PANDROL

CD200 IQ

OPERATION AND MAINTENANCE MANUAL

ENG_OMM_CD200IQ_P04

2023-09-22

Partners in excellence

Table Of Content

Thank you for choosing CD200IQ! You are now the owner of a quality product from Pandrol.

1. Preface

This manual aims to help you get to know your new CD200IQ, 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.

Revision	Date	Comment
P01	2020-11-27	New manual
P02	2022-05-02	Updating hydraulics
P03	2022-09-23	General update
P04	2023-09-22	General Update

2. Introduction

2.1. General

The purpose of this manual is to provide the owner and its users with the essential knowledge for carrying out routine maintenance procedures necessary for the proper working of the machine and for the purposes for which it is intended. All the information contained in this manual must be READ and UNDERSTOOD before undertaking any attempt to maintain the machine.

It is recommended that maintenance/overhaul is performed by qualified personnel from Pandrol AB or personnel that have been trained by Pandrol AB. The manual referrers to a fully equipped CD200 IQ, some of the tools are optional and this particular machine may miss a few of the features.

Read the safety instruction in the user manual and shut off the machine before performing any maintenance. See chapter “Start and Stop” in the operator´s manual

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.

Any adjustments or service on the machine only allowed to be done by qualified personnel that have read and understood this manual and have had training and information from Pandrol AB.

A copy of this manual must be kept with the machine at all times as it provides essential maintenance and safety information, and details the mandatory requirements for the general use of the machine.

In case of replacement of spare parts, always use Pandrol original spare parts to ensure that the machine fulfil the correct safety requirements at all times. Incorrect spare parts will affect the warranty of the machine.

To ensure that correct oils and grease are being used, see chapter “Technical Specifications” in the operator´s manual for information of oil and grease specifications, volumes and colour coding.

This manual is written according to the RIS-1530-PLT standard.

Training on how to use and work with the CD200IQ can be found on our YouTube channel, ”Training CD200IQ”.

2.2. Safety Actions Prior to Working on the CD200 IQ

- Prior to transportation, ensure that the pathway is free of obstructions or trip hazards..
- When lifting or carrying machinery or equipment, adhere to the permissible per-person lifting weight. It is the responsibility of the operating company to ensure that the national safety regulations and guidelines of the trade associations in the respective countries are observed.
- Ensure that a risk assessment has been carried out and that the following aspects with regard to operators and the transport task have been considered: – Frequency of transport – Age – Gender – Operator's state of health – Uneven flooring – Poorly lit worksites – Bad weather – Working under time pressure – etc.
- Observe the relevant guidelines on lifting and transporting heavy machinery or equipment.
- Mechanical aids to lifting are always the preferred method of handling where possible, e.g. hoists, tail lift, rail trolleys et
- Your Safety and the persons who work with you are within your responsibility.
- Read and understand all safety regulations and warnings stated both in the operator manual and in this manual before any installation, operating or performing maintenance on this machine.
- Locate the emergency stop button before installation, operating or performing maintenance on this machine.
- Only qualified personnel are permitted to operate the machine during operation.
- The machine is never to be used as a transport vehicle for personnel or equipment.
- The machine is not to be used to recover other vehicles or equipment.
- Make sure that no unauthorized persons are located within the operating area during installation, use or maintenance.
- Safety regulations regarding authorized personnel within the operating area of the CD200 IQ are valid for this attachment.
- Improper operation and maintenance of this equipment can be dangerous and could result in personnel injury.
- 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).
- It is of great importance that all service, component replacements or other operations in the electronic or hydraulic systems are accomplished by Qualified Personnel only. And that only original spare parts are being used

- The use of solvents as cleaning agents and the use of lubricants can involve health and/or safety hazards. The manufacturers of the solvents and lubricants should be contacted for safety data. The recommended precautions and procedures of the manufacturers should be followed.
- Personal protection clothing and eye protection must be worn when undertaking work. Read chapter 2.6 in this manual for detailed information of protection clothing.
- When placing CD200IQ on track, choose a suitable place with as little interfering obstacles and with as firm and flat ground as possible. If the permissible per-person lifting weight is exceeded when lifting or carrying, there is a risk of injuring muscles, tendons, joints or bones.
- Ensure that the road to the workplace is safe and free from interfering obstacles to avoid accidents.
- The modules should only be manually handled in an emergency situation. Always use the handles to lift the modules. Always use two hands and address the modules symmetrically. Do not twist the spine when handling. Do not carry any of the modules more than 3 meters without a rest, or without using a mechanical aid. Contact your Health and Safety Advisor for more information.

2.3. Safety Equipment

The machine is to be equipped with safety equipment according to national requirements. The CD200IQ control system is designed to supervise the machine in a safe way to avoid damage or injury to the machine or a person.

Text within brackets ( ) refers to number in figure unless otherwise specified.

The machine is equipped with one emergency stop button (1).

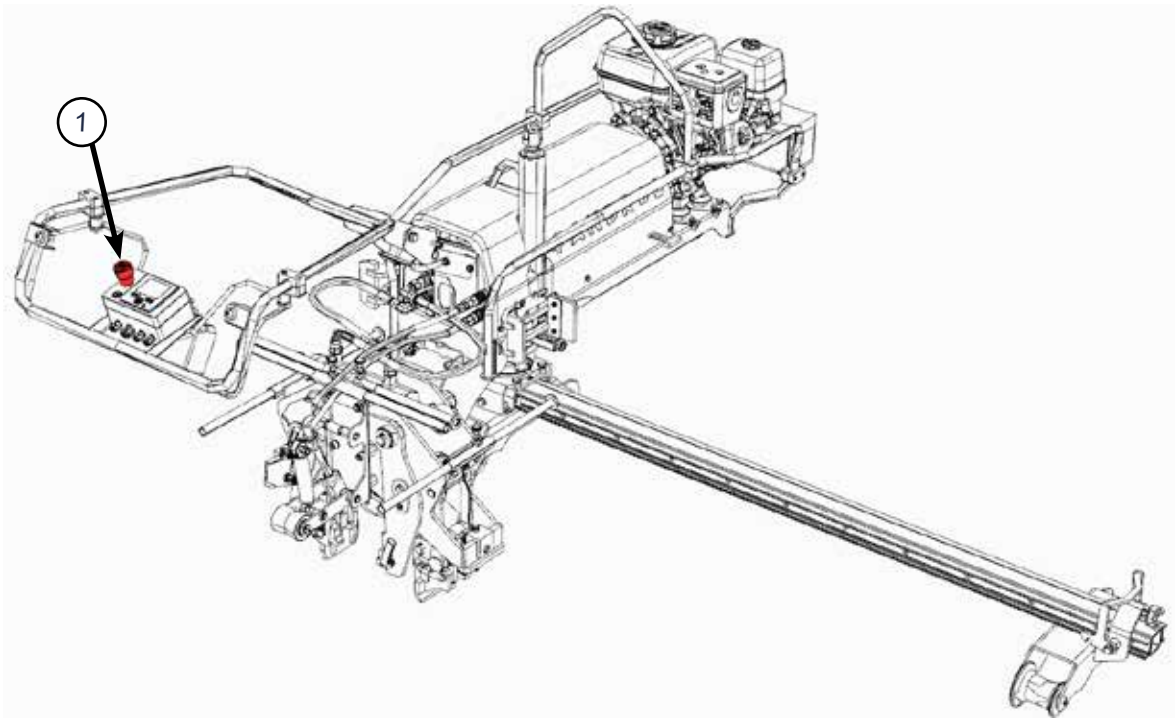

Fig 1. Emergecy Stop button

Pos.	Description
1	Emergecy Stop

1.1.1 Control System

The control system of the CD200 IQ is configured to avoid simultaneous operations that could cause damage to the vehicle or equipment or injury of personnel.

2.4. Safety warnings

1.1.2 Moving Parts

WARNING! – Risk of crushing.

During operation, parts of the machine are moving. Moving parts can cause serious personal injury. To avoid accidents, follow the guideline below:

- Keep away from the machine and moving parts when operating the machine.

1.1.3 Pressurised Hydraulic Oil

WARNING! – Pressurised hydraulic oil

Hydraulic oil under high pressure is present in the hydraulic system. Fluids under high pressure are dangerous and can cause serious personal.

To avoid accidents, follow the guidelines below:

1. Always shut off the engine before carrying out any maintenance work. See chapter “Start and stop” in the operator´s manual.
2. Always wear appropriate personal-protection according to chapter 2.6 in this manual.

1.1.4 Live Current

DANGER! – Live current

High voltage live current is very dangerous and can cause serious injury or death of a person. Contact with electric parts can damage the equipment if live current is present.

Always ensure that there is no live current present in the power lines or the third rail!

1.1.5 Vehicle in Operation

DANGER! – Machine in operation

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

To avoid accidents, make sure that no unauthorized personnel are within 5 meters of the machine when operation is started.

1.1.6 Danger due to unergonomic operation

WARNING!

With some activities there is a risk of injuring muscles, tendons, joints or bones if the necessary caution is not exercised with the controls. Avoid adverse movements and poor posture. Avoid static postures of the thumb and hand when using the controls.

1.1.7 Danger due to manual handling

WARNING!

To decrease the footprint of the machine on the transportation vehicle the trolley can be manually handled and then put on track and the rest of the machine put on top of it using a crane/hoist. This is the only permitted manual handling in the normal course of events. Alternatively it can be left on the machine and it can all be mechanically handled.

In an emergency the machine could be manhandled off the track as a whole unit (poerpack/ tool) by 8 people. In the event of lifting equipment failure ONLY it can be broken down into modules.

1.1.8 Danger due to noise

WARNING!

Risk of permanent damage, particularly to hearing, if the user does not continuously wear suitable hearing protection. Wear hearing protection. See noice data in section 3.3.

1.1.9 Danger due to vibration

WARNING!

The transmission of vibrations to the human body is harmful to health. Wear padded gloves. Include other vibration-free activities with mainly vigorous use of the muscles during the work process. See vibration data in section 3.3.

2.4.1. Operator leaving the machine unattended

When the operator leave the machine unattended, the machine must always be parked horizontal on the ground. If the machine is placed on the rail the clipping tool shall rest on the ballast or sleeper. This is to avoid the risk of the machine to tip over or uncontrolled movement along the track.

1.1 Battery Precautions

- Maintenance tasks or repairs on batteries must NOT be carried out when the battery is on charge or being discharged. Before commencing any work on the batteries, ensure that the power has been switched OFF and that the battery is ISOLATED and not being charged.
- The gases generated by a battery on charge are highly inflammable. Keep flames away from batteries. Do not smoke in the vicinity of batteries. Where a battery is found to be or is suspected to be overheated, extreme caution should be taken to prevent ignition and ample time must be allowed for the dispersal of the gases.
- Metal parts of a battery are LIVE. Use insulated spanners on battery connections. Never place tools or metal objects on the batteries.
- To avoid short circuits when removing the battery, cables in the battery box should be tied back and insulated after being disconnected.
- Take care to keep electrolyte away from eyes, skin and clothing. Protective clothing and goggles must be worn during ALL battery repairs.
- If electrolyte enters the eyes it should be washed out immediately with the specified irrigation fluid using either an eye sachet or a bottle with an eye irrigator bath. For skin burns the affected area should be immediately washed with copious quantities of clean running water. In all cases, immediate medical attention must be obtained and medical staff informed that battery electrolyte is concerned.
- Clothing soaked with electrolyte must be removed immediately.
- Only pure distilled or de-ionised water may be used for topping up battery cells.
- Ensure that all cables used for battery charging are maintained in good condition. When in use, they MUST be positioned so that they do not present a danger to personnel or damage cables and equipment.
- Disposal of electrolyte must be strictly in accordance with the Local arrangements made between the Depot concerned and the Local Government Authority.

2.5. Service and Repairs

- Equipment repaired or changed must be tested for correct operation after fitting to the vehicle.
- All work shall be carried out in accordance with the job descriptions in this schedule, supplemented by the base machine manuals.
- Only material called up on approved drawings, parts lists and specifications shall be used for repairing machines. Where equipment is to be tested following repair, this shall be carried out using the authorized test equipment provided.
- Equipment removed for repair must be protected against damage and handled with care.
- Following any reportable incident or accident involving the machine a detailed examination must be carried out around the damaged or suspected damaged area. Testing of brakes, and lifting of vehicles, together with gauging of axles and wheels shall be carried out as appropriate or called for by the specialist engineer appointed to investigate the incident. Any tests/checks called for shall be carried out in accordance with the appropriate job description in this schedule and all details recorded.
- If any components on the following systems have been disturbed, a functional test MUST be carried out on the relevant system AFTER ALL work is completed and BEFORE the unit is returned to service:
  - Braking Equipment
  - Rail Guidance

2.6. Warning Signs and Decals

The images below describe the valid signs that apply to this machine. The signs must remain visible to guide and to inform about risks. If a sign is damaged or missing, new signs can be ordered from your service provider or Pandrol AB.

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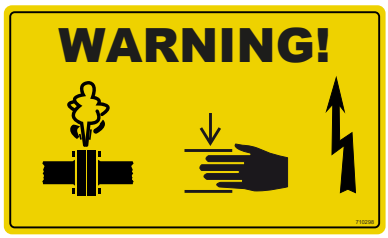
710143



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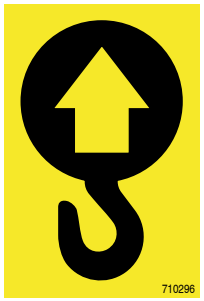

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2.7. Minimum Facilities

Clean, dry, covered accommodation for dealing with wheel set, bearings, mechanical hydraulic and electrical components etc.

- Adequate illumination for inspection of components and under frames.
- Cleaning facilities which will not cause damage to the components.
- Jacking facilities for raising the machine.
- Handling facilities for removal and refitting of components such as engines.
- Protection from the weather of vulnerable areas of the vehicles and its components.
- Any specific requirements additional to those listed are identified in the applicable job description.
- A suitable length of straight level rail track for carrying out brake tests.

2.8. Qualified personnel

Staff competence

Work on the CD200 IQ 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 and only on specified rail types.

In order to carry out this maintenance plan in a manner that will achieve the required safety and quality, the following minimum level of competence required is:

- For all activities the person leading the task must be able to follow and carry out the instruction detailed in this document.
- All Safety Critical Work must be carried out by persons competent in accordance with:

1. ORR Railway safety publication 1 “Developing and Maintaining staff competence” March 2007.
2. Duty holders safety critical work competence management system
3. The railways and other guided transport system (safety) Regulations
4. Staff undertaking this work must have been trained to handle the CD200 IQ

3. General Description

3.1. Intended Use

The Clip Driver CD200 IQ is designed and manufactured for clipping and de-clipping PANDROL FASTCLIP and FASTCLIP FE, or PANDROL E-CLIP (depending on how the machine is equipped). Switching from clipping to de-clipping is easy since the Clip Driver CD200 IQ uses the same head for both clipping and de-clipping and it is also easy to setup for different rail gauges and inclinations. Choose the type of tool in the control panel (2).

The Clip Driver CD200 IQ is rapid and easy to use and it is ergonomically operated by one single operator. The Clip Driver CD200 IQ can clip on both rails by sliding the unit from one side to the other. The clipping capacity is up to 20 sleepers per minute. The CD200 IQ can be separated into 3 pieces.

3.2. Main Components

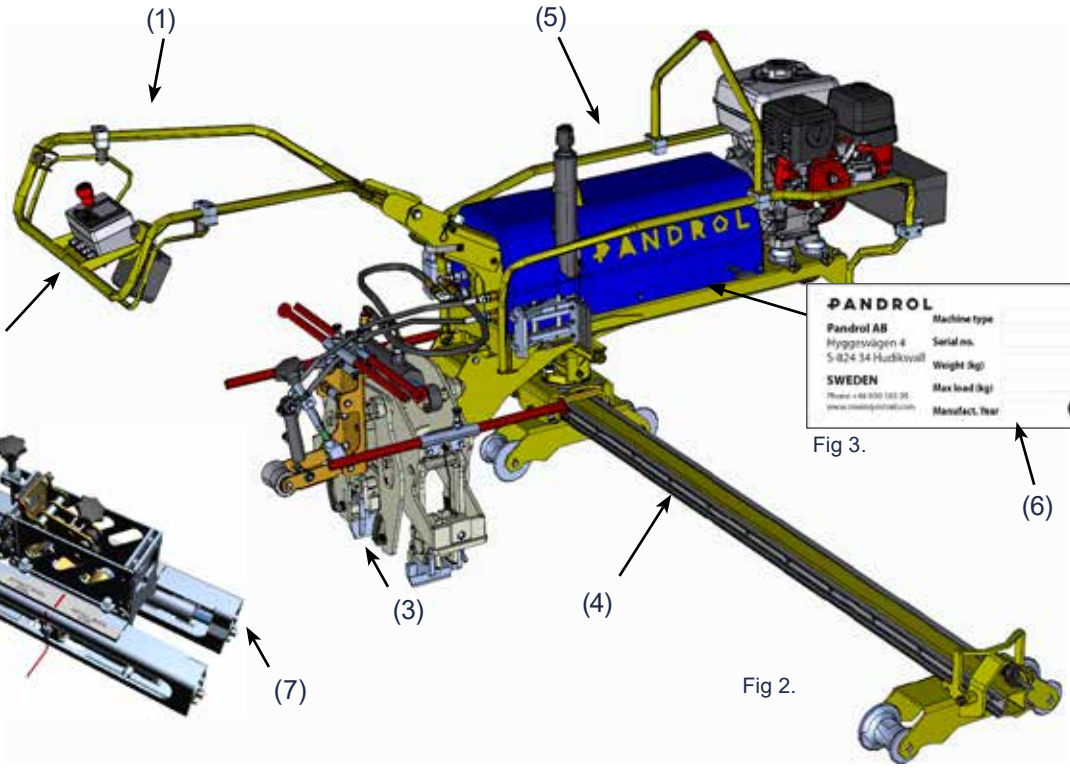

Fig 2.

Fig 3.

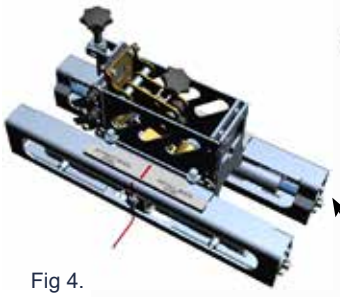

Fig 4.

Pos	Description	Pos	Description
(1)	Height adjustable handlebar	(5)	Main unit
(2)	Control panel	(6)	Identification plate
(3)	Work head FC/FE	(7	Work head e-clip
(4)	Trolley unit		

* Please note that the machine pictured above may be fitted with extra equipment. Pandrol AB reserves the right to change any technical details without prior notice.

3.3. Technical Specifications

CD200 IQ		Fastclip 5014300 e-Clip 5014699 (Honda)	Fastclip 5014853 e-clip 5016448 (Briggs & Stratton)
Measurements	Length	2202 mm	
	Height	fastclip 1142 mm / e-CLIP 1103 mm	
	Width	2111 mm	
	Weight Power pack	103 kg	
	Weight Trolley	54 kg	
	Weight Tool, Fastclip	97 kg	
	Weight Tool, e-CLIP	115 kg	
Performance	Track gauge	1067-1600 mm	
	No of clips being installed/extracted at the same time, 2 clips per cycle		
	Capacity: Fastclip (up to) 20 sleepers/min / e-CLIP (up to) 10 sleepers/min		
Engine	Manufacturer	Honda	Briggs & Stratton
	Model	GX 270	XR1450 / 19N1
	Type	Air-cooled 4-stroke OHV	Air-cooled 4-stroke OHV
	Power	8,5 HP (6,3 kW) @ 3600 rpm	10 HP (7,5 kW) @ 3600 rpm
	Net torque	14.1 lb-ft (19.1 Nm) @ 2,500 rpm	19,77 Nm @2600 rpm
	Fuel	Unleaded 86 octane or higher	Automotive gasoline (unleaded)
	Fuel tank capacity	5,3 litre	5,3 litre
Electronics	Voltage	12 volt DC	
	Ground	Negative	
Hydraulics	Pump	Gear pump	
	Max flow	17 l/min	
	Max pressure	120 bar / Boost 215 bar	
	Hydraulic tank volume	8-9 litre	
Noise data	Noise level, LpA	86 dB (A)	
	Noise level, LwA	88,5 dB (A)	
Vibration data	Clipping	4,31 m/s²	
	De-clipping	4,65 m/s²	
Electrical protection index		IP64	

Maximum travelling speed	3 mph
Maximum working speed	0,5 mph
Maximum travelling speed through S&C	3 mph
Maximum travelling speed through raised check rails	3 mph
Maximum working cant	150 mm
Maximum working gradient	1:25
Minimum radius	80 m
Maximum ON/OFF track gradient	1:25
Maximum ON/OFF track cant	100 mm
May be used under LIVE overhead lines	Yes
May travel on LIVE 3 or 4 rail lines	No
May be used on isolated 4/4 rail lines	See ECC
May be used adjacent to running line	Yes
Not permitted outside of a possession	

3.4. Drawings Fastclip

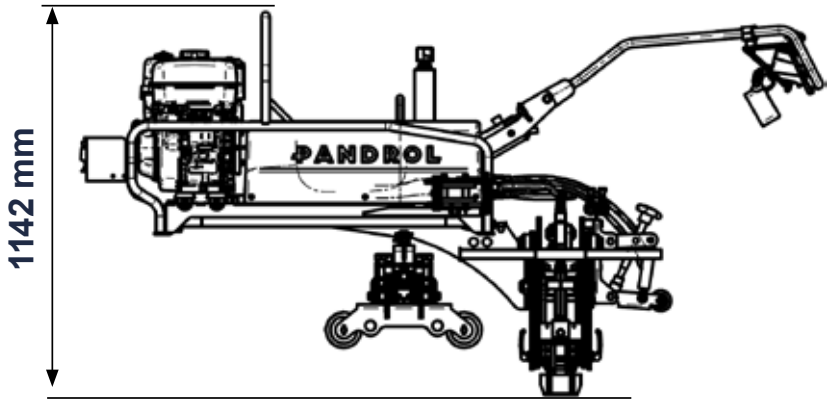

Fig 5.

