Safety features and warnings
4. Maintenance and troubleshooting

(1) refers to a component in a figure/illustration.

IMPORTANT

This manual contains ordered actions, e.g.

1. Do this
2. ...and then this...
3. ...and finally this

These actions **must** be done in the numerical order presented.



2. Revision

Revision	Date		Note
P01	2021-12-16		New manual
P02	2023-03-30		Updated work modes

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4. Safety Information and Warnings

4.1. Safety instructions

- Read through all the safety instructions and warnings before installing, using or carrying out maintenance on this machine.
- Ensure that the carrier machine has the requirements to lift and to operate the CD300EC.
- It is essential that all kind of use, maintenance and service work, is carried out by qualified personnel, trained by Pandrol AB.
- The CD300EC is can operate with automatic machine cycles that entail a risk of crushing injuries. Only the operator may be in the vicinity of the machine when in use. Track personnel must be at a distance of minimum 3 meters from the machine.
- The machine shall not be used as a transport vehicle for personnel or equipment.
- Improper operation of this equipment can be dangerous and could result in personnel injury.
- The safety instructions that apply when working on railroad vehicles in the track area shall also be applied to work using this equipment.
- Use standards and regulations, accident prevention regulations and regulations concerning special ambient conditions (e.g. areas potentially endangered by explosive materials, heavy pollution or corrosive influences).
- Personnel working with or close to the machine must wear sufficient protection clothing such as helmet, ear protectors, goggles, protection- shoes, gloves, and clothes.
- Before carrying out any maintenance or service work on the machine; switch off the carrier machine engine, release the hydraulic pressure by moving the levers.
- The carrier machine should only be used under normal conditions and overloading must not occur.
- If the CD300EC is pressed to much towards the rail, derailment can occur. Make sure that all carrier machine rail wheels are in full contact with the rail.
- Keep the machine clean and free from dirt to ensure safe work environment.
- Make sure that unqualified persons are not within the operating area during installation, use or maintenance.

4.2. General

- The machine has been developed and manufactured to be used on railway lines with aerial power lines or lines used by diesel-powered vehicles.
- Warnings and safety precautions described in this document shall only be considered as a minimum. National conditions, standards and regulations override conditions, standards and regulations described in this document.
- Work with the machine is only to be carried out by qualified personnel, well-informed and educated in general railway workmanship and specifically in the conditions, standards and regulations on specific rail track.
- The machine may only be used for its specified purpose.
- Make sure that the working area is free from obstacles that could cause a risk of stumble and fall.
- It is not allowed to climb on or step on the machine due to the risk of injury.
- Any adjustments, service or maintenance work on the machine is only allowed to be carried out by qualified personnel who have read and fully understood this manual, the maintenance manual and have had training and information for this particular model from Pandrol AB. Instructions and maintenance schedule is given in the maintenance manual. If there is a situation where a trained and skilled person is not available, contact your local Pandrol service person, or Pandrol aftersales technical support. Contact information is available at the end of this manual.

4.3. Warnings

This section describes safety related information that needs to be taken into consideration before, during and after using the equipment.

DANGER, WARNING, CAUTION and Note statements are used throughout this manual to emphasize important and critical information. You must read these statements to help ensure safety and to prevent damage to the product. The statements are defined below.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

Note: A note statement is used to notify people of installation, operation or maintenance information that is important, but not hazard-related.

4.4. General warnings

Incorrect installation, usage or maintenance of this equipment can be dangerous and can result in personal injury, or in worst case death of a person.

Do never install, use or carry out any maintenance on this equipment before you have read through and fully understood the instructions in this manual and the carrier machine.



WARNING! Moving Parts

Risk of crushing. During operation, some parts of the CD300EC are moving. Moving parts can cause personal injury.

To avoid accidents, follow the guidelines below:

- Keep away from moving parts when operating the machine.
- Make sure that no unauthorized personnel are within the working area (3m) when operating the machine.



WARNING! Pressurised hydraulic oil

High pressure fluid is present in the hydraulic system. Fluids under high pressure are dangerous and can cause serious injury. To avoid accidents, follow the guidelines below:

- Only qualified technicians or engineers are allowed to make modifications, service or adjustments to the hydraulic system.
- Always wear appropriate personal-protection equipment.
- Shut off the engine and drain the hydraulic system before carry out any work on the hydraulic system.



WARNING! Live current

Contact with electric parts can cause serious injury or death, and/or serious damage on the equipment if live current is present. To avoid accidents, follow the guidelines below:

- If electricity needs to be connected for testing purposes. Keep hands, tools etc. away from all electrical parts.

In any other case:

1. Shut off the engine.
2. Disconnect the battery cables from the battery terminals.



DANGER! – Machine in operation

Special precautions must be taken to ensure that operation of the machine will not result in injury of a person and/or serious damage to the equipment.

To avoid accidents, make sure no unauthorized persons are in the vicinity of the machine before operation is started.



WARNING! – Operator leaves the machine unattended

When the operator leaves the machine unattended, the machine must always be parked horizontally on the ground or on the rail with the brakes activated. This is to ensure that the machine does not move unintentionally that could result in serious injury of a person and/or serious damage to other equipment.

4.5. Warning labels

There are a number of labels intended to inform and warn the operator of the machine. If any label become damaged or lost, they are to be replaced with new original warning labels that are available from Pandrol AB.



4.6. Qualified Personnel

The CD300EC is only to be used by trained personnel, thoroughly familiar with, and trained in general railway workmanship.

The CD300EC shall be operated according to the conditions and standard regulations applying to the track of where the machine is being operated.

The equipment must be serviced, maintained, or in any way modified only by trained personnel, who have received training and information from Pandrol AB.

The components of this unit and other components in the vicinity are powered by dangerous contact high voltage. Touching any parts, connected to such voltage, can cause serious injury or death of a person.

In order to avoid personal injury or death and/or material damage, everyone involved with assembling, starting-up or overhaul must possess relevant knowledge of the following:

- The automation technology sector.
- Dealing with dangerous voltages.
- Using standards and regulations, accident prevention regulations and regulations concerning special ambient conditions (e.g. areas potentially endangered by explosive materials, heavy pollution or corrosive influences).



WARNING!

Touching parts that are subject to high voltage may cause personal injury or death of a person.



WARNING!

All maintenance and service on the electric or hydraulic system shall be carried out by qualified personnel.

5. Risks

5.1. Introduction

An analysis shows that there are three distinct risk areas for this equipment:

- Operation and handling
- Repair and Maintenance
- Transport

For each risk identified, there is a short explanation and the means of limiting this risk described. Most of the operating risks are also highlighted in other chapters in this manual.

Great emphasis is placed on the operators training to reduce the risk associated with the operation of this equipment. It should be stressed that, whilst the risk assessment laid out in this chapter include some consideration of the risk of working the machine under on-site conditions, this should not be taken as a thorough risk assessment of the site operations, as other equipment and processes, not considered herein, may affect the overall risk profile of the operation.

5.2. Operation and Handling

Machine rolls away

If the Clip Driver is left on the rail and not attached to a carrier machine, the Clip Driver could roll away. The Clip Driver can be equipped with a parking brake that activates as soon as the pressure from the carrier machine drops. If the Clip Driver is not equipped with parking brake, wheel stops are to be placed at all of the four wheels when parked on a rail.

Flying objects

If a sleeper is not correctly aligned during clipping, there is a risk that the toe insulator brakes and parts of the it goes off at high speed causing personal injury.

Make sure that no personnel are within the working area (3m) when operating the machine.

Hydraulic fluid under pressure

Pressurized hydraulic systems in use on this equipment. Damage or failure of hoses and fittings may cause a high pressure jet of oil to be emitted from the system. This could be hazardous to eyes, skin etc. Pools of leaked oil could lead to an increased risk of slips, trips or falls. Connecting and disconnecting the supply and return hoses to the hydraulic systems of the power unit carries a risk that oil may be spilled. Hydraulic oil is frequently very hot and may cause burns and scalds.

All components used in the power unit hydraulic system are CE marked.

Quick couplers used minimizes oil being spilled during connection or disconnection.

