

PANDROL



CD100 B

USER AND MAINTENANCE MANUAL



ENG_OMM_CD100B_P09

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Partners in excellence



Thank you for choosing CD100!

You are now the owner of a quality product from Pandrol.

The pictures in the manual are for illustration only, the appearance of the machine may vary. This manual aims to help you get to know your new CD100, 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 the machine. 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.

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1. Safety Information

1.1. General

- Read and understand all safety regulations and warnings before installation, operating or performing maintenance on this machine.
- Make sure that no unauthorized personnel are in the operating area during installation, use or maintenance.
- Improper installation of this unit can be dangerous and may lead to mishaps or accidents and could result in personal injury.
- Improper operation of this unit can be dangerous and could result in personal injury or death.
- Improper maintenance of this unit can be dangerous and may lead to mishaps or accidents and could result in personal injury.
- Do not operate this unit until you have read and understood the safety instructions in this manual.
- Do not perform any maintenance on this unit until you have read and understood the instructions in this manual.
- The drive unit is only permitted to be used as a power source for Pandrol manufactured original tools.

1.2. Safety Regulations

- Do not make any alterations to your CD100. Doing that, you could compromise your own safety and expose yourself to a serious accident or injury risk.
- Before each start, perform a general inspection of all parts and make sure that they are not worn, damaged or loose. Also make sure that the tool is dry everywhere and that there is no oil leakage.
- Regular maintenance is required to ensure a safe operation. Keep all nuts and bolts securely tightened.
- The drive unit must be switched off when performing cleaning, control, adjustments, reparations, oil filling and when the unit is being left unattended.
- Attention! Risk for clamping. Be careful with bodily parts around the unit. Risk for injuries.
- Do not use the unit with damaged or worn parts. If parts must be replaced use original parts, please contact Pandrol AB for consultation.
- When the CD100 is used the operator must wear protecting clothes, i.e. long trousers, boots, gloves, ear defenders and goggles or a protective visor.
- To protect the environment, do not dispose oil by pouring it down the drain, in the gutter or on the ground.
- All handling of the battery must be done according to the manual for the battery and battery charger.

1.3. Warning Labels

The warning labels present on the machine are presented below. If any of these warning labels become damaged or lost, they are to be replaced with new original warning labels that are available from Pandrol AB.



Read manual before use
(art. 710016)



Wear safety goggles
(art. 710017)



Wear safety helmet
(art. 710018)



Wear hearing
protection
(art. 710019)



WARNING! Oil
pressure
(art. 710216)



WARNING! Risk
of crushing
(art. 710217)



High voltage
(art. 710018)

1.4. Qualified Personnel

The CD100B with its working tools is only to be used by qualified personnel, thoroughly familiar with and trained in general railway workmanship and operated according to the conditions and standard regulations applying to the track they are working on.

The equipment must be serviced, maintained, or in any way repaired only by qualified personnel who are familiar with both this Operation & Maintenance Manual and have received training and information from Pandrol AB.

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



WARNING! All maintenance and service or other operations on the hydraulic system is to be carried out by qualified personnel.

2. General Description

CD100B is a single person walk behind tool used to install and uninstall Fastclip FE and FCX clips on railway worksites.

The CD100B is designed for installing and uninstalling two clips per cycle and is not able to lift any sleeper or rail. **Due to design, the tool is not able to be used on insulated rail joints.**

CD100B is patented and delivered CE-certified. A machine identification plate is fastened on the Drive unit, refer to Fig. 1. In case the identification plate becomes damaged or lost, please contact Pandrol AB to obtain a new identification plate.

The CD100 B consists of a drive unit (1), a handlebar (2), a fastening tool (3) and a declipping tools (4,5) according to the table below.

Nr	Dercription	Item No
1	Drive unit CD100 B	6000617 (incl. handlebar)
2	Handle bars CD100B	6000618
3	Clipping tool FC / FCX	1100201
4	Declipping tool FC	1100058
5	Declipping tool FE / FCX	5012730



Fig 1. Identification plate

1



Fig 2. Drive unit CD100 B

2



Fig 3. Handlebar

3



Fig 4. Clipping tool

4

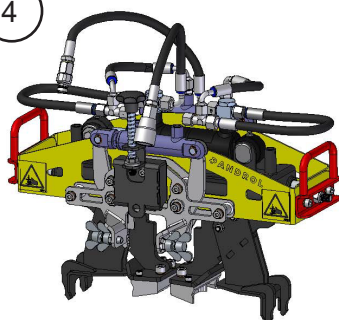


Fig 5. Declipping tool FC

5

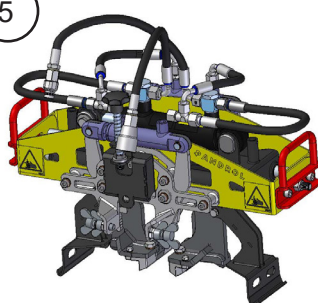


Fig 6. Declipping tool FE / FCX

3. Technical Information



3.1. Technical Information CD100B

The Drive unit is designed as an easy moveable, ergonomically battery driven hydraulic power source. It is designed with a quick connect interface which enables fast and easy connection to the working tools.

The Drive unit is supported by a steel wheel to the rail, which relieves the operator from the weight and thus prevents the operator from wearing injuries. The components of the Drive unit are presented in Fig 7 and the components of the Handle Bar are presented in Fig 8.

Nr	Description
1	Battery
2	Hydraulic connections
3	Wheel adjustment screw
4	Hydraulic tank
5	Direction control
6	Handlebar
7	Handle rod
8	Throttle and locking controls

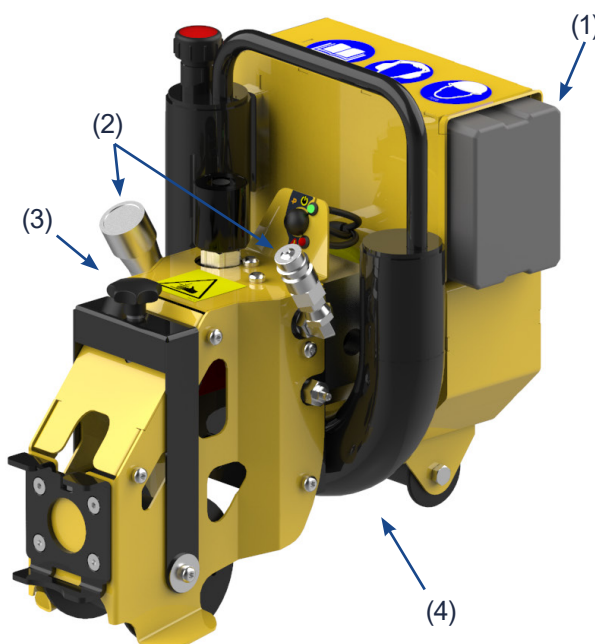


Fig 7.

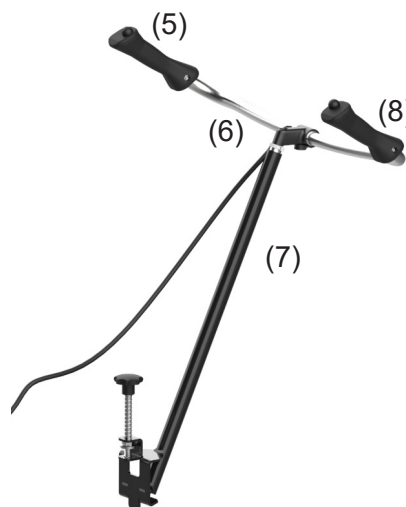


Fig 8.