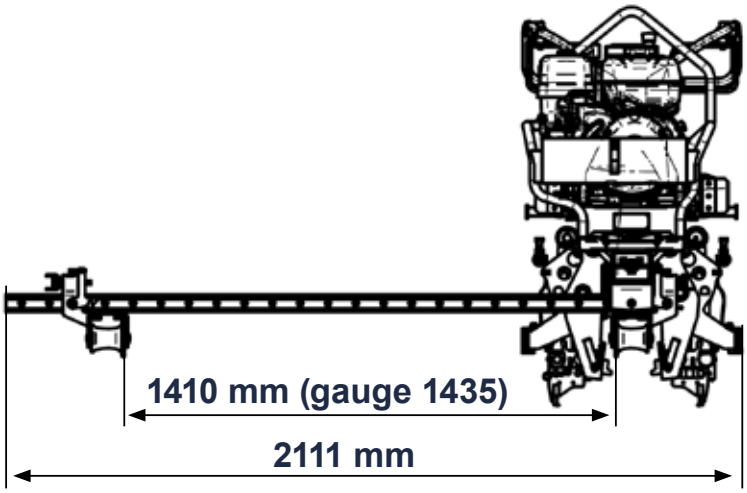

Fig 6.

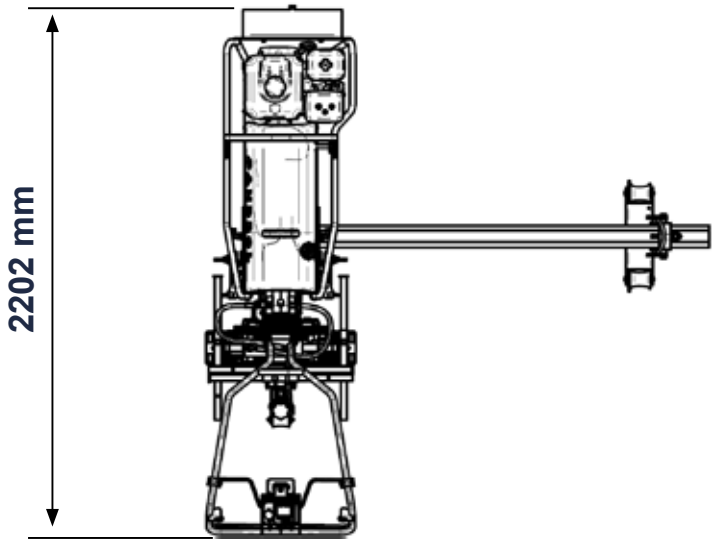

Fig 7.

3.5. Drawings e-CLIP

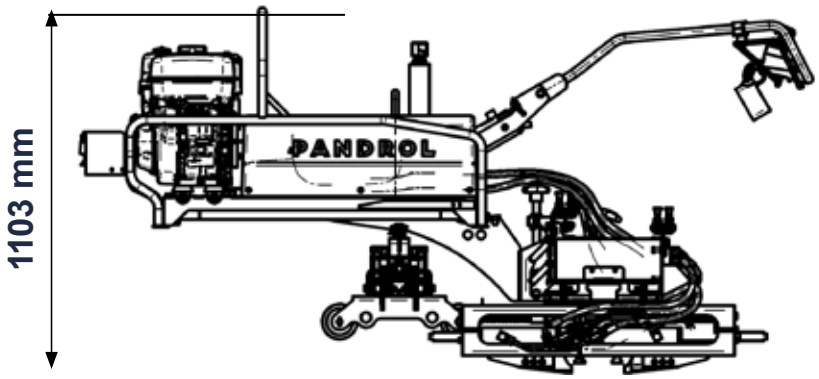

Fig 8.

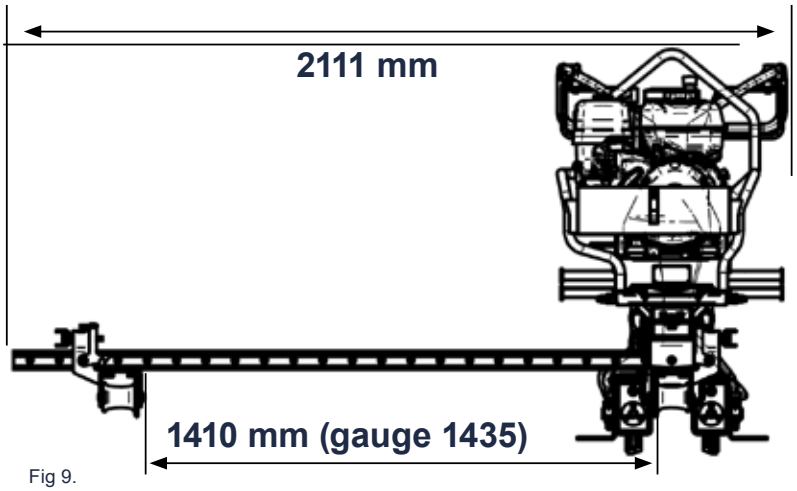

Fig 9.

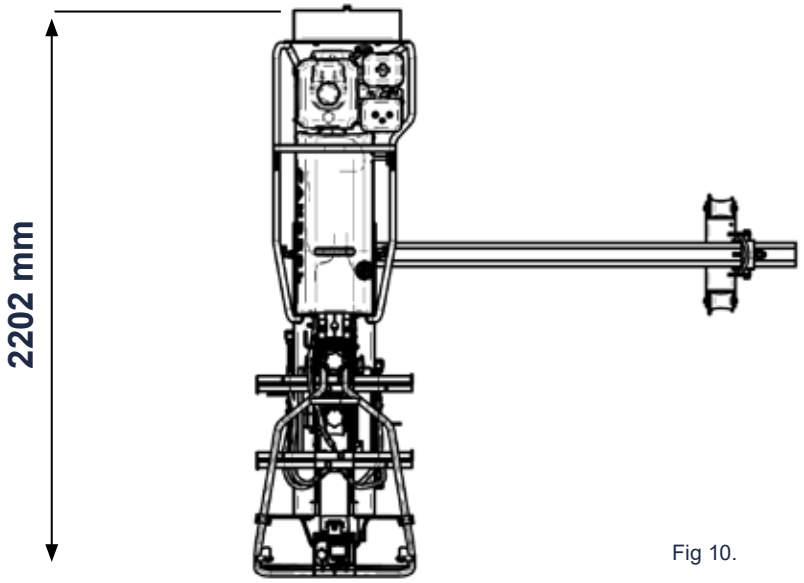

Fig 10.

4. Machine Components

4.1. Main Unit - Power Pack

The Main Unit is the heart of CD200 IQ. It contains the engine, all central hydraulic components such as pump, block and valves and almost all electronics. The handle bar with the operator controls is also mounted on the Main Unit.

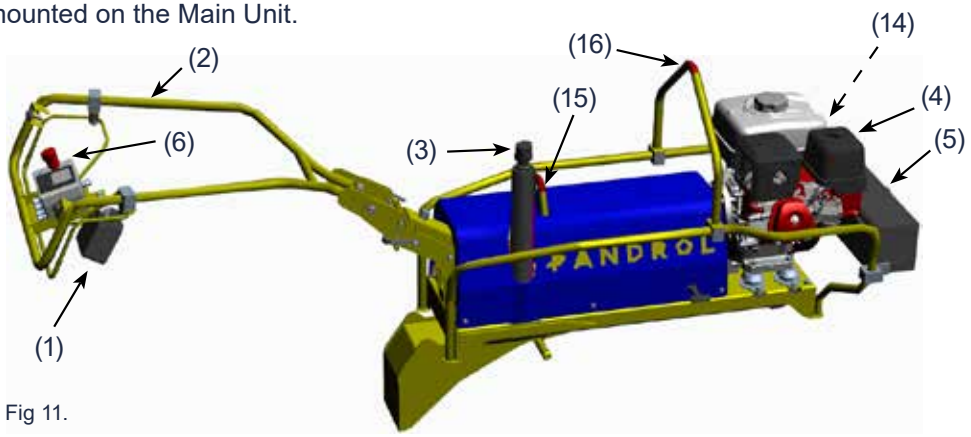

Fig 11.

4.2. Trolley

The trolley for the CD200 IQ supports the machine and guides it along the track. The Trolley also enables the operator to switch direction as well as slide the main unit across to the opposite rail in a convenient manner. When setup correctly, the trolley gives the machine the right inclination independent of direction of travel or chosen rail for operation. The connection tray needs to be secured in position prior to moving the trolley. The slide carriage/connection tray has no automatic lock and the load of the trolley is unbalanced therefore extra care needs to be taken when handling the heavy end of the trolley.

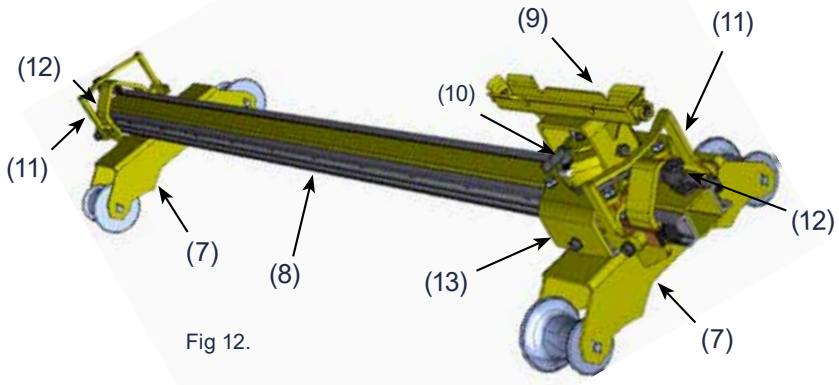

Fig 12.

Pos	Description	Pos	Description
(1)	Work light	(9)	Main unit attachment
(2)	Handle	(10)	Locking pin
(3)	Hydraulic tank	(11)	Lock/lift handle
(4)	Engine	(12)	Adjustment screw
(5)	Tool box	(13)	Slide carriage
(6)	Emergency stop	(14)	Engine starter key
(7)	Trolley	(15)	Lifting eye complete machine
(8)	Beam	(16)	Lifting eye power pack

4.3. Brake (option)

When removing the machine from the trolley there is a possibility that the trolley can run along the track. For that reason the CD200 IQ is equipped with brakes that will automatically stop the trolley from running away when removing the machine. The brake is activated as long as the handle (1) is not pressed down. The trolley is always in parked position from the beginning.

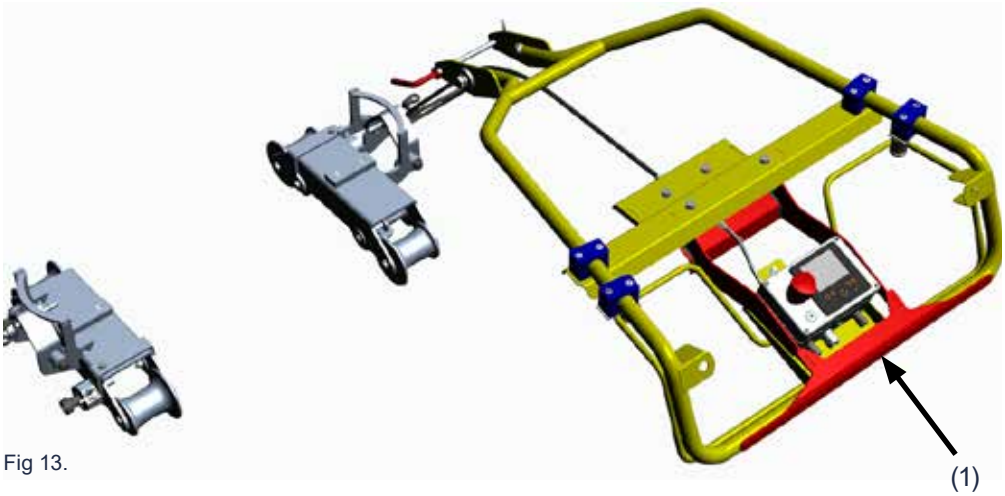

Fig 13.

4.4. Workhead

4.3.1. Workhead FC/FE

The work head is designed to be able to both clip up and de-clip PANDROL FASTCLIP and FASTCLIP FE.

The tool is adjustable to enable work on different rail heights (S49 to 141 RE, i.e. rail heights between 149-189 mm).

The work head utilizes the rail head as starting point at declipping. The work head is easily adaptable to enable clipping or declipping by changing the clipping/declipping shoe and rotate the mechanical stop 180 degrees.

Pos	Description	Pos	Description
(1)	Clipping shoe	(4)	Adjustable heel plate
(2)	Gripper arm	(5)	Double pin
(3)	Mechanical stop for declipping	(6)	Main arm

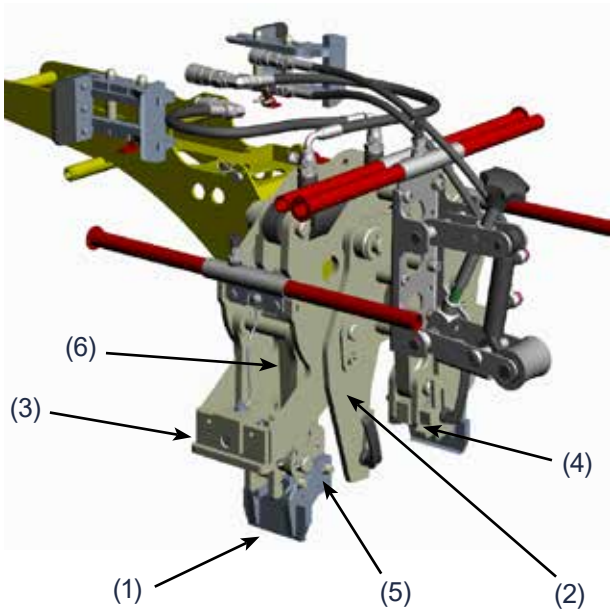

Fig 14.

4.4.1. Sleeper Lifter FC/FE

The sleeper lifter device enables the machine to lift low laying sleepers up to 50 mm. This is done in a certain sequence. This device also includes an adjustment mechanism to accommodate for different rail section heights. When the dead-mans-handle/sleeper lifter control is pressed in towards the handlebar, the cylinder takes its fully extended position, which is the normal operation position.

Pos	Description
(1)	Height adjustment knob
(2)	Lift cylinder
(3)	Ril wheel

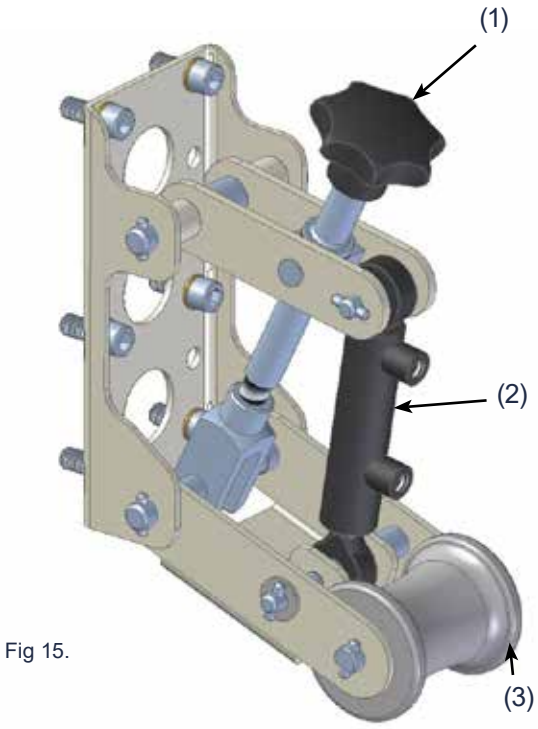

Fig 15.

4.4.2. Work head e-CLIPS

The work head is designed to be able to both clip up and de-clip e-CLIPS. It is also designed to be able to work on rails with different rail heights.

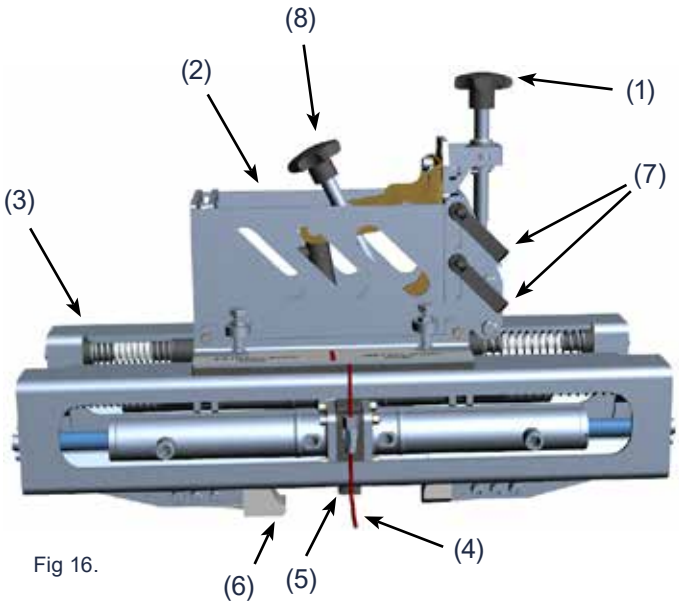

Fig 16.

Pos	Description	Pos	Description
(1)	Parallel adjustment knob	(5)	Double hook
(2)	Tower	(6)	Heel plate
(3)	Frame	(7)	Quick locking mechanism
(4)	Indicator	(8)	Height adjustment knob

4.4.3. Indicator

The indicator (1) indicates the position of the double hook relative to the E-CLIPS.

When the indicator is in the INSTALL MODE ZONE (3), the tool is ready to install the clips. The indicator will move towards the center mark (4) during the clipping operation. The clips are installed when it reaches the center mark. It will then move back to the starting position and the cycle is complete.

When the indicator is in the EXTRACT MODE ZONE (3), the tool is ready to extract the clips. The indicator will move towards the center mark (4) during the de-clipping operation. The clips are extracted when it reaches the center mark. It will then move back to the starting position and the cycle is complete.

Pos	Description
(1)	Indicator
(2)	Extract Mode Zone
(3)	Install Mode Zone
(4)	Center mark

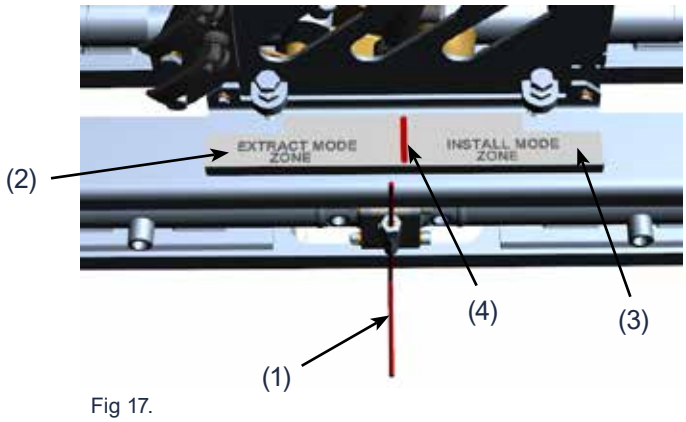

Fig 17.

4.4.4. Work Head Lifting Mechanism e-CLIPS

The work head is in the operating position (low) when the dead-mans-handle is not pressed. When it is pressed in towards the handle bar, the lifting cylinder (2) will extract to its full length and the work head will rise above the clips. In this position CD200 IQ can easily be pushed towards the next sleeper.

This mechanism is also used to adjust the machine to different rail heights and also to make sure the work head is parallel to the rail.

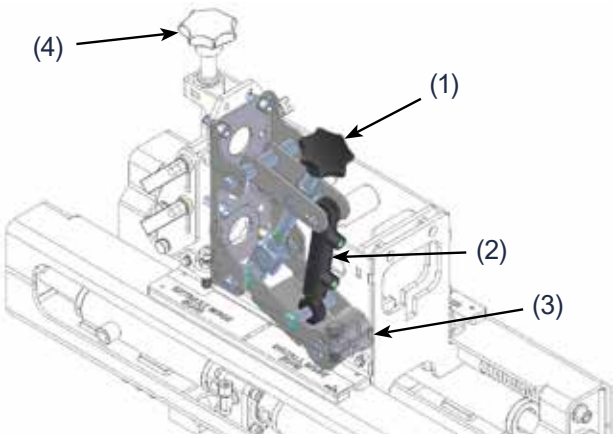

Fig 18.

Nr	Description	Nr	Description
(1)	Height adjustment knob	(3)	Support wheel
(2)	Lifting cylinder	(4)	Parallelity adjustment knob

5. Control System

5.1. Controls

The CD200IQ is easily operated via the control panel, dead man's grip and two push buttons. The adjustable handles and accessibility of controls give good ergonomics for the operator. The CD400IQ have four different work modes described here below.

WARNING!
Do not use the machine befor it has been adjusted according to instructions given in this manual.