Operators and service personnel should wear appropriate protective equipment, such as gloves, goggles and overalls. Skin exposed to hydraulic oils should be washed immediately. All personnel should be made aware of the contents of the product data sheets relating to the oil used.

Pandrol Inc recommends the use of biodegradable oils and greases, in order to minimize the environmental impact in case of an oil leakage.

Risk of crushing

The CD300EC is can operate with automatic machine cycles that entail a risk of crushing injuries.

Track personnel must be at a distance of minimum 3 meters from the machine.

Damaged clip

Incorrect angle between sleeper and rail the toe insulator touches the edge of the rail. If the clip is forced to fasten, the the toe insulator could be damaged. Too high pressure when clipping could cause damage to the equipment.

Pandrol (UK) Ltd specifies a maximal clamping force of 35 kN to prevent damage to the toe insulators. The clamping force is limited by a pressure valve set at factory assembly.

The clipping tool design prevents the clipping pads to move too far causing damage to the equipment.

Insufficient clipping

If the clip is not properly installed, the functionality of the e-clip is impaired. The clips connect the sleeper with the rail, which makes it a key factor of the railway infrastructure. Failed installatons och clips could result in catastrophic results such as derailment of train.

Operators and inspection personnel must be observant and make sure that the operators always make controls to ensure correct installation of clips.

Damage to shoulder

Incorrect adjustment of the clipping tool may lead to damage on the shoulder or the attachment between sleeper and shoulder. Sleepers made of concrete need extra attention due to risk from water penetrating the damaged area. This could lead to frost damage and crackilation.

Operators and inspection personnel must consider the importance of correct adjustments of the clipping tools described in this manual.

Technical information about Pandrol FASTCLIP can be ordered from:

Pandrol UK Ltd
Gateford Road, Worksop
Nottinghamshire, S81 7AX
England
Tel. +44 (0)1909 476 101
Fax. +44 (0)1909 500 004

5.3. Lifting and Handling

Personal injury

Risk of machine or equipment drop. Risk of death or serious injury. The machine must only be lifted at designated lifting points at the machine bracket or support legs.

Lifting chains and slings must be approved for lifting the machine and be in good condition.

Only trained personnel are allowed to handle lifting equipment.

Do not lift the machine if there are any loose objects lying onto the machine.

No person is allowed within the working area during lifting.

Tipping

There is a great risk of tipping over if the carrier machine lifting capacity is below specification, or loading arm extensions are outside given lifting safety area.

Ensure that the carrier machine has the lifting capacity required for lifting the Clip Driver.

Only trained personnel are allowed to carry out lifting.

Lifting and load indicators on the carrier machine must at all times be used when lifting.

Always take the cant and ground strength into consideration before lifting.

No person is allowed within the working area during lifting.

5.4. Repair and Maintenance

Damage to the equipment

Damage to the machine during repair or overhaul may cause the equipment to malfunction and may increase risk for personnel when in service.

Only competent staff should perform any repair or maintenance. For advice on maintenance or repair on the machine, please contact Pandrol Inc.

Personnel injury

Hydraulic system may have stored pressure even with the tool disconnected.

Only competent staff should perform any repair or maintenance. For advice on maintenance or repair on the machine, please contact Pandrol Inc.

- Appropriate protective equipment should be used at all times.
- Careful consideration should be given to the handling of all parts before commencing repair operations.

5.5. Qualified Personnel

The machine is only to be used by qualified personnel.

The equipment must be serviced, maintained, or in any way modified only by qualified personnel who are familiar with this Operation & Maintenance Manual.

The components in this unit and other components in the vicinity are powered by dangerous contact voltage.

Touching any parts, connected to such voltage, can cause serious injury or death.

In order to avoid personal injury or death and/or material damage, everyone involved with assembling, starting-up or overhaul must possess pertinent knowledge of the following:

- The operator must be familiar with all prohibited work areas such as unsafe grades, poor footing areas, overhead hazards and the automation technology sector.
- Dealing with dangerous voltages
- Using standards and regulations, accident prevention regulations and regulations concerning special ambient conditions (e.g. areas potentially endangered by explosive materials, heavy pollution or corrosive influences)



WARNING!

All maintenance and service, or other operations on the electronic or hydraulic systems are to be carried out by qualified personnel.

6. Transport

6.1. Lifting and Transportation On Flatbed

Before lifting, make sure that the lifting equipment is suitable for its task. Chains or straps must be of an appropriate strength with a minimum of 3 tonne lifting capacity. See "9.1. Technical Information" på sida 2227" for machine weight and dimension. Use a guiding rope to align the machine during lifting. Lifting of the machine is only allowed at the dedicated lifting eyelets "Fig 1. Lifting points".



DANGER!

Never stand under a hanging load. If a chain or strap comes off there is a serious risk of death of a person.



WARNING!

Do not stand within two meters from the machine during lifting. Use a guiding rope to align the machine during lifting.

Lifting points

No	Description
1	Lifting point for lifting chain, strap, pallet fork
2	Lifting point for lifting chain or strap

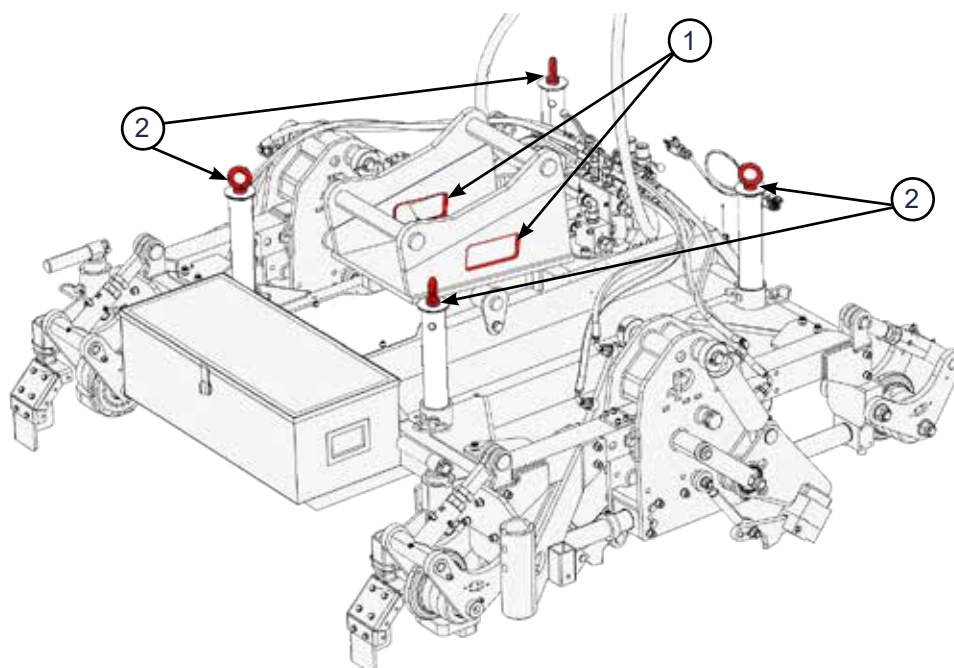


Fig 1. Lifting points

6.2. Transport

During transport it is essential that the machine is securely fastened onto the transport flatbed.

6.3. Securing The Machine Onto A Flatbed

Before lifting the machine onto a flatbed the parking support legs must be lowered to parking position. Lift the machine according to instructions given in chapter "6.1 Lifting and Transportation". The machine and parking support legs must fully rest on the flatbed to ensure full stability during transport.

Secure the CD300EC on the flatbed with chains or straps of appropriate strength. Ensure to use dedicated fastening points according to "Fig 2. Securing the machine".

