

DD210L

Operator's manual



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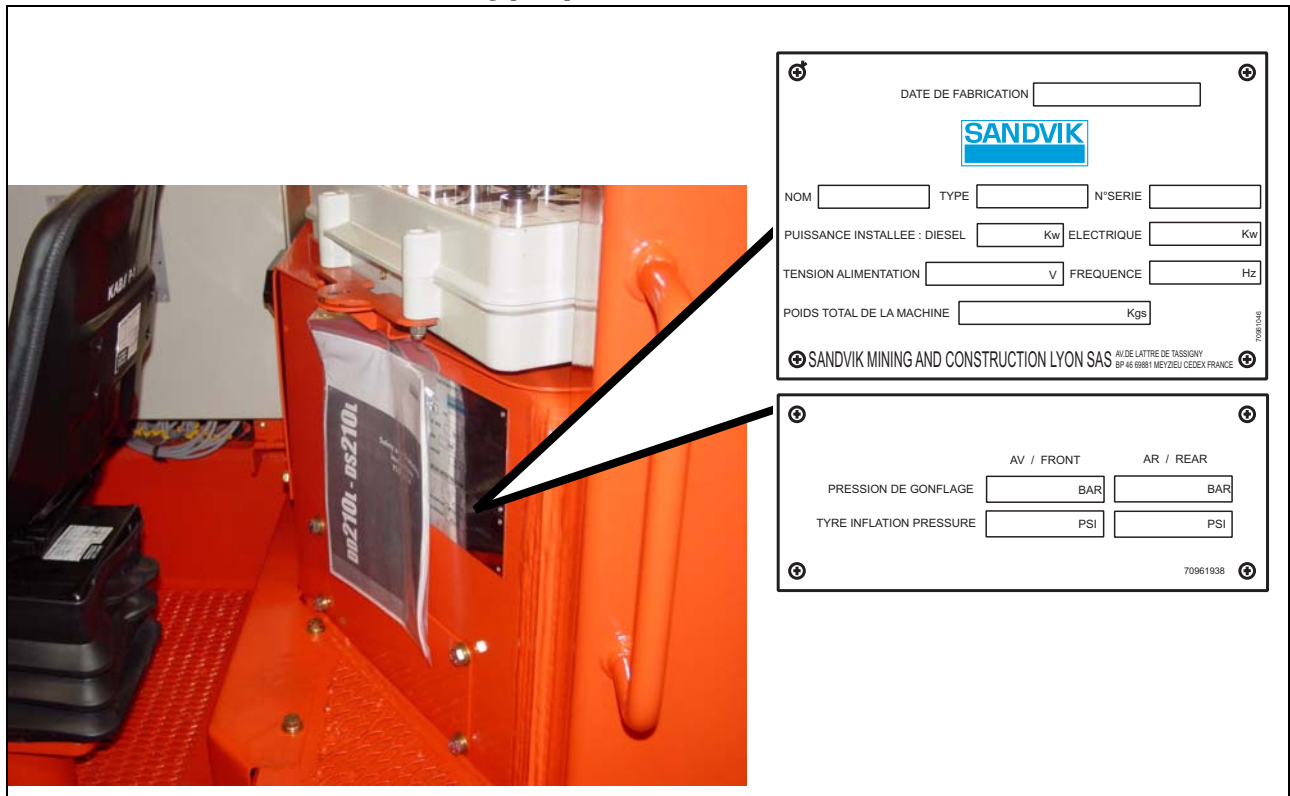
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1. GENERAL

1.1. Unit identification / Type plate



1.2. Preface

Congratulations on your choice of Sandvik bolting rig.

This manual describes the use of **DD210L** low profile drilling rig. Only those who have been given proper training are allowed to operate the rig. The operator shall also read and fully understand the contents of the Operator's Manual and the Safety Instructions.

The manual gives you such information on the structure and operation of the rig that is necessary for correct use and maintenance. It also guides you in performing the maintenance each shift. Periodical maintenance is explained in the Maintenance Manuals.

For demanding maintenance and repairs, we recommend that you contact your nearest authorized Sandvik Service. Our maintenance personnel have the skills and special tools required for the most demanding tasks.

Through correct use and by following the maintenance instructions, you can expect a **high degree of utilization and long operating life** of your rig.

1.3. Declaration of conformity

Manufacturer: **SANDVIK MINING AND CONSTRUCTION LYON S.A.S.**
19, av. De Lattre de Tassigny
B.P. 46
69881 Meyzieu Cedex
FRANCE

Herewith declares that **DD210L drilling machine**
has been designed and manufactured according to good mechanical engineering.

2. SAFETY & ENVIRONMENTAL INSTRUCTIONS

RISK OF INJURY AND AUTOMATIC VOIDANCE OF SANDVIK WARRANTY

TO WHOM IT MAY CONCERN:

SANDVIK HAS DESIGNED SAFETY FEATURES BECAUSE IT BELIEVES SUCH FEATURES WILL BETTER PROTECT PEOPLE. DO NOT DO ANYTHING THAT MAY HAMPER SAFETY FEATURES ON EQUIPMENT.

It is strictly forbidden to make ANY modification to a Sandvik product without prior written approval of the factory. If ANY modifications are made without written approval, Sandvik can not be held responsible for any accidents, incidents or damage to persons or property, especially if modifications are made on any safety feature including, but not limited to, safety critical circuits or components.

In many cases, the affect of a modification to a machine's total performance is unknown. Therefore, if a machine is modified for any reason, even if safety is not affected, Sandvik warranty will be void.

2.1. Operator safety instructions



Danger. Operation, maintenance and adjustments are only allowed to persons with specific training in operation and maintenance of the equipment. Read the operating and maintenance instructions before using or servicing the equipment.



Danger. Plan your work carefully in advance to avoid possible accidents and injuries. The operator must be familiar with the functions of the equipment before taking it into use.



Danger. The operator must always wear required personal protection, such as safety helmet, protective overall, safety boots, hearing protectors, safety goggles, etc...
Always ensure that those protections are in good shape before using them.



Danger. Adequate ventilation must always be provided. Make sure that ventilation is sufficient to prevent exhaust fumes and dust.
Exhaust fumes can be lethal.
When operating in confined conditions the exhaust gases and dust must be directed in such a way that they do not return to the working area and create a hazard.
Check regularly the exhaust purifier clogging according to its maintenance manual.



Danger. Always have a fire extinguisher at hand and learn how to use it.

Have the extinguisher inspected and serviced regularly according to the local regulations and to the extinguisher maintenance manual.



Danger. Take care of sufficient lightning.

Danger. Insufficient scaling of drilling site

2.2. Main safety hazards in use or maintenance work



Danger. MAKE SURE THAT THERE ARE NO UNAUTHORIZED PERSONS IN THE DANGER AREAS DURING DRILLING OR TRAMMING.

Danger. Simultaneous charging and drilling is strictly forbidden.

Danger. Always check the efficiency of the safety devices before using the machines: emergency stop push button, emergency brakes, backward tramming light and buzzer, tramming and working light, horn, etc...

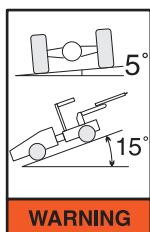


Danger. All hoods must be correctly mounted on the machine and the doors correctly closed and locked, this all the time in order to prevent accident with moving components such a engine belt, cable reel chain, etc...



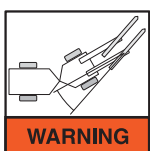
Danger. Danger of slipping, tripping or falling.

Keep the ladders, steps, hand rails, handles and working platforms clean of oil, dirt and ice.



Danger. Observe the balance of the rig.

Never exceed the specified inclination angles when parking, tramming or drilling.



Danger. While tramming NEVER SWING THE BOOM, if needed SWING THE DRILL FEED.



Danger. Before moving the booms make sure that the jacks and the stabilizers are firmly in contact to the ground.



Danger. Crushing hazard : do not stay in dangerous area, for instance: central articulation, front chassis and rear chassis..



Danger. The movements and rotation of components form also danger areas (boom, feed and drilling equipment).

MAKE SURE THAT THERE ARE NO UNAUTHORIZED PERSONS IN THE DANGER AREAS.



Danger. Danger of hot surface.

Hot surface can cause serious injuries.

Components as diesel engine, exhaust gas purifier, rod, shank or hydraulic components can be hot and before starting a maintenance work, please let them cool off.



Danger. Service operations should be carried out only when the rig is stopped. Replace or repair faulty tools and equipment.

Make sure that there are no unauthorized persons in the working area when you carry out service and repair work.

The drilling equipment must always be kept clean of oil and dirt.



Danger. Make sure that the boom is properly supported before servicing the hydraulic system.



Danger. Danger of high pressure air streams. The air streams can cause serious personal injuries.

Release the pressure before opening filling caps or pneumatic connections.



Danger. The lubricator, the compressor air/oil receiver and any air receiver are pressure vessels and they are not allowed to be repaired without proper authorization.

Check regularly the certification validity of those components.

At the end of validity period, you must make recertify the component by a registered organization or replace it by a new one.

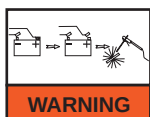
Danger. Danger of high pressure oil jets.

High pressure oil jets can cause serious personal injuries.

Release the pressure in the hydraulic circuits before opening caps or connections (accumulators, cylinders and hydraulic circuit).



Danger. If the component must be live, a fellow worker must be standing by to cut OFF voltage at the emergency or main switch in an emergency situation.



Danger. If you have to weld the rig, disconnect the alternator cables or open the main switch before starting to weld. Consider also the fire and explosion risk caused by welding. Make sure that the rig and its surroundings are clean and fire-safe.

2.3. Environmental precautions



Danger. Please notice that the hydraulic oil, fuel, and battery liquid can cause pollution. Please refer to your own environmental standards for the liquid processing.

Before operating maintenance always plan your work in order to use adequate and in good shape receptacles.

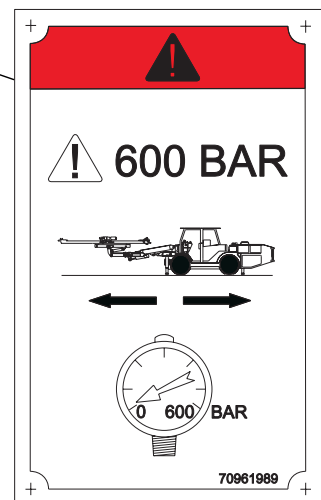
Do not use the diesel engine if it is not needed because of exhaust gas, think about the people and the environment.

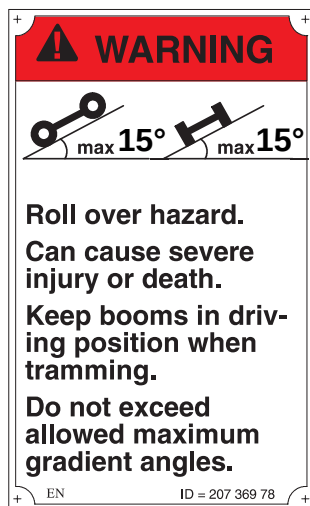
For decommissioning, scrapping and disposal of machine's components (diesel engine, tyres, batteries, etc...), you must always observe the law in force in your country.