Pos	Description
1	Push button clipping
2	Push button de-clipping
3	Dead man's grip / Sleeper lift function
4	Contro panel
5	Emergency stop
6	Power on button, control system

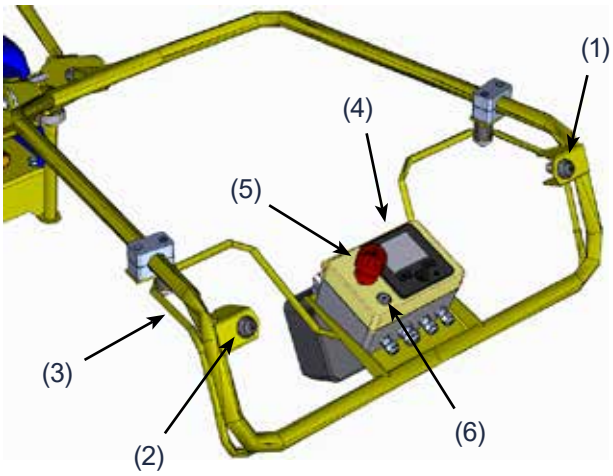

Fig 19.

NOTE! The display does not have touch functionality. All navigation and settings are made by the push buttons below the display.

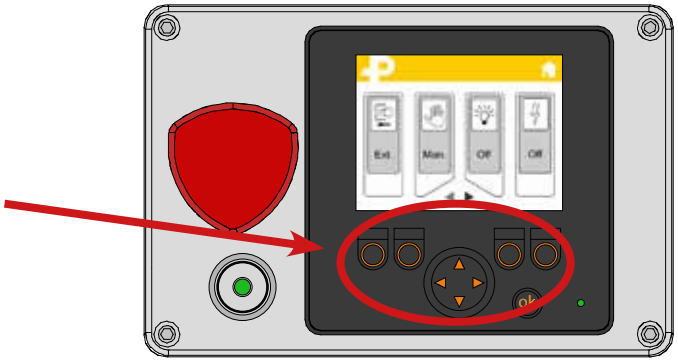

Fig 20.

5.2. Control panel

The CD200IQ is easily operated via the control panel. The panel has four menu pages used for settings and information.

NOTE!
Settings are made by pressing the buttons on the control panel, not on the icons on the display.

5.2.1. Menu page ”Home”

At startup, the menu page ”Home” is displayed, showing currently active functions.

With the push buttons below the display is used to navigate between menues, make selections and activate/de-activate functions.

Pos.	Description Fig 21
1	Select clipping/de-clipping mode
2	Select manual/automatic mode
3	Switch menu page
4	Work light On/Off
5	Power down control panel
6	Boost function On/Off

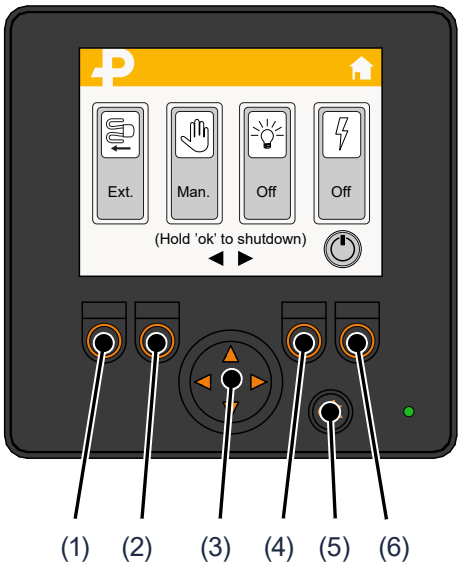

Fig 21. Menu page ”Home”

Select function mode (1)

Ext. De-clipping mode.

Inst. Clipping mode.

Automatic mode (2)

Auto. Clipping / De-clipping is made automatically.

Man. Clipping / De-clipping is made manually..

Work light (4)

On Work light On

Off Worklight Off

Boost (6)

The Boost function can be used in manual mode to gain extra power at de-clipping if a clip is jammed due to rust or similar.

IMPORTANT!
Always make sure that no damage occure during when using the boost function.

Boost In manual mode, higher pressure and more power will be used.

Off Boost function deactivated.

5.2.2. Menu page ”Counters”

This menu displays total running hours, number of clipping / de-clippings and hours left to next service / maintenance.

The counters are reset by press and hold the button (5).

Pos.	Description Fig 22
1	-
2	-
3	Switch menu page
4	-
5	Counter reset
6	-

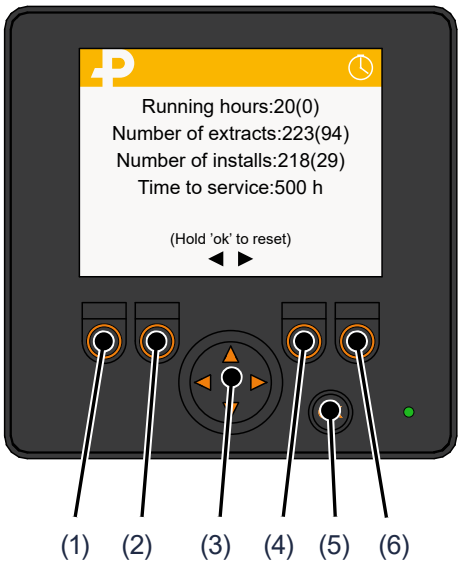

Fig 22. Menu page ”Counters”

5.2.3. Menu page ”Settings”

In this menu the operator can switch between tools and select language.

Switch between fastclip / e-clip by press and hold the button (6).

Pos.	Description Fig 23
1	Navigate upward
2	Navigate downward
3	Switch menu page
4	Navigate left
5	-
6	Navigate right / Switch between tools

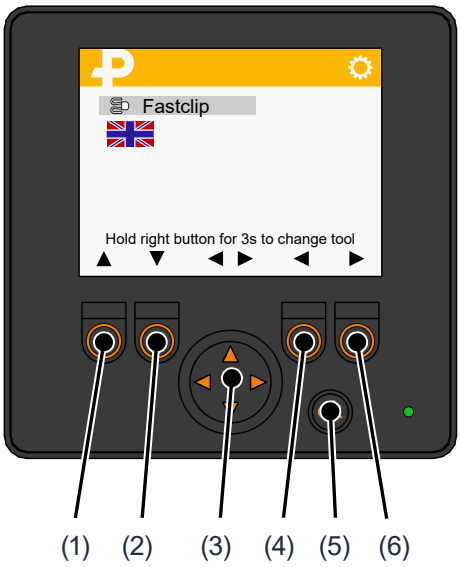

Fig 23. Menu page ”Settings”

5.2.4. Menu page ”Error codes”

This page displays error codes in the event of system error.

Please contact Pandrol in the event of system error.

Pos.	Description Fig 24
1	-
2	-
3	Switch menu page
4	-
5	-
6	-

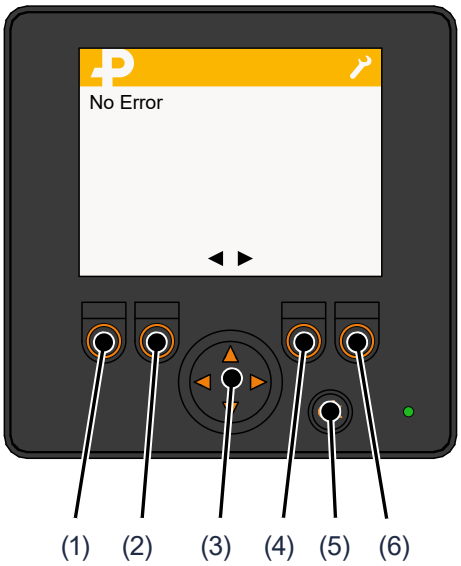

Fig 24. Menu page ”Error codes”

NOTE!
Settings are made by pressing the buttons on the control panel, not on the icons on the display.

5.3. Operation

Press and hold button 1, Fig 25 for 3 sec to startup the control system.

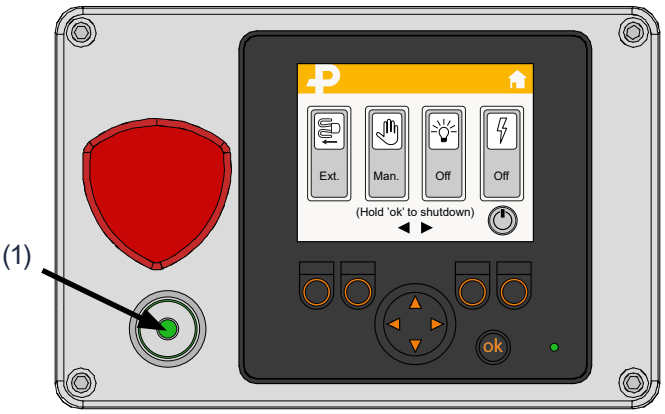

Fig 25.

5.3.1. Manual Clipping (Fig 26)

Manual clipping mode is used at machine adjustment or if the operator need to operate manually.

1. Press the button (2) to select manual mode ”Man”.
2. Press the button (1) to select clipping mode ”Inst”.
3. Pull and hold the dead man’s grip.
4. Press the button (5) to perform clipping.
5. Press the button (6) to retract the clipping arms.

5.3.2. Manual de-clipping (Fig 26)

Manual de-clipping mode is used at machine adjustment or if the operator need to operate manually.

1. Press the button (2) to select manual mode ”Man”.
2. Press the button (1) to select de-clipping mode ”Ext”.
3. Pull and hold the dead man’s grip.
4. Press the button (5) to perform de-clipping.
5. Press the button (6) to retract the de-clipping arms.

5.3.3. Automatic Clipping (Fig 26)

This is the common mode during clipping.

1. Press the button (2) to select automatic mode ”Auto”.
2. Press the button (1) to select clipping mode ”Inst”.
3. Pull and hold the dead man’s grip.
4. Press and release the button (5) to perform clipping. The clipping arms will retract automatically.

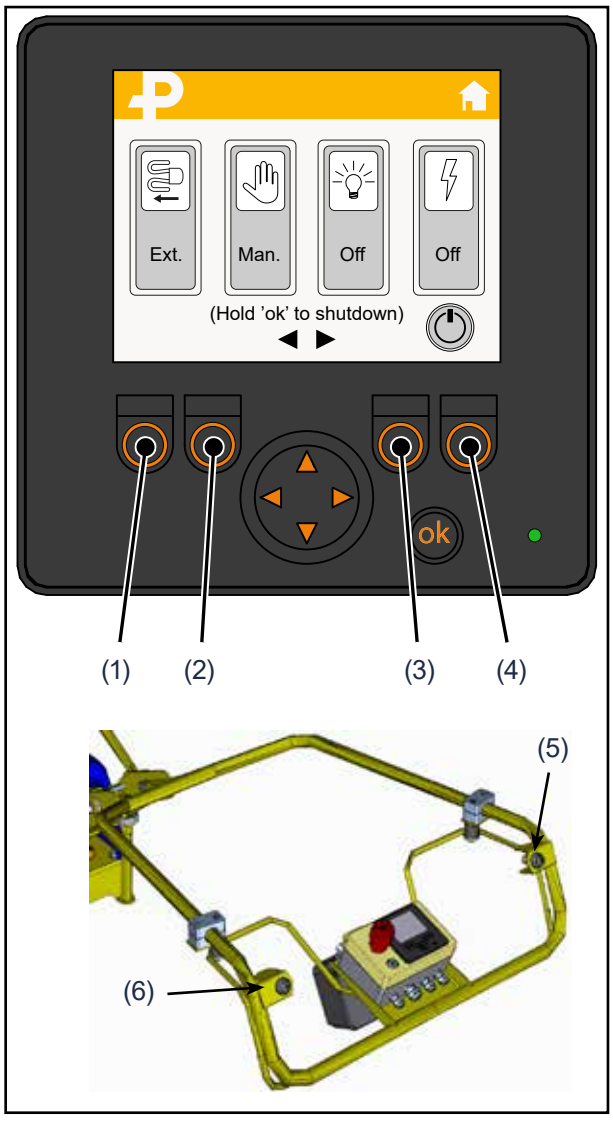

Fig 26.

5.3.4. Automatic de-clipping (Fig 26)

This is the common mode during de-clipping.

1. Press the button (2) to select automatic mode ”Auto”.
2. Press the button (1) to select de-clipping mode ”Ext”.
3. Pull and hold the dead man’s grip.

Press and release the button (5) to perform de-clipping. The de-clipping arms will retract automatically.

5.3.5. Sleeper lift

1. Release the dead man’s grip to lower the tool against the rail.
2. Press and hold the button (5) until the tool is pressed against the clips.
3. Verify that the tool is fully attached to both clips. Pull the dead man’s grip to lift the tool.
4. Release the button (5) as soon as the clip is installed. The clipping arms will retract automatically.

5.3.6. Dead man’s grip

The dead man’s grip shall be hold against the handle bar during normal operation. This will enable tha machine to rest onto the support wheel. The machine will lower to the ground to avoid uncontrolled movement if the operator release the dead man’s grip. Release thee deam man’s grip to lift low positioned sleepers.

5.4. Electrical System

The CD200 IQ electrical system consist of high quality components well protected from wear and weather condition. The electrical system require a minimum of service and maintenance.

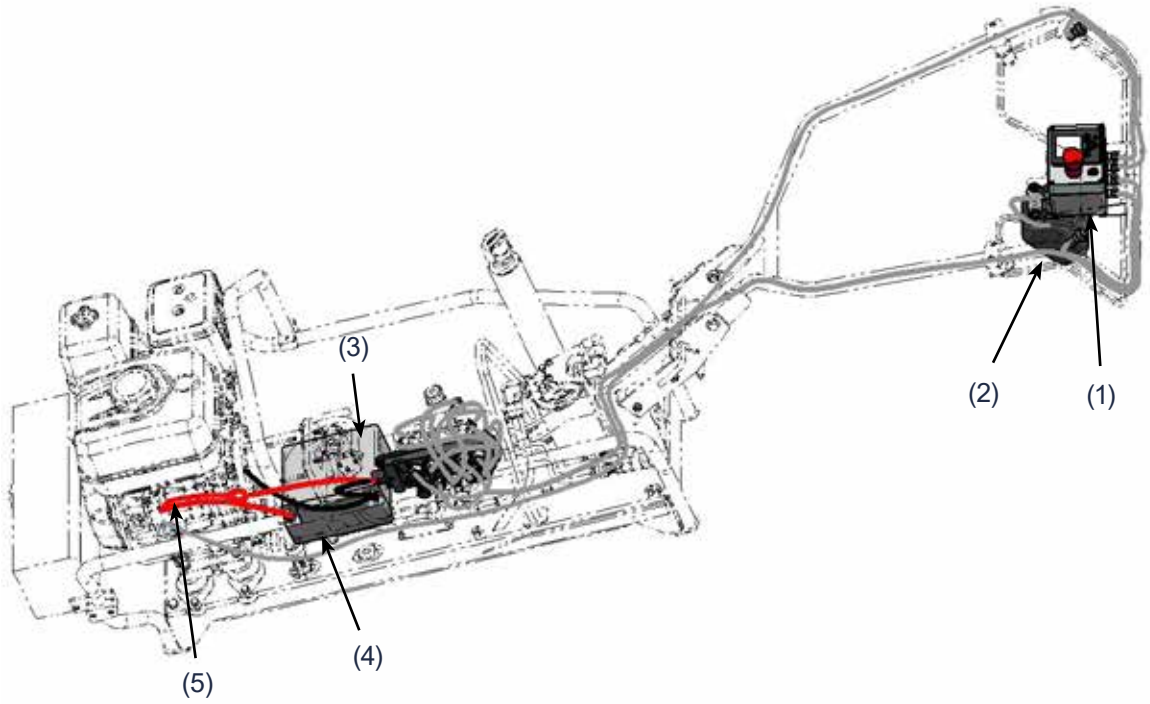

Fig 27.

Nr	Description
(1)	Control panel
(2)	Work light
(3)	I/O unit
(4)	Battery
(5)	Fuse 10A

5.5. Hydraulic system FC/FE

The hydraulic system consist of two hydraulic pumps that maximize the power output and enables rapid work cycles. The customized control valve assembly in combination with the control system gives the CD200IQ its unique charateristics. The hydraulic return filter is a ”Spin On” filter that enables easy replacement during service maintenance. The hydraulic tank is designed to function as a frame for the machine as well as hydraulic tank.

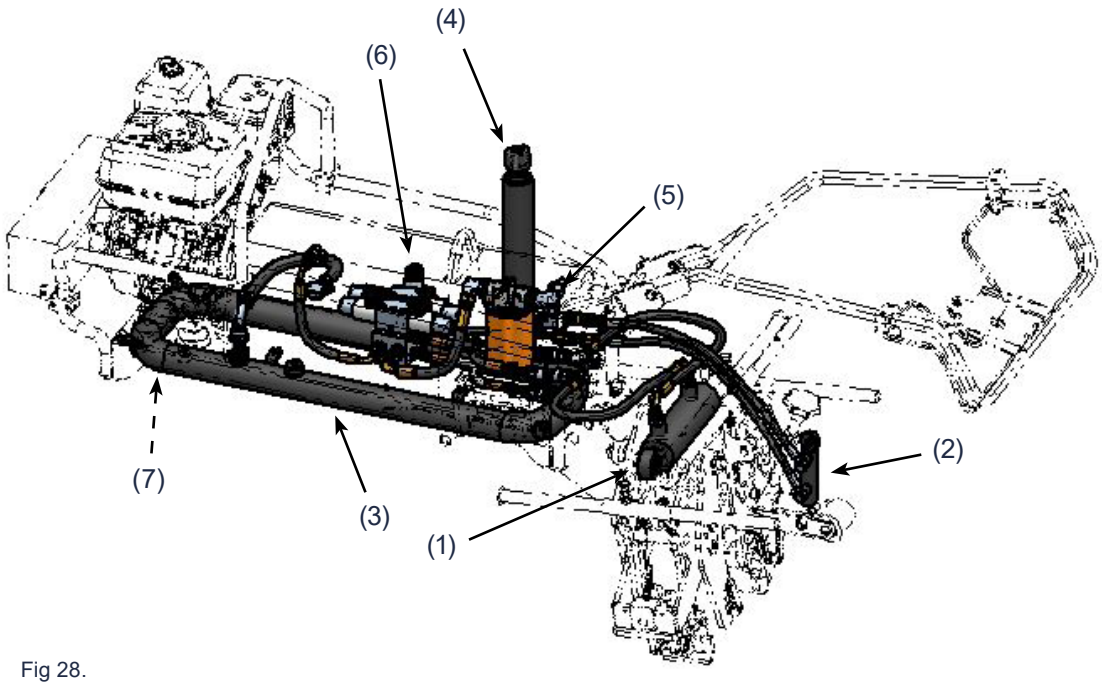

Fig 28.

Pos.	Description	Pos.	Description
(1)	Clipping/de-clipping cylinder	(5)	Return filter
(2)	Sleeper lift cylinder	(6)	Control valve assembly
(3)	Hydraulic tank	(7)	Drain plug
(4)	Breathing filter/filling cap		

5.6. Hydraulic System e-clip

Hydraulic system illustration that describe the difference between FC/FE and e-clip tools. The e-clip tool has four hydraulic cylinders working in pairs. The FC/FE use one hydraulic cylinder for clipping / de-clipping.

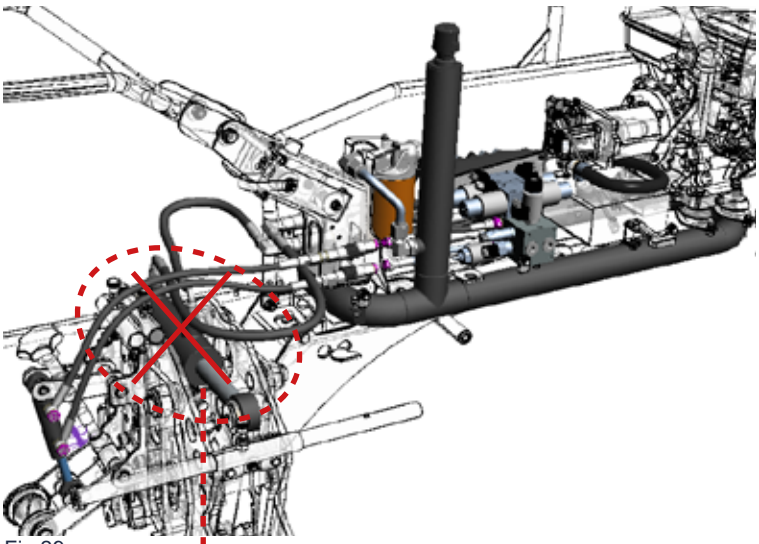

Fig 29.

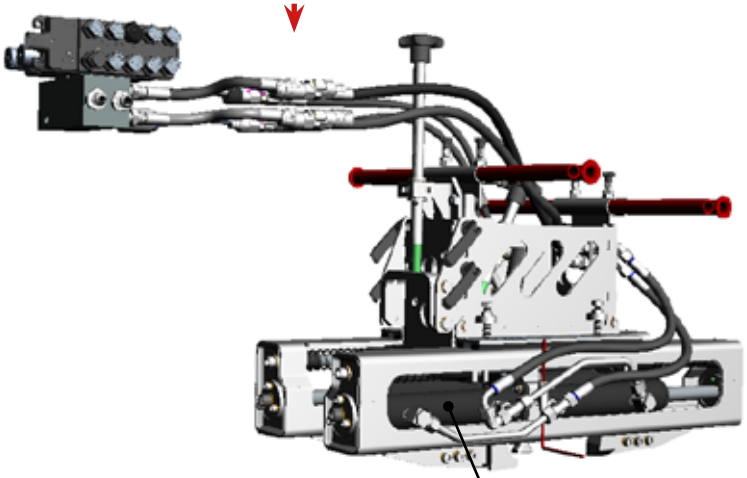

Fig 30.

6. Transport And Parking

6.1. Preparing for Transport or Storage

When CD200 IQ is to be transported or stored off-track,ensure that the machine is safely rested on surface. CD200 IQ should only be lifted mechanically. Use appropriate slings/chains and lifting accessories when lifting the CD200 IQ

VARNING!