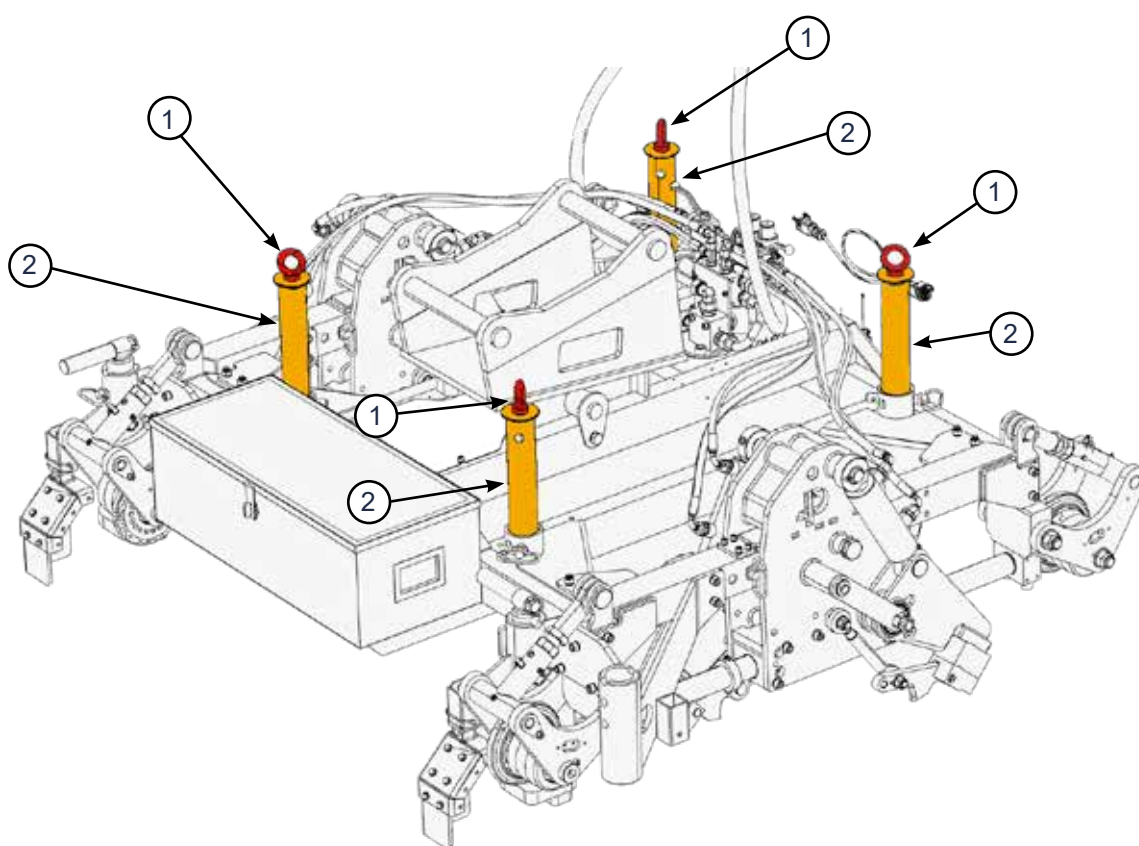


Fig 2. Securing the machine

No	Description
1	Fastening point for lifting and load securing
2	Support legs

7. Installation

7.1. Hydraulics

Connect the hydraulics after the CD300 is attached to the machine bracket on the carrier machine.

Depending on carrier machine and configuration, the pressure and return couplers may differ. In some cases, the quick couplers on the CD300 need to be switched. Check and verify pressure and return lines on the carrier machine before connecting the CD300.

Connect the hose (1) to the pressure line.

Connect the hose (2) to the return line.

Read section "9.1. Technical Information" for recommended oil pressure and oil flow.

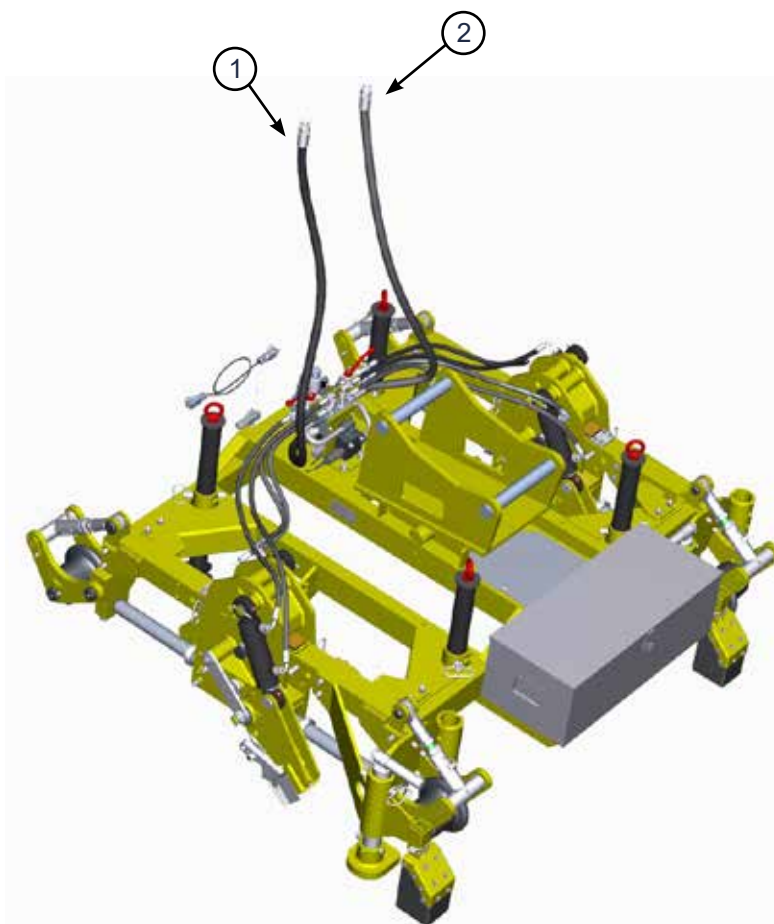
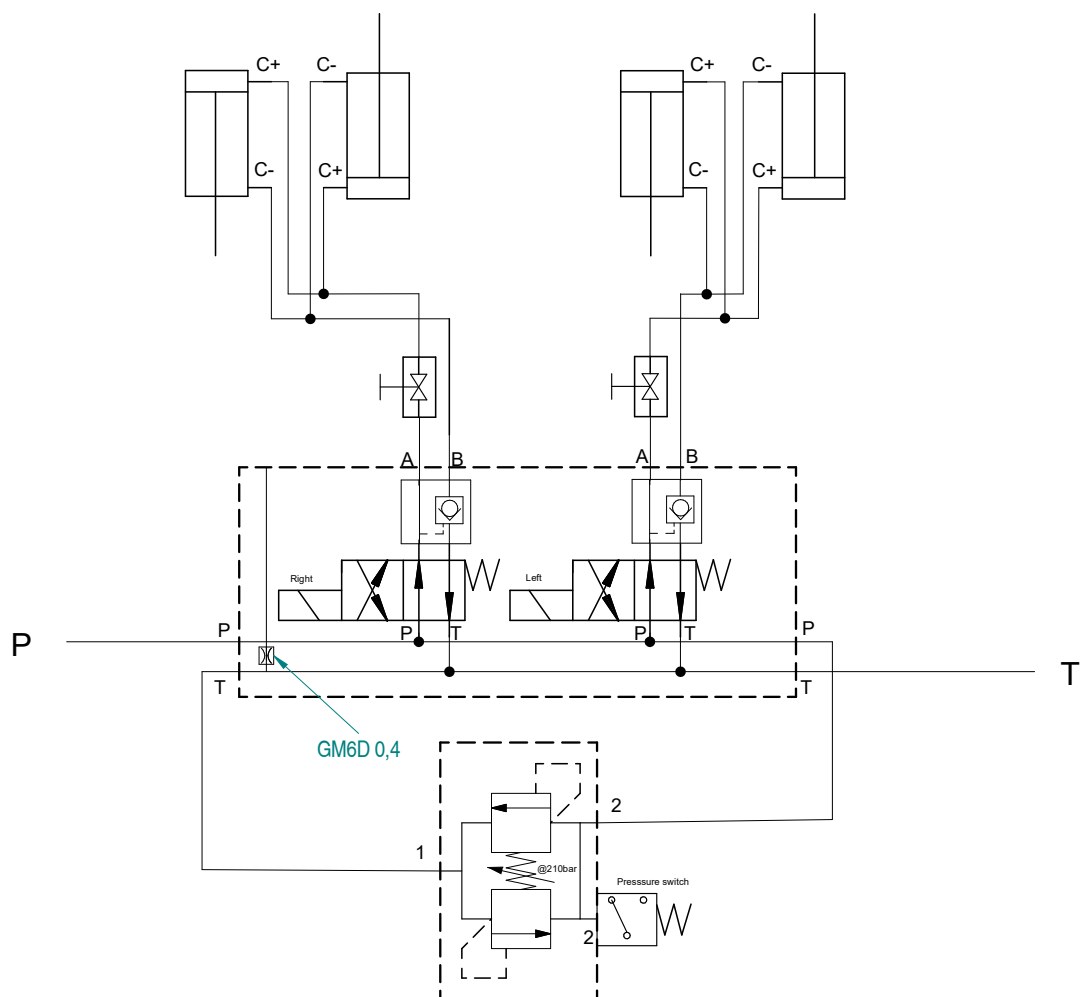


Fig 3.