3.2. Technical Data - Battery Drive unit 6000617

Technical data for the Drive unit (part no. 6000617)		
Description	Specification	
Noise level	Measuring point : Operating condition: Measured vibration emission value:	In operating position Normal operation 79.2 dB (A)
Vibration emission	Measuring point : Operating condition: Measured vibration emission value:	Handle bar Normal operation 1,28 m/s ²
Measurement		
Length	480 mm	
Width	260 mm	
Height	400 mm	
Weight	19 kg	
Packaging dimensions		
Length	580 mm	
Width	390 mm	
Height	450 mm	
Weight	29 kg	
Battery		
Battery capacity	72V DC 6 Ah, 432 Wh, 82V max	
Work capacity	300 clips / charge cycle	
Charge time	45 min (use 82C2/82C1G charger)	
Hydraulics		
Pump	Vivolo XV-OP/0.45	
Max. oil pressure	190 bar	
Displacement	0,45 cm ³ /rev	
Max. engine speed	6000 rpm	
Hydraulic tank volume	1,1 L (1,16 Quarts)	
Hydraulic oil quality	ISO VG 46 or similar	
Hydraulic connectors	Quick coupling (adjustable)	

Above specifications may be changed without notice according to Pandrol AB's requirements.

4. Tools



4.1. Clipping Tool 1100201

The Clipping Tool is an attachment to the Drive unit, ergonomically friendly designed and easy to lift manually. It is based on well-known Pandrol technology and has a quick connect interface which enables fast and easy connection to the Drive unit.

The components of the Clipping Tool are presented in Fig 9.

Nr	Description
1	Locking mechanism
2	Arm
3	Hydraulic connectors
4	Bracket
5	Claws

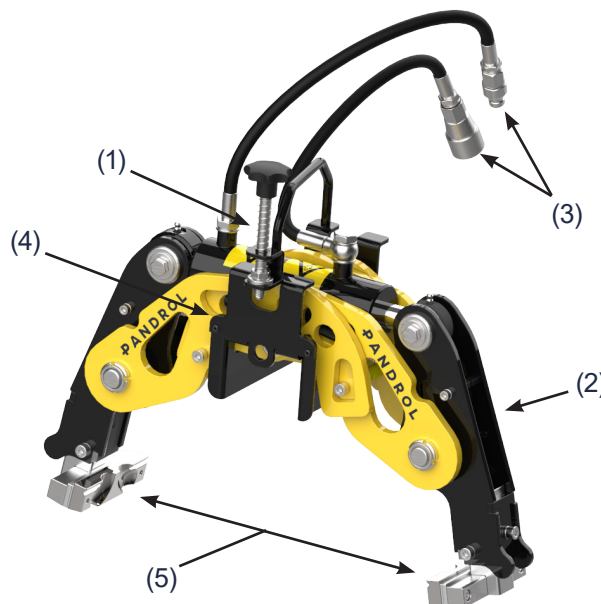


Fig 9. Clipping tool

Technical data for the Clipping Tool (part no. 1100201).

Decription	Specification
Attachment to	Drive unit, part no. 5014188, or Battery Drive unit, art nr 6000617
Capacity	Approx. 10 installations/min
Clips	Pandrol Fastclip
Measurements	
Length	580 mm
Width	210 mm
Height	390 mm
Weight	24 kg
Packaging measurements	
Length	590 mm
Width	240 mm
Height	450 mm
Weight	32 kg
Hydraulics	
Max. working force	33,8 kN
Max. oil pressure	190 bar
Hydraulic cylinder	Double-acting, with spring return
Hydraulic connectors	Quick coupling
Cycle time	6,5 sek

Above specifications may be changed without notice according Pandrol AB's requirements.

4.2. De-clipping Tool - FE / FCX 5012730

The De-clipping Tool is an attachment to the Drive unit, ergonomically friendly designed and easy to lift manually. It is based on well-known Pandrol technology and has a quick connect interface which enables fast and easy connection to the Drive unit. The components of the De-clipping Tool are presented in Fig 10.

Nr	Dercription
1	Hydraulic connectors
2	Clip catcher
3	Arm
4	Locking mechanism
5	Bracket
6	Claw
7	Adjustment screws torsional stiffness

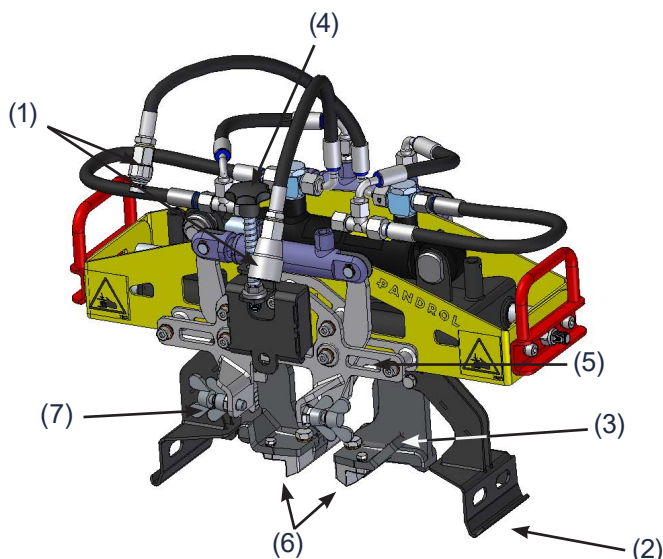


Fig 10. Declipping tool FE / FCX

Technical data for the De-clipping Tool (part no. FE/FCX 5012730).	
Decription	Specification
Attachment to	Drive unit, part no. 5014188, or Battery Drive unit, art nr 6000617
Capacity	Approx. 10 installations/min
Clips	Pandrol Fastclip
Tool Measurements	
Length	560 mm
Width	338 mm
Height	408 mm
Weight	29 kg
Transport packaging measurement	
Length	621 mm
Width	371 mm
Height	450 mm
Weight	40 kg
Hydraulics	
Max. working force	23,9 kN
Max. oil pressure	190 bar
Hydraulic cylinder	Double-acting
Hydraulic connectors	Quick coupling
Cycle time	6,5 sek

Above specifications may be changed without notice according to Pandrol AB's requirements.

4.3. De-clipping Tool - FC 1100058

The De-clipping Tool is an attachment to the Drive unit, ergonomically friendly designed and easy to lift manually. It is based on well-known Pandrol technology and has a quick connect interface which enables fast and easy connection to the Drive unit. The components of the De-clipping Tool are presented in Fig 11.

Nr	Dercription
1	Hydraulic connectors
2	Clip catcher
3	Arm
4	Locking mechanism
5	Bracket
6	Claw
7	Adjustment screws torsional stiffness

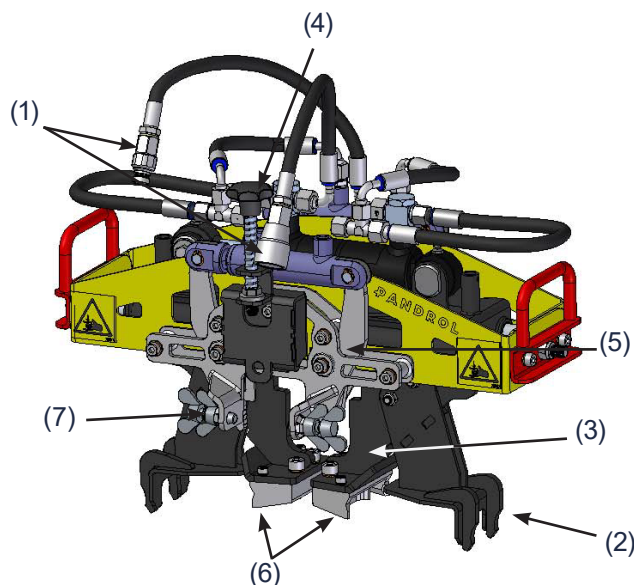


Fig 11. Declipping tool FC

Technical data for the De-clipping Tool (part no. FC 1100058).	
Decription	Specification
Attachment to	Drive unit, part no. 5014188, or Battery Drive unit, art nr 6000617
Capacity	Approx. 10 installations/min
Clips	Pandrol Fastclip
Measurements	
Length	560 mm
Width	270 mm
Height	400 mm
Weight	24 kg (29 kg for 5012730)
Packaging measurement	
Length	580 mm
Width	330 mm
Height	450 mm
Weight	35 kg (40 kg for 5012730)
Hydraulics	
Max. working force	23,9 kN
Max. oil pressure	190 bar
Hydraulic cylinder	Double-acting
Hydraulic connectors	Quick coupling
Cycle time	6,5 sek

Above specifications may be changed without notice according to Pandrol AB's requirements.