In case of no law or if you think it's not sufficient, you can contact the component supplier. Always have a fire extinguisher at hand and turn it on to use it.

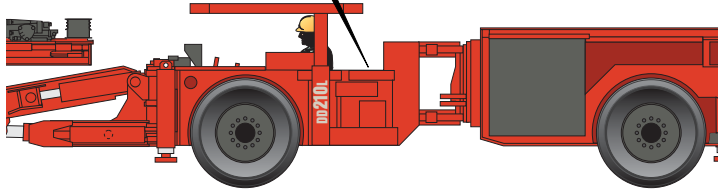
2.4. Warning labels

The following signs are used to point out important safety warnings. The locations and the descriptions of the signs are detailed in the chapter. Please observe the signs and follow the instructions, replace also the labels when needed.



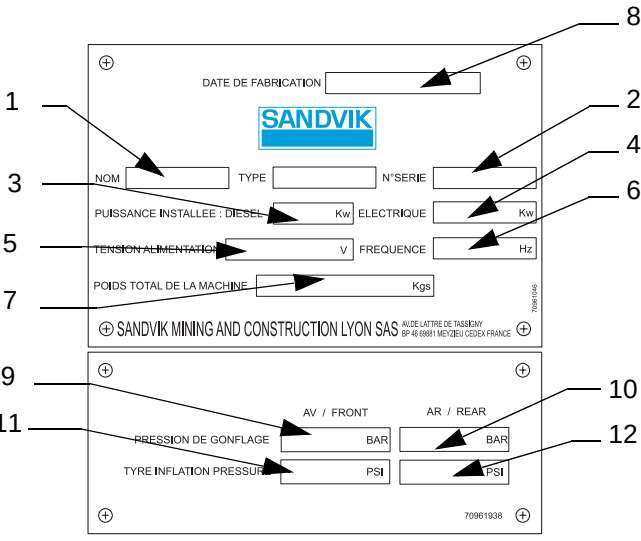


2.5. Type plate



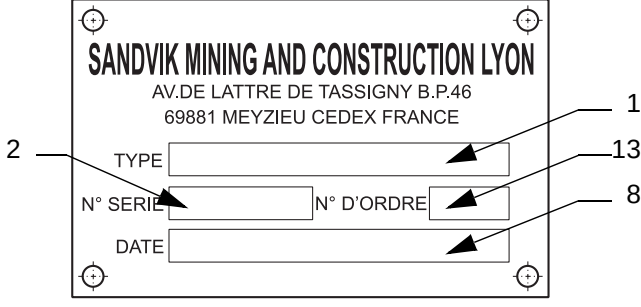


1. Machine name and type
2. Serial number
3. Diesel engine power
4. Electric input power (N/A)
5. Electric voltage (N/A)
6. Electric frequency (N/A)
7. Total weight of the machine
8. Manufacturing date
9. Front tyre inflation pressure (bar)
10. Rear tyre inflation pressure (bar)
11. Front tyre inflation pressure (psi)
12. Rear tyre inflation pressure (psi)
13. Order number



The type plate contains the following information:

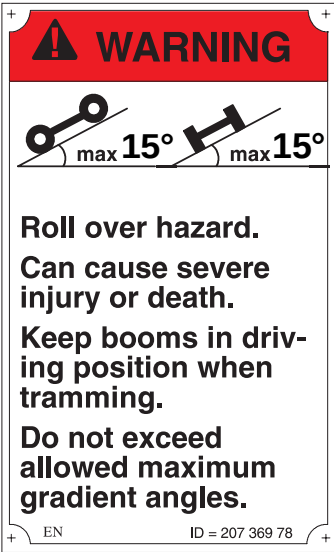
- DATE DE FABRICATION
- SANDVIK**
- NOM, TYPE, N°SERIE
- PUISSANCE INSTALLEE : DIESEL Kw, ELECTRIQUE Kw
- TENSION ALIMENTATION V, FREQUENCE Hz
- POIDS TOTAL DE LA MACHINE Kgs
- SANDVIK MINING AND CONSTRUCTION LYON SAS
- AV / FRONT, AR / REAR
- PRESSION DE GONFLAGE BAR, PSI
- TYRE INFLATION PRESSURE PSI



The type plate contains the following information:

- SANDVIK MINING AND CONSTRUCTION LYON
- AV.DE LATTRE DE TASSIGNY B.P.46
- 69881 MEYZIEU CEDEX FRANCE
- TYPE
- N° SERIE, N° D'ORDRE
- DATE

2.6. Gradient angles

	 Danger. The maximum gradient angle is 15°. Danger. The maximum side slope angle is 15 °.  Danger. On slippery surfaces, e.g. ice or smooth rock, safe tramming and drilling gradients are much smaller than on surfaces with good grip. NOTE: There are two inclination gauges at the tramming compartment.
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2.7. Safety telescopic canopy

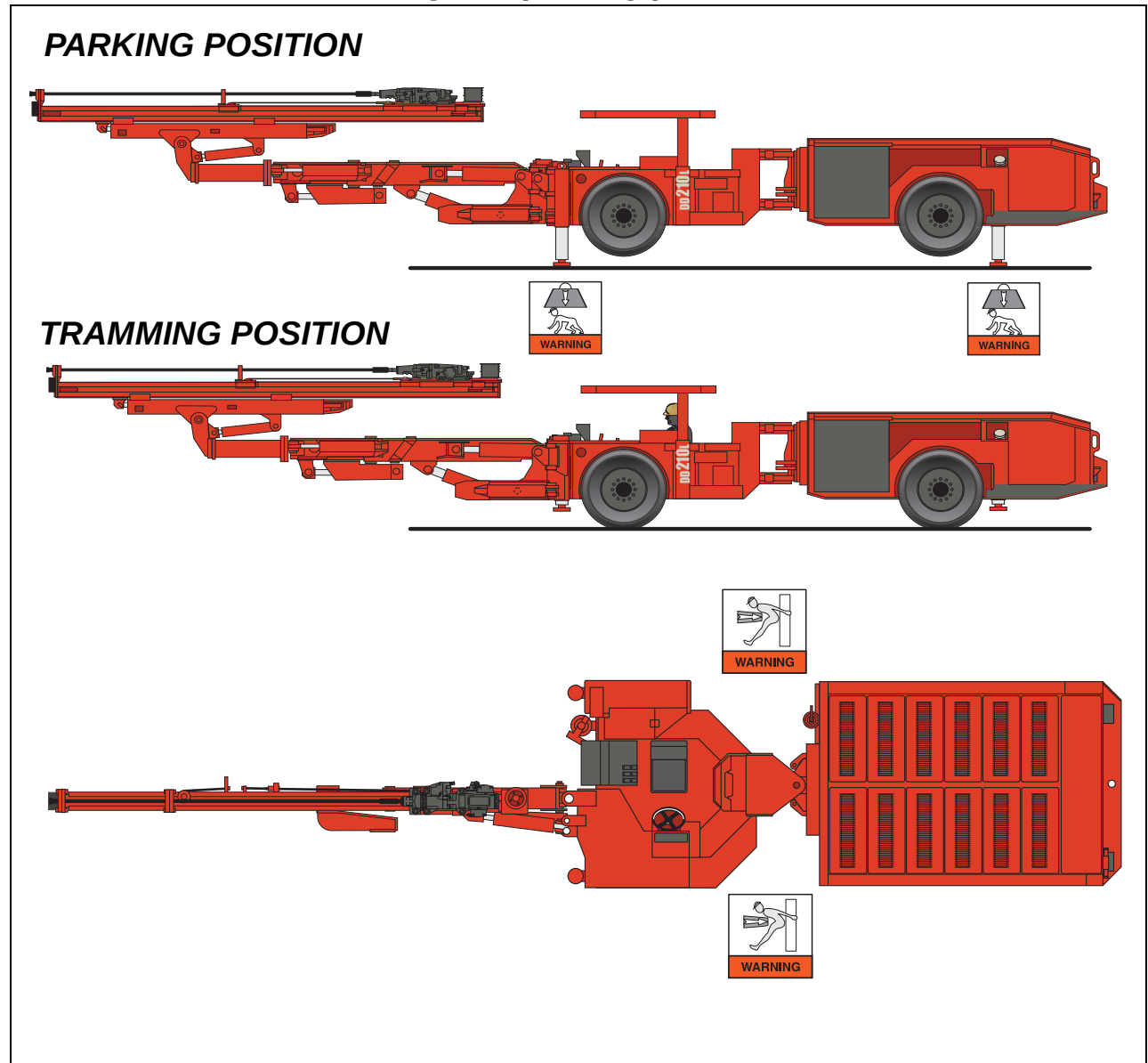
In order to maintain the safety function and fops certification of the canopy, the canopy must not be lowered under the painted red line of the canopy leg.

	385 mm 385 mm is the distance between the bottom end of the gusset and the top of the red line.
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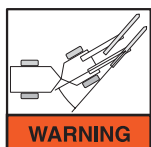


Danger. This position must always be clearly marked on the telescopic canopy leg in order to inform the operator of the machine. You must paint again the red line on the canopy leg, when the red line starts to be erased. Apply a painted red line over an approximately width of 25mm (1 inch).

2.8. Machine in tramming and parking positions



- Boom and feed extension must be fully retracted.
- Boom and feed must be in line with the machine axis.
- Boom and feed must be horizontal.
- Machine on stabilizers in parking position.



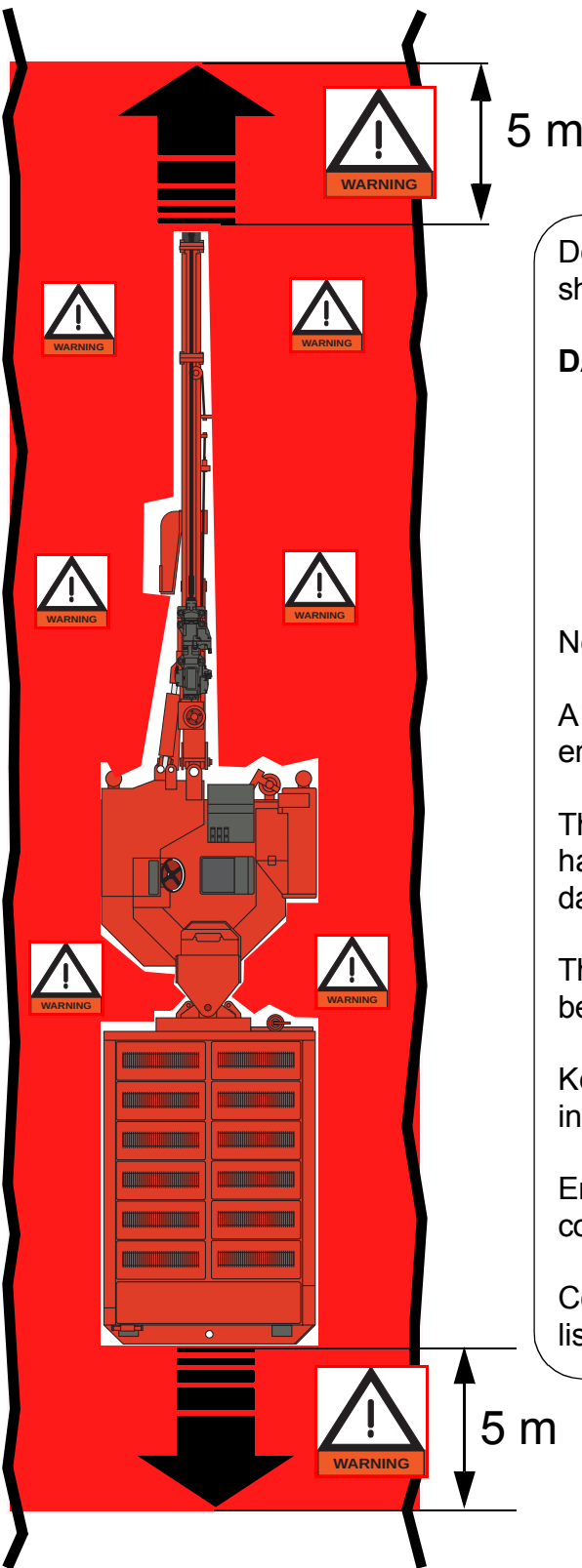
**Danger. While tramming NEVER SWING THE BOOM
- If needed SWING THE DRILL FEED -**



**Danger. Crushing hazard : do not stay in dangerous area, for instance:
central articulation, front chassis and rear chassis..**

2.9. Danger areas

2.9.1. Danger area when tramming



5 m

WARNING

Do not allow other personnel to stand in the area shown beside.