7.2. Hydraulic Diagram CD300IQ E-clip



7.3. Electric Cable

Electric cable on excavator arm

1. Install the rectangular connection socket on the loader arm near the machine bracket, Fig 4. Attach the cable along the excavator arm and fasten with straps.

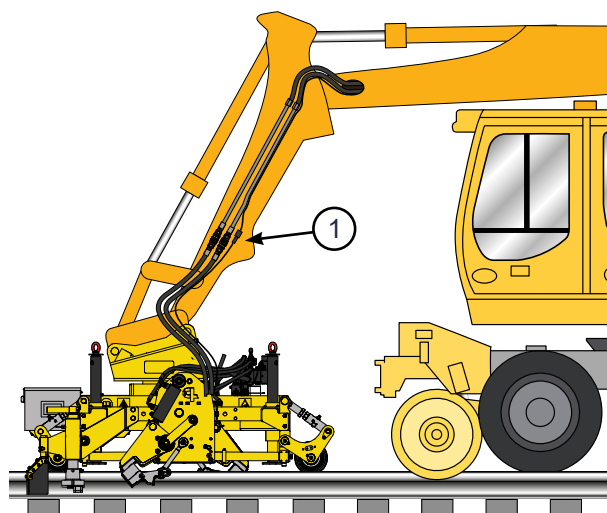


Fig 4. Connection socket



Fig 5. Cable

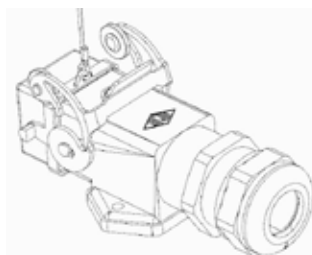


Fig 6. Extra connection

8. Description

8.1. General description

Clip Driver CD300EC has been developed and manufactured as a machine held tool for clipping and declipping Pandrol e-clip.

The CD300EC can be connected to any rail vehicle that can supply the equipment with hydraulic feed. The machine is equipped with a pressure switch that controls the semi-auto function.

All tools can be permanently mounted on the CD300EC and do not need to be removed to run different types of clips.

The CD300EC is CE marked on delivery.

Machine identification plate with CE-marking and serial number.



Fig 7. Identification plate

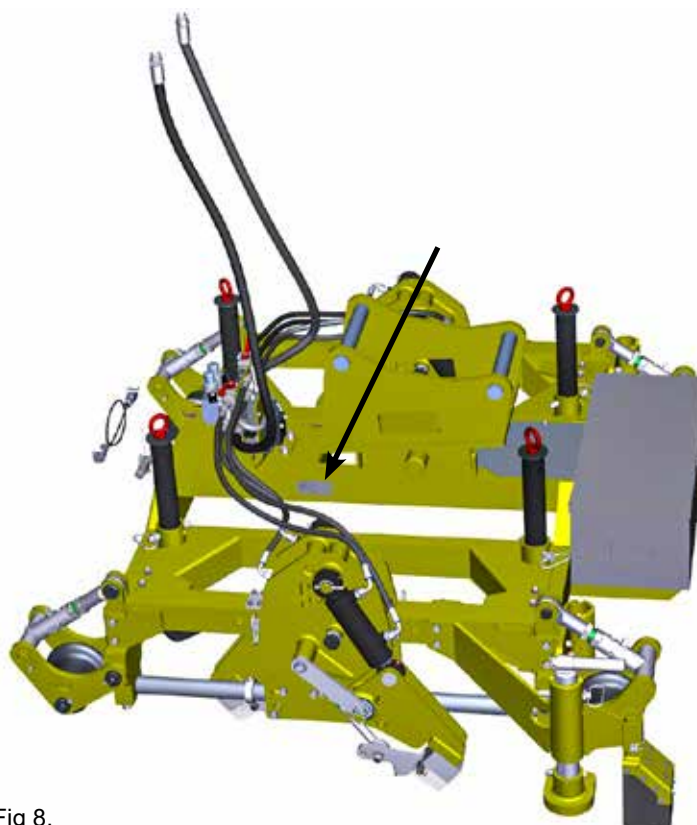


Fig 8.

8.2. Overview

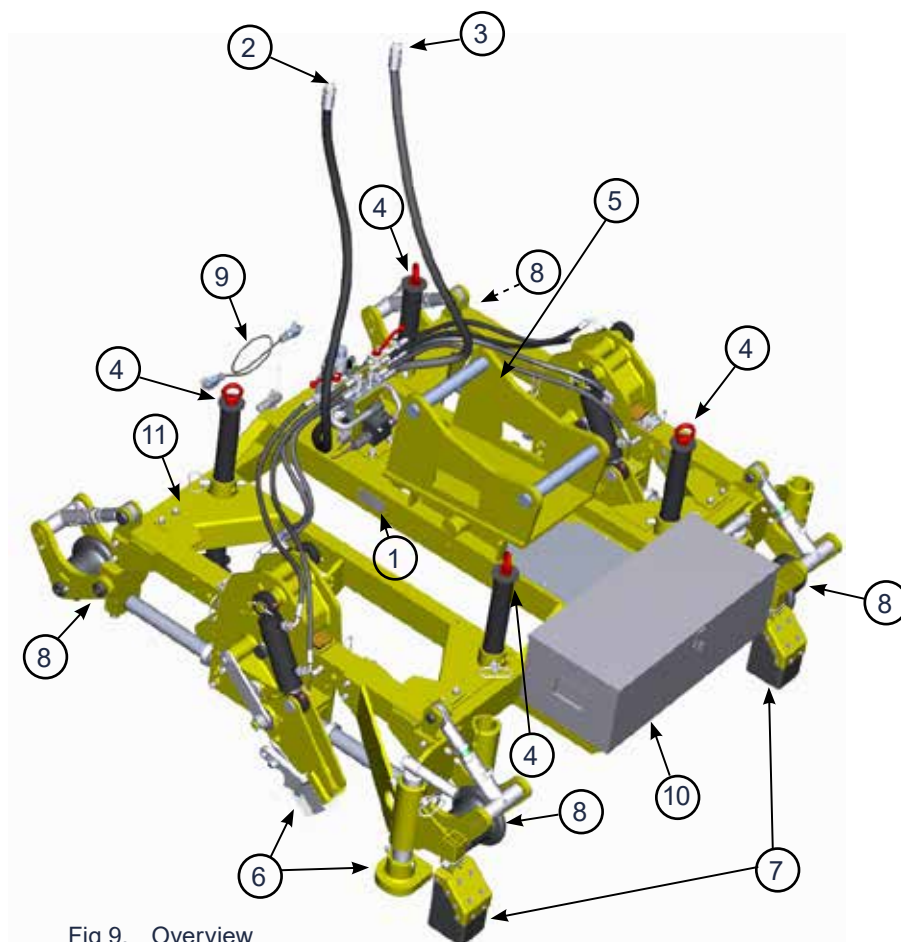


Fig 9. Overview

No	Description
1	Identification plate
2	Hydraulic quick coupler pressure side
3	Hydraulic quick coupler return side
4	Support legs
5	Machine bracket
6	Clipping/De-clipping tool
7	Clipcatcher
8	Railwheel
9	Electrical cable
10	Tool box
11	Main frame

9. Technical data

9.1. Technical Information

Machine type	Clip Driver CD300EC	5014990
Length		1790 mm
Height		1034 mm
Width		2222 mm
Weight		840 kg
Track gauge	Standard	1435 mm
Rail wheel	Standard UIC - Profile	Ø 125 mm
Clipping		2 clips per cycle
De-clipping		2 clips per cycle
Electric system	Machine will not function correctly if connected to 12V Power supply.	24 V
Hydraulic system	Hydraulic oil flow	80 - 120 l/min
	Hydraulic oil pressure	190 - 210 bar
Impedance measure < 0.15Ω - EN50153-1 6.4.4 Impedance.		