- **When longer transportation is necessary, fasten the machine safely on to a loader platform or lorry, standing upright on its supporting legs.**
- **Only qualified personnel are allowed to operate the lifting machinery.**
- **The lifting zone has to be clear when lifting is taking place.**
- **Ground conditions, inclination etc. should be evaluated prior to lifting the machine to reduce the risk of rolling over.**
- **When placing CD200IQ on track, choose a suitable place with as little interfering obstacles and with as firm and flat ground as possible.**
- **Ensure that the road to the workplace is safe and free from interfering obstacles to avoid accidents.**

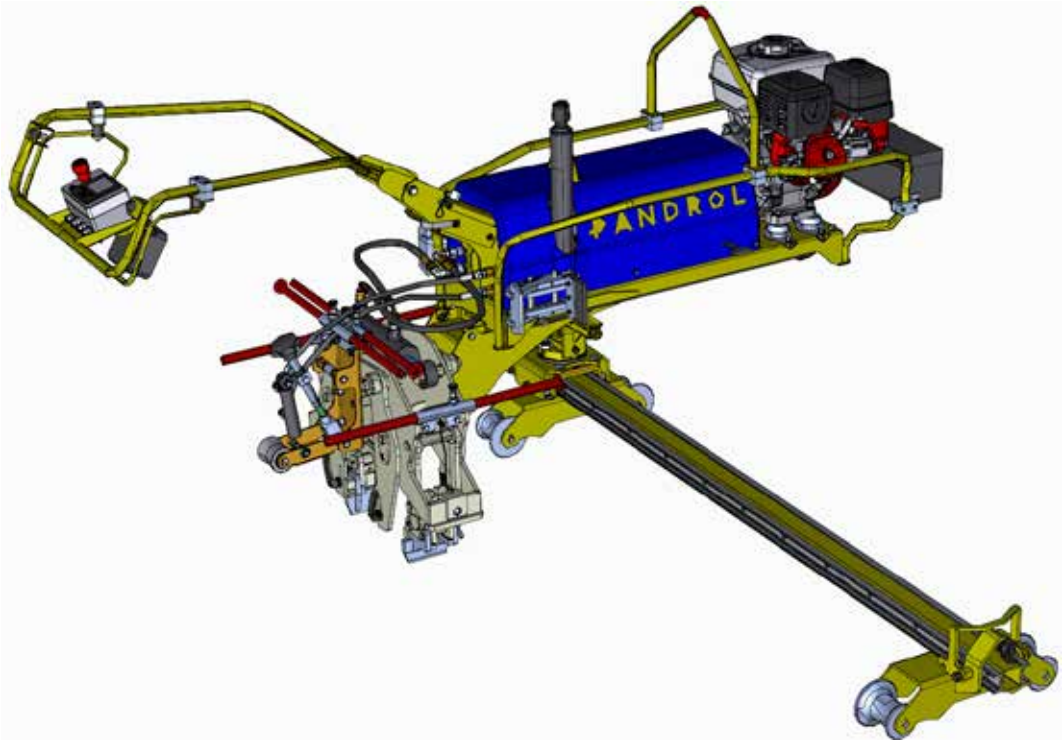

Fig 31.

6.2. Parking On The track

When the CD200 IQ is to be parked on track, the work head has to rest with the shoes onto a sleeper or the ballast. This is to ensure that the machine does not fall over or run away along the track.

6.3. Parking Off-Track

When the CD200 IQ is not being used on the track, it must be parked on a level ground standing on the work head.

6.4. Storage

CD200 IQ and the individual parts should only be lifted mechanically. Use appropriate slings/ chains and lifting accessories when lifting CD200 IQ.

The CD200 IQ can be stored as follows:

• complete unit

• separated into 2 parts (power pack/tool and trolley)

• separated into 3 parts (power pack, tool and trolley).

Storage at longer periods of time.
To avoid battery discharge at storage. Disconnect the battery cables from the battery.

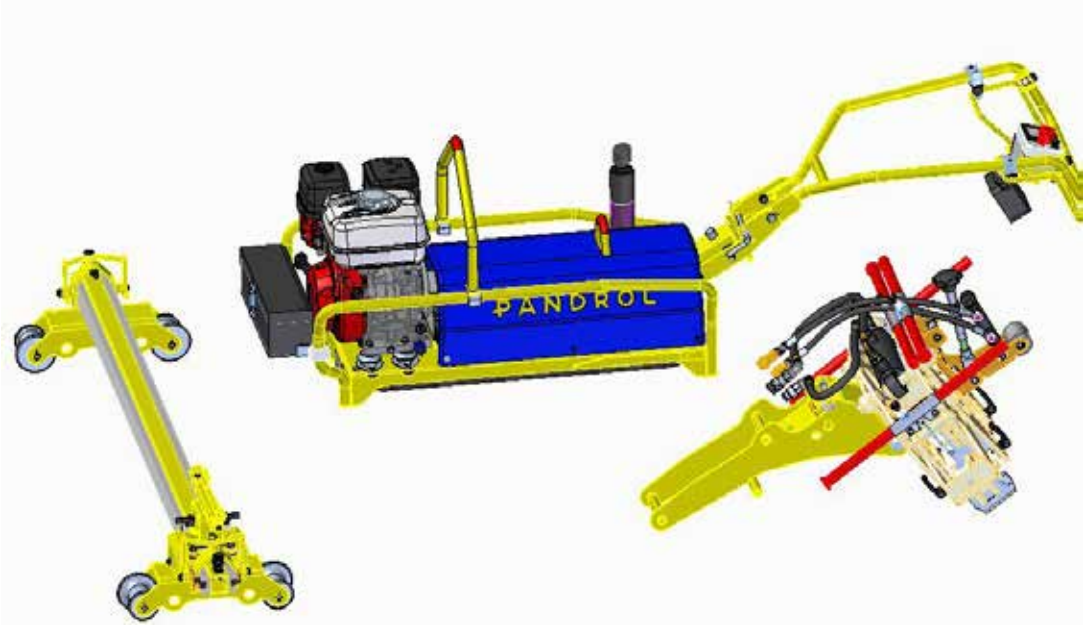

Fig 32.

6.5. Disassemble CD200IQ

6.5.1. Disassemble the Powerpack

The Powerpack is disassembled by sliding backward and lift.

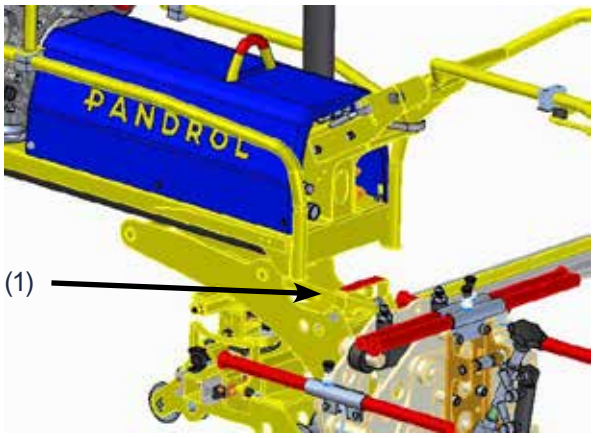

Fig 33. Locking hatch

1. Disconnect the brake wire from the trolley.

Fig 34. Disconnect the brake wire

2. Disconnect the hydraulic hoses between the power pack and the work tool.
3. Unlock the powerpack from the working tool by turning/pulling the hatch (Pos. 1, Fig 33) and then slide the powepack backwards.

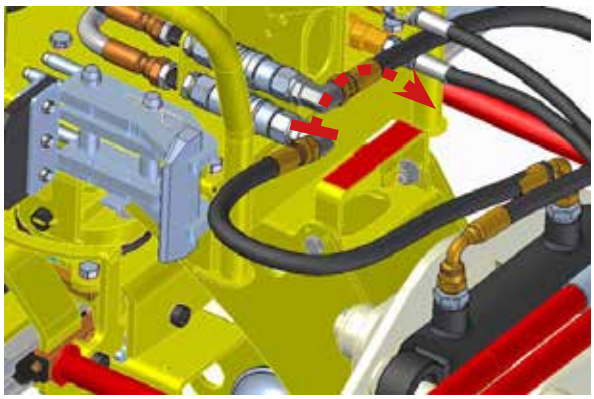

Fig 35. Disconnect the cuick couplers

4. Slide out of position and lift. Place the powerpack onto a firm surface.

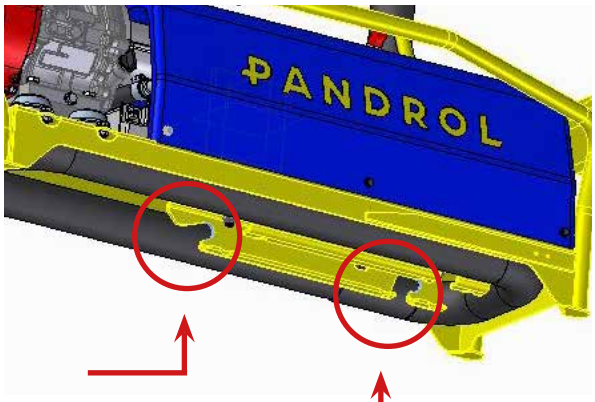

Fig 36.

6.5.2. Disassemble the Workhead

1. Unlock the tool from the trolley by opening/turning the hatches, Fig 37.
2. Use a mechanical tool to lift the workhead out of it's position. Place on steady surface.

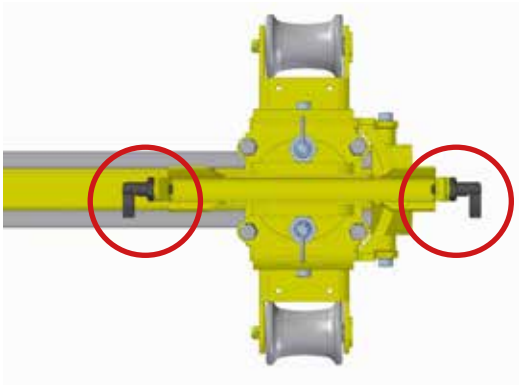

Fig 37.

Fig 38.

7. Installation On Track

7.1. General

The CD200 IQ must be adjusted for the type of rail and clip assembly it is to be used on before operation on track. The interaction between the clips on the track and the steel shoes on the de-clipping and the clipping arms must be checked in order not to damage the clips and insulators.

WARNING!

- **The CD200 shall always be lifted in its lifting eye located on the top of the main unit see weight labels on machine.**
- **CD200 must only be operated by trained personnel and with experienced workmanship.**
- **All safety precautions and other requirements is the responsibility of the equipment operator.**
- **When placing CD200IQ on track, choose a suitable place with as little interfering obstacles and with as firm and flat ground as possible.**
- **Ensure that the road to the workplace is safe and free from interfering obstacles to avoid accidents.**
- **Operation or preparation for use can be dangerous and may cause serious personal injuries if not correctly performed.**
- **All safety and necessary precautions shall be taken by the operator of the machine. The machine operator is also responsible that nobody interferes with CD200 IQ whilst in use and powered.**
- **When the CD200 IQ operates on track, the de-clipping shoes follow the rail web (just above rail foot on the inside of the rail). The machine operator must at all times check that the shoes do not collide with fish plates, welds or other related installations in the rail, causing serious damages to the CD200 IQ or the rail infrastructure.**

7.2. On / Off Tracking

The CD200iQ should be mechanically handled with the exception of the trolley. The trolley can be lifted mechanically or manually, depending on the specifics of the work site. It is preferable for the trolley to be mechanically handled.

Only in the event that the mechanical handling aid fails or is not available can the powerpack and work tool be lifted manually. The same applies under emergency conditions.

Use appropriate slings/chains and lifting accessories when lifting CD200IQ.

Fig 39. Manual lifting

1. Choose a suitable place with as little interfering obstacles and with as firm and flat ground as possible.
2. Lift the trolley with a suitable crane or manually by the handles/latches and put the trolley on track. The trolley brake is automatically applied.

Fig 40. Mechanical lifting

3. Secure the slide carriage in position by locking the handles/latches, Fig 41 on the side that is to be worked on first. The slide carriage has no automatic lock and the load of the trolley is unbalanced.

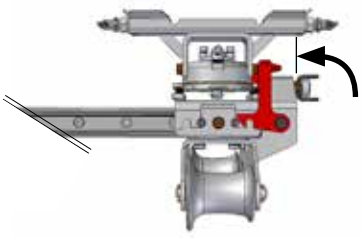

Fig 41. Lock the slide carriage

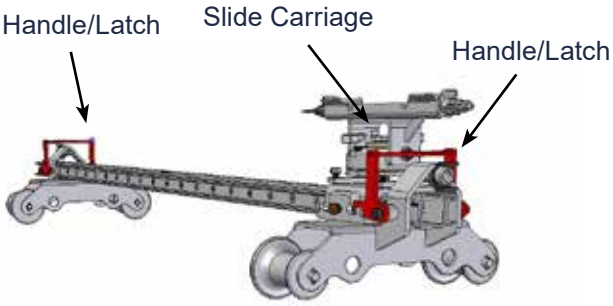

Fig 42. Trolley

4. Open the handles on the slide carriage before lifting the power pack i position, Fig 43.
5. Lift the power pack in the lifting eye according to Fig 43. The unit can also be lifted manually.
6. Place the powerpack in position above the slider carriage, Fig 43.
7. Lower the power pack. Ensure that both sides of the power pack shaft rests in position. The Power pack is well balanced and easily placed in position. Lock the handles to secure the power pack, Fig 44. Make sure that the locking pin is in its inner position.

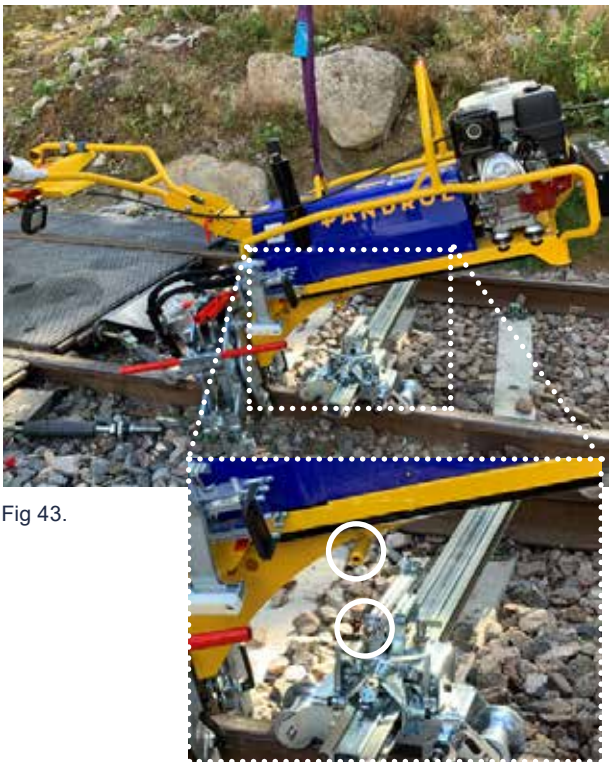

Fig 43.

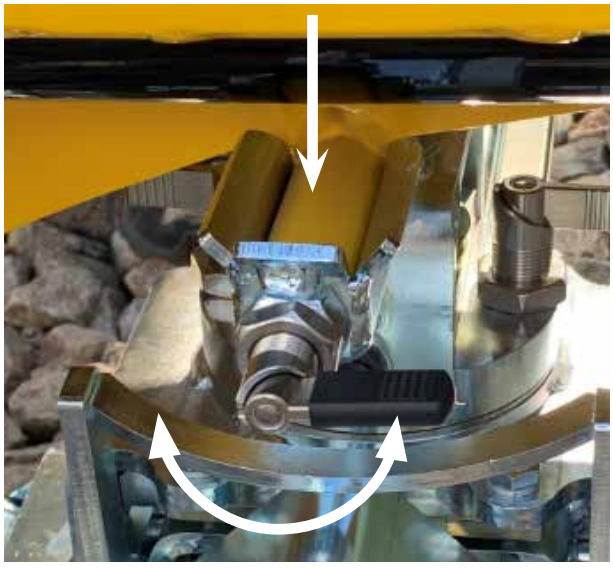

Fig 44.

8. Connect the brake wire by opening the locking handle (3) and push the wire in position. Lock the handle. The trolley brake is automatically engaged.

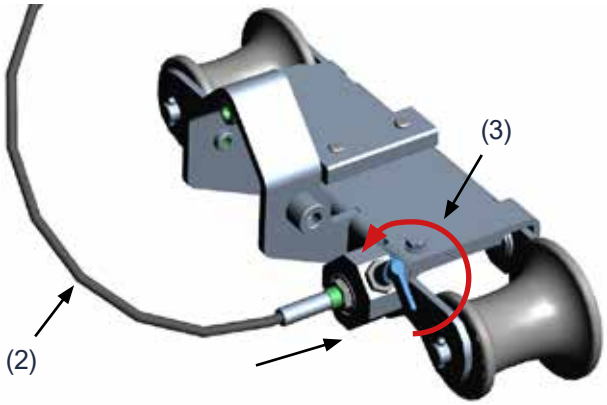

Fig 45.

9. Install the plug (4) on the opposite side to release the brake. The plug is used to unlock the brake on the side that has no locking wire. When changing sides, remove the plug (4) by turning the locking handle and pull out the plug. Fit brake wire (2).

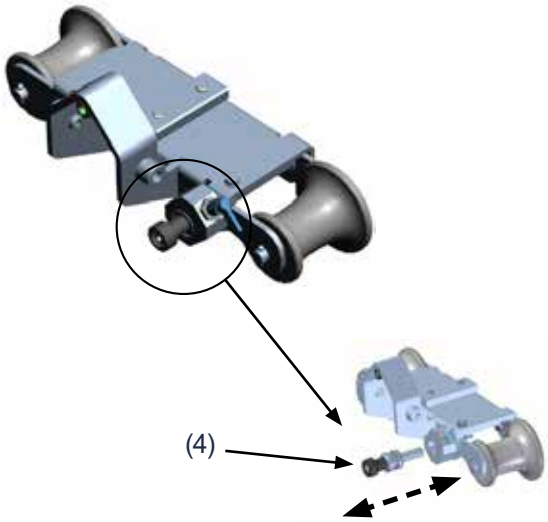

Fig 46.

10. To move the CD200IQ and release the brake, press and hold red handle (1). As soon as the handle is released, the machine is braked, release = locked.

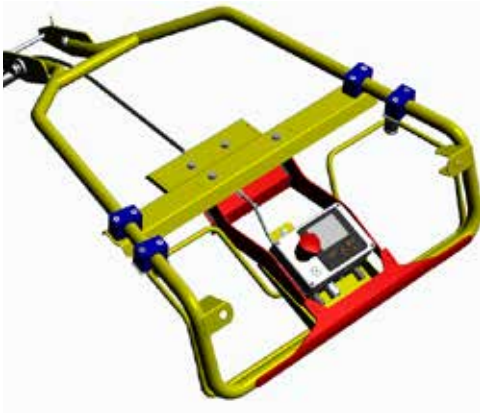

Fig 47. Brake handle

7.3. On / Off Tracking Using Emergency Handles

The emergency handles can be used to quickly move the machine off track if a emergency situation arise and no lifting device is available.

To lift the CD200IQ it has to be separated into twoo or three parts; Powerpack/Tool and Trolley.

The emergency handles are locaded on the machine, see Fig 48. Lifting the powerpack and tool requires 8 persons. Lifting the power pack and tool separatly requires 4 persons. The load shall at all times be addressed face on, symmetrically, and handled with two hands at all times. Team lifting of this nature should be controlled by one person, who should control the handling operation giving clear instructions.

Lifting the trolley requires 2 persons and with two hands at all times. The slide carriage has no automatic lock and the load of the trolley is unbalanced.

The modules are not to be handled up and down stairs.

Clear the site of all obstacles prior to commencing any handling.

See section ”6.4. Storage” på sida 36 for instruction of how to disassemble the CD200IQ into three separate parts.