DANGEROUS AREAS:

- 5m toward the front end of the drill feed and 5m backward the rear end of the carrier.
- Area between the machine and the side wall of the drift.

Never allow riders on any part of the machine.

Always sound the horn before starting the engine.

The operator must be attentive at any time and have to stop the machine if a person is in the dangerous area.

The operator must also be seated with the safety belt fastened all the time during tramming.

Keep hands, arms, legs and head completely inside the tramming compartment.

Ensure that the machine is in perfect operating condition.

Complete in full, at each shift, the pre-start check list.

5 m

WARNING

NO PERSONNEL ALLOWED

WARNING

WARNING

WARNING

WARNING

WARNING

STOP

STOP

NO PERSONNEL ALLOWED

 WARNING

DURING DRILLING OPERATION, NEVER ALLOW PERSONNEL TO STAND IN THE AREA BETWEEN THE DRILLING COMPARTMENT AND THE ZONE BEING DRILLED.

A MACHINE SHOULD NEVER BE IN AN AREA THAT HAS NOT BEEN CAREFULLY SCALED.

2.10. Conditions in which the rig should not be used



Risk factors for personnel:

- Operator does not have sufficient training.
- Unauthorized person are present in the working area.
- Insufficient scaling of the working area.
- Exposition to gases in the drift.
- Safety systems are deficient or out of order.
- The field is charged.
- Transportation of persons.
- Use of the rig for lifting purposes.
- Inadequate ventilation.
- Inadequate lightning.
- Inadequate electric earthing.
- Defective safety devices.

2.11. Noise level and noise emission

Noise level

The measurement of the noise emission and the noise level at the operator compartment have been measured in accordance of the European Standard Drill Rig safety 89/392/EEC and changes of 91/368/EEC AND 93/44/EEC.

Noise emission: 100 db(A) the rockdrill in operation.

Level at the operator compartment: 98 db(A) the rockdrill in operation.

2.12. Acceleration value

The measurement of the acceleration value at the operator's positions have been measured in accordance of European Standard Drill Rigs - safety 89/392/EEC and changes of 91/368/EEC and 93/44/EEC.

Acceleration value does not exceed 0.5 m/s^2 .

2.13. Safety equipment



Danger. Check the emergency stop buttons and safety equipment for proper operation and condition at the beginning of each shift and always after tramming.

- Fire extinguisher(s)
- Emergency stop buttons
- Safety and protection devices



Danger. Always check the emergency/park brake efficiency prior to move the machine.

2.14. Fire prevention



- Keep the machine clean at all times, especially from fuel, grease, oil rags and paper.
- Wash the machine regularly.
- Check fire extinguishers and/or fire prevention equipment daily to ensure that they are in perfect working order.
- Keep electric components and wiring in good condition.
- The filling of tanks must be carried out in a well-ventilated area.
- The control and recharging of batteries must be carried out in a well-ventilated area.

2.14.1. Refilling fuel tank

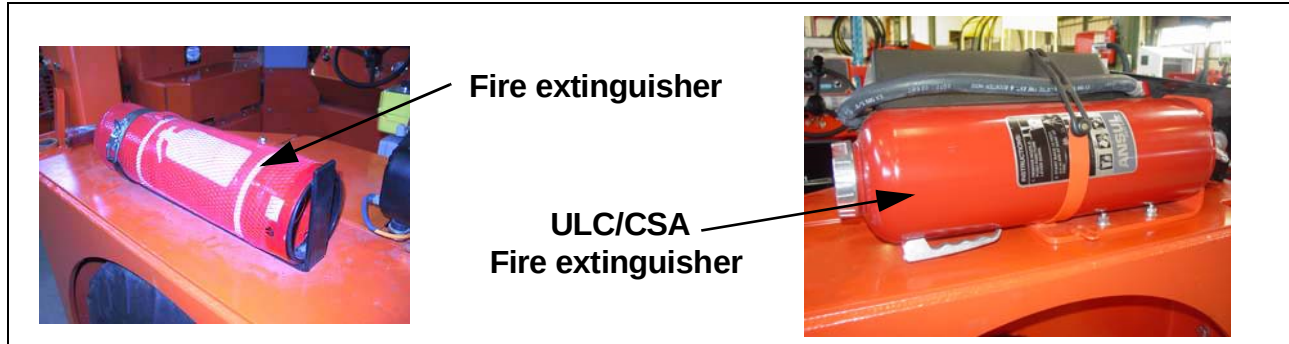
The following precautions must be observed when replenishing fuel:

- Do not fill fuel tank when the engine is running.
- Take care not to spill fuel on hot surfaces.
- Fuel filling should be done in a well ventilated space.
- Smoking, open flame and sparks are dangerous when the fuel tank is being filled.
- Wipe off spilled fuel before starting the engine.
- Keep the fuel replenishing pipe in contact with the fuel tank or arrange earthing to prevent sparking caused by static electricity.



Danger. Smoking during filling or control operations is forbidden.

2.15. Fire extinguisher (optional)



Danger. Look at the operation instructions from the side of the fire extinguisher.



Danger. Adequate ventilation must always be provided. Make sure that ventilation is sufficient to prevent combustion gas of fire. Combustion gas can be lethal.



Danger. Check the filling state of the fire extinguisher by looking that the gauge needle is not in the red zone.



General operation instructions of fire extinguisher:



1. Shut off the rig.



2. Set the brakes.



3. Pull the safety device and take the hose in your hand.

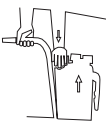
4. Direct the hose under the flame.

5. Press the gun.

6. After use send the fire extinguisher to be filled.

or

General operation instructions of fire extinguisher (UL/CSA):



1. Shut off the rig.

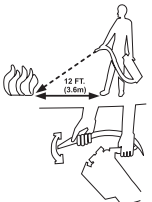
2. Set the brakes.

3. Remove nozzle, push puncture lever down.

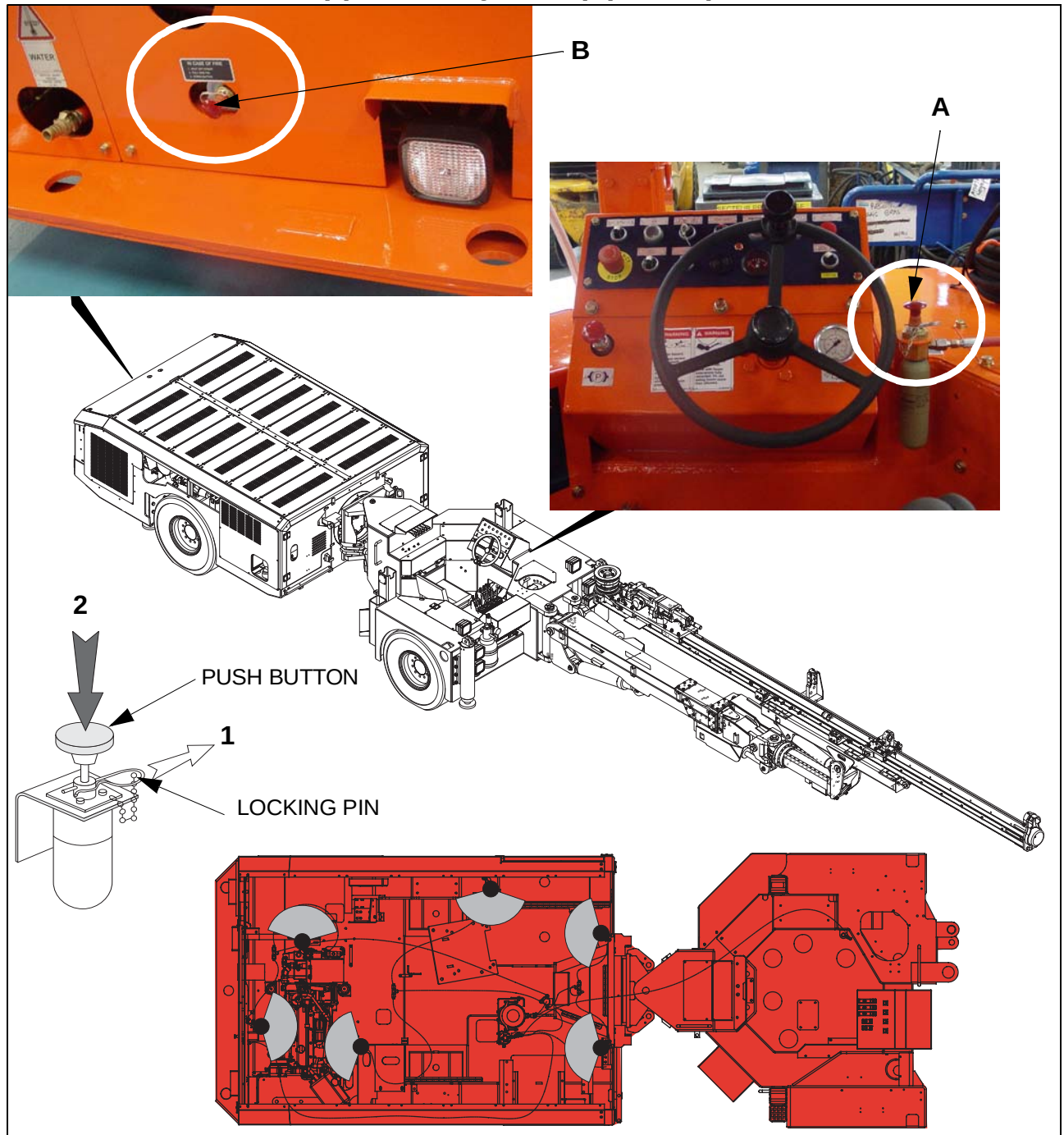
4. Start back 12 feet (3.6m) aim at base of fire.