5. Transport And Packaging



The CD100B are delivered in a suitable, environmentally friendly wooden boxes. When the machine is not being used or transported, the components shall be stored in their suitable boxes. The boxes are designed as a system easy and safe to transport, store and carry. Follow the instructions in the reversed order when storing the components.

The pictures are for illustration only, the appearance of the machine may vary

5.1. Unpacking The Drive unit

1. Lift the drive unit and the handle out of the box and place it on the ground.
2. Mount and attach the Handle Bar Unit to the Drive unit using the locking mechanism.
3. Attach the Handle to the Handle Bar.
4. Adjust the handles
5. Attach the required tools according to section "6. Setup/Installation".



Fig 12.



Fig 13.



Fig 14.



Fig 15.

5.2. Unpacking The Clipping Tool



Fig 16. Clipping Tool in its storage box

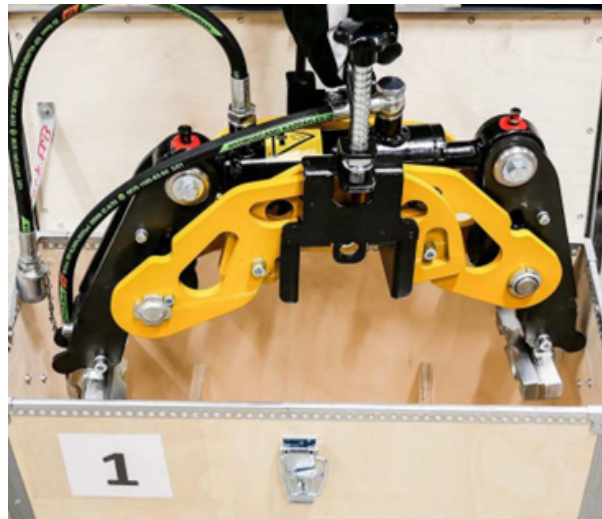


Fig 17. Easy to lift up and to store when not being used.

5.3. Recommended storage conditions:

Store in a dry environment between -25°C and +40°C.

5.4. Electrical/Battery Storage

See battery and charger manual. Do not place the battery in direct sunlight or in a hot or cold environment. Keep it at normal room temperature in a dry environment. When not using the battery for an extended period of at least 2 months, store it in a room temperature environment. Half charge the battery before storing and charge it for 2 hours every 2 months.

5.5. Transportation And Storage Of CD100B

The Drive unit contain a Lithium Ion battery and shall be handled according to local legislations of handling and transporting batteries.

The battery is classified according to UN 3481 standard, meaning that the capacity is greater than 100 Wh. Find detailed battery information in section "9.2. Battery Technical Specification" on page 17.

On-ground transport for private use or transport carried out by an employee or an inhouse company transport service from company site to working site does not require lithium battery mark and ADR.

All transports with a forwarder requires Lithium battery mark and ADR. Always consult your forwarder before the transport is to be carried out. Special terms for air transport of the Drive unit applies. Always contact your forwarder for information.

Remove the battery pack from the tool before storing.

Store and charge your batteries in a cool area. Temperatures above or below normal room temperature will shorten battery pack life.



Fig 18.



Fig 19.

6. Setup/Installation



6.1. Drive unit

Be aware that the Drive unit is delivered without Hydraulic oil



WARNING! Fill up the Drive unit with hydraulic oil according to the manual before starting.

6.1.1. Hydraulic oil (CD100/CD100B)

Fill with new hydraulic oil, quality ISO VG 46 or similar, approximately. 1,1 litres until the oil level is 10 mm up on the oil dipstick. Check the oil level with the oil dipstick.

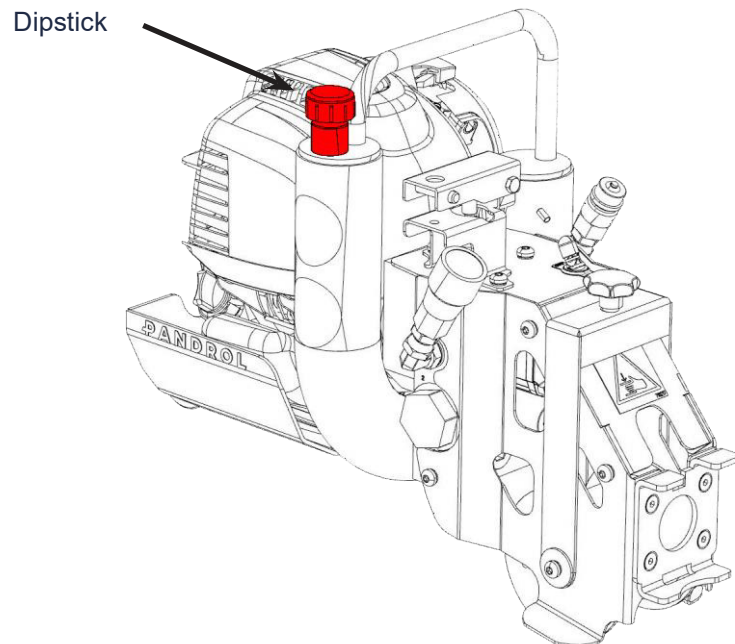


Fig 20.



WARNING!
Check that the hydraulic hoses are clean each time prior to connection.

6.2. Clipping Tool

- Place the Clipping Tool with the arms on each side of the rail.
- Disconnect the Handle Bar Unit from the Drive unit).
- Fasten steering bar to the Clipping Tool using the locking mechanism.
- Fasten the Drive unit to the Clipping Tool. Connect the hydraulic hoses, making sure they are clean before connecting.

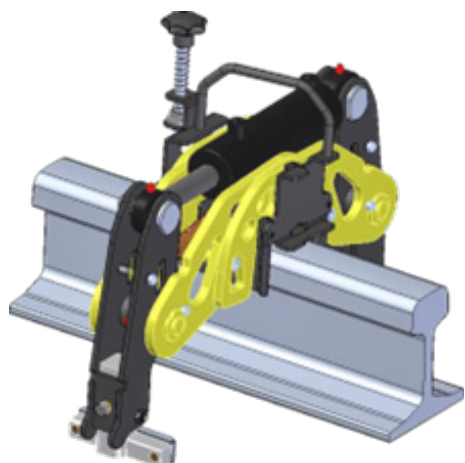


Fig 21.

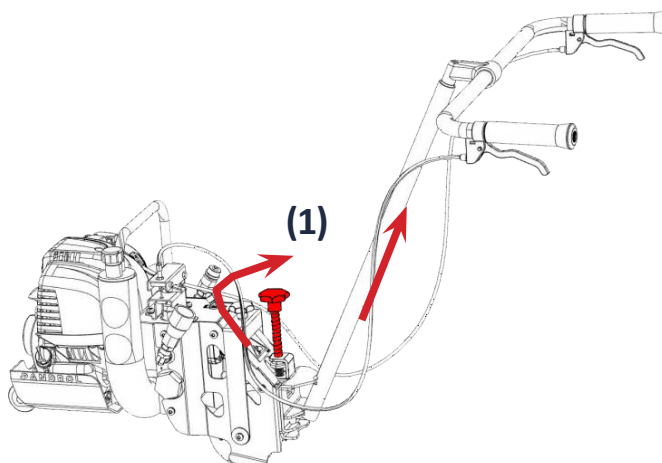


Fig 22.

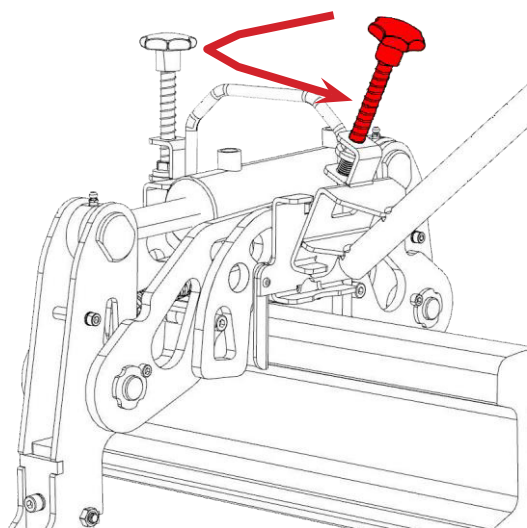


Fig 23.