10. Operation

CD300EC has two operating modes, clipping e-Clip and de-clipping e-Clip. Selection of tools is made by the operator mechanically on the machine.

The machine has a working mode, Semi-auto. It is possible to activate the tools on both sides or individually.

To drive one side, close the handle for the side to be turned off, Fig. 8.

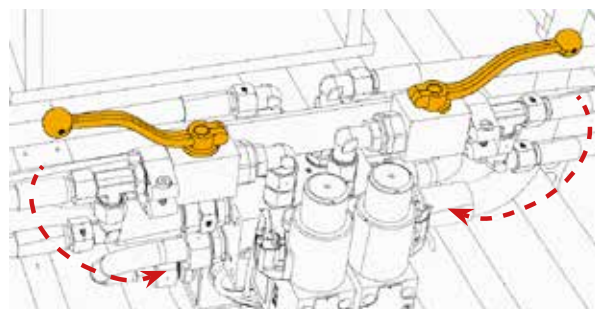


Fig 10.



WARNING!

Before starting work on the machine, make sure that you have read and understood the information in the manual, warnings and how to start / switch off and operate the machine safely.

Make sure that no unauthorized persons are within the working area of the machine.

10.1. Preparations

1. Attach the CD300EC onto the carrier machine.
2. Connect the hydraulic couplings and the electrical plug, fig. 9, to the digging arm.
3. Plug the electric connector to the 24V power socket. fig 10.
4. Place the machine onto the railway track.
5. Check and carry out required adjustments for the specific rail for where the work will be carried out onto. Information about correct adjustments is given in the chapter "Adjustments".
6. Inspect and clear the rail and the working area to ensure that there are no obstacles that could affect the result of the work task.



Fig 11.

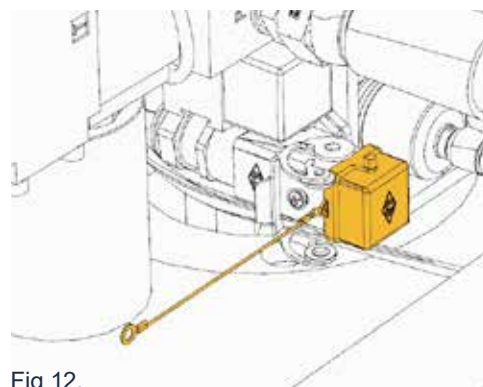


Fig 12.

Extra contact, fig. 11, entails if you need your own assembly

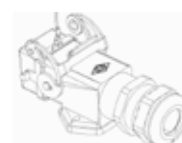


Fig 13.

11. e-clips

The e-clips tool can handle Pandrol e-clips and Pandrol PR-clip.

Depending on the type of clips to be installed, the clutch guide may need to be replaced to match the clip. To replace the clutch guide, 6mm and 10 mm allen keys are used.

The Clutch guide can be ordered at Pandrol AB.
PR clips require special steel.

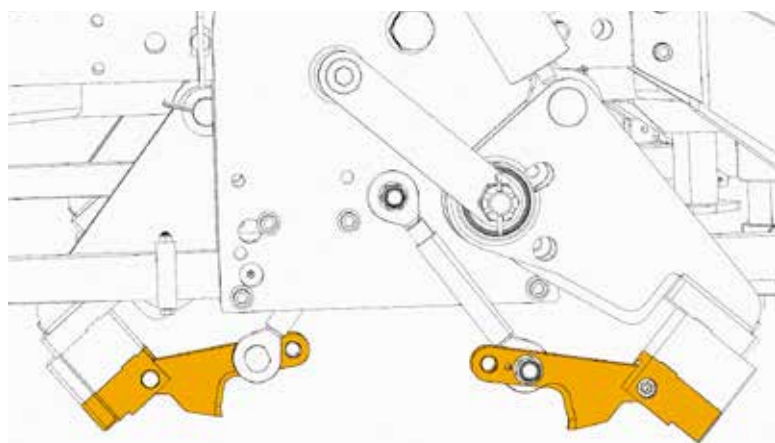


Fig 14. Clutch on e-clips tool



Fig 15. Clutch for e-clips



Fig 16. Requires special tool (PR clips)



Fig 17.

11.1. Adjustment of e-clips tool

The e-clipping tool on the Clip Driver must be adjusted to the e-clip before they can be used. On delivery, the CD300EC is adjusted for the rail inclination specified when ordering the machine, 1:20, 1:30 or 1:40. If the machine is to be run on tracks with a inclination other than the preset, the inclination of the tool must be adjusted to suit the current rail inclination. Failure to adjust the tool properly may result in damage to the tool, machine, and sleeper. Below is an instruction for adjusting the e-clip tool.

11.1.1. Adjustment for inclination

1. Start with adjusting the e-clip tool to the rail inclination. Make sure that the clipping tool slides easily over the frame and that there is a minimum of play sideways between the sliding part and frame.
2. Adjustment is made by turning the adjusting screw to the desired position.

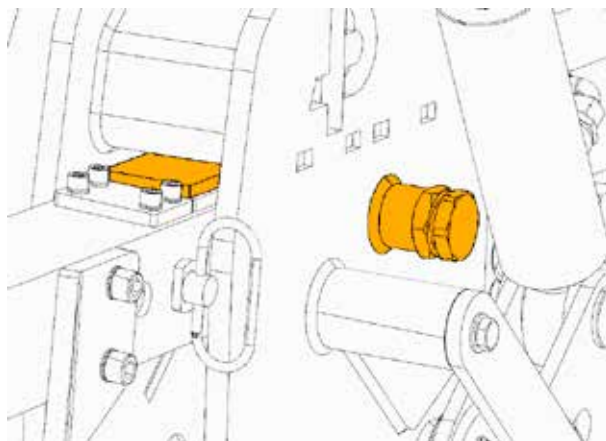


Fig 18. Adjustment for inclination

11.1.2. Adjustment clipping tool

Adjust the clipping clutch by loosening two screws

Carefully close the tool over a properly installed clip to get the tool properly centered.

Adjust the tool

Tighten the screws

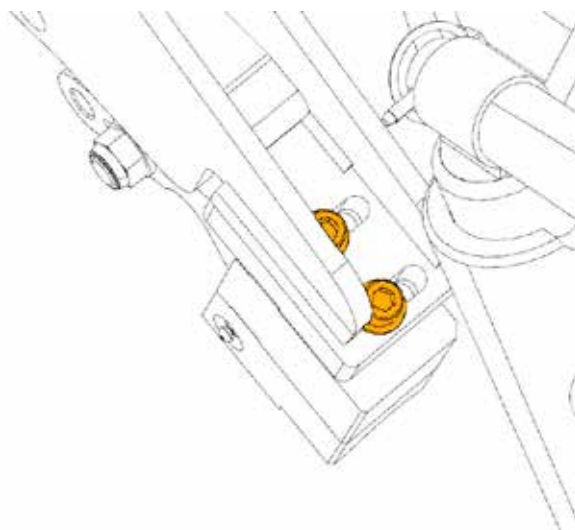


Fig 19.

11.1.3. Height adjustment

Set the correct adjustment depending on the rail, fig. 18. Make sure that all four adjustment points are set the same.