5. Squeeze nozzle, sweep side to side.

6. After use send the fire extinguisher to be filled.



2.16. ANSUL fire suppressor system (optional)



This 6 nozzles fire suppressor system nearly cover all the rear part of the machine (Diesel engine, electric cabinet, etc...)

The ANSUL fire suppressor system's actuators are located in **A** at the tramming compartment and in **B** at the rear of the machine, as shown on the pictures above

To activate the fire extinguisher:

- Step 1 : **Pull out the lock pin.**
- Step 2 : **Push the red button.**

2.16.1. At fire operation

- 1. Push rig's emergency stop buttons on the control panel.
- 2. Shut off the rig and/or engine.
- 3. Turn off main switch, carrier's main switch and cut fuel supply.
- 4. Operate the fire suppressor system from the actuator. There are two actuators, one at the tramming compartment and the other on the rear end of the vehicle.
- 5. Be prepared with a hand extinguisher to fight possible re-ignition.

2.17. After fire

When fire is out and the rig has cooled down: Open ventilation hatches to clear from smoke and gases. Avoid inhaling fire gases. Keep a hand fire extinguisher ready for use during ventilation.

Wash the machine with plentiful of water as soon as possible after extinguishment because powder can cause corrosion especially to the cables. Before re-starting the machine, put back in working order the fire extinguishing equipments, replace or refill extinguishers, empty powder tanks and actuators' gas cartridge.



Danger. In case of fire, evacuate area to reduce the risk of injury from flames, heat, hazardous vapors, explosions, or other hazards that may be created.



Danger. Manual actuation will result in immediate system discharge which may obscure vision. Make certain vehicle is stopped safely before manually actuating the system.



Danger. Do not re-start the rig again until the cause of the fire has been established and the fault repaired.



Danger. For ANSUL fire suppressor systems, INSPECTION, MAINTENANCE AND RECHARGE MUST ALWAYS BE DONE by an Authorized ANSUL Distributor.

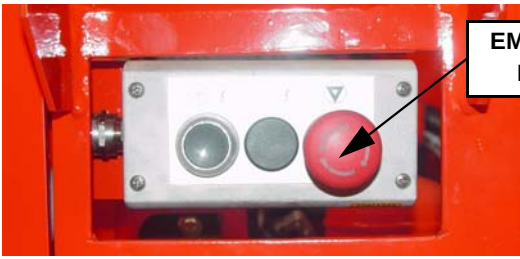
2.18. Emergency stops, main switches and emergency brakes



Danger. Always ensure free access to the emergency stops.

Danger. Check the operation of the emergency stops prior to use the machine.

- When the tramming compartment emergency stop button is depressed, the Diesel engine and the power pack stop at once.
- When the drilling compartment emergency stop button is depressed, the power pack stops at once
- When the machine's rear emergency stop button is depressed, the Diesel engine stops at once.

EMERGENCY STOP BUTTONS	
AT TRAMMING COMPARTMENT	AT DRILLING COMPARTMENT
 EMERGENCY STOP PUSH BUTTON OR  EMERGENCY STOP PUSH BUTTON	 EMERGENCY STOP PUSH BUTTON OR  EMERGENCY STOP PUSH BUTTON
AT MACHINE'S REAR	
 EMERGENCY STOP PUSH BUTTON	

(O) EMERGENCY/PARKING BRAKES**(O) EMERGENCY / PARK BRAKE
PUSH BUTTON**

When tramming in emergency situation:

- Release the accelerator pedal
- Push the emergency/parking brakes red button.

(O) ELECTRIC OR OPTIONAL ABA BRAKES**(O) ELECTRIC BRAKES OR
OPTIONAL ABA BRAKES
PUSH BUTTON**

Optional ABA brakes bypassing
switch for machine's towing

Optional ABA brakes
buzzing red caution light



- PUSH TO ACTIVATE THE BRAKES



- Pull to release the brakes



- Valve in normal position

If the brake system is released the push button red light turns off

The red ABA brakes caution light turns on and buzzes, if there is a braking circuit pressure falling down: **STOP IMMEDIATELY THE MACHINE AND NOTIFY MAINTENANCE.**



Danger. The machine is featured with a safety brake system that applies the brakes automatically when there is a sudden drop in the pressure of the braking circuit.

As the machine may come to an abrupt halt, the operator must be correctly seated with the safety belt fastened and attentive at all times.

TRANSPORTING PASSENGERS AND STANDING UP WHILE TRAMMING IS STRICTLY FORBIDDEN.



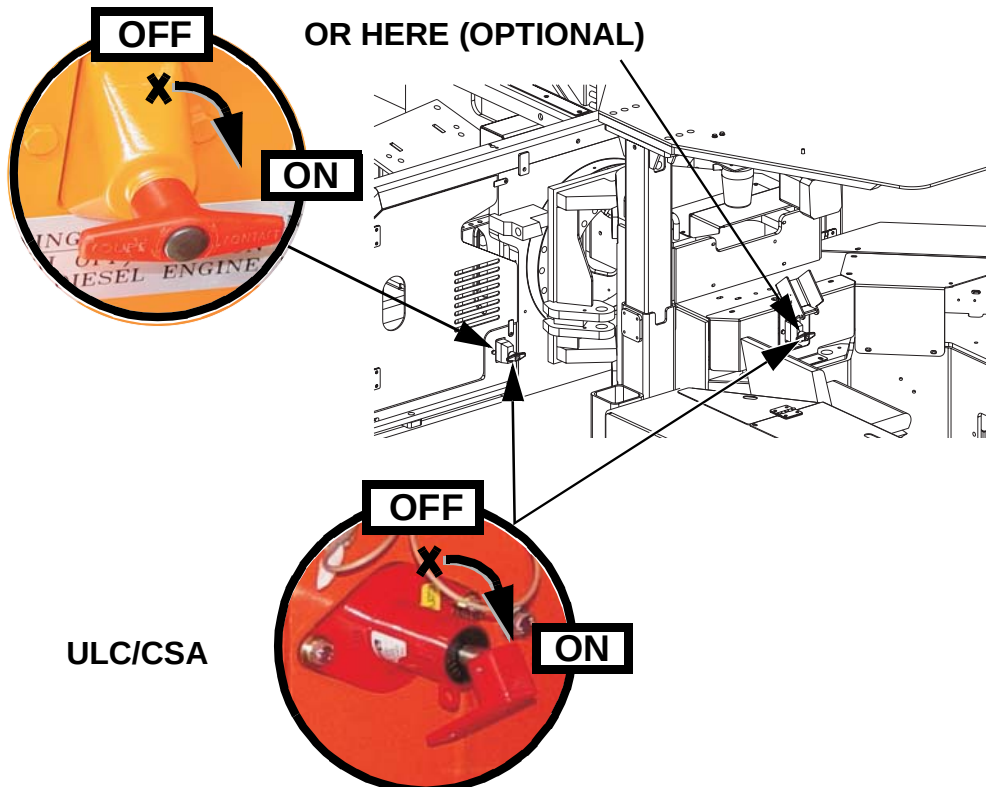
Danger. Memorise the location of this brake valve in order to be able to activate it rapidly in case of emergency.

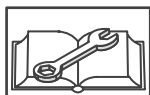


Danger. The tramming wheel motors braking technology only enables 10 emergency stops. After 10 emergency braking, all wheel motors braking disks must be replaced in order to ensure a safe operating of the machine.

Emergency braking must be counted and immediatly reported, Sandvik also recommends to always get wheel motors braking disks kits in stock.

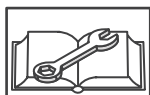
BATTERIES MASTER SWITCH





CAUTION

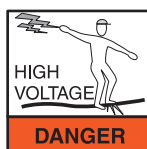
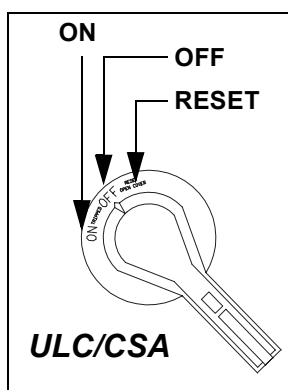
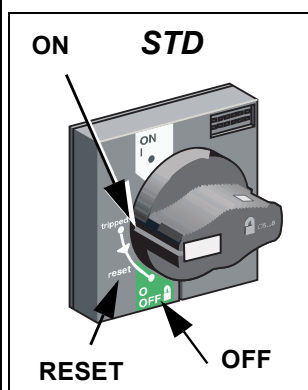
Caution. So as to prevent the alternator to be damaged, stop the engine prior to turn the battery master switch to the «OFF» position.



CAUTION

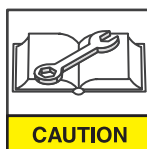
Caution. In drilling electric mode, switch off the battery in order not to discharge the battery.

ELECTRIC MAIN CIRCUIT-BREAKER



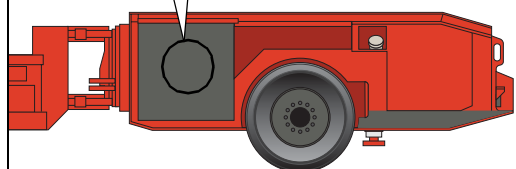
DANGER

Danger. Switching off the main circuit-breaker do not shut off the power at the cable reel and in the cable connected to the machine. Consequently the cable is still live. **NEVER HANDLE A LIVE CABLE.** Never leave the machine while motors are running.



CAUTION

Caution. Do not rotate the main switch if a motor is running. Stop all motors prior to use the main switch.



NOTE: if the electric main circuit-breaker trip OFF automatically due to an electric problem, move the handle fully to reset position prior to place it back to ON position.

2.19. Electric cable



DANGER

Danger. Never use an electric cable unless it is firmly positioned on its support. this will prevent unnecessary tension on the cable which may result in the plug being pulled from its socket.

The cable must never be live before the machine is ready to drill and the cable itself has been placed in its support and support hooks. **NEVER HANDLE A LIVE CABLE.**

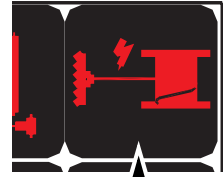
Never move the machine if the cable is live.

To ensure that no vehicle will drive over the cable, lay the cable in hooks which have been placed in the sidewall along the length of the gallery being drilled.



Caution. For machines delivered with electric cable, cable end limit switches are adjusted at factory. For others machines, the operation must be done when the cable is connected to the machine, as follows:

- First safety S32 : 6 cable reel revolutions left.
- Second safety S33 : 3 cable reel revolutions left.