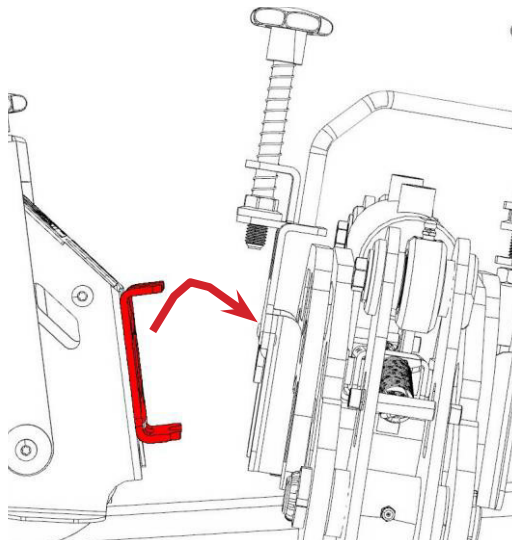


Fig 24.

6.3. De-clipping Tool

- Place the De-clipping Tool with the arms on each side of the rails.
- Disconnect the Handle Bar Unit from the Drive unit (1).
- Fasten the Handle Bar Unit to the De-clipping Tool.
- Fasten the Drive unit to the De-clipping Tool. Connect the hydraulic hoses, making sure they are clean before connecting



Fig 25.

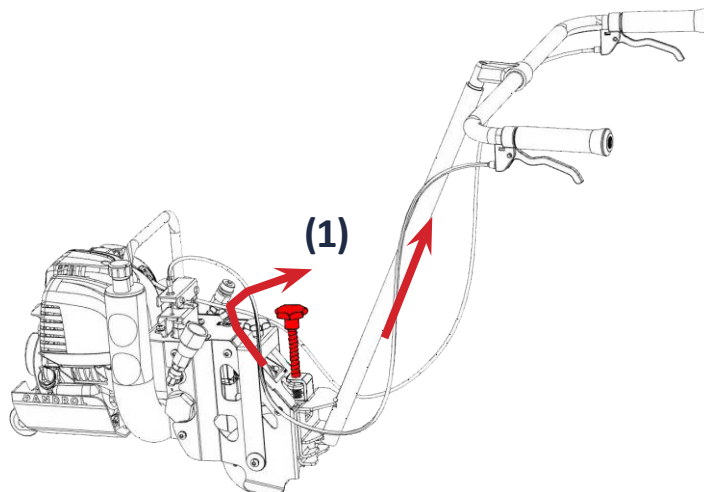


Fig 26.

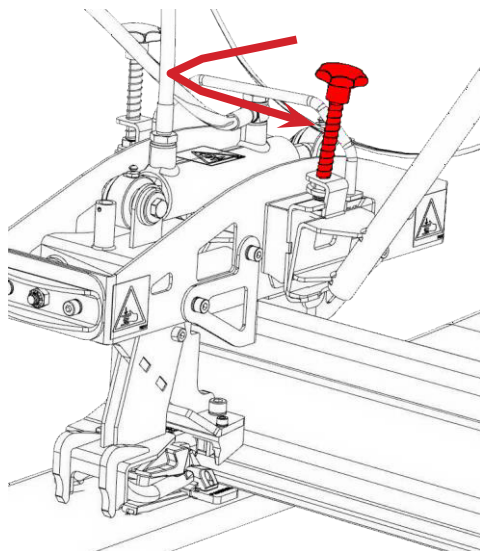


Fig 27.

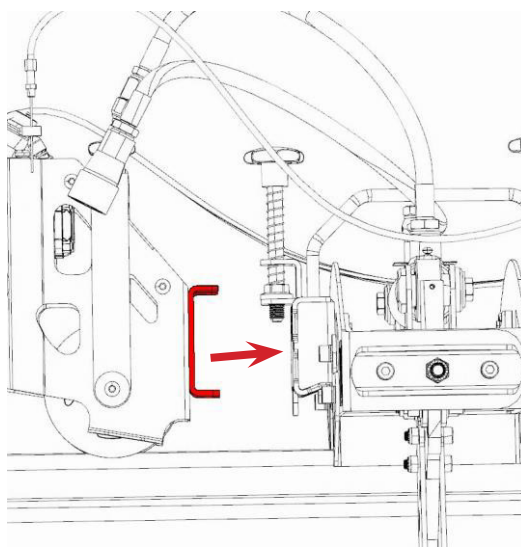


Fig 28.

7. Adjustments

7.1. Adjustments of the Handle Bar Unit

The Handle Bar Unit is adjustable to fit the individual operator.

Adjust height:

1. Loosen screw (1) Fig 29.
2. Adjust the height
3. Tighten the screw

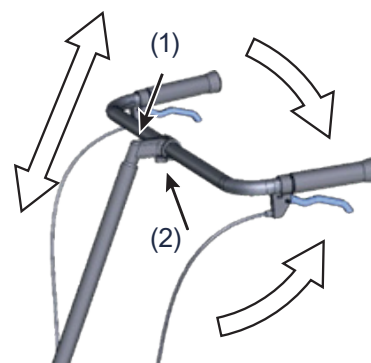


Fig 29.

Adjust inclination:

1. Loosen screw (2) Fig 29.
2. Adjust the inclination
3. Tighten the screw

7.2. Rail Height Adjustments

CD100 can be adjusted to clip and de-clip rail of different heights.

Turn the knob (1), Fig 30 to adjust to correct height.

When correctly adjusted, the work head is in horizontal position according to Fig 30

- Turning the adjustment knob clockwise will lift the work head.
- Turning the adjustment knob anti-clockwise will lower the workhead

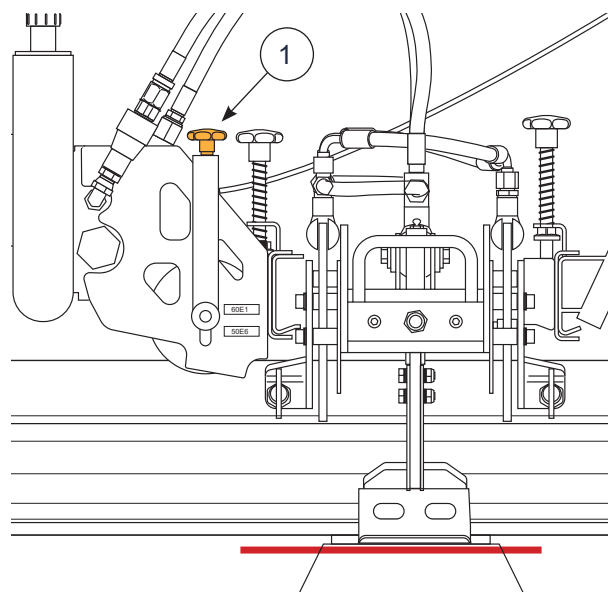


Fig 30. Correct adjustment

7.3. Lift the workhead

If the workhead is too low (Fig 31), turn the adjustment knob (1), Fig 30 clockwise, to lift it to horizontal position according to "Fig 30. Correct adjustment".

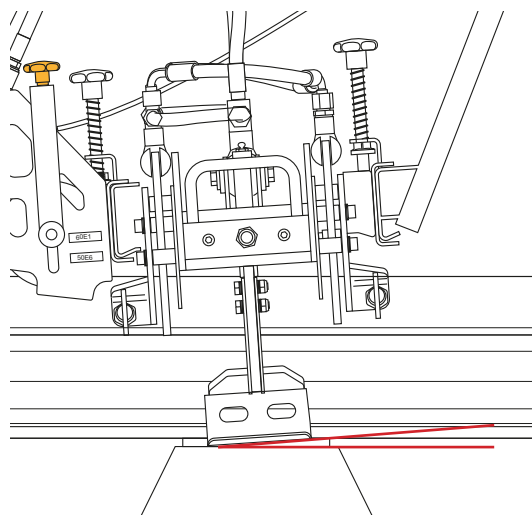


Fig 31. Too low

7.4. Lower the workhead

If the workhead is too high (Fig 32), turn the adjustment knob (1), Fig 30 anti-clockwise, to lower it to horizontal position according to "Fig 30. Correct adjustment".