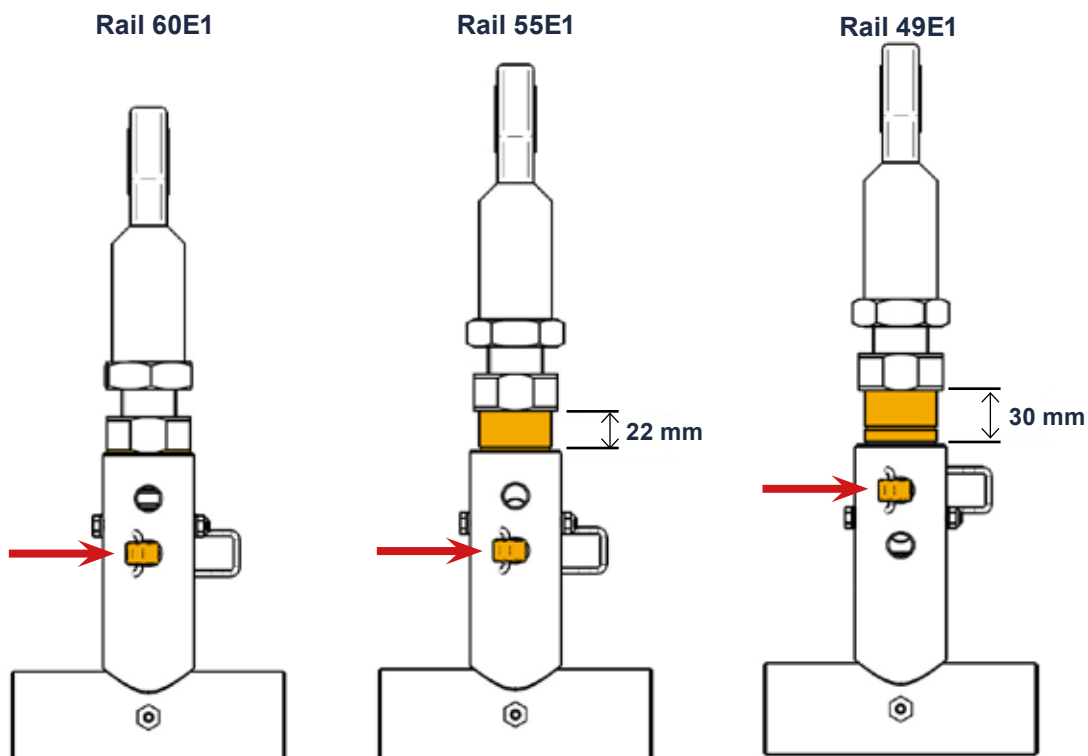


Fig 20.

Fine adjustment can be made if necessary by turning the adjusting screw, fig. 19, to the desired position.

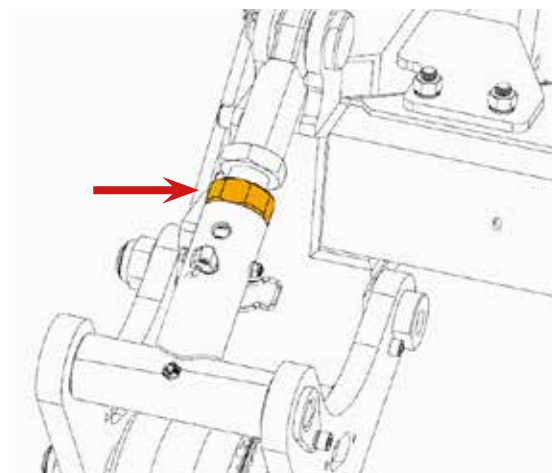


Fig 21.

Figure 20 shows the correct height of the clipping arm in relation to the shoulder. The distance between the clipping arm and the shoulder should be 2 mm.

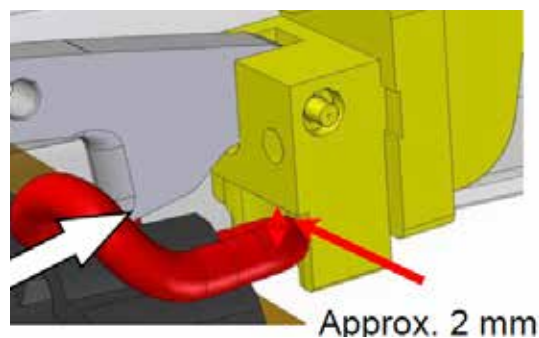


Fig 22. Correct adjustment

1. To adjust the height of the clutch guide, loosen the screw at the top or bottom and turn the link until the tip of the clutch guide is correctly positioned. The tip of the clutch guide should stroke close to the shoulder, (approx. 1-2 mm)

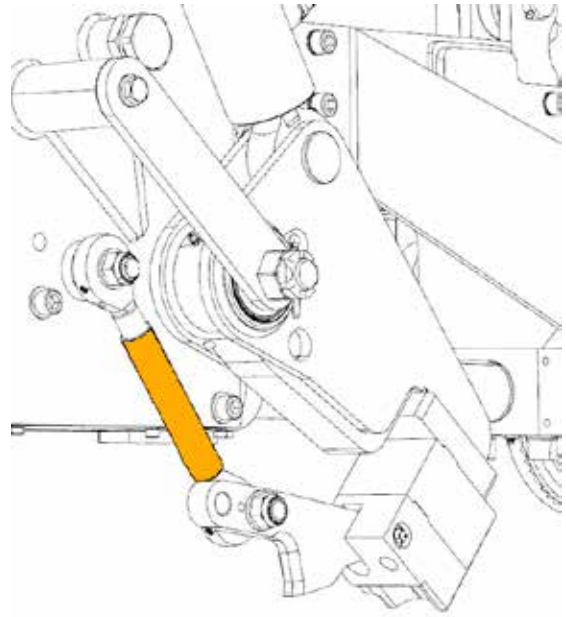


Fig 23. Height adjustment

11.2. Obstacles on track

In the event of obstacles on the track, the tools must be moved to the raised position. The machine can then run the CD300EC over the obstacle.

11.3. De-clipping tool e-clips

The de-clipper is a tool for rapid and efficient declipping of e-clips. The tool does not require any hydraulics. The tool has a collector that prevents the clips from flying off, causing them instead to drop down beside the rail, making collection of the clips easier.

The declipper has three different work positions – parked position and two different positions depending on the rail type. The three different positions are described here.

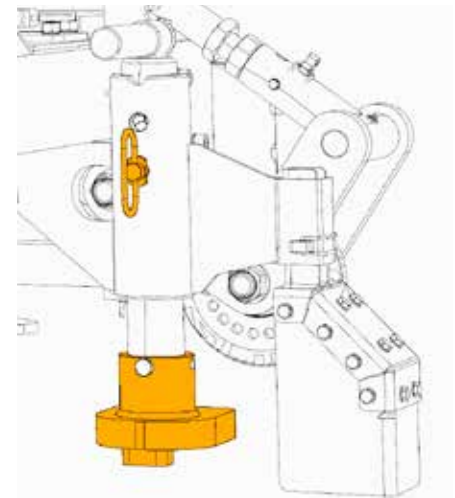


Fig 24. De-clipping steel – facing inwards

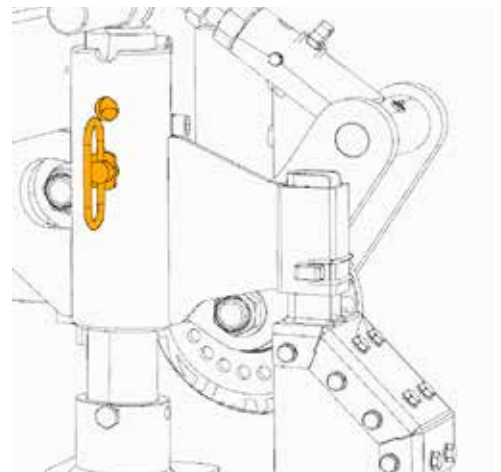


Fig 25. Locking pin in the lower hole

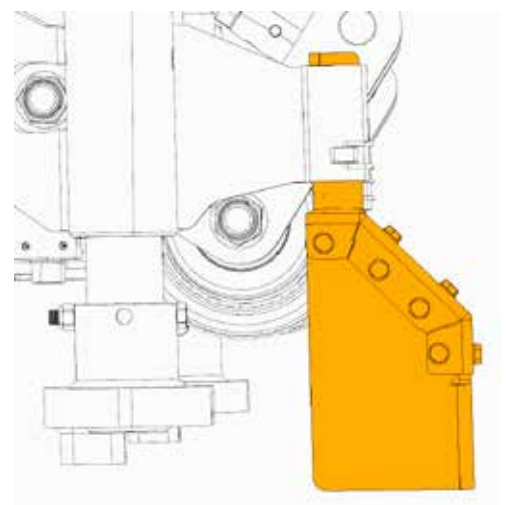


Fig 26. Collector

11.4. Rail type UC60, BV50 or similar

In this position, the declipping pad must be turned in towards the rail and the shaft lock pin must be located in the lower hole. No tools are required to turn the pad. The pad is turned by pulling out the shaft lock pin and then lifting up and turning the rod through 180 degrees. The rod must then be resecured with the shaft lock pin.