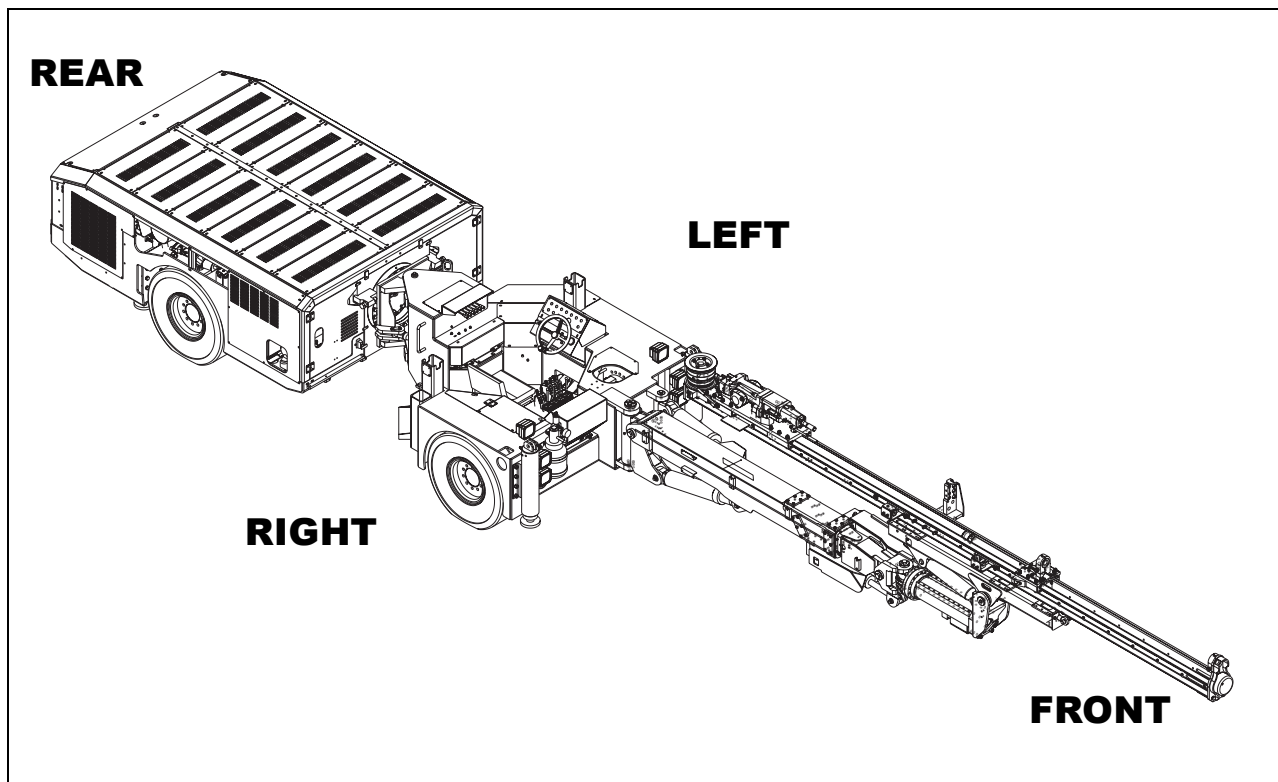


Cable reel's end
caution light

3. INTRODUCTION TO MACHINE

This manual provides instructions for the use and safe operation of a **DD210L** face drill machine. The information contained in this manual must be studied and thoroughly assimilated before attempting to operate this machine.

NOTE: Whenever FRONT, REAR, RIGHT and LEFT are mentioned throughout this manual, it is assumed that the operator is standing at the rear of the machine (Engine end) and looking toward the front (Boom end). Right and left DO NOT REFER to the operator's seat but refer to the right and left of the machine.



Danger. It is the operator's responsibility to ensure that the machine is in perfect working condition. At each machine start-up, a pre-start check list **MUST** be completed even if the machine has been used earlier in the day. It is the operator who is at the controls that will assume full responsibility if an accident or injury occurs.

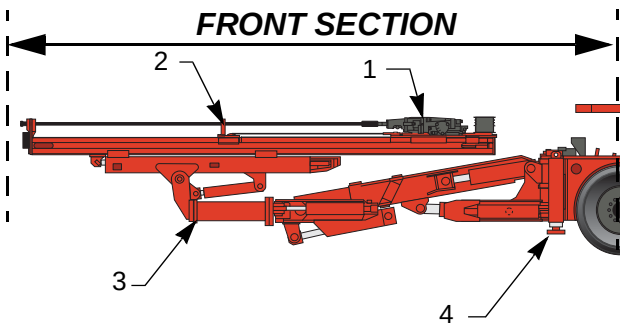
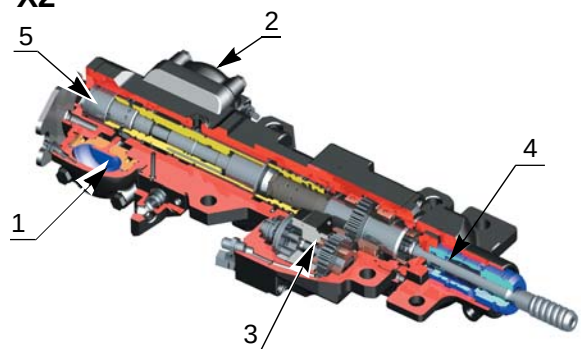
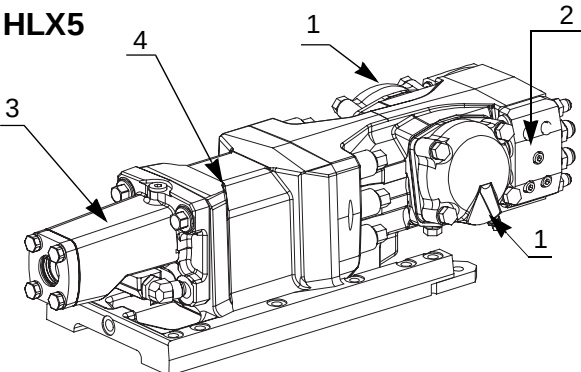
3.1. Intended to use

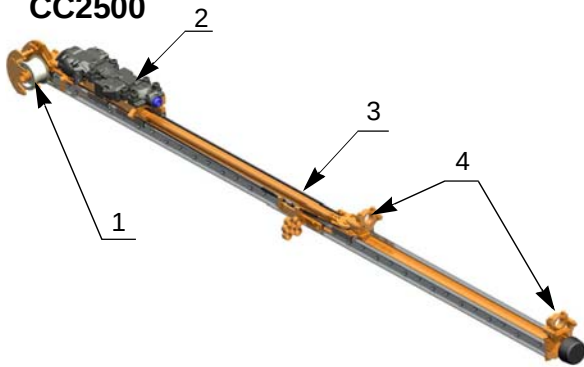
DD210L is intended for use in mining, preparation work and tunneling. It is an independently operating hydraulic rig that drills vertical, inclined and horizontal holes.

3.2. Recommended operating conditions

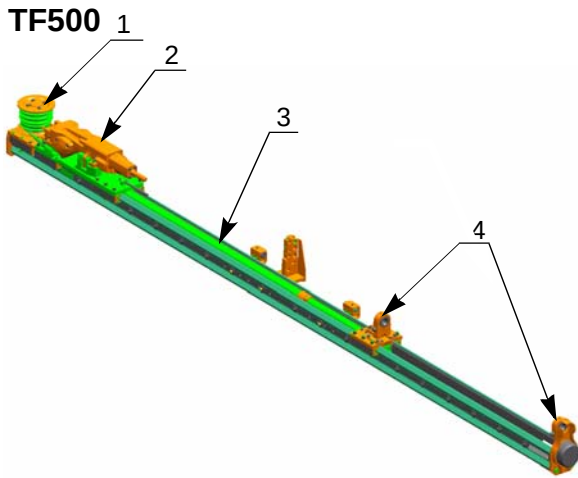
- Ambient temperature : -30°C +50°C.
- Maximum altitude from sea level: 3000m.
- Before use in exceptional conditions, contact Sandvik engineering department.

3.3. Components of the machine

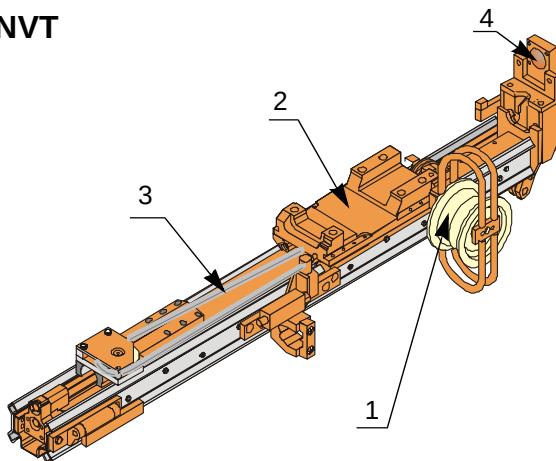
FRONT SECTION	
 FRONT SECTION 1. Rock drill 2. Feed 3. Boom 4. Front stabilizers	
ROCK DRILL X2  1. Low pressure accumulator 2. High pressure accumulator 3. Rotation motor 4. Flushing housing 5. Percussion assy HLX5  1. Pressure accumulator 2. Rotation motor 3. Flushing housing 4. Gear housing HL510  1. Pressure accumulator 2. Rotation motor 3. Flushing housing 4. Gear housing	

**DRILL FEED
CC2500**


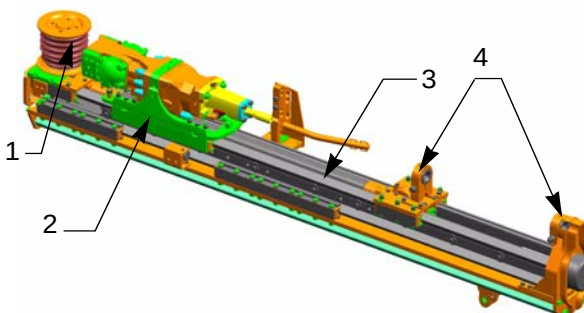
1. Hose reel
2. Rock drill carriage
3. Feed cylinder, wire ropes
4. Centralizers

TF500


1. Hose reel
2. Rock drill carriage
3. Feed cylinder, wire ropes
4. Centralizers

NVT


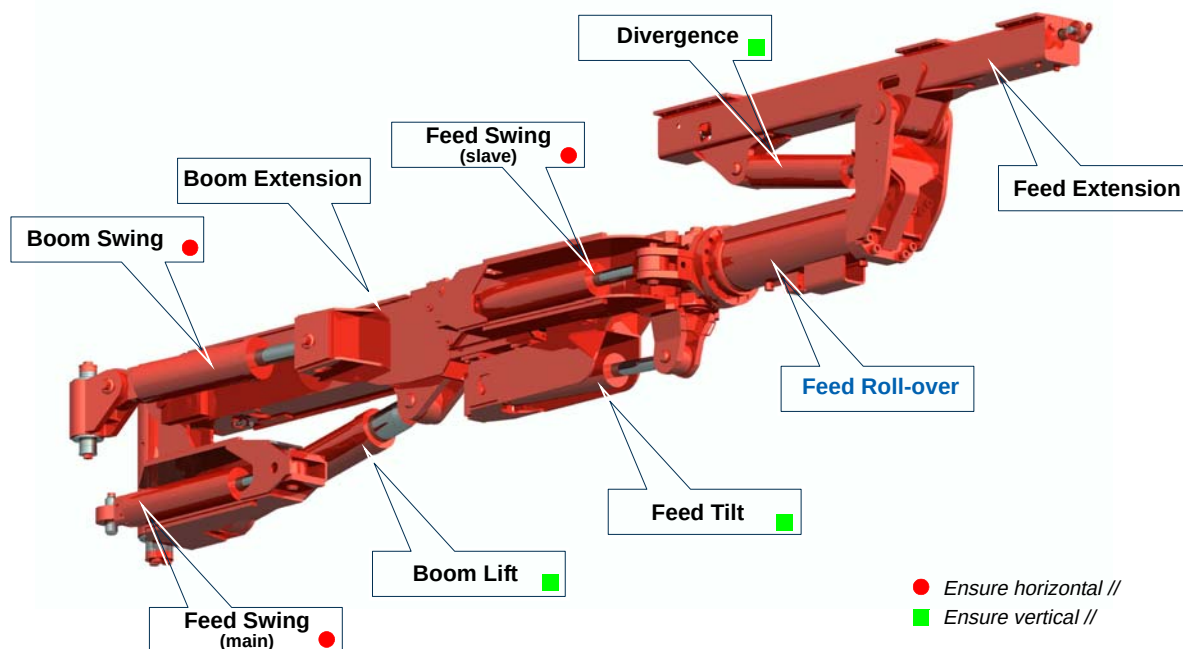
1. Hose reel
2. Rock drill carriage
3. Feed cylinder, wire ropes
4. Centralizers