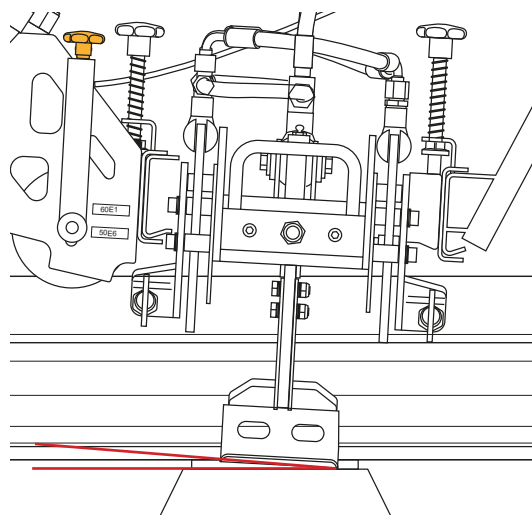


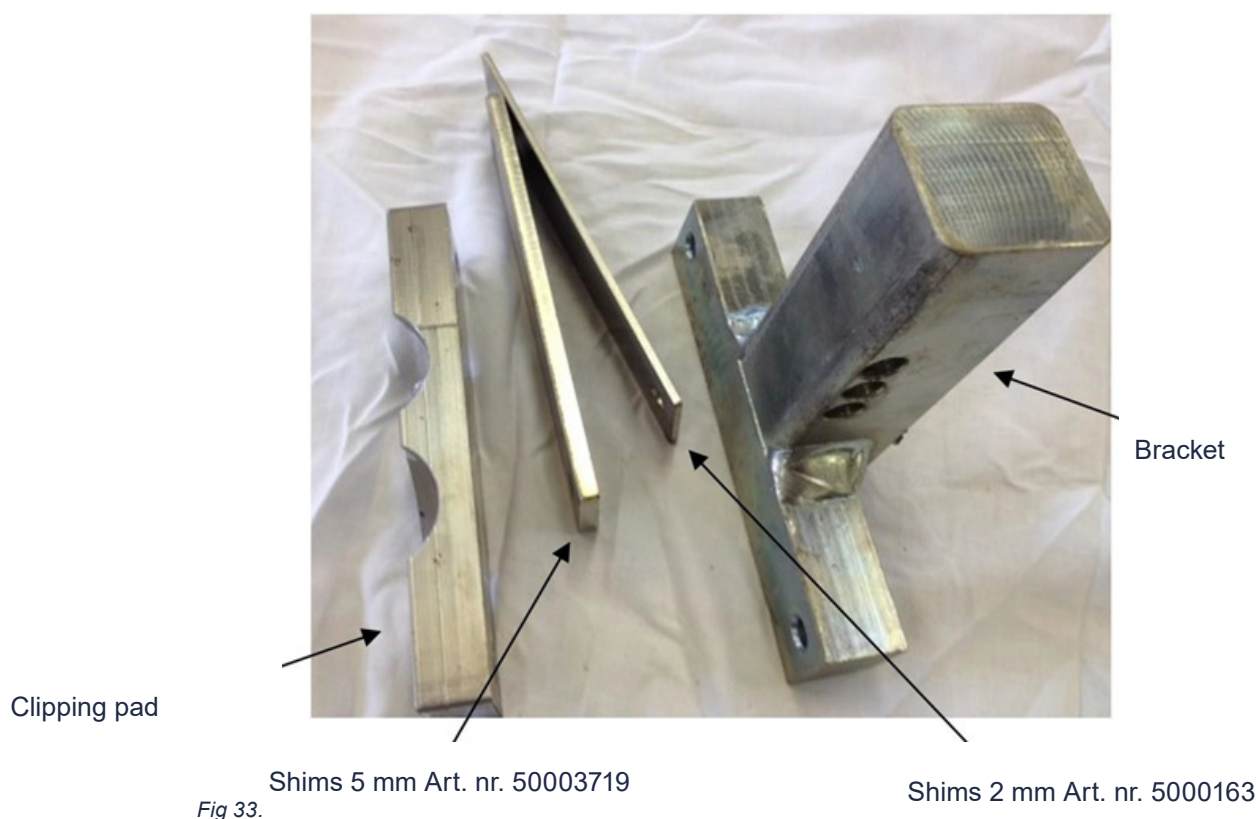
Fig 32. Too high

7.5. Clipping Tool Adjustments

7.5.1. Adjustments For Different Types Of Rail Using Shims

The Clipping Tool is preset for rail UIC 60 and U 50. It can be used with other types of rail as well, however shims may be needed to adapt the machine to the new rail type. Please follow the instructions below and refer to Fig 33 to install the appropriate shims.

1. Ensure that the power pack is OFF.
2. Unscrew the clipping pads and remove them on both sides.
3. Place the shim(s) between the clipping pad and the bracket.
4. Screw the clipping pad back with screws that are adapted to the purpose.
5. Install the first two FASTCLIP.
6. Check that the FASTCLIP is correctly installed. The FASTCLIP must be in the position recommended by Pandrol. Measure its position and compare with documentation from Pandrol Rail Fastenings Ltd.
7. If the clip is not pressed in far enough, place more shim(s) behind the pads on both sides in order to press the clip into the correct position.
8. Check that the installed FASTCLIP has not sustained any damage, either to the clip or the insulator.



WARNING! All adjustments work, overhaul and service must take place with the drive unit switched off and with working tools disengaged.

Above specifications may be changed without notice according to Pandrol AB's requirements.

7.5.2. Adjustments Of Claws

The claws are adjustable in three different positions.

1. Loosen the screws on the lower part of the claws. Those screws are indicated by yellow washers.
2. Set the claws in desired position.
3. Tighten the screws.

PLEASE NOTE: This must be done on both sides of the tool.

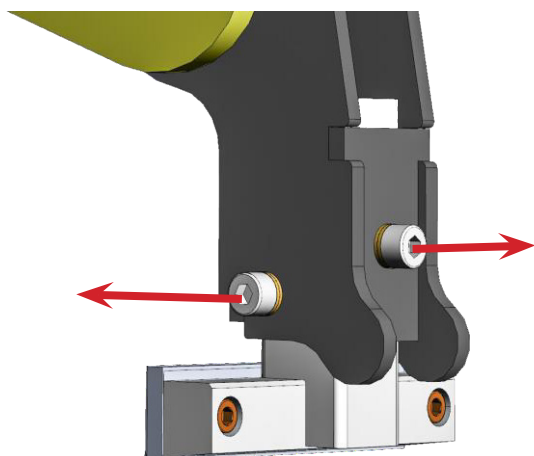


Fig 34.

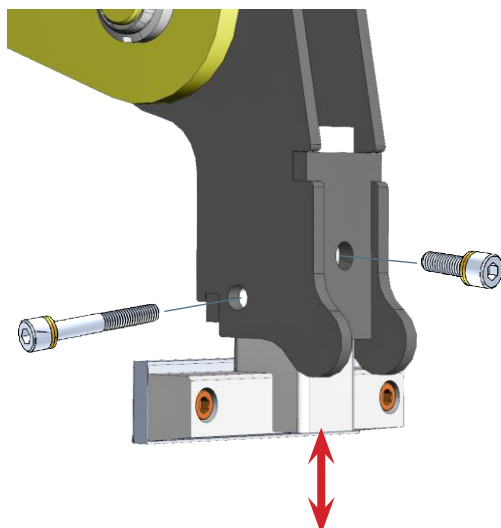


Fig 35.

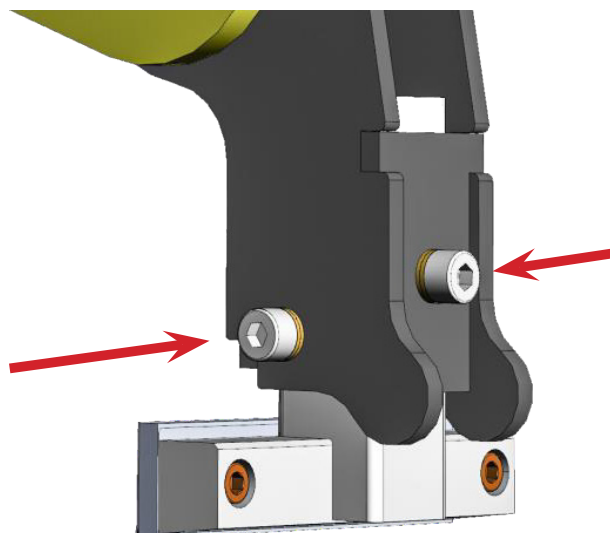


Fig 36.