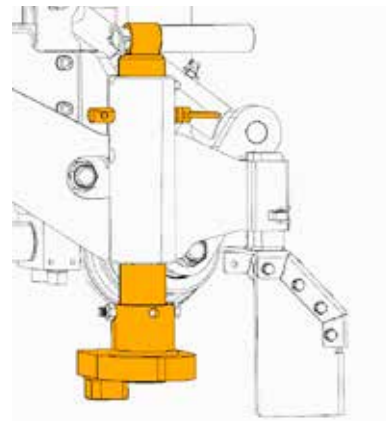


Fig 27.

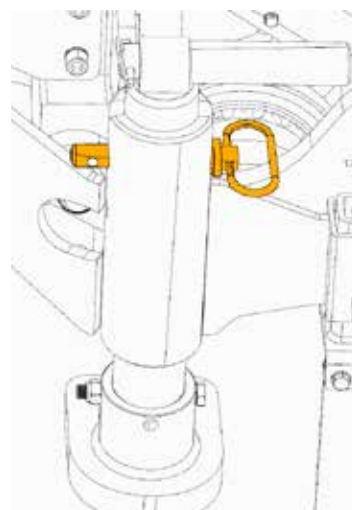


Fig 28.

Parked position

In the parked position, the rod with the declipping pad must be raised to the uppermost position and secured with the shaft lock pin. The collector is placed upside-down.

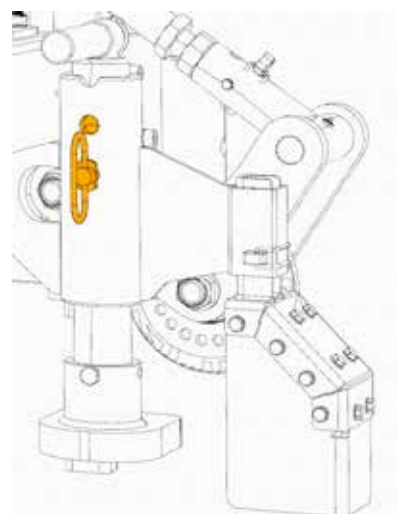


Fig 29.

11.5. Replacing de-clipping pad

The declipping pad can be replaced with a new one if required. The through-bolt is removed with a 10 mm allen key and an 18 mm open-ended spanner. New declipping pads can be ordered from your dealer.

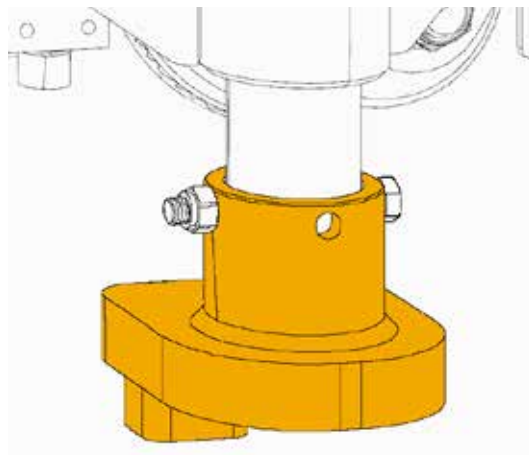


Fig 30. Interchangeable fastening steel

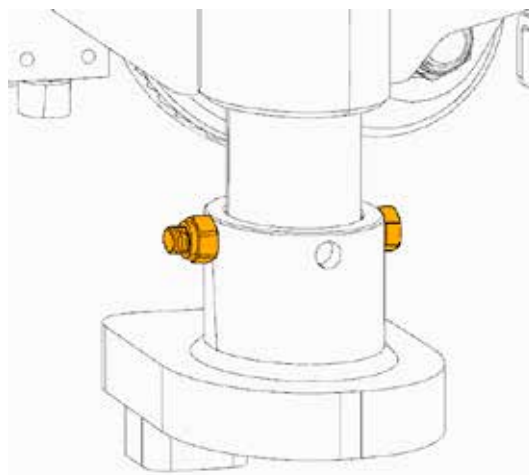


Fig 31. Through bolt

11.6. Protection for e-clips clipping tool (option)

The Clip Driver can be equipped with protective baskets for the e-clips clipping tools. The protective baskets prevent the clip or insulator from flying off in an uncontrolled manner. The protective basket also protects against the risk of crushing injuries. During operation, the safety distance of 3 metres must always be respected.

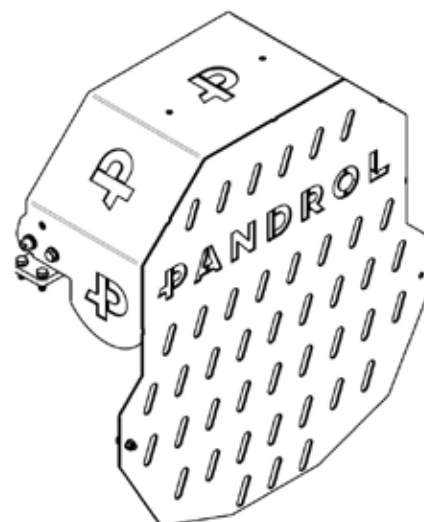


Fig 32. Protective baskets for e-clip tools

11.7. Work in clipping mode

The CD300 EC can be operated in both manual and semi-auto mode. To operate in semi-auto mode the electrical connector must be connected to the carrier machine 24V power outlet.

Operate in manual mode

1. Carry out the preparations specified in chapter “10.1. Preparations” without connecting the electrical connector.
2. Operate the double-acting auxiliary hydraulic function to perform clipping.
3. When the e-clip is correctly installed, operate the auxiliary hydraulic function in the opposite direction to retract the tool to its “home” position.
4. Release the lever/switch.
5. Continue to the next sleeper to fasten the next set of e-clips.

Operate in semi-auto mode

1. Carry out the preparations specified in chapter “10.1. Preparations”
2. Activate and hold the double-acting auxiliary hydraulic function to perform a clipping cycle. The tool will perform clipping and return to its home position automatically when the clip is installed.
3. Release the lever/switch once the tool has returned to its home position.
4. Continue to the next sleeper to fasten the next set of e-clips.

11.8. Work in de-clipping mode

The tool does not require hydraulics.

1. Carry out the preparations specified in chapter “10.1. Preparations ”
2. Remove the clip by driving the machine in the direction of travel. The de-clipping pad will knock the clip out of its position.



WARNING!

**To ensure correct function. The tool must be correctly adjusted.
Improper adjustment can damage the shoulder and machine.**

12. Care and Maintenance

Maintenance and overhaul should only be performed by experienced personnel. Clip Driver CD300EC needs:

- Minor maintenance before each shift.
- Minor maintenance after each shift.
- A more comprehensive review each year.

In the built-in computer system, the times for fastening and fastening are adjusted at the factory. However, in specific cases, the times for clipping and declipping may need to be adjusted slightly to optimize performance. If adjustment is required, contact your dealer.



WARNING! Before carrying out any maintenance or service work on the machine; switch off the carrier machine engine, release the hydraulic pressure by moving the levers manually and disconnect the quick couplers.



WARNING! Personnel working with or close to the machine must wear sufficient protection clothing such as helmet, ear protectors, goggles, protection- shoes, gloves, and clothes.



WARNING! Do not smoke or bring a naked flame near the hydraulic oil system.

Warranty only applies if original parts supplied by Pandrol AB have been used.

12.1. Daily Inspection

Before and after every usage or working shift:

- Check for leaks on hydraulic components and hoses. If necessary, tighten couplers and replace damaged components.
- Check hydraulic couplings by re-tightening every 8 hour up to 80 hours of usage to avoid unnecessary failures or damage to the hydraulic system.
- Check and make sure that all bolts and nuts are tightened. Tighten if necessary. Vibrations can make them come loose. Vibrations can cause them to drop.
- Check that clipping arms. Adjust or replace if needed.
- Check that de-clipping arms are free from damage. Adjust or replace if needed.