TFX500


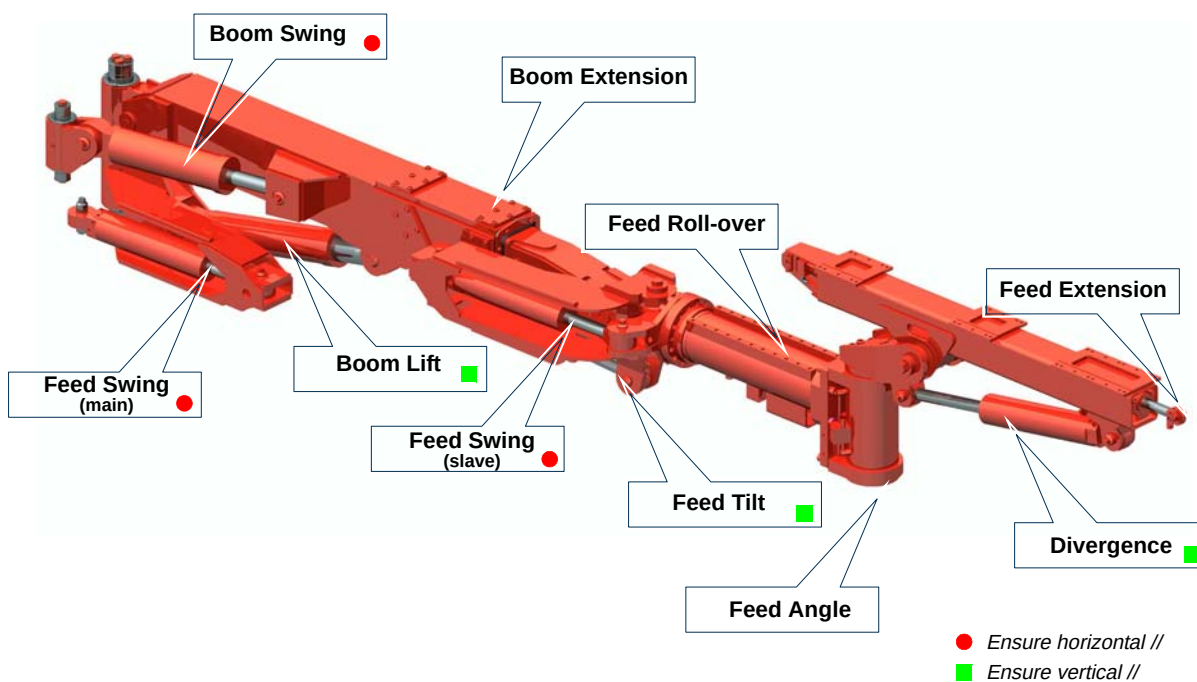
1. Hose reel
2. Rock drill carriage
3. Feed cylinder, wire ropes
4. Centralizers

BOOM

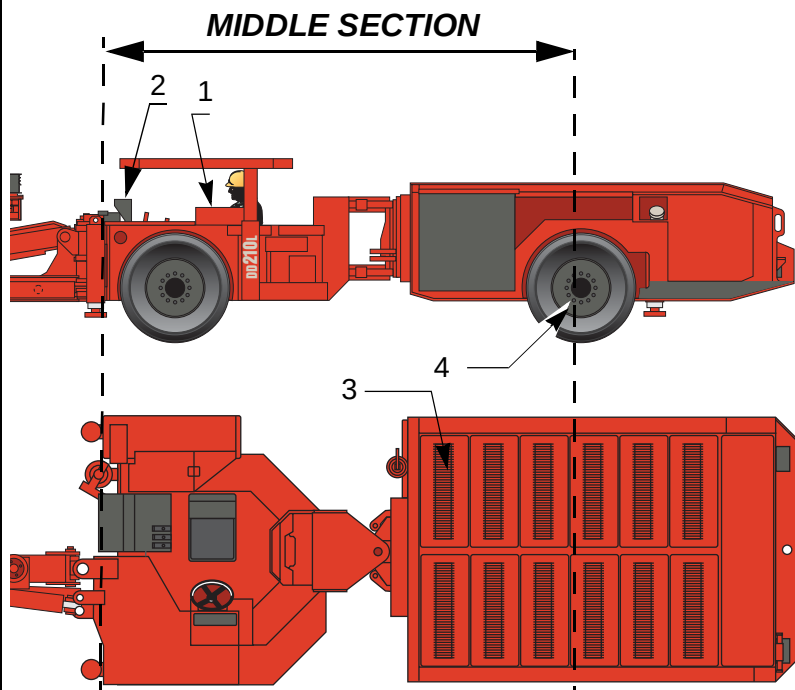
B26F-B26XLF



B26NV-B26XLNV

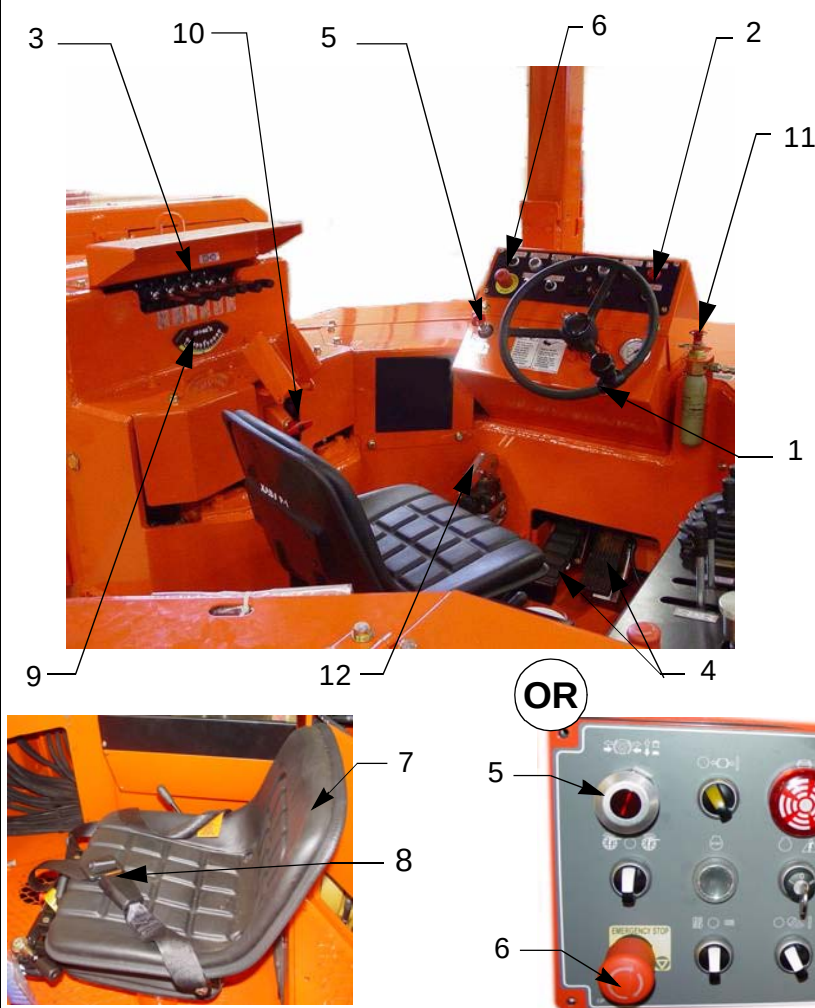


MIDDLE SECTION



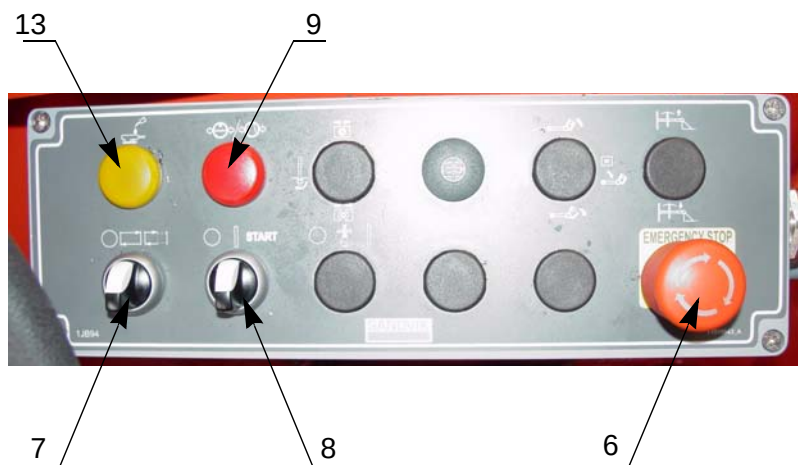
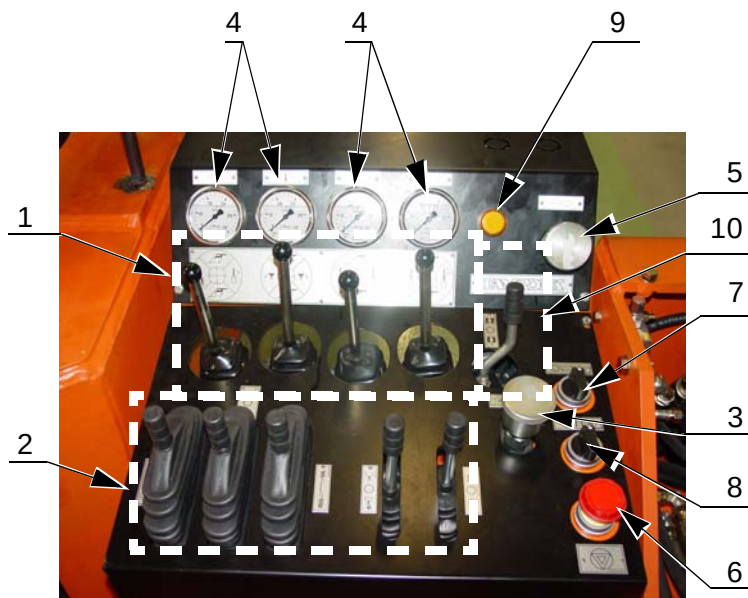
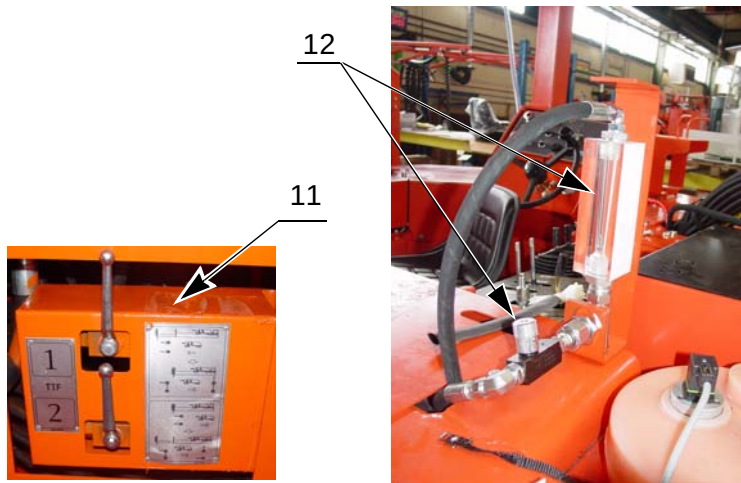
1. Tramming compartment
2. Drilling compartment
3. Air circuit components
4. Tramming wheel motors