WARNING!

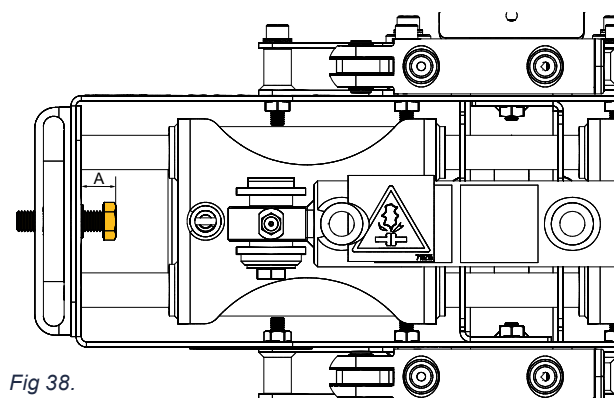
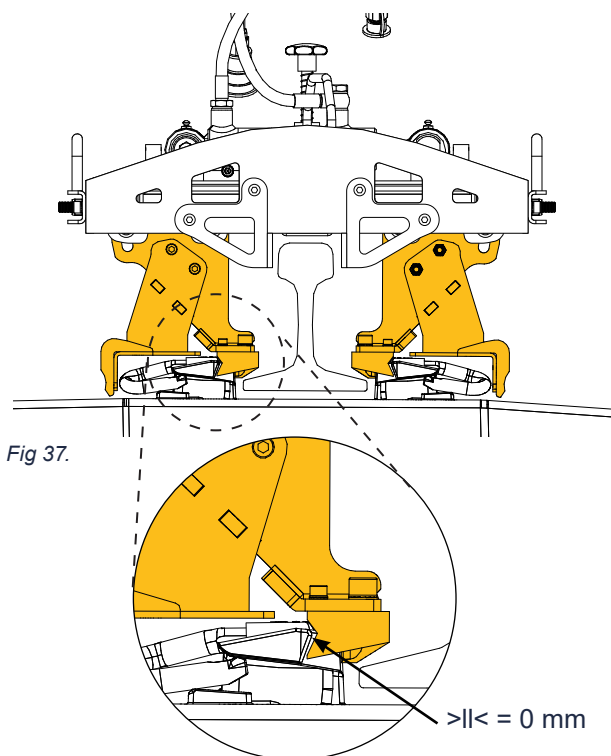
Risk for clamping. All adjustments work, overhaul and service must take place with the engine switched off, cooled and with working tools disengaged.

7.6. FC De-clipping Tool Adjustments

Adjust the declipping tool to have full contact with the shoulder in its outer position, Fig 37.

Adjustment:

1. Set the stop screw distance A, Fig 38 to its minimum.
2. Perform declipping and keep the arms in its outer position. Switch off the drive unit.
3. Screw the stop screw Fig 38 until it touches the bracket. Tighten the nut.
4. Repeat on the other side of the tool.



7.7. FE/FCX De-clipping Tool Adjustments

The FE/FCX De-clipping tool can be set for de-clipping either FE or FCX clips

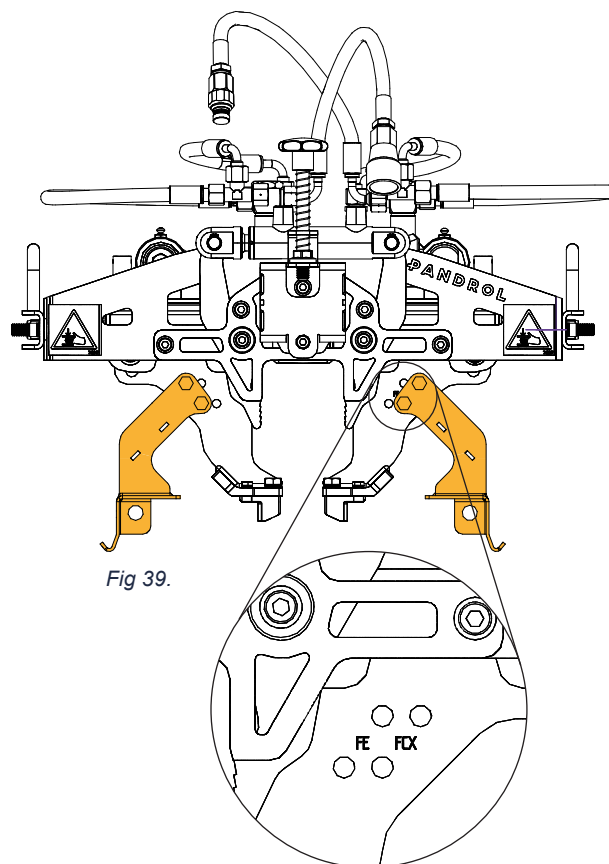
7.7.2. FE/FCX mode

FE mode

Attach the arm to the holes marked FE

FCX mode

Attach the arms to the holes marked FCX



7.7.1. Torsional stiffness adjustments

Adjust the 4 screws (1), Fig 40 to enable good torsional stiffness during de-clipping.

Ensure that there is a gap between the screw end and the rail head. Do not tighten the screws. If the screws are set to tight against the rail head the machine will be hard to operate when along the rail.

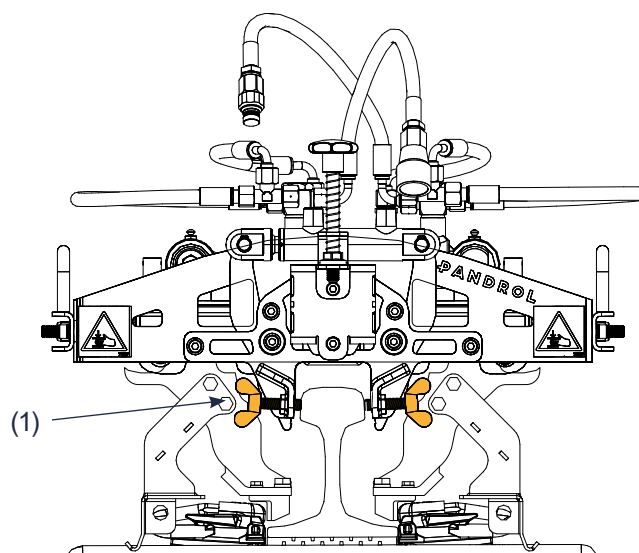


Fig 40.

7.7.3. Adjust the de-clipping arms

To prevent damage to the isolator, the de-clipping arm is adjusted to align with the rail base

Adjustment

1. On a sleeper with clips, carefully operate to perform declipping. Ensure that the arm does not touch the isolator Fig 41.
2. Adjust with the stop screw (1) Fig 42 on each side
3. Perform a de-clipping cycle to verify correct function.

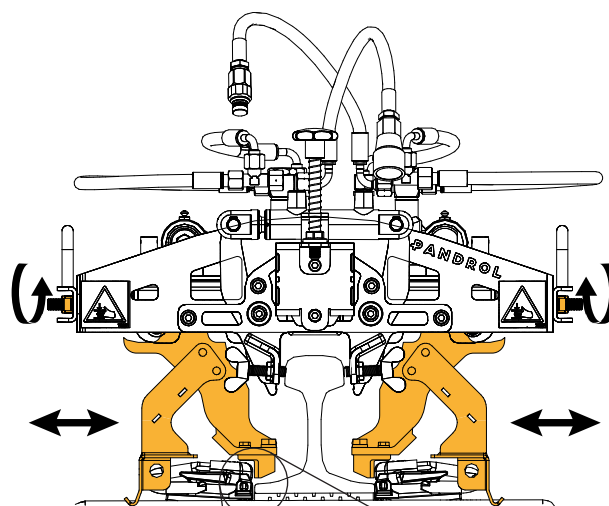


Fig 41.