WARNING!
THIS PROCEDURE IS ONLY MEANT FOR EMERGENCY SITUATIONS WHERE NO OTHER LIFTING OPTION IS AVAILABLE TO AVOID SERIOUS ACCIDENT ON TRACK! MAKE SURE YOU ARE FAMILIAR WITH ”CHAPTER 2, INTRODUCTION, SAFETY”

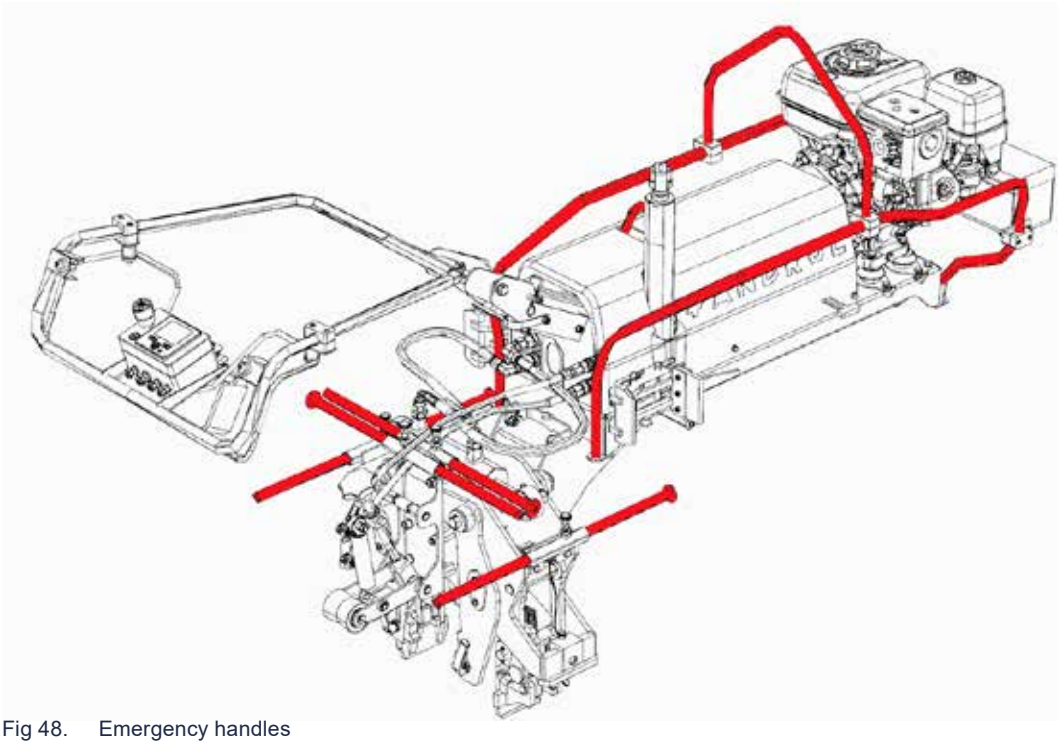

Fig 48. Emergency handles

7.4. Lift Weights Manual Handling

7.4.1. Complete Machine

WARNING! HEAVY WEIGHT

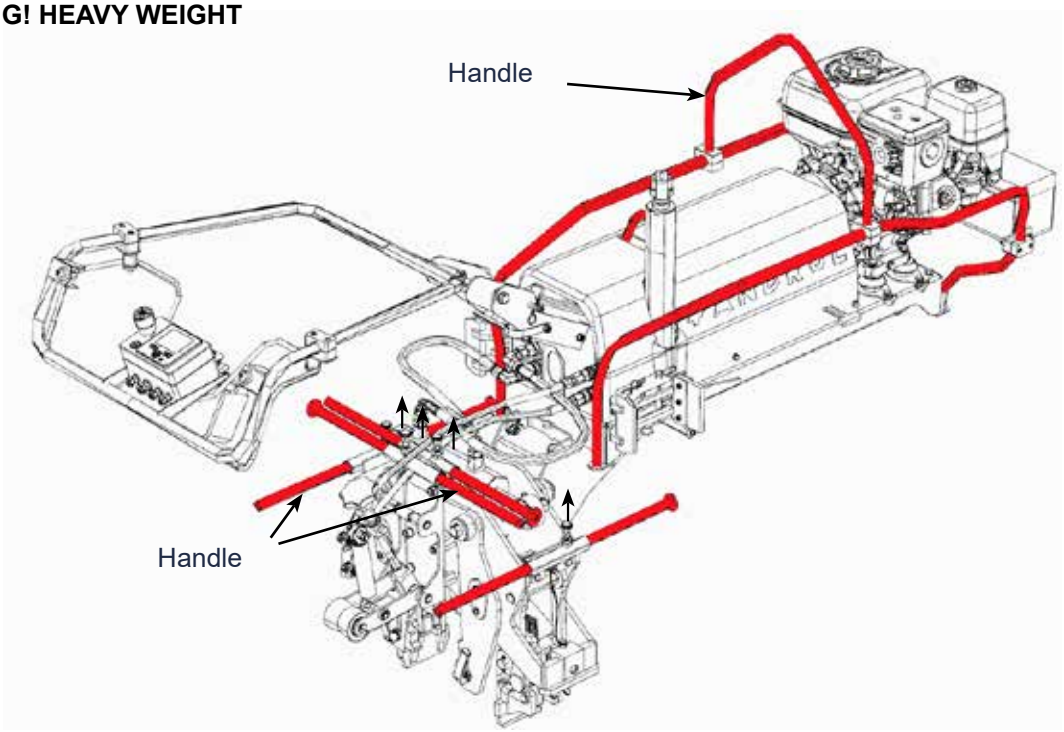

Fig 49. Overview Lifting handles

Weight Table

Model	Weight (kg)
FASTCLIP	254
e-CLIP	272

7.4.2. Manual Handling Power Pack

VARNING! HEAVY WEIGHT

Weight Table

Description	Weight (kg)
Powerpack	103

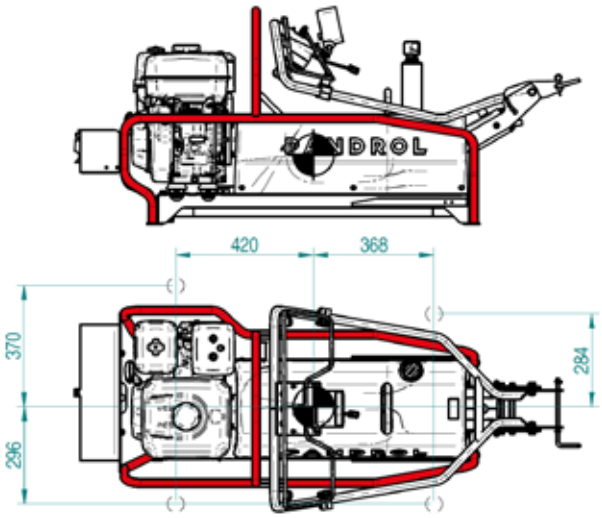

Fig 50. Overview lifting handles Powerpack

Weight Balance Powerpack

Pos.	Weight (kg)
1	22
2	27
3	27,5
4	26,5

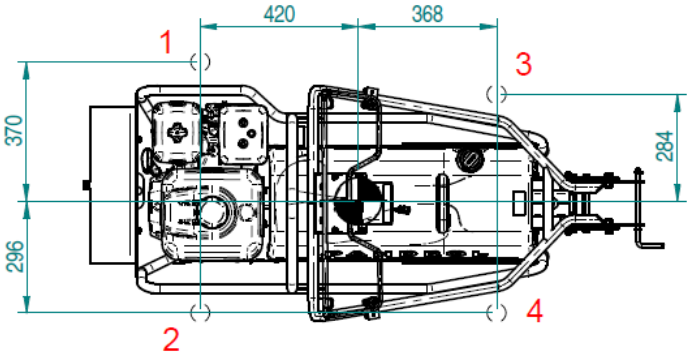

Fig 51. Weight balance Powerpack

7.4.3. Manual Handling Fastclip Work Head

VARNING! HEAVY WEIGHT

Weight Table

Description	Weight (kg)
Fastclip arbetshuvud	97

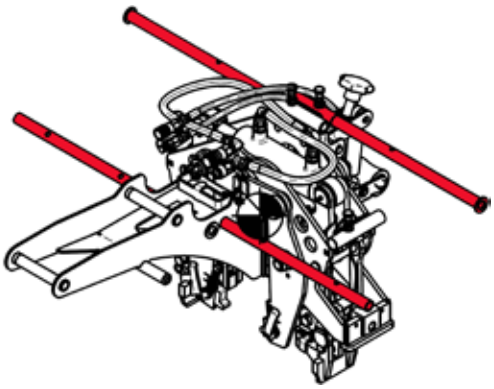

Fig 52. FE/FC work head

Weight Balance Fastclip Work Head

Pos.	Weight (kg)
1	22
2	22
3	26,5
4	26,5

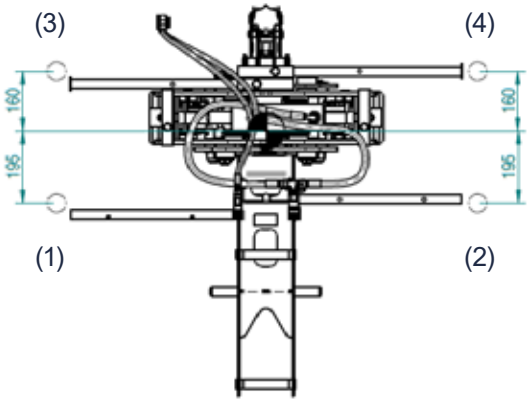

Fig 53. Fastclip work head

7.4.4. Manual Handling e-clip Work Head

VARNING! HEAVY WEIGHT

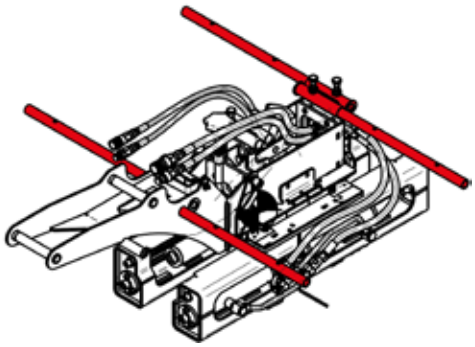

Fig 54. e-clip work head

Weight Table

Description	Weight (kg)
e-tclip arbetshuvud	115

Weight Balance Fastclip Work Head

Pos.	Weight (kg)
1	24
2	24
3	33,5
4	33,5

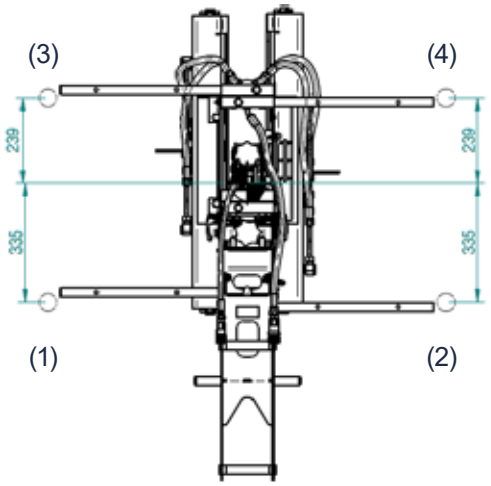

Fig 55. e-clips work head

7.4.5. Manual Handling Trolley

VARNING! HEAVY WEIGHT

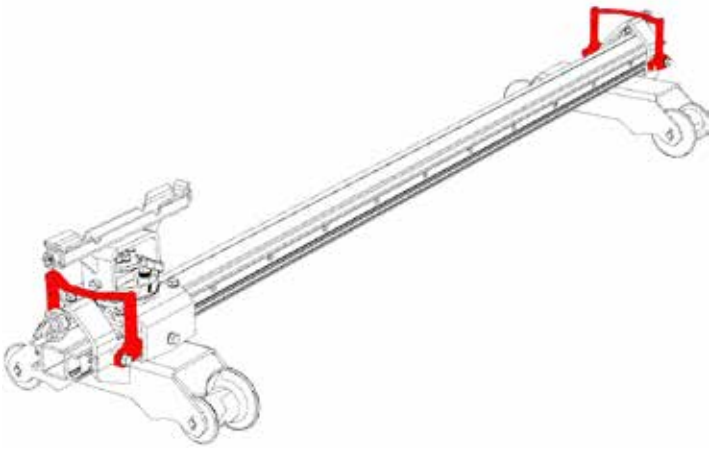

Fig 56. Trolley

Weight Table

Description	Weight (kg)
Trolley	54

Weight balance trolley

Pos.	Weight (kg)
1	32,5
2	21,5

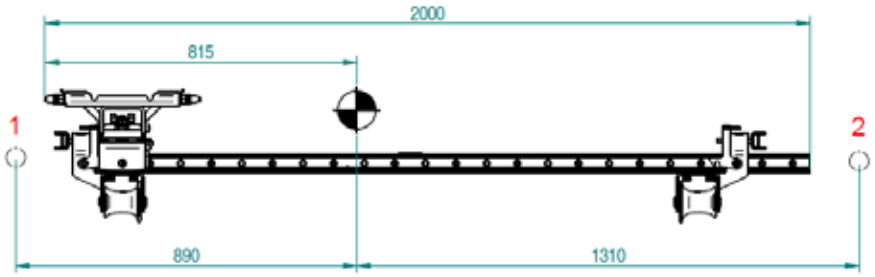

Fig 57.

7.5. Changing The Inclination

Inclination is preset depending on rail inclination. To be changed, the inclination pieces (4) needs to be replaced. To check the inclination setting, see inscription on the inclination piece.

There are three different options: 1:20, 1:30 and 1:40, see spare parts manual or consult Pandrol AB for more information

To change the inclination pieces:

1. Unscrew the horizontal bolt (1) and open the latch (2).
2. Unscrew the four vertical bolts (3) and replace the inclination pieces on both sides (4).
3. Tighten the four vertical bolts (3), put the latch (2) back and tighten the horizontal bolt (1).

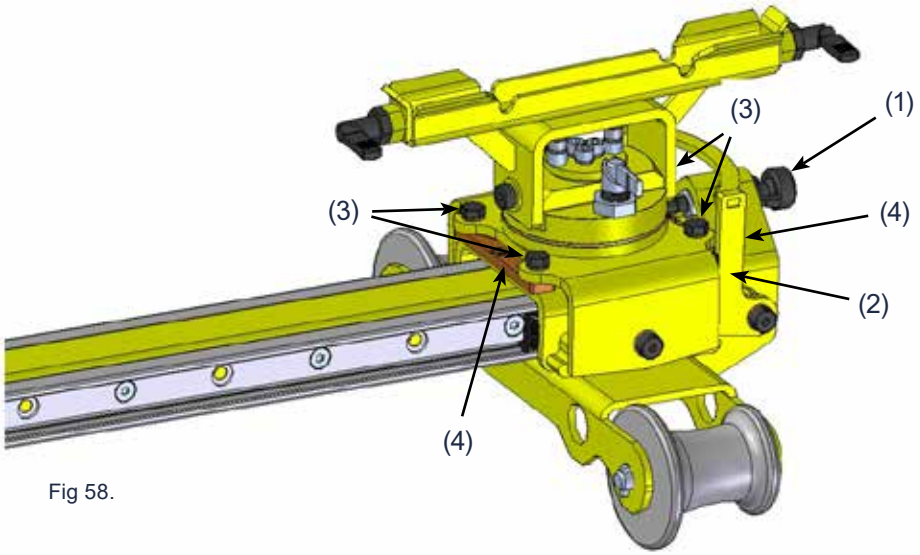

Fig 58.

7.6. Changing Direction Of Operation

CD200IQ is designed to make it quick and easy to change the direction of operation on track.

WARNING!
There is a risk that the operator and/or machine is brought outside set safety zone while changing the direction of operation. Consider this and make sure the change of direction is carried out within the safety zone, e.g. between the rails or on the side that is in the safety zone.

1. Open the two locking handles on the slide carriage.
2. Rotate the machine to desired work direktion.

NOTE! Lift the machine in its handles according to instruction ”7.3. On / Off Tracking Using Emergency Handles” på sida 43

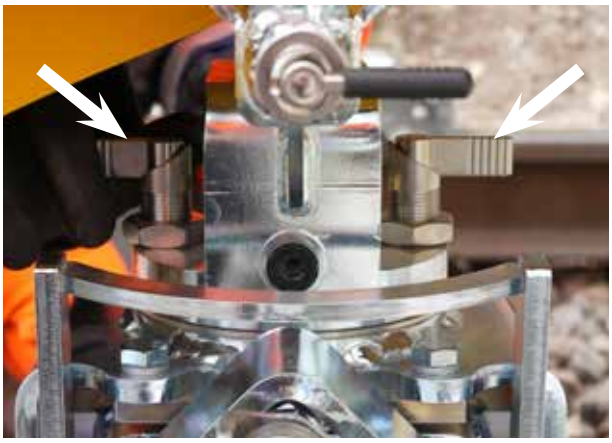

Fig 60.

3. Use the handles to rotate the machine. Use one hand on the operating handle and the other hand on the emergency handle to gain balance when rotating the machine.
4. The locking pins will automatically lock the work head when turned in position. Make sure that the machine is locked in position before starting to work.

Fig 61.

Fig 62.

7.7. Changing Rail Side of Operation

With CD200 it's quick and easy to change the rail side of operation.

1. Remove the brake wire, Pos. 1 and the plug, Pos 2 Fig 64. The trolley is now hold in position by the brakes.

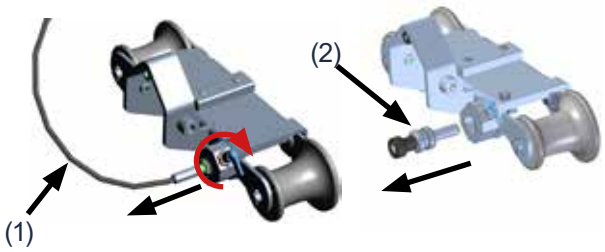

Fig 64.

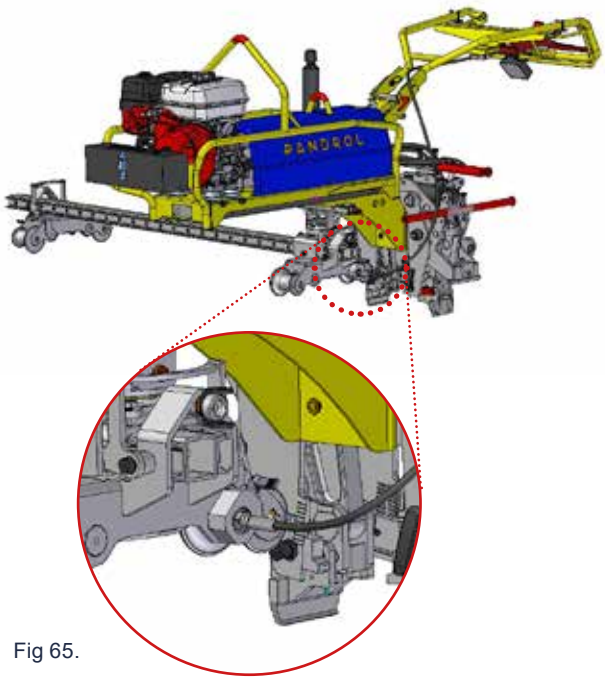

Fig 65.

2. Open the handles, Pos. 1, Fig 66 on both sides of the trolley.
3. Push the slide carriage to the opposite side of the trolley. Use one hand on the operating handle and

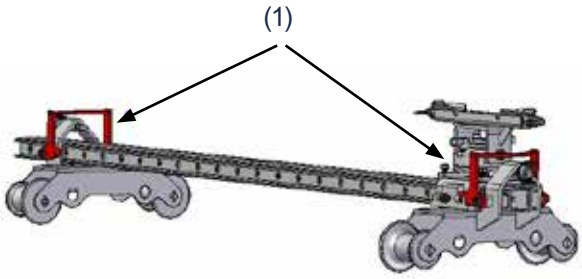

Fig 66.

the other hand on the emergency handle to gain balance when pushing the machine the machine. Fig 63.

NOTE! Do not lift the machine in the steering handle since it may damage it. Lift with one hant on the emergency handle and the other hand on the steering handle.

Fig 63.

4. Lock the handles (1) Fig 67 to secure the slide carriage in position.

NOTE!
Consider the rail inclination when locking the slide carriage in position; the main unit has to be tilted slightly to match the inclination, otherwise it will not be possible to get it firmly locked.

There should be some force required to close the latch. If it locks too easily the slide carriage will not be rigidly locked. This can be adjusted using the setting bolt for the slide carriage.

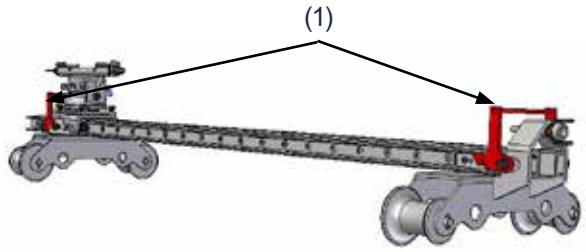

Fig 67.

Adjust clearance (Fig 69)

1. Loosen the locking nut (1)
2. Adjust the adjudtment screw until there is no clearance between the adjustment screw (2) and trolley.
3. Tighten the locking nut (1).

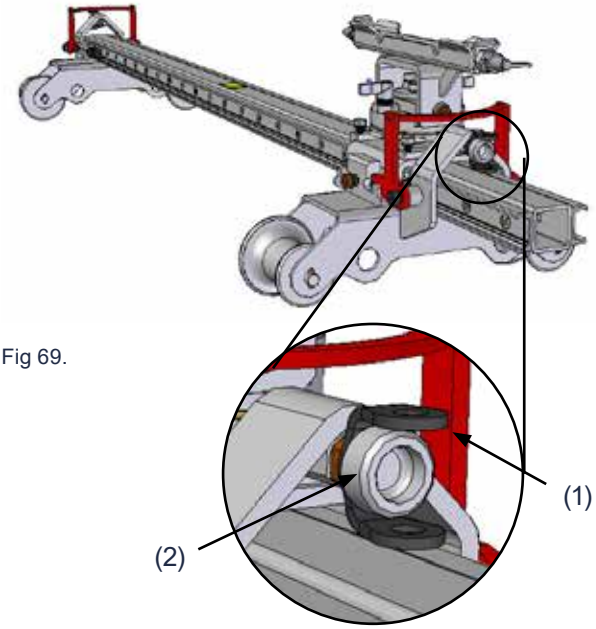

Fig 69.

5. Install the brake wire (1) and the plug (2) onto the trolley. Check the brake functionality.

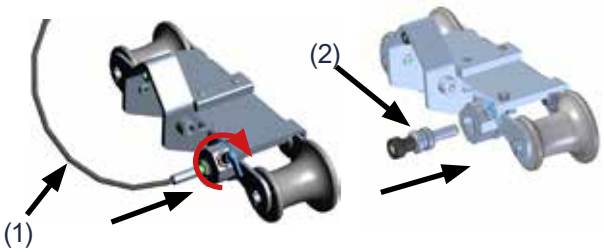

Fig 68.

8. Operation (FASTCLIP- Machine)

8.1. Clipping

8.1.1. Settings Before Clipping

1. Install the clipping shoe (1) in the correct position for the current clip assembly. Correct positions are presented in Table below. The current position can be determined using the scale on the side of the shoe (2).