TRAMMING COMPARTMENT



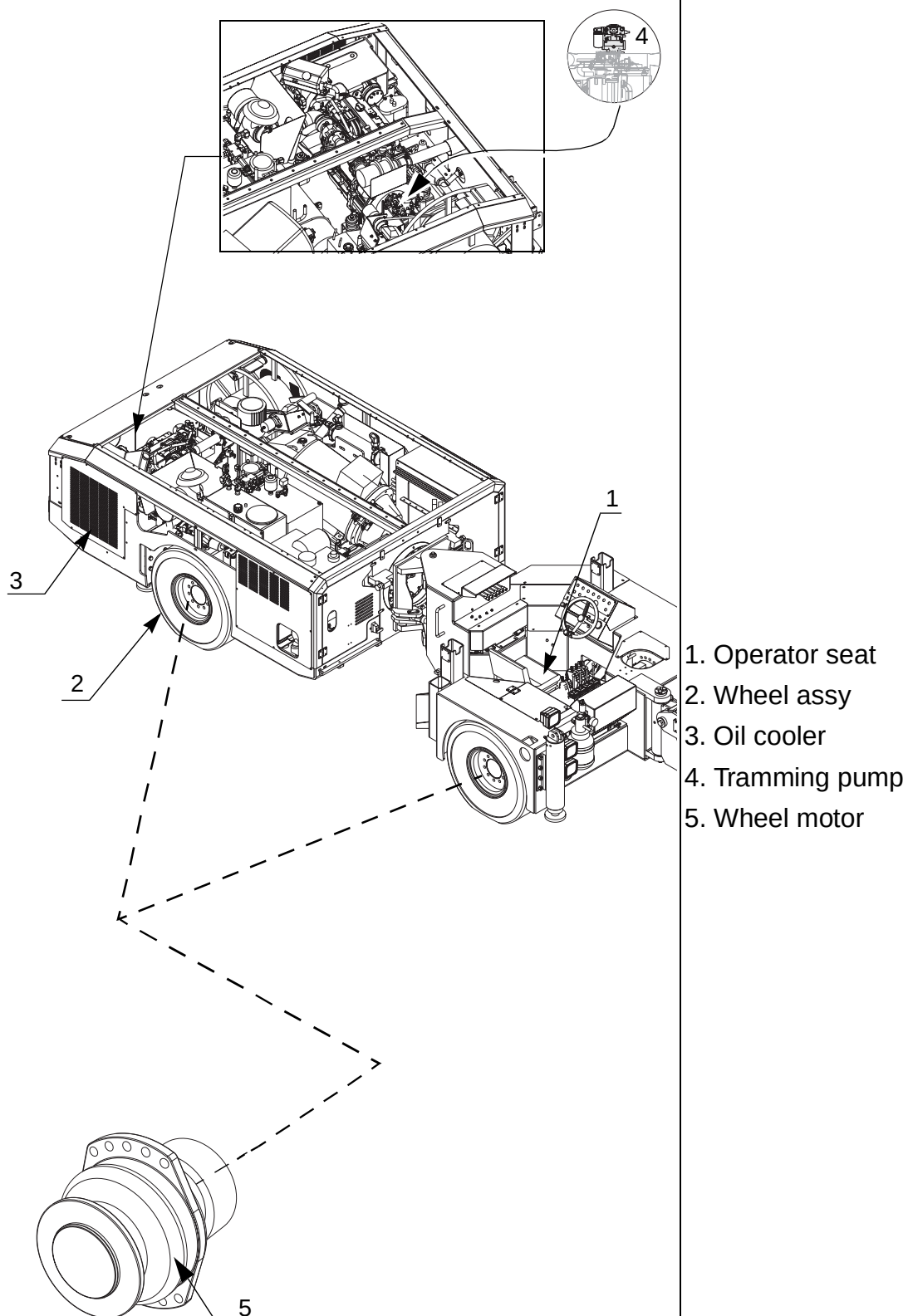
1. Steering wheel
2. Tramming control panel
3. Stabilizers and diesel boom supply control valve
4. Tramming control pedals
5. Emergency/park brake push button
6. Emergency stop push button
7. Operator seat
8. Safety belt
9. Angle indicator
10. Battery master switch
11. Ansul fire extinguisher actuator (optional)
12. Manual unbraking handpump (optional)

DRILLING COMPARTMENT

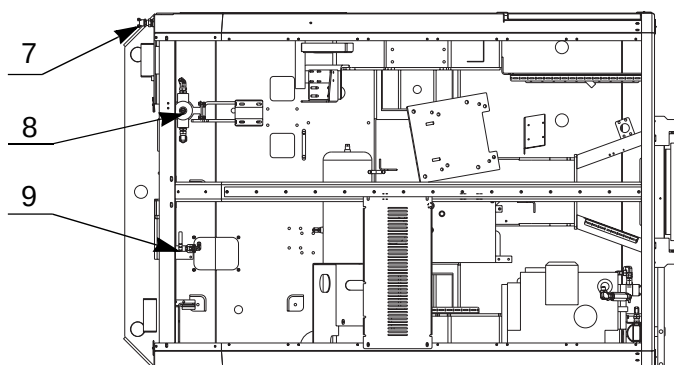
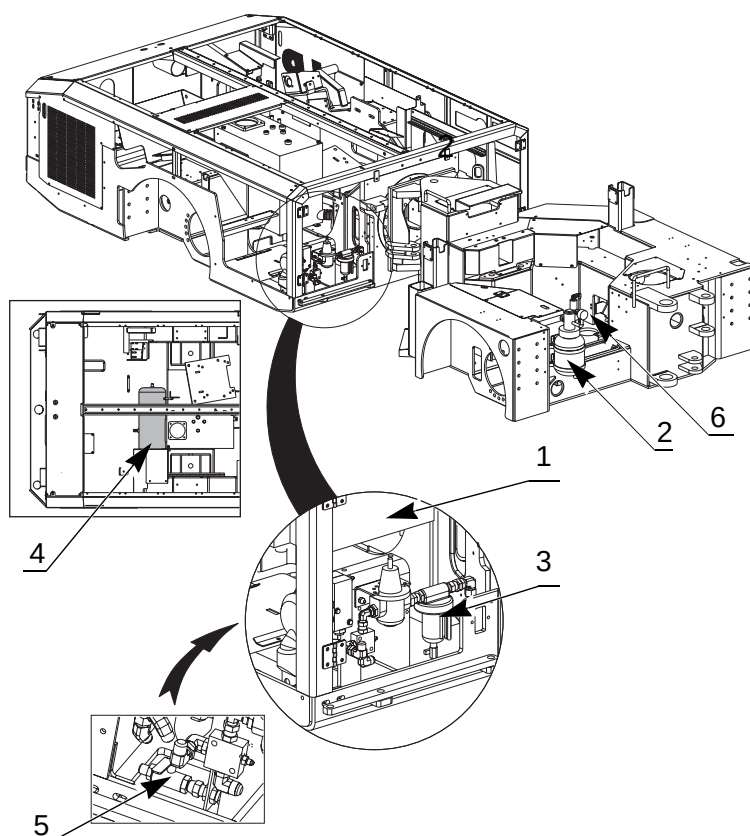


1. Boom controls
2. Drilling controls
3. Feed force regulating valve
4. Gauges
5. Rotation speed control valve
6. Emergency stop push button
7. Automatic return automatic selector switch
8. Powerpack starting switch
9. Air/water caution light
10. Optional lever for B26NV & B26XLNV
11. TTF or TFX feed setting ball valves
12. Air mist flow control valve and flowmeter
13. SLU rock drill oiler caution light (optional)

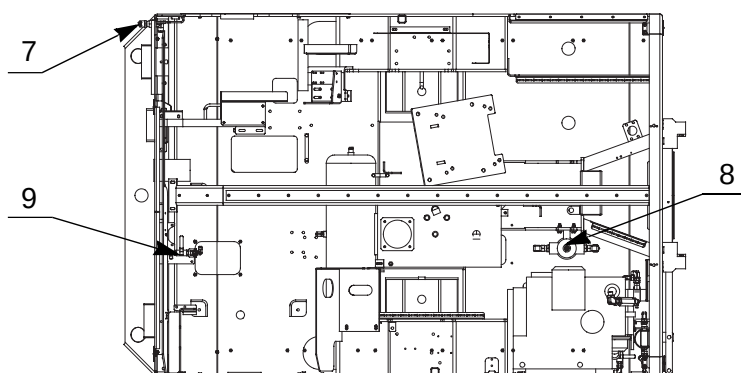
TRAMMING POWER TRAIN



AIR CIRCUIT COMPONENTS



OR



1. Air compressor
2. Rock drill air oiler
3. Air/water separator
4. Air tank (option)
5. Drain ball valve (option)
6. Air/oil lubrication sight glass

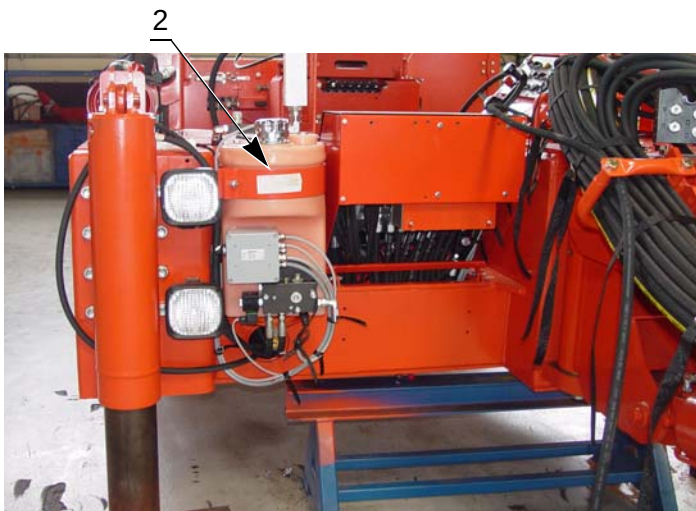
Mine's air connection (optional):