Align with rail foot →

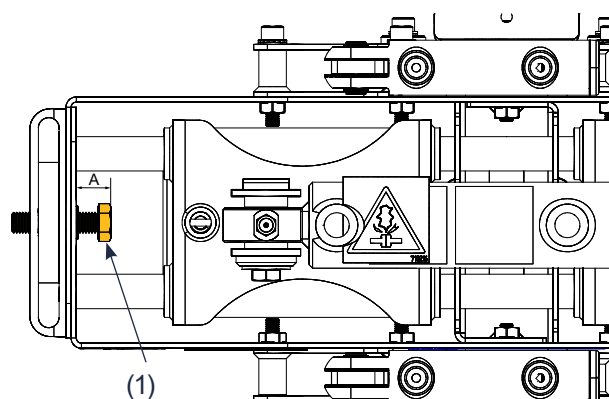


Fig 42.

8. Operation CD100B



CD100B is a walk-behind machine to be pushed by hand.

To operate the Drive unit you always need to have a working tool connected. The working tool is also the parking support on the rail. When not operating the Drive unit and its working tools they are to be stored into their suitable boxes. **The CD100B is designed for installing and uninstalling two clips per cycle and is not able to lift any sleeper or rail. Due to design, the tool is not able to be used on insulated rail joints.**



WARNING! When the equipment is being used the operator must use protecting clothes i.e. long trousers, boots, gloves, ear defenders and goggles or a protective visor.

8.1. Mounting Drive unit/Battery

For instructions on the battery or battery charger, see the respective manuals for the battery and battery charger included with the product.

If you have lost the manuals, please contact Pandrol AB. Read the complete manuals referred to above prior to use.

The battery is mounted by pushing the battery (2) straight in, until a clicked sound is heard. The battery is then locked in position.

To release the battery, press the red button (1).



Fig 43.



WARNING!

Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

8.2. Clipping And Decclipping - Connect Rail To Sleeper

1. Setup the machine on the rail with the arms placed on either side of the rail. Connect the drive unit according to assembly instructions. Connect the hydraulic hoses (make sure that they are clean prior to connection). Ensure that you are using correct claws and arms.
2. Press the button (1) once to power up the drive unit.
3. Press the activation button (3) once to activate the tool.
4. Lift the machine slightly and move the tool along the rail so that the arms are positioned correctly next to the clips.
5. Simultaneously press hold the activation button (3) and the run button (2) to drive the clipping tool motion.
6. Press and hold the run button (2) to return the arms to their original position.
7. Repeat steps 3-5 for the next clip.



Fig 44. Left handle

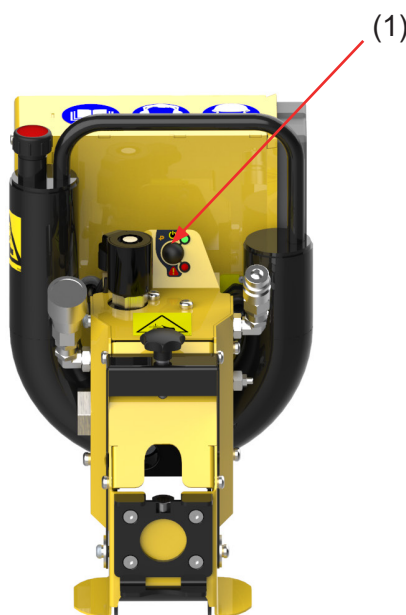


Fig 45. Drive unit



Fig 46. Right handle

8.3. De-Clipping - Disconnect Rail From Sleeper



WARNING! Each time the unit is being used make sure that the hydraulic hoses are clean before connecting them.

1. Setup the machine on the rail with the arms placed on either side of the rail. Connect the drive unit according to assembly instructions. Connect the hydraulic hoses (make sure that they are clean prior to connection). Ensure that you are using correct claws and arms.
2. Press the button (1) once to power up the drive unit.
3. Press the activation button (3) once to activate the tool.
4. Lift the machine slightly and move the tool along the rail so that the arms are positioned correctly next to the clips ("Fig 47.").
5. Make sure there is a space of 1-2 mm between the clips and the claw when positioning the de-clipping pads for an optimal function ("Fig 48.").
6. Press and hold the run button (2) to drive the declipping tool motion.
7. Simultaneously press hold the activation button (3) and the run button (2) to return the arms to their original position.
8. Repeat steps 3-5 for the next clip.

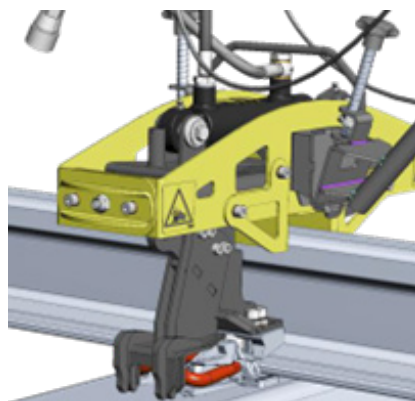


Fig 47.

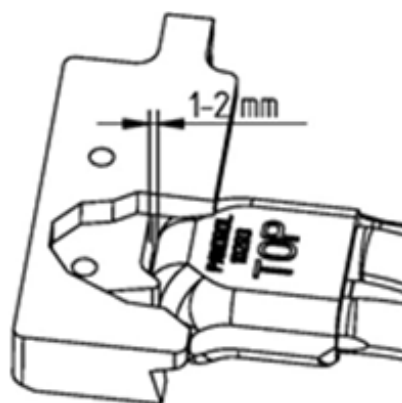


Fig 48.

8.4. Change of tools

1. Turn off the drive unit by pressing the power button (1) Fig 45. and disconnect the hydraulic hoses.
2. Connect the quick couplers together in order to prevent dirt from entering the hydraulic system.
3. Disengage the working tool from the Drive unit.
4. Place the tool back in its suitable box.
5. Install the tool to be used according to chapter 6.2 ,6.3.

8.5. After Operation

1. Turn off the drive unit by pressing the power button (1) Fig 45. and disconnect the hydraulic hoses.
2. Connect the quick couplers together in order to prevent dirt from entering the hydraulic system.
3. Disengage the working tool from the Drive unit.
4. Place the components back in their suitable boxes.



WARNING! The drive unit must be switched off before disengaging the working tool.

9. Emergency operation



In case of emergency and if the de-clipping arms are in their inner position.

1. With a distinctive grip, lift the CD100 off the rail. The springloaded arms will open to enable the tool to come off.
2. Place the CD100 in a safe position from the rail.

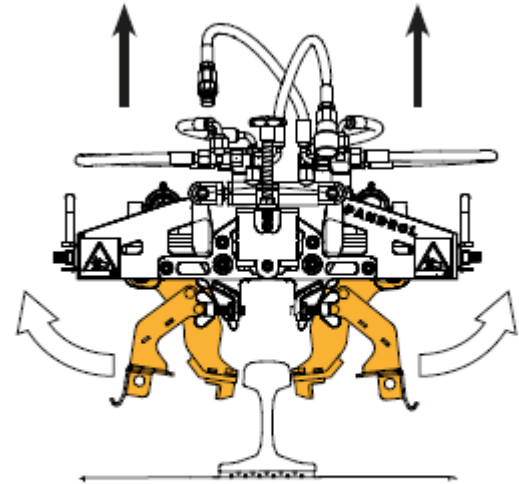


Fig 49.

10. Maintenance



WARNING! All maintenance and service are to be carried out by qualified personnel only.

CD100D is designed for the absolute minimum of maintenance. All its components have been chosen for a long working-life and high quality.

The machine requires:

- A minor maintenance before and after every working shift
- A more comprehensive overhaul after 100 hours

Warranty is based on parts and spares delivered by Pandrol AB.



WARNING! All adjustments work, overhaul and service must take place with the engine turned off, cooled down and with working tools disengaged. Failure to do so could lead to fatal injury.