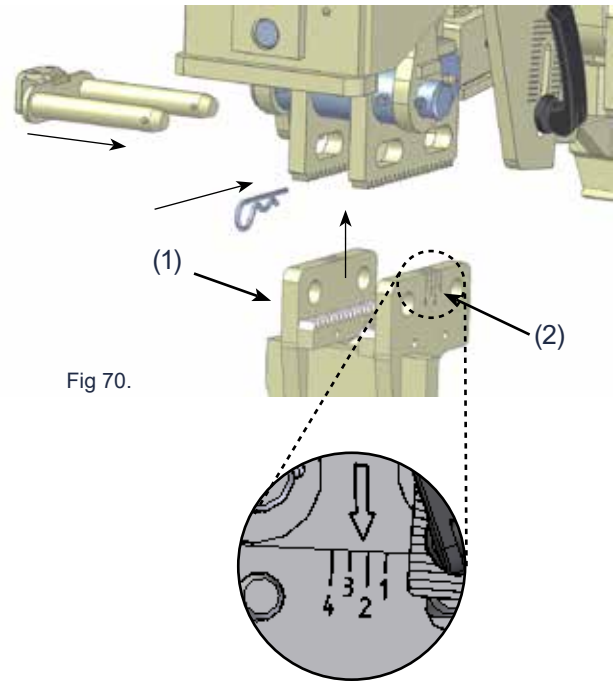

Fig 70.

Clips	Rälstyp	Nr.
FASTCLIP FE	UIC60	2
FASTCLIP FE	S49/S54	4
FASTCLIP FC1501	UIC60	2
FASTCLIP FC1504/1604	UIC60	1
FASTCLIP FC1501	S49/S54	3

NOTE! The machine is NOT limited to the combinations stated in this table. These combinations are only examples..

2. Make sure the mechanical stops (3) for de-clipping are inactive, i.e. bolt pointing outwards on both sides, (3) Fig 71..

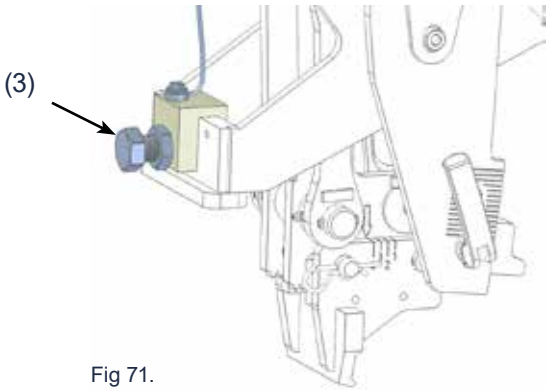

Fig 71.

3. Activate the dead-mans-handle and check that the clipping shoes are in the right height relative the clip. This depends on the type and dimension of the actual rail. If necessary, adjust the height of the work head with the adjustment screw (1) Fig 73.
   The distance (A), Fig 72 should be between 10-13 mm for FASTCLIP FE and 8-11 mm for FASTCLIP FC.

After clipping the FASTCLIP shall be in the position recommended by Pandrol. Measure its position and check with prescription documentation from Pandrol Rail Fastenings Ltd.

WARNING!
To avoid injury, ensure the engine is turned off before adjusting anything on the machine.

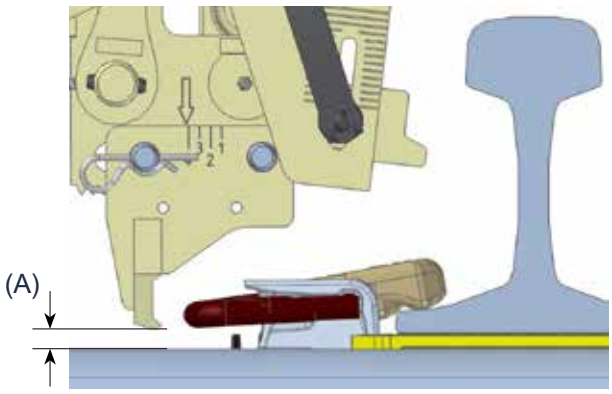

Fig 72.

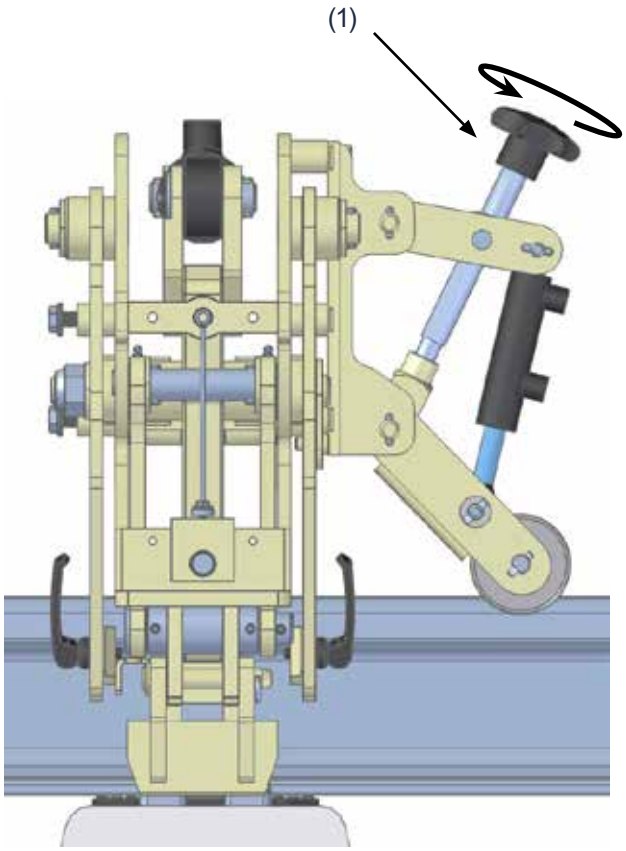

Fig 73.

8.1.2. Clipping

1. Make sure all settings described in previous chapters are performed
2. Set the machine to manual operation by pressing the button (2).
3. Set the tool to clipping mode by pressing the button (1).
4. Position the work head centered above the clip assembly.
5. Pull and hold the dead man's grip (7)
6. Press an hold the button (5) to operate the clipping function.
7. Push the button (6) to retract the clipping arms.
8. Ensure that there is no damage to neither clip or insulators.
9. Set the machine to auto clipping mode by pressing the button (2). on the user panel.
10. Bring the machine to the next sleeper. Initiate a clipping cycle by pressing the button (5). The clipping arms will retract automatically.

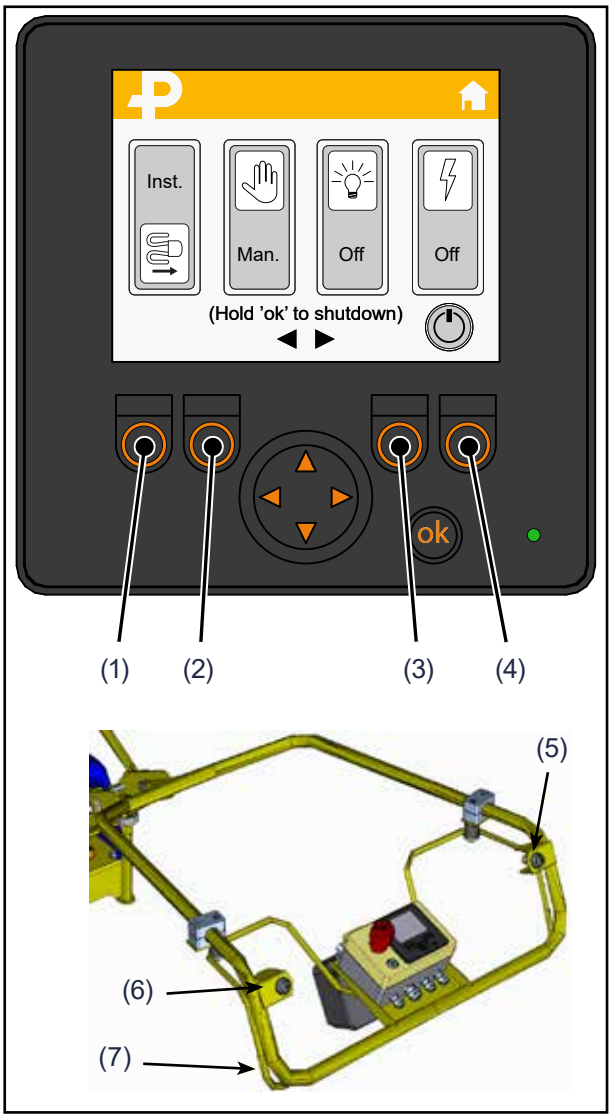

Fig 74.

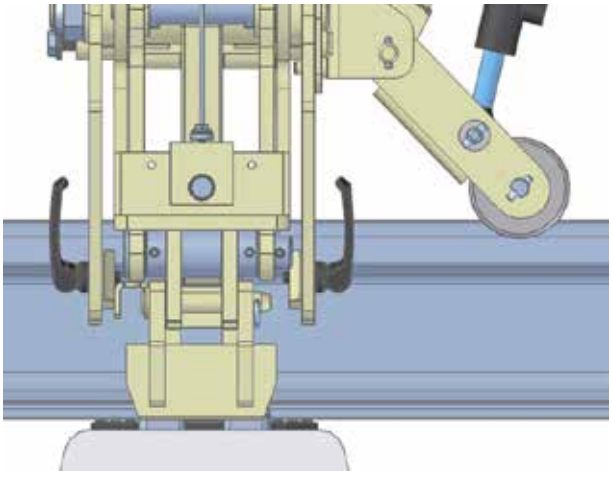

Fig 75.

8.2. Sleeper Lifting Operation

If a sleeper is more than about 10 mm low, a sleeper lifting operation is required.

1. Release the dead-mans-handle and let the work head be lowered so that the shoes reach down to the sleeper level.
2. Active the clipping cycle.
3. When the shoes are locked onto the back of the clips and have stopped moving, grab the dead-mans-handle and the sleeper will be lifted up towards the rail.
4. When the sleeper is lifted, the clipping operation will be completed automatically.
5. Move on to the next sleeper and repeat the sequence if necessary.

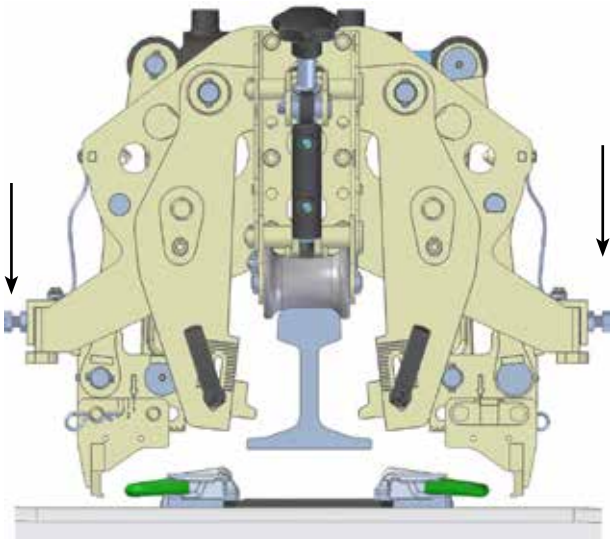

Fig 76.

NOTE!
FASTCLIPS secure the rail to the sleepers and are therefore a key element of the railway infrastructure. It is very important that operators and supervision staff

- **Check that clipping/de-clipping shoes have been correctly adjusted as described in this manual.**
- **Check that the installed clips have not been damaged during installation and that they have been properly installed in accordance to recommendations from Pandrol UK Ltd.**

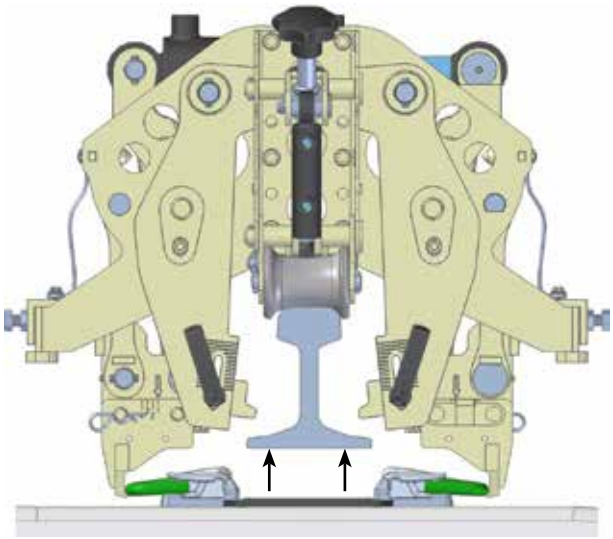

Fig 77.

8.3. De-clipping

8.3.1. Settings Before De-clipping

WARNING!
To avoid injury, ensure the engine is turned off before adjusting the work head.

1. Install the de-clipping shoe (1) in the right position for the current clip assembly. The current position can be determined using the scale on the side of the shoe (2), Fig 78.

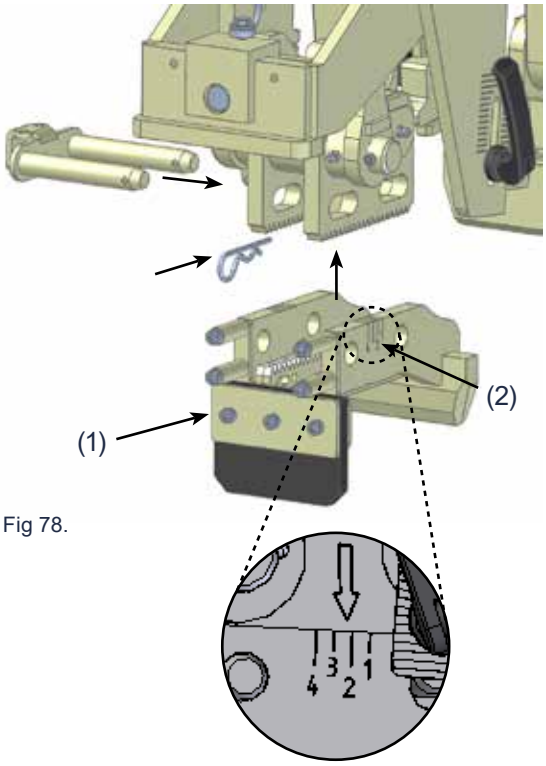

Fig 78.

Clips	Rail type	No.
FASTCLIP FE	UIC60	2
FASTCLIP FE	S49/S54	4
FASTCLIP FC1501	UIC60	2
FASTCLIP FC1504/1604	UIC60	1
FASTCLIP FC1501	S49/S54	3

NOTE! that the machne is not limited to the combinations listed in the table. These combinaio are ust used as exampled.

2. Check that the mechanical stops (3) for unclipping are active, the screws pointing inwards on both sides, Fig 79.

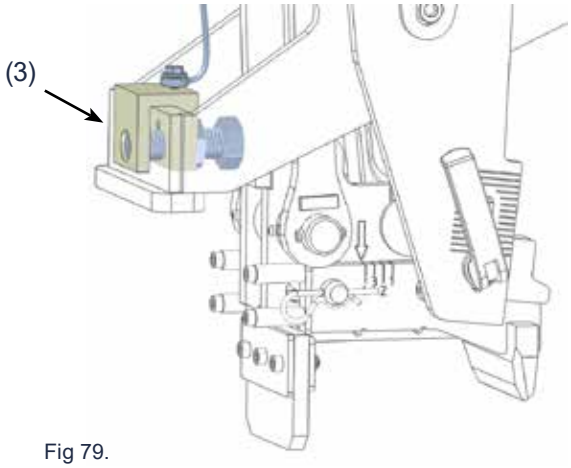

Fig 79.

3. Set the machine to manual mode by pressing the button (2) Fig 80.
4. Set the tool to de-clipping ”Ext” mode by pressing the button (1) Fig 80.
5. Activate the dead man’s grip (7), Fig 81. check that the de-clipping shoes are in the right height relative the clip.This depends on the type and dimension of the current rail. If necessary, adjust the height of the work head with the adjustment screw (1) Fig 82 on the sleeper lifter. There should be a gap of about 5 mm between the tip of the de-clipping pad and the foot of the rail.

Fig 80.

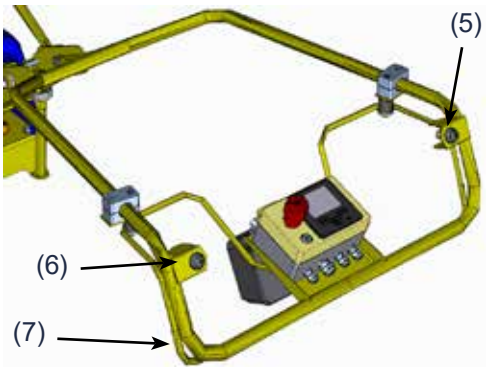

Fig 81.

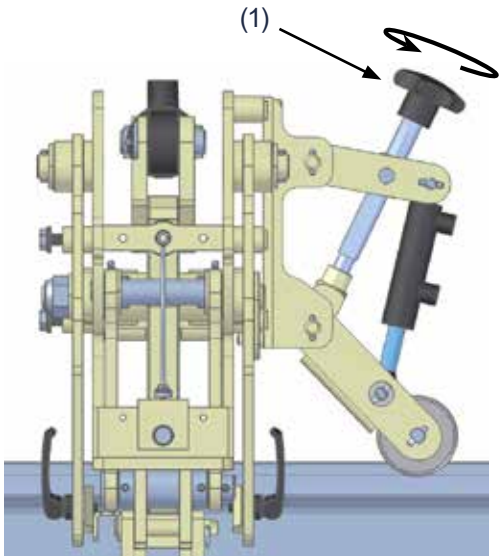

Fig 82.

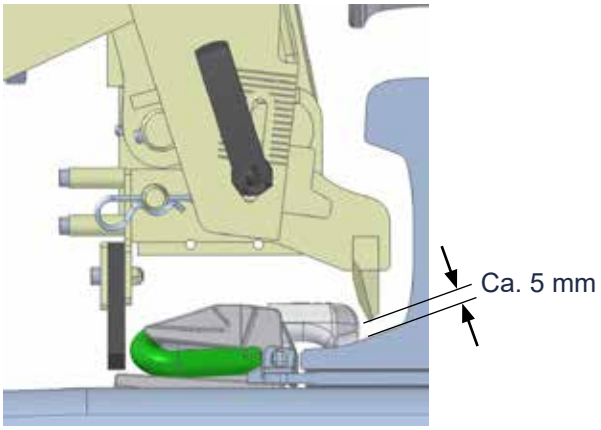

Fig 83.

6. Position the work head over the center of a clip assembly.
7. Start de-clipping in manual mode by pressing the button (6) Fig 81.
8. Run the de-clipping until the reference arms (4) close. The four reference plates (5) should now fit the profile of the lower parts of the head of the rail. Adjust if necessary.

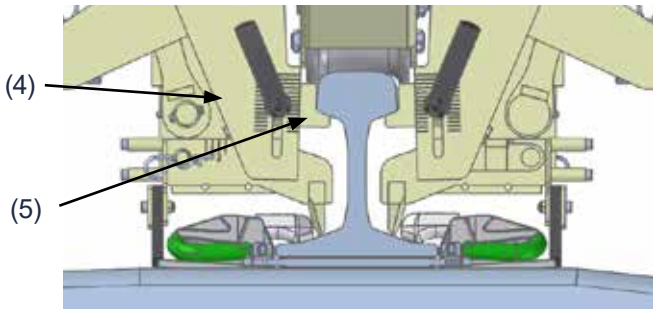

Fig 84.

8.3.2. Adjusting the reference plates

1. Open the arms by pressing button (5), Fig 81.
2. Adjust the four reference plates by opening the excentric lock handle. (1), Fig 85.
3. Position the reference plate to fit the actual rail type.
4. Position the work head in between two sleepers to operate the arms against the mechanical stop.(3) Fig 86.
5. Check the de-clipping plate position against the rail foot. Adjust if necessary
6. Position the work head over the center of a clip assembly.
7. In manual operating mode, run the de-clipping sequence by pressing the button (6) Fig 81.
8. Ensure that the clips are completely retracted.
9. If the clips are not fully retracted, adjust the mechanical stop screw (3) Fig 86.

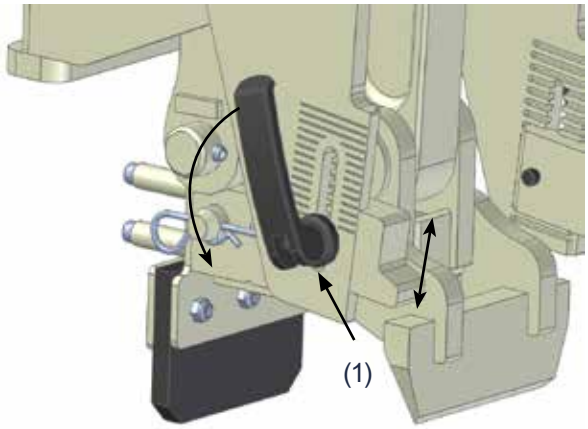

Fig 85.

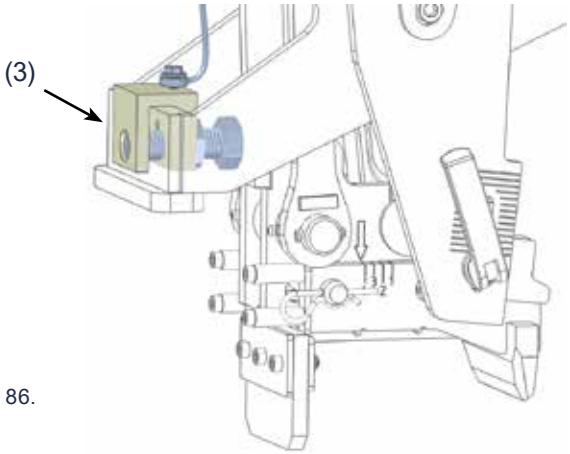

Fig 86.

8.3.3. Adjusting the Rubber Stop

The rubber stop (1) can be reversed to fit different types of clips.