12.2. Maintenance Schedule

All maintenance must be carried out by trained, authorised and qualified personnel. Maintenance must be carried out in a safe manner with correct safety equipment and at a location when safety is not compromised by, for example, adjoining rails, over head lines or catenaries, or rail traffic.

Maintenance schedule			Service interval		
Product	Check	Action	Before each use	Annually or every 250 hours	Remark(s)
Tools	Check tools daily for proper operation, leaks, or damage.	Replace faulty and broken components.	X		
Hydraulic hoses/ cylinders	Check the condition of the hydraulic hoses and hose connections.	Replace faulty and broken components.	X	X	
Quick couplers	Keep quick couplers clean and lubricated.	Replace faulty and broken components.	X		
Electrical system	Check for damages	Replace faulty and broken components.	X		
Bolts, nuts, screws and fastenings	Check condition and tightening.	Replace faulty or damaged components. Tighten if necessary.		X	
Shafts and bearings	Check for play Check function	Replace faulty and broken components.		X	
Warning signs and decals	Check that all decals are fitted to the machine in compliance with chapter "Warning Signs".	Replace broken and faded decals. Fit decals missing from the machine. Clean dirty decals.	X		Decals are available through your dealer.
Cleaning	Ensure the Power unit is kept in a clean condition.	Clean using warm water, neutral detergents or degreasing agents. Do not point the waterjet directly at electric components	X		
Entire unit	Check that all functions work properly in the environment in which it is to be operated.	Take remedial measures	X		If necessary, consult with your dealer.
Lubrication	Check functionality	Lubricate according to lubrication chart	X		
Paint	Check for damages	Re-paint damaged components with Pandrol original colour (RAL1004) to prevent upcoming rust.		X	

12.3. Lubrication points

Wheels

Check and lubricate annually when needed. The illustration do not cover all grease nipples. Take grease nipples on both sides in consideration when lubricating.

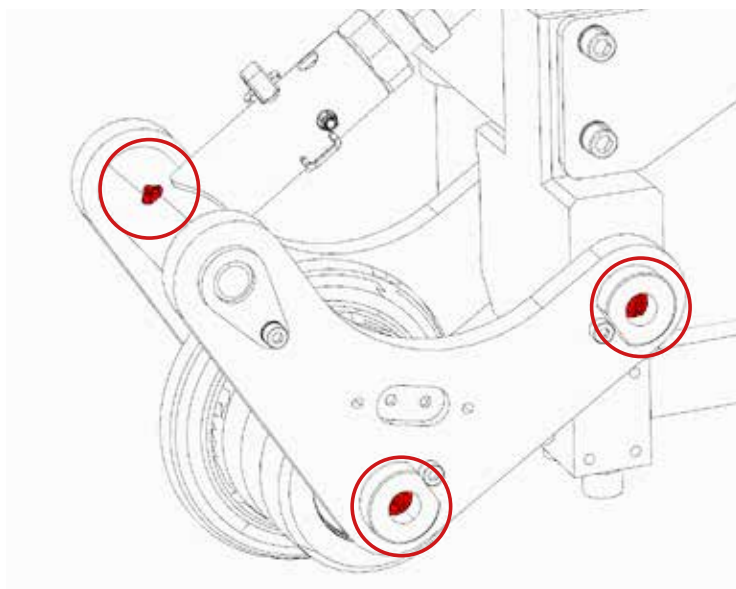


Fig 33. Lubrication at wheel

Tools

Check and lubricate every 8 hour. The illustration do not cover all grease nipples. Take grease nipples on both sides in consideration when lubricating.

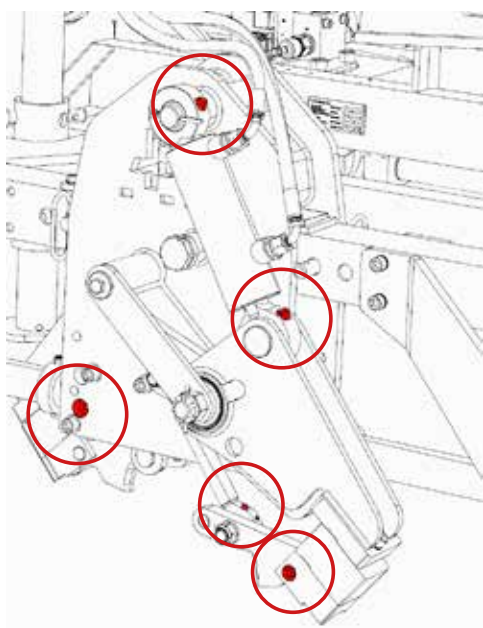


Fig 34. Lubricating tools

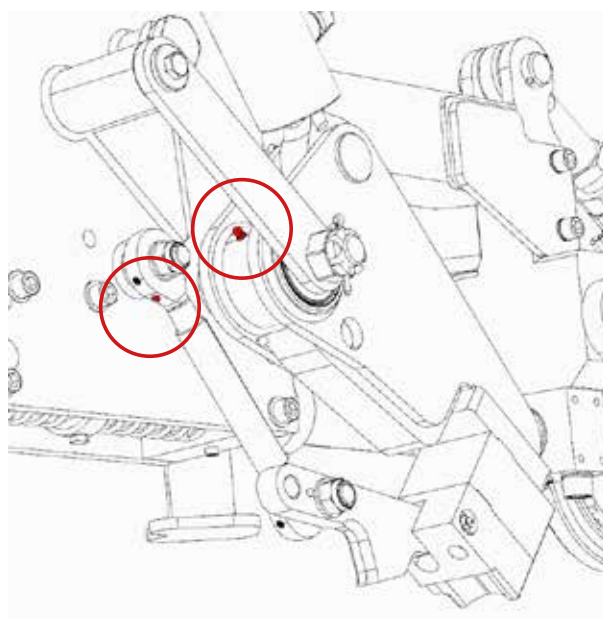


Fig 35.

13. Mounting Torque for Screws & Nuts

The preload force must be maintained at a level where the tensile stress and the intensity of the torsional stress do not exceed the screws yield stress for the specific material. Its main function is to clamp together the assembled parts and produce friction force between the assembled parts.

At Pandrol AB we mainly use steel screws and nuts. The table below shows the nominal tightening torque in Nm for the screws and nuts that are used

These torques do not apply to wheel bearings!

Thread diameter [mm]	Tightening Torque (per bolt grade) [Nm]		
	Grade 8.8	Grade 10.9	Grade 12.9
5	5,7	8,1	9,7
6	9,8	14	17
8	24	33	40
10	47	65	79
12	81	114	136
14	128	181	217
16	197	277	333
18	275	386	463
20	385	541	649
22	518	728	874
24	665	935	1120
27	961	1350	1620
30	1310	1840	2210
33	1770	2480	2980
36	2280	3210	3850



IMPORTANT

Check that all bolts and nuts are tightened at least every 8 hours until 80 hours have been reached. If necessary, use spanner to tighten.

14. Warranty and Service

14.1. Warranty

All products from Pandrol AB are supplied with a 12 month Warranty.

The Warranty is not valid if the indicated defect or fault in the product does not exist or if the fault is the result of a handling error, tampering or non-permitted modification, or if the machine has been exposed to fire, lightning or excess voltage.

14.2. Service

Aftersales support and technical service are available from Pandrol AB, Sweden, during and after the Warranty period. Please contact Pandrol AB.

14.3. Disclaimer

Pandrol AB exempts itself from liability in the event of usage that deviates from that recommended in this manual.

14.4. Contact

Address	Phone	Internet and E-mail
Pandrol AB	+46 (0) 650 165 05	www.pandrol.com
Hyggesvägen 4		info.rosenqvisttrail@pandrol.com
824 35 Hudiksvall		
SWEDEN		

14.5. Declaration Of Conformity

Insert a copy of the Declaration of Conformity in this section.

14.6. Recycling and Environment

Sustainable environment is a great part of Pandrol.
All components of the Power unit can either be:

- Recycled
- Taken care of
- Be re-used



We recommend you to follow your local region regulations of environmental and recycling policies



PANDROL

Find out more at
pandrol.com

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