10.1. Drive unit

Item	Service	Frequency	
		Daily Inspection	Once per year or every 100 hour
Hydraulic oil	Check level (10 mm up on the dipstick)	X	
Hydraulic oil	Oil change		X
Entire unit	Check for oil leakage	X	
Screws and nuts	Check/tighten if needed	X	
Bolts	Lubricate with oil spray*		X
Drive unit, battery	Make sure that the unit is free from damage See Battery manual	X	X
Battery	See Battery manual	X	X

*) CRC 5-56 or similar

10.2. Clipping And De-clipping Tools

Item	Service	Frequency	
		Daily Inspection	Once per year or every 100 hour
Screws and nuts	Check/tighten if needed	X	
Entire unit	Check for oil leakage	X	
Locking mechanism	Lubricate with oil spray*		X
Hydraulic cylinder	Lubricate with grease**		X
Bolts	Lubricate with oil spray*		X
Sliding bearings	Lubricate with grease**		X

*) CRC 5-56 or similar

**) SKF LGEP2 or similar

10.3. Lubrication points

10.3.1.Clipping tool

(Also on the other side)

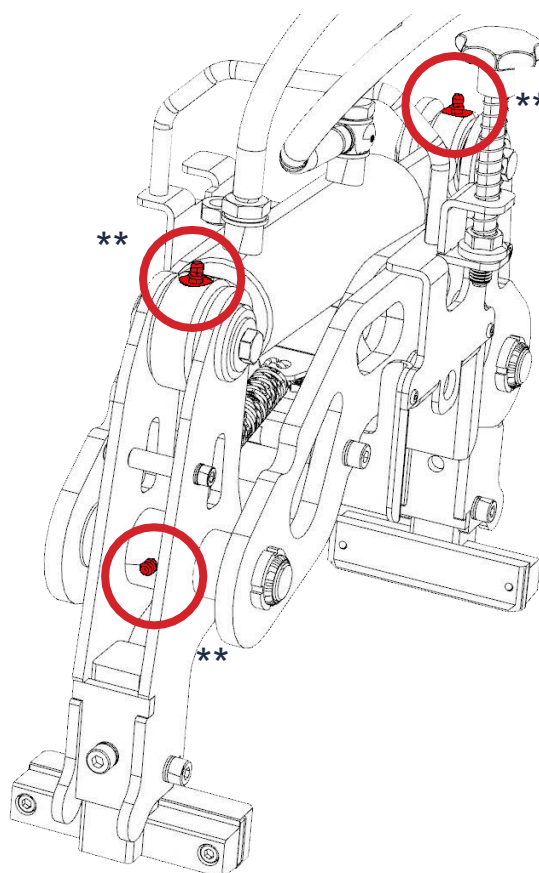


Fig 50.

*) CRC 5-56 or similar

**) SKF LGEP2 or similar

10.3.2.De-clipping tool

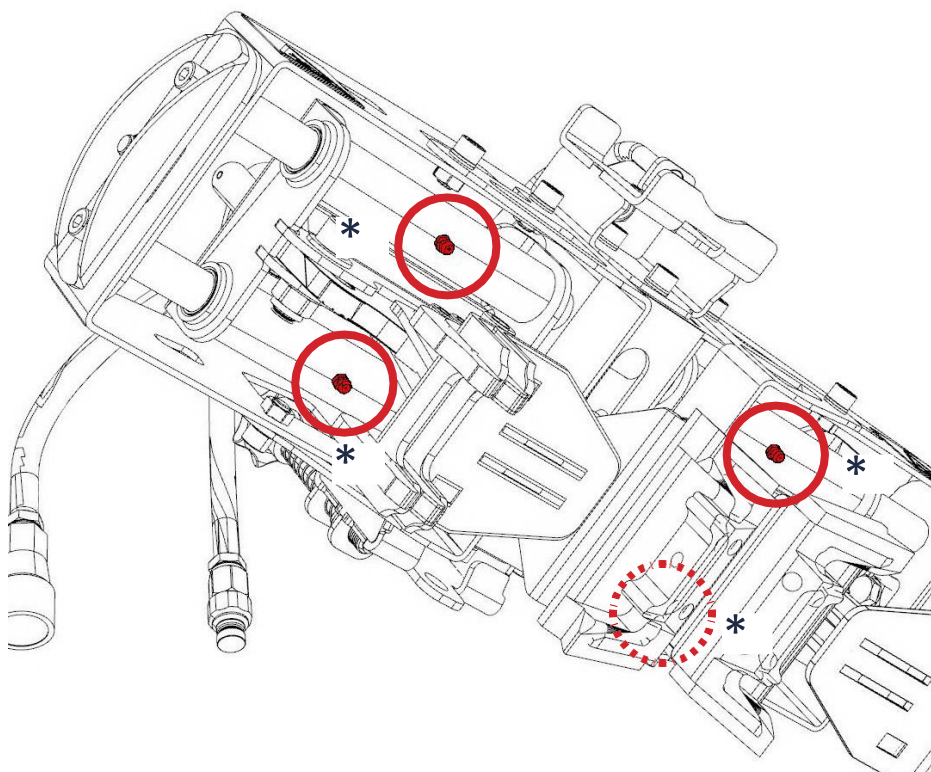


Fig 51.

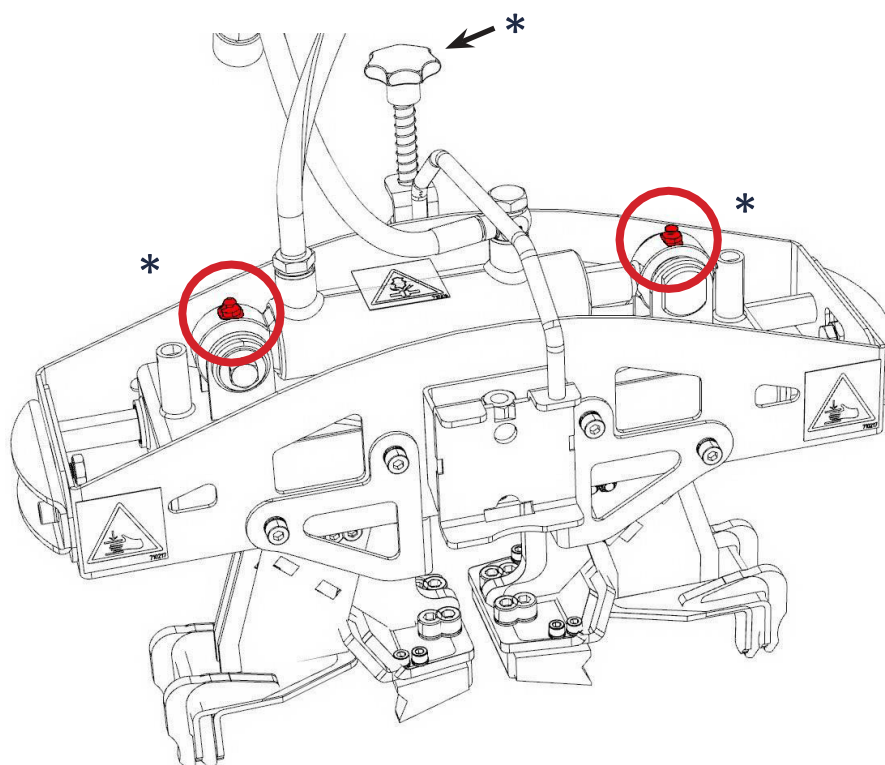


Fig 52.

11. Mounting Torques

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	Tightening Torque (per bolt grade) [Nm]		
[mm]	8.8	10.9	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.

12. Warranty And Service



12.1. 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.

12.2. Service

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

12.3. Disclaimer

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

12.4. Contact

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

12.5. Declaration Of Conformity

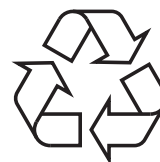
A declaration of conformity is attached (CE certification). The declaration is a proof that the tool is CE approved.

12.6. Recycling and Environment

Sustainable environment is a great part of Pandrol. All components of the Drive 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



12.7. Disposal Of Battery

At the end of their useful life, discard batteries with due care for our environment. The battery contains material which is hazardous to you and the environment. It must be removed and disposed of separately at a facility that accepts lithium-ion batteries. This product must not be disposed of with normal household waste. Should you find one day that your product needs replacement, or if it is no further use to you, do not dispose of it with household waste. Make this product available for separate collection.





PANDROL

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