To reverse the rubber stop:

1. Unscrew the four screws (2).
2. Reverse the rubber stop unit (1).
3. Re-tighten the screws (2).

Repeat the procedure on the other side of the work head.

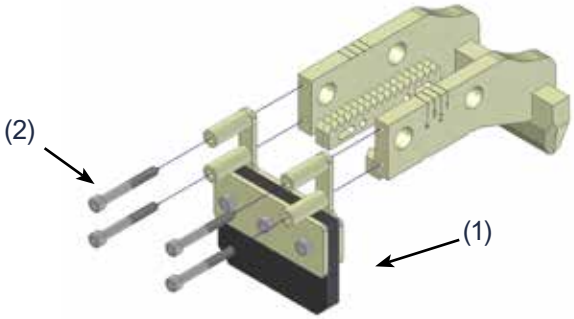

Fig 87. Rubber stop set to fit FASTCLIP FE

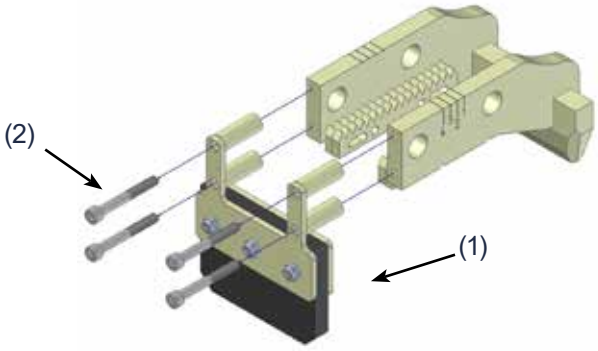

Fig 88. Rubber stop set to fit FASTCLIP FC

8.3.4. De-clipping

1. Ensure that all necessary adjustments and settings is carried out according to instructions in sections 8.3.1, 8.3.2 and 8.3.3.
2. Set the machine to manual mode by pressing the button (2) on the control panel.
3. Set the tool to de-clipping mode ”Ext” by pressing the button (1) on the control panel.
4. Position the work head over the center of a clip assembly.
5. Hold the dead man’s grip (7) to enable operation.
6. Press and hold the button (6) to manually de-clip the clips. Press the button (5) to retract the clipping arms.
7. Make sure that the FASTCLIP does not have any damage to neither the clip or the insulator.
8. Set the machine to Auto mode maskinen i Auto-läge by pressing the button (2) on the control panel.
9. Bring the machine to the next sleeper.
   Initiate a de-clipping cycle by pressing the button (5).
   The clipping arms will retract automatically.

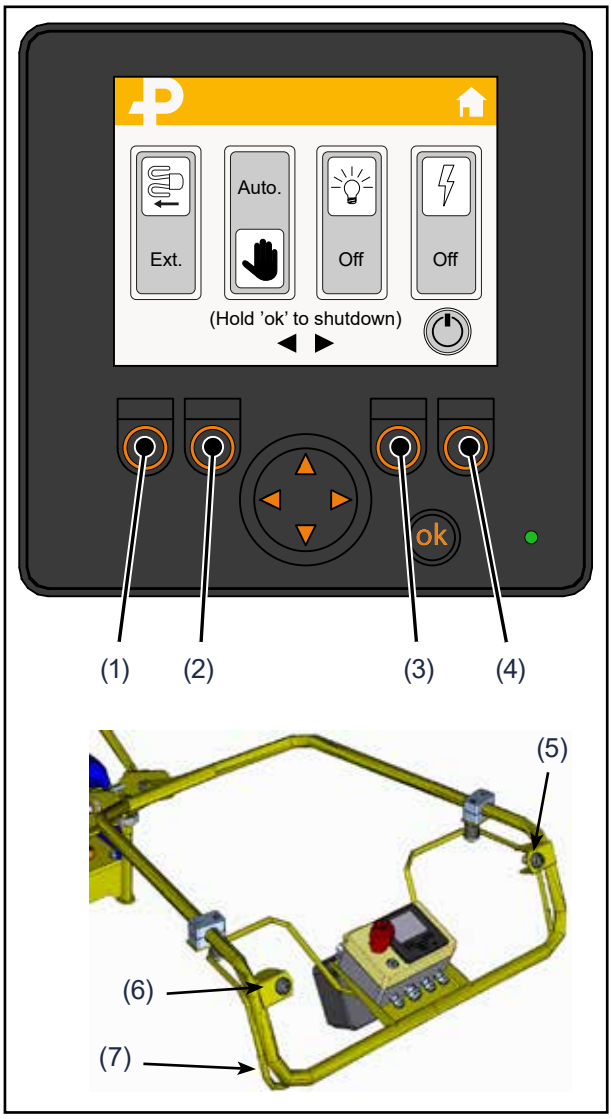

Fig 89.

Boost function

If a clip is jammed due to rust or other, the boost function can be used to gain extra power.

1. Set the machine to manual mode by pressing the button (2) on the control panel.
2. Activate the boost function by pressing the button (4).
3. Press the button (6) to de-clip.

8.4. Storing clip/de-clipping plates

Double pins are located on both sides of the power pack where to store the plates when not in use.


Fig 90. Storing the clipping/de-clipping plates.

9. Operation (E-Clip- Machine)

9.1. Adjustments before start

Make sure that the work head is parallel with the rail. If not, adjust according to instructions below.

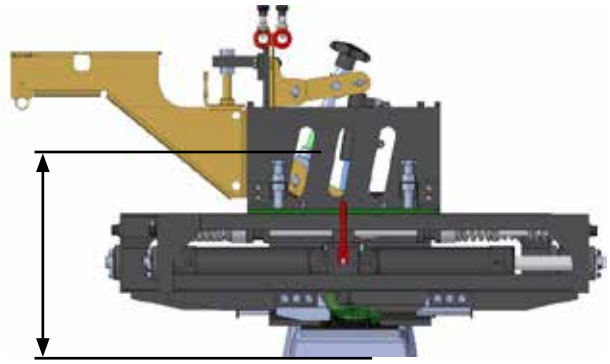

Fig 91. Parallel with the rail

1. Loosen the four excentric lock handles. (3), Fig 92.
2. Turn the knob (1), Fig 92 to adjust the height until the workhead is in parallel with the rail, Fig 91.
3. Tighten the excentric lock handles.
4. Fine adjust the height by turning the knob (2) Fig 92. When correctly adjusted, the double hook shall measure 2-3 mm above the shoulder Fig 93.

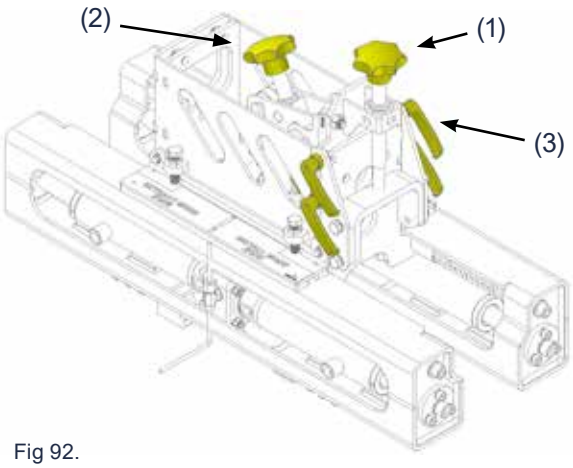

Fig 92.

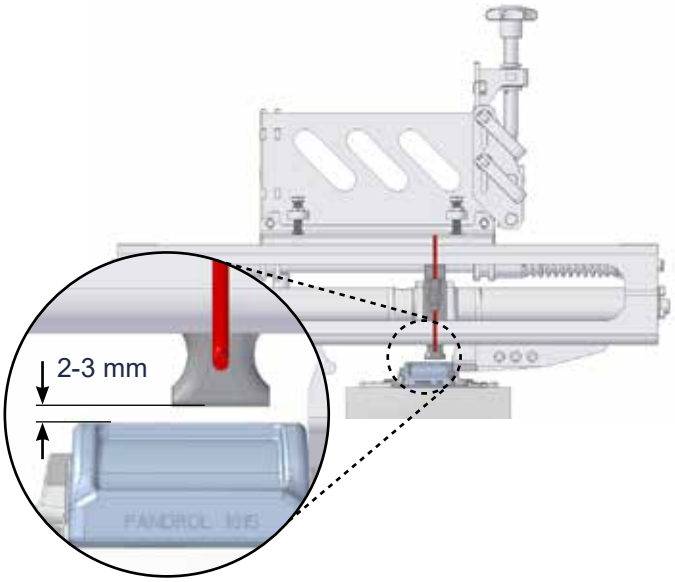

Fig 93.

9.1.1. Adjusting the sliding pad

Make sure that the sliding pad is correctly adjusted towards the frame. There should not be any gap or play between the sliding pad and the frame. The frame must slide easily to center with the indicator toward the center marker. This adjustment shall be carried out weekly.

If adjustment is needed:

1. Loosen the screws (1).
2. Loosen the nuts (3).
3. Turn the adjustment screws (2) until there is a slight friction between the frame and sliding pad.
4. Tighten the nuts (3).
5. Tighten the screws (1).

Repeat the adjustment on the opposite side of the tool.

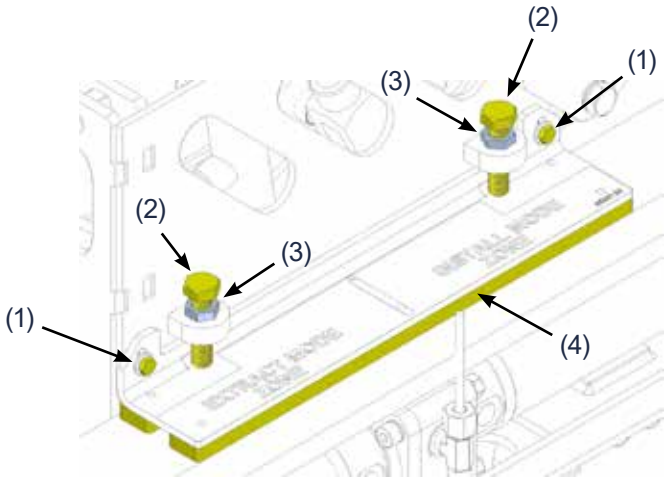

Fig 94.

Pos.	Description
(1)	Screw
(2)	Adjustment screw
(3)	Nut
(4)	Sliding pad

9.2. Clipping

WARNING!
Do avoid injury or damage, make sure that the engine is turned off before any adjustments are made.

1. Make sure that all neccesary adjustments and settings described in previous chapters are carried out.
2. Set the machine to manual mode by pressing the button (2) on the control panel.
3. Check that the indicator (1), Fig 97 is set to ”Installation mode”.
4. Set the tool to clipping mode ”Inst.” by pressing the button (1).
5. Position the workhead centered above the clips.
6. Pull the dead man’s grip to activate (7).
7. Press and hold the button (5) to operate the clipping function.
8. Press the button 6 to retract the clipping arms.
9. Make sure that there are no damages to the insulator or the installed e-clip.
10. Set the machine to auto mode by pressing the button (2) on the control panel.
11. Transfer the machine to the next sleeper.Initiate a clipping sequence by pressing the button (5). The clipping hook will retract automatically.

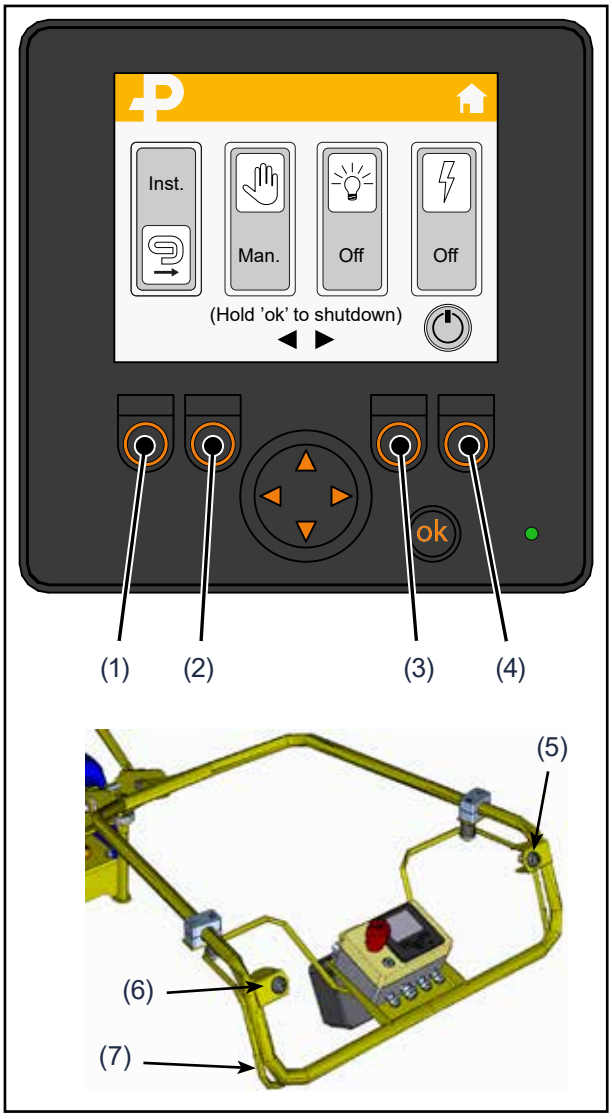

Fig 95.

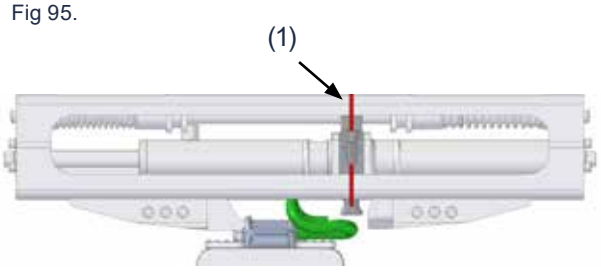

Fig 96. Tool set to ”Installation mode”

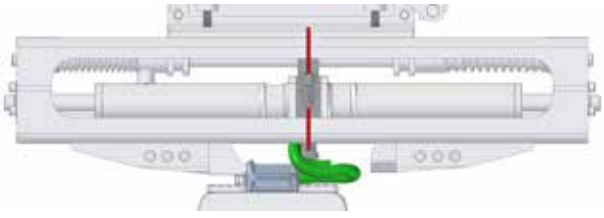

Fig 97.

9.3. De-clipping

WARNING!
Do avoid injury or damage, make sure that the engine is turned off before any adjustments are made.

9.3.1. De-clipping

1. Make sure that all neccesary adjustments and settings described in previous chapters are carried out.
2. Set the machine to manual mode by pressing the button (2) on the control panel.
3. Set the tool to de-clipping mode ”Ext.” by pressing the button (1).
4. Position the workhead centered above the clips.
5. Pull the dead man’s grip to activate (7).
6. Press and hold the button (6) to operate the clipping function. Press the button (5) to retract the clipping arms.
7. Make sure that there are no damages to the insulator or the e-clip.
8. Set the machine to auto mode by pressing the button (2) on the control panel.
9. Transfer the machine to the next sleeper.Initiate a clipping sequence by pressing the button (5). The de-clipping arms will retract automatically.

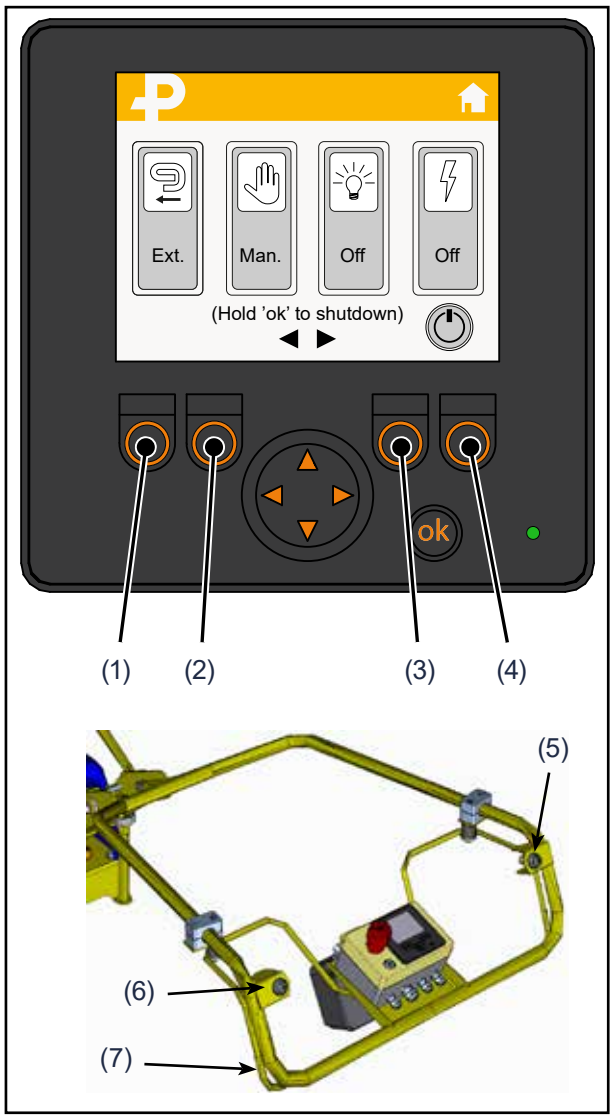

Fig 98.

Boost function

If a clip is jammed due to i.e. rust, the boost function can be used to gain extra power to the de-clipping function.

1. Set the machine to manual mode by pressing the button (2) on the control panel.
2. Activate the boost-functionen by pressing the button (4).
3. Press the button (6) to operate the de-clipping function and release the jammed clip.

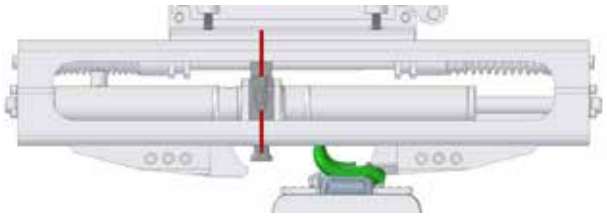

Fig 99. Tool set to EXTRACT MODE ZONE.

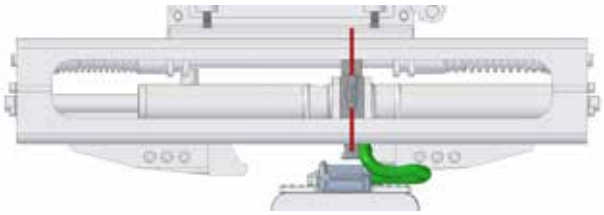

Fig 100.

10. Troubleshooting

10.1. Clips are being installed before sleeper is fully lifted

Possible causes:

- Sleeper stuck in ballast
- The pressure switch for the sleeper lifter is set to low

Solution:

- Lift only free laying sleepers
- Pressure switch for clipping function may need to be adjusted. This adjustment should only be done after consulting a retailer or Pandrol AB.

10.2. Clips are not being fully installed

Possible causes:

- Clipping shoe not in correct position
- Clipping pressure to low

Solution:

- Change position of clipping shoe
- Pressure switch for clipping function may need to be adjusted. This adjustment should only be done after consulting a retailer or Pandrol AB.

10.3. Clips are being over driven

Possible causes:

- Clipping pressure to high

Solution:

- Pressure switch for clipping function may need to be adjusted. This adjustment should only be done after consulting a retailer or Pandrol AB.

10.4. Clipping shoe rides over clip on one side

Possible causes:

- Clipping shoe rides over clip on one side.

Solution:

- Set inclination according to chapter.

10.5. The tools are stuck to the rail

Possible causes:

- Electrical fault
- Out of fuel
- Faulty engine

Solution:

The tools can be forced to be opened if a emergency occurs by

removing cover and pushing button on valve.

(1) Clipping/Declipping tool

(2) Sleeper lift

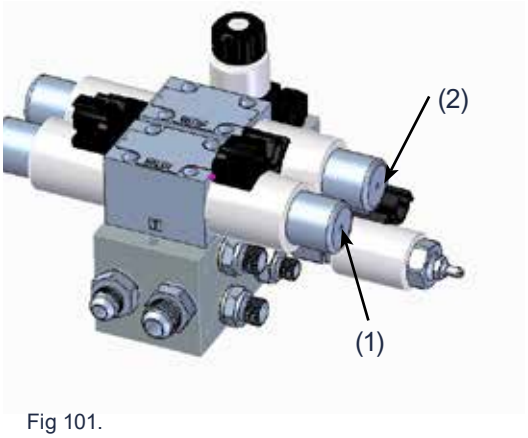

Fig 101.

11. Maintenance

11.1. General

MAINTEANCE AND OVERHAUL SHALL ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL

CD200IQ is designed to require a minimum of maintenance. All components are selected funcion for a long time of period and to maintain high quality.

Required maintenance:

- Daily inpection and mainentance before and after working shift.
- Grease lubrication every 40 working hours or once per week.
- General maintenance every 500 working hours or once per year.

Warranties and claims are only valid and accepted if Pandrol original spare parts are used and the work is carried out by a qualified service provider approved by Pandrol. All warranty related work must be approved and documented by Pandrol AB before warranty repair work is carried out.

WARNING!
All adjustments, overhaul and maintenance must be carried out with the engine shut down, cooled down, tools disconnected and depressurized. Ignoring this can lead to severe injury of a person or damage to the equipment. All service and maintenance work must be carried out by a qualified person approved by Pandrol AB.

11.2. Maintenance schedule

Item	Action	Frequence		
		Before every use	Once per week or every 40 h	Once per year or every 500 h
Hydraulic fluid	Check oil level with oil dipstick**	X		
Hydraulic fluid	Replacement***			X
Hydraulic return filter	Replace filter			X
Breathing filter tank	Replace filter			X
Complete machine	Check for leakage	X		
Screws an nuts	Check and tighten if necessary	X		
Lubrication Fastclip work head	Lubricate with SKF LEGP 2 or similar		X	
Slide plates on trolley	Clean and lubricate with oil*		X	
Screws	Lubricate with oil*		X	
Engine	See Honda instruction manual	X	X	X
Decals and signs	Replace worn and missing decals and signs	X		
Cleaning	Wash with warm water and clean with non agressive solvents. Lubricate when the machine is dry.	X		

*) CRC 5-56, WD-40 or similar

**) Wait at least one hour before checking oil level.

***) Recommended hydraulic fluid:

At suurounding temperatures below 25°C, hydraulic fluid with viscosity class 46 is recommended. At surrounding above 25°C, hydraulic fluid with vicosity class 68 is recommended.

It is important to follow these service intervals in order to guarantee safety.

11.3. Lubrication points on Fastclip

NOTE

This only applies for Fasclip since e-clip does not have any grease nippes.

Lubricate every 40 h or once per week.

Use Shell Alvania EP2, BP Energrease LS-EP-2 or similar. Use grease gun and apply until fresh grease emerges. Använd en fettpistol och applicera tills färskt fett pressas ut. Wipe off excess grease.

Replace damaged grease nipples.

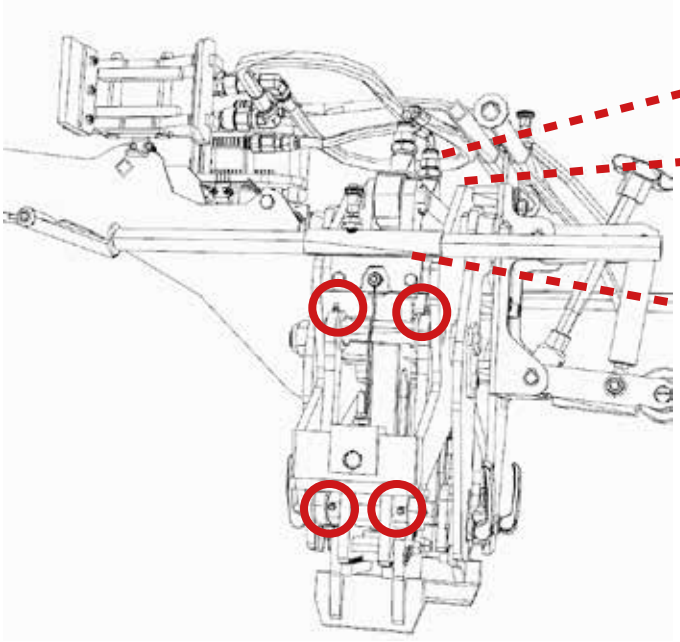

Fig 103.

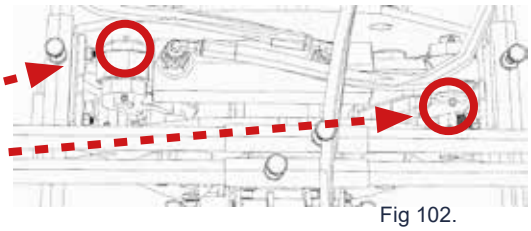

Fig 102.

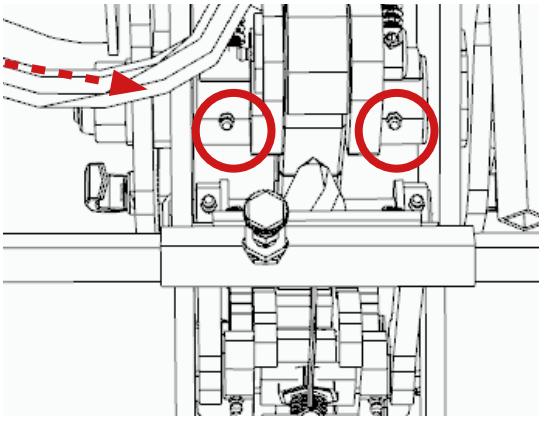

Fig 104.

11.4. Engine

Please read the engine user manual for manintanance instructions.

11.5. Hydraulic fluid level – Check

Check the hydraulic fluid level with the dipstick.

Clean the area around the filling cap and fill with hydraulic fluid if necessary.

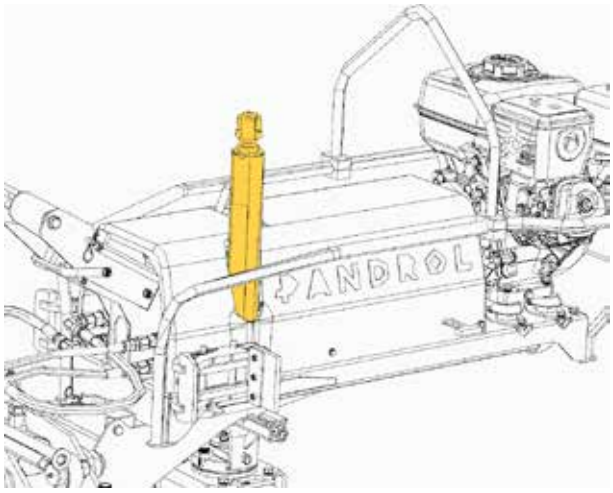

Fig 105. Hydraulic fluid tank

11.6. Hydraulic filters – Check

Check fhe following filters:

- Breathing filter Fig 106
- Return filter Fig 107

Replace if necessary.

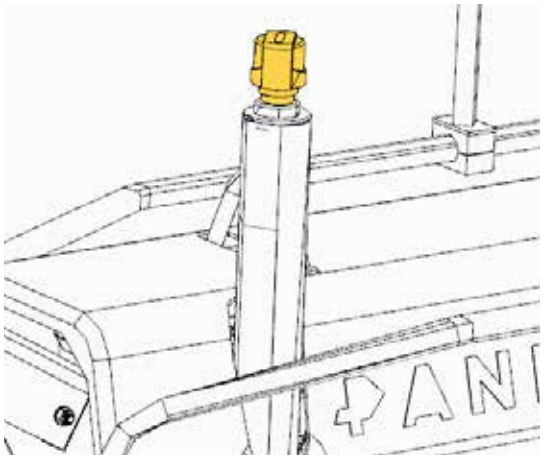

Fig 106. Breathing filter

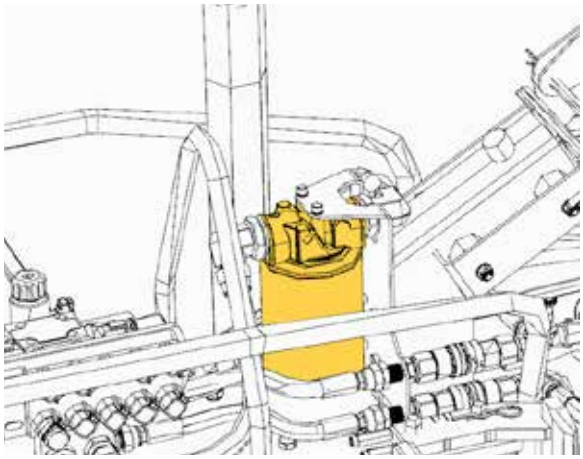

Fig 107. Hydraulic fluid return filter

11.7. Changing hydrailic fluid

1. Drain the hydraulic system via the drain plug at the bottom of hydraulic fluid tank.

   IMPORTANT!
   Empty the contaminated fluid in a approved container with capacity according to the hydraulic system volume.

2. Replace the hydraulic filters.
3. Fill the hydraulic fluid tank according to specification below. The system volume is approximately 7 L. Use the dipstick to check the fluid level.

Hydraulic fluid specification

Fluid used for filling must be clean. No not mix different typer of hydraulic fluid. Hydraulic fluid approved by Pandrol must fulfill one of the standards given below.

- DIN 51524 del 3
- SS 15 54 34
- ISO 11158 HV

Example: Shell Tellus S2 M46, BP Bartran HV 46.

Hydraulic fluid suppliers must be able to verify that the quality and prestanda fulfill the standards given above. Always contact Pandrol if the hydraulic fluid will be replaced with a non-mineral fluid such as syntetic or biograde fluid.

Panolin HLP SYNTH 46.

Fluid viscosity

The fluid viscocity is of grat importance to achieve the best possible efficiency within the hydraulic system. The numbering of fluid in the table below showing the viscosity at 40°C.

Fluid viscosity at 40° C	Temperatur
32	-25°C to 75°C
46	-15°C to 90°C
68	-5°C to 90°C

If the machine is used in an arctic environment, a fluid with viscosity lower than 32 shall be used.

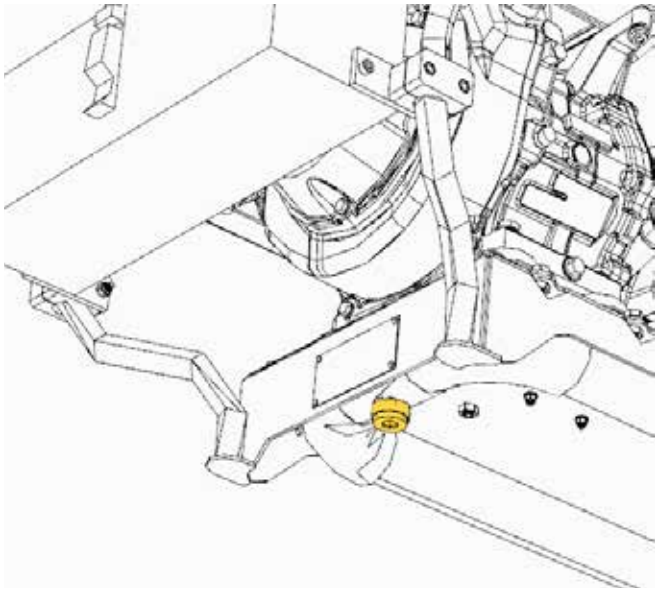

Fig 108. Drain plug

11.8. Hydraulic pressure and flow – Test

Flow measurement procedure.

Fillowing conditions to be fulfilled:

1. Take appropriate precautions to not contaminate the fluid. Clean areas and surfaces of where the test equipment shall connect to the hydraulic system.
2. Use a flowmeter, manometer och flow restrictor classified for the specific pump flow and pressure. Make sure that the test equipment is calibrated to give the correct values.

Pressure test:

Connect a pressure gauge to the quick coupler. Start the engine and run at maximum speed. Check the pressure value given and compare with the table below.

Flow test:

Connect the flow meter to the quick couplers Anslut flödesmätaren till snabbkopplingarna. Start the engine and run at maximum speed. Check the flow value given and compare with the table below.

If the flow measured is 90% or higher than specification, the hydraulic pump is in good condition.

Pressure and Flow specification

Pump	P1
Flow L/min	17
System pressure	215 Bar

11.9. Brake pads

Use a calibrated measurement device to measure thickness of the brake pads.

Replace if the thickness of the brake pad is less than 2 mm.

11.10. Inspection of rail wheel profile

Examine the Back-To-Back measure

Using a calibrated gauge, check that the back-to-back measurement is within tolerance at the top and bottompositions of the wheels, record findings on table 1. Note! This can only be measured with the machine sitting on the rails.
If back-to-back dimension is out of tolerance adjust with shims.

Examine axial/radial play

Turn the trolley upside down. Clean the entire wheel flange and tread, removing,grease, corrosion and debris. Rotate the wheel and check that there is no sign of axial or radial play in the bearings, or noises or harshness.

If axial or radial play in the bearing exceeds 0,05 mm, or noise or harshness is detected, dismantle and replace the bearings and rectify the defects. Note! This work must be carried out in a workshop.

Examine wear

Rotate the wheel slowly by hand, and examine all surfaces of the wheel, checking for cracks, cavities, metal migration and flats.The acceptable limits for all wheel parameters are found in, Wheel Examine Record Form.

Replace worn wheels in pairs or re-profile in pairs.

NOTE!

If flat is more than 30 mm, remove from service immediately. If flat is 20-30 mm, remove from service on completion of work.

Examine the wheel profile

Usa a profile gauge Fig 109. Profile template" to check that the wheel profile is within limit Fig 110.

Wear limit max 3 mm

Fig 109. Profile template

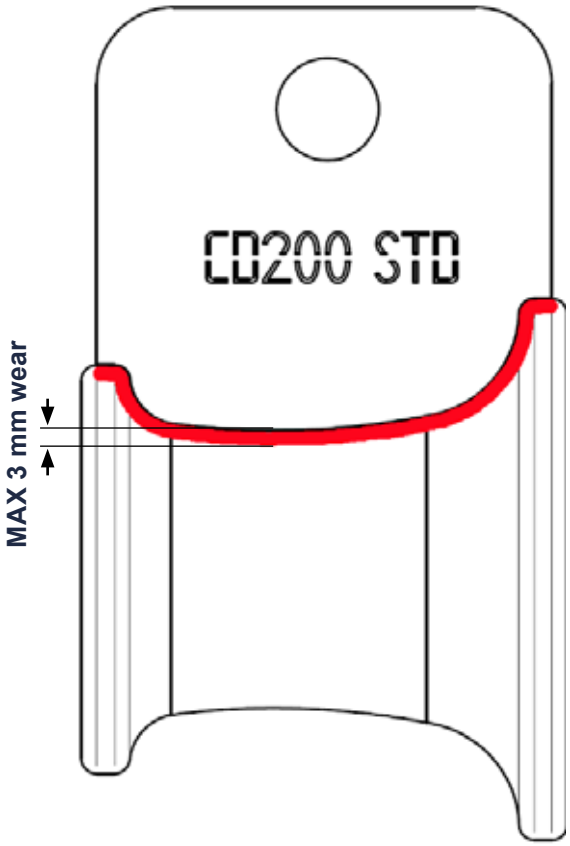

Fig 110. Wear limit max 3 mm

Description Klausul A

Limit for false flange

The maximum allowed wear och the thread must not exceed 2 mm. If the wear exceeds 2 mm the wheel need to be re-profiled or replaced.

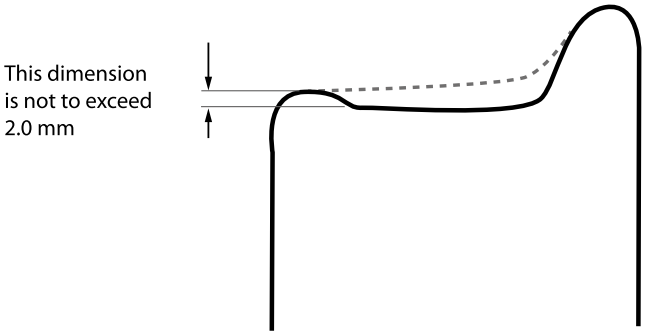

Fig 111. Maximum allowed wear

Cracks

Cracks normally have a jagged saw tooth type of surface profile with sharp edges. Cracks will normally form at the tread chamfer in an axial direction (across the thread ”Fig 112. Wheel with crack”.

No cracks are permitted. Replace wheels unless the cracks can be completely removed by re-profiling.

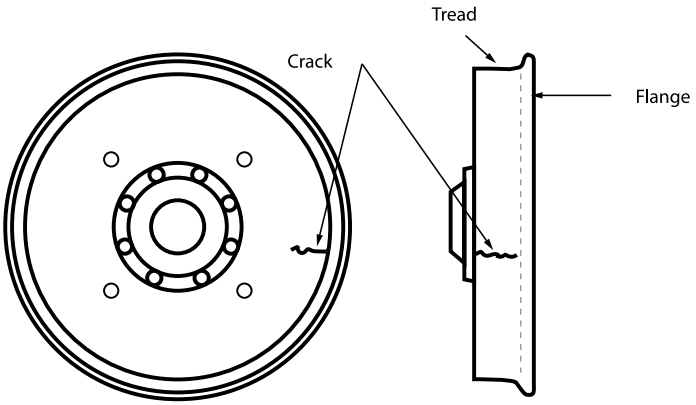

Fig 112. Wheel with crack

Cavities

Rolling contact fatigue causes microscopic subsurface cracks which develop into a localised network, Fig 113.

Over a long period small sections or spalls break away leaving cavities, Fig 114.

Record the number and length of the cavities. Take action if the length of any cavity exceeds 15 mm, or if two cavities are within 50 mm of each other and their combined length exceeds 15 mm. Re-profile wheels to remove cavities and cracks, otherwise replace the wheels.

Fig 113. Microscopic cracks

Fig 114. Cavities

Migration

Material migration results from a rolling action that forces the surface material sideways. This can occur in two places:

Tread Rollover

This forms on the tread chamfer ”Figure 153. Rollover”. The maximum allowable is 5 mm. Associated with this are circumferential cracks ”Figure 152. Circumferential cracking limit associated with rollover” which do not affect the integrity of the wheel.

Migration down the flange

Shown in ”Figure 154. Migration down the flange” where the extreme edges have flaked off. This does not affect the integrity of the wheel. These defects are removed when re-profiling becomes necessary to restore the wheel profile

Fig 115. Circumferential cracking limit associated with rollover

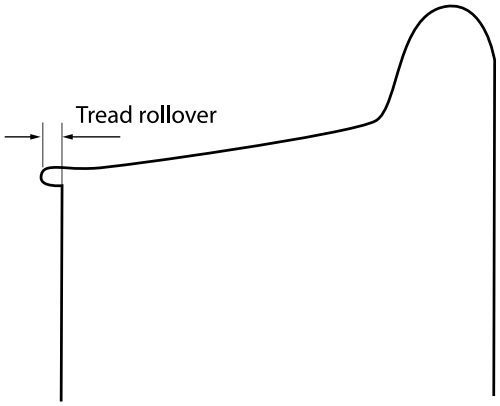

Fig 116. Rollover

Fig 117. Migration down the flange

11.11. Examination of clipping pads

To ensure correct clipping, carry out daily inspection to determine any wear on the clipping pad edge. If any part of the edge is less than 1 mm, the pad must be replaced.

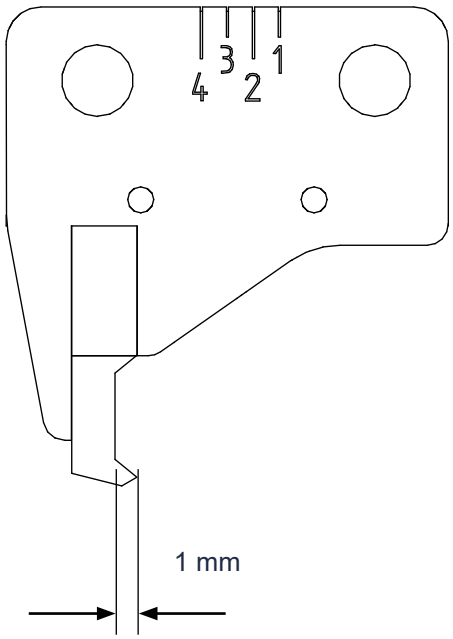

Fig 118. Examin the clipping pads

11.12. Examination of de-clipping pads

To vaoid damage to the insulator at de-clipping, carry out daily inspection of the surface by sensing with the thumb or a finger. Uneven surface and sharp edges will harm the insulator. If the surface irregularities are more than 50 µm, the pad must be replaced.

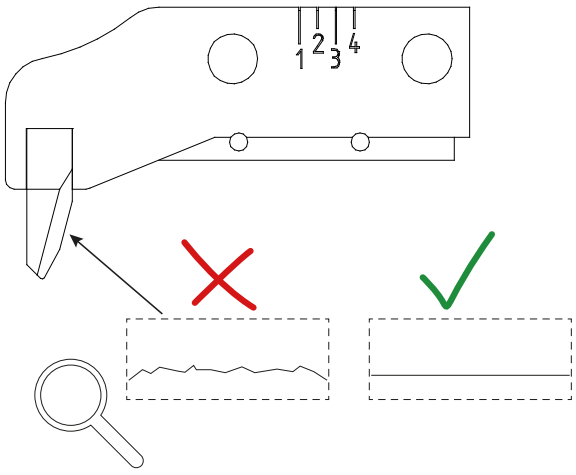

Fig 119. Examine the de-clipping pads

12. Nominal mounting torque, Nm

The material preload shall be kept on a level so that tensile stress and torsional stress does not exceeds the yield strength of the screw. Its main purpose is to clamp the parts to achieve friction between the clamped parts.

Pandrol AB mailly use screws made from steel. The table below show the nominal tightening torque for the screws and bols used.

NOTE!
These tightening torques do not apply for wheel bearings.

Thread diameter	Strength class [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 tightening torque for all bolts and nuts every 8 h until the machine has been in operation for 80 h. Tighten if necessary.

13. Warranty and Service

13.1. Warranty

All products from Pandrol AB are subject to a 12 month warranty.

The warranty does not apply if the product defect or flaw in question exists because of or is a result of improper use, tampering, or unauthorized modification, or if the product has been exposed to fire, electrical storms or excessive voltage.

Warranties and claims are only valid and accepted if Pandrol original spare parts are used and the work is carried out by a qualified service provider approved by Pandrol. All warranty related work must be approved and documented by Pandrol AB before warranty repair work is carried out.

13.2. Service

Regular maintenance will make the product more reliable and extends its lifetime. Service is offered after the expiration of the warranty as well. Please contact your local dealer or Pandrol AP for more information.

13.3. Disclaimer

Pandrol AB disclaims any use that deviates from what is recommended in this manual.

13.4. Contact

Address	Telephone	Web och E-mail
Pandrol AB	+46 (0) 650 165 05	www.pandrol.com
Hyggesvägen 4		info.rosenqvistrail@pandrol.com
S-824 35 Hudiksvall		
Sweden		

13.5. Declaration of Conformity (CE certificate)

Attached is a declaration of conformity (CE certificate) The declaration proves that the machine is CE approved.

13.6. Recycling and Environment

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

- 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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