7. Mine's air connection
8. IP5 air cleaner (optional)
9. IP5 air cleaner drain ball valve

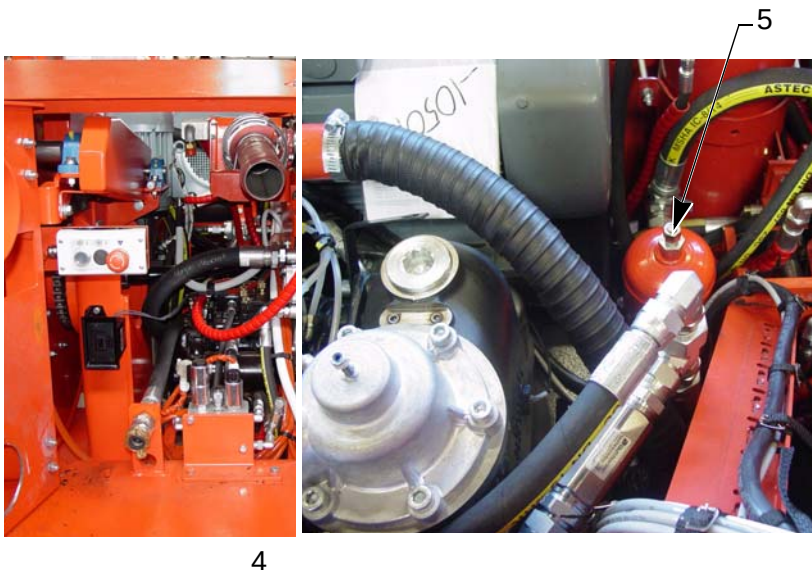
ULC/CSA AIR CIRCUIT



- 1. Air compressor
- 2. Rock drill air oiler
- 3. Air/water separator

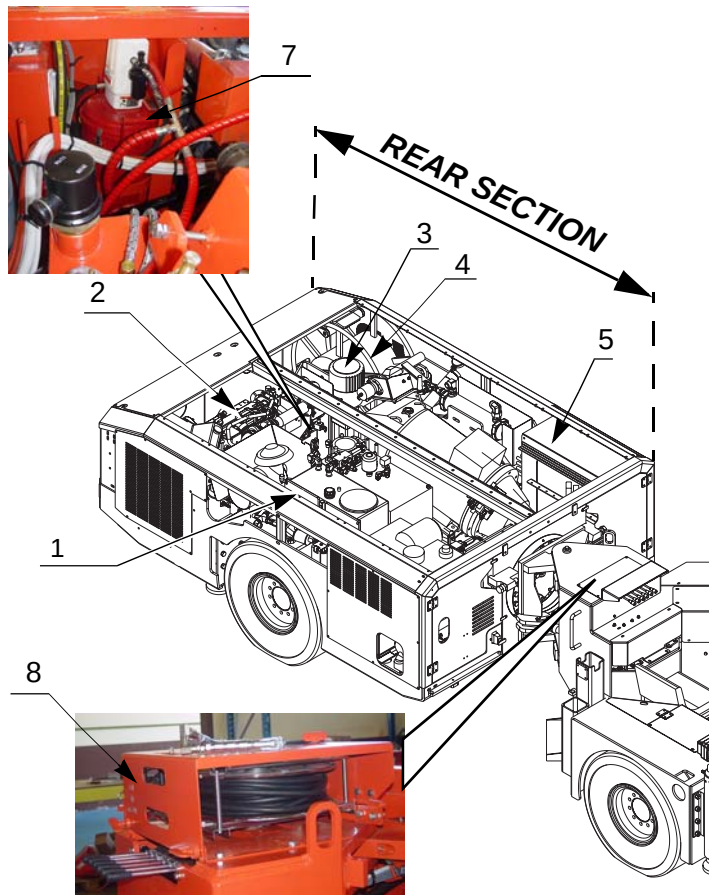


- Mine's air connection (optional):
- 4. Mine's air connection
 - 5. IP5 air cleaner (optional)
 - 6. IP5 air cleaner drain ball valve



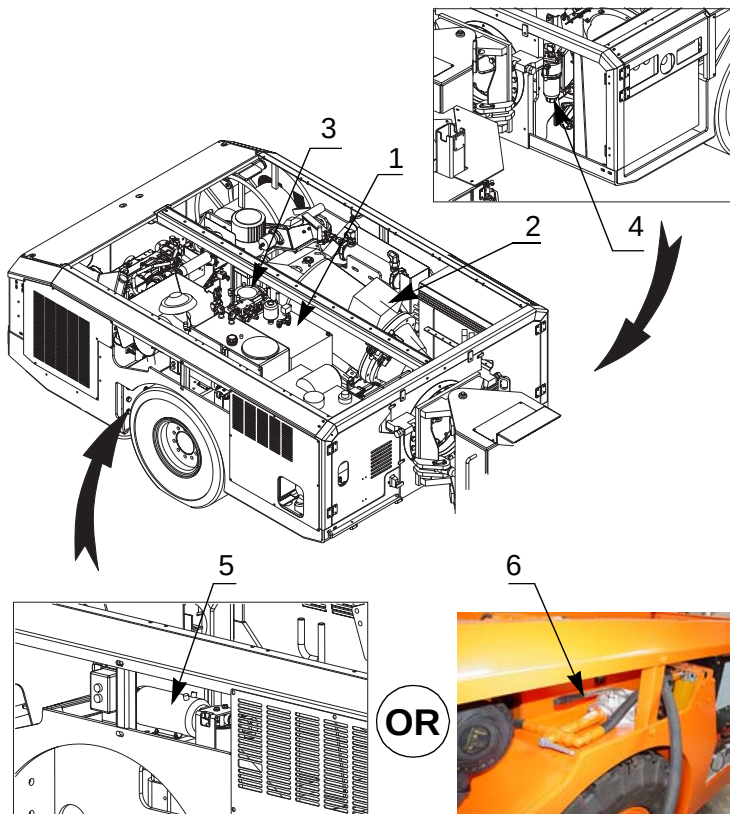
4

REAR SECTION



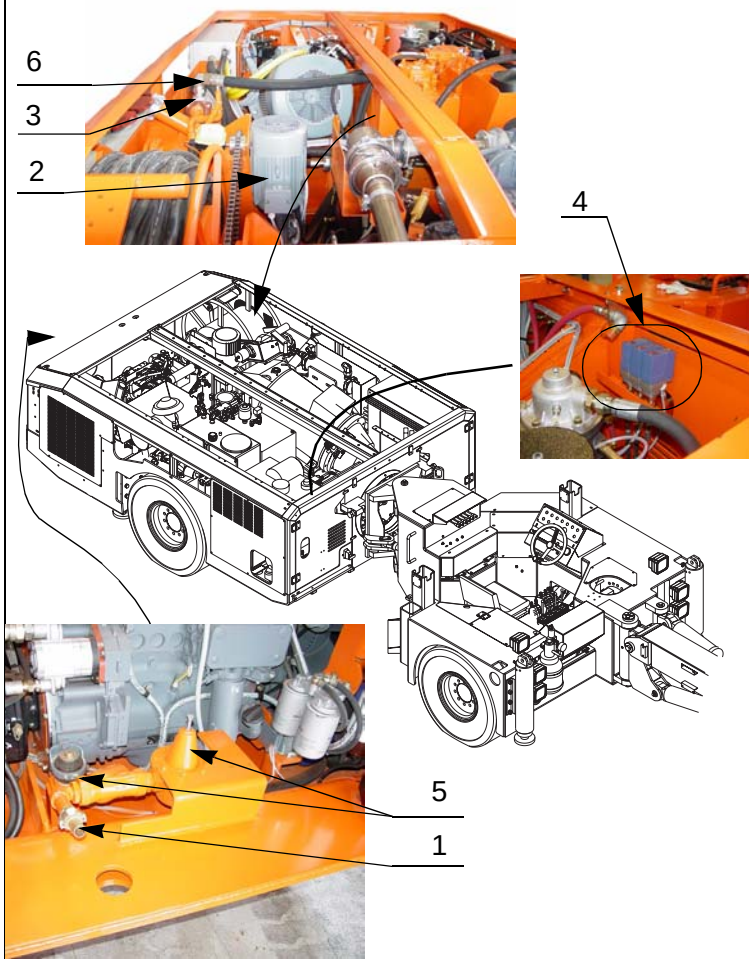
1. Trimming hydraulic tank
2. Diesel power pack
3. Water pump
4. Electric cable reel
5. Electric cabinet
6. Rear stabilizers
7. Grease pump
8. Hose reel and gun

DRILLING HYDRAULIC COMPONENTS



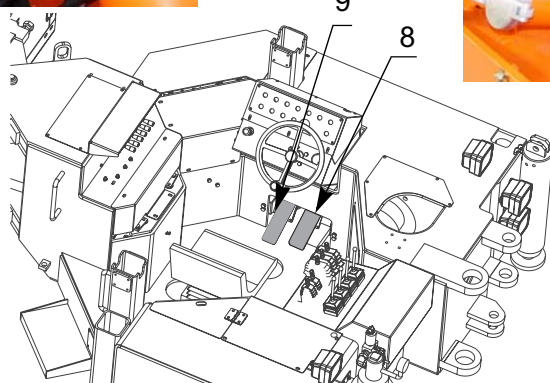
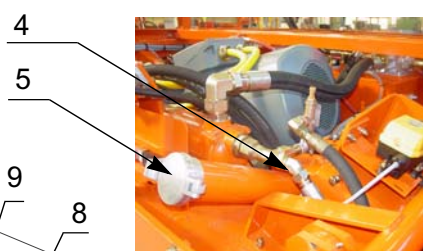
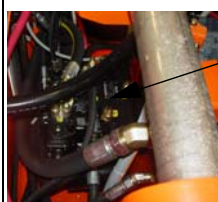
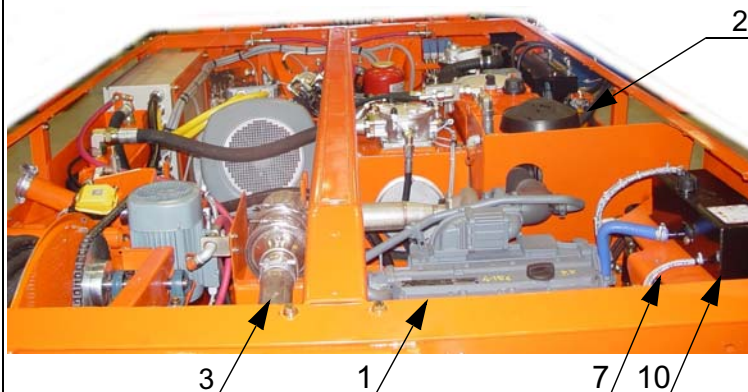
1. Drilling hydraulic tank
2. Drilling electric power pack
3. Drilling low pressure oil filter
4. Drilling high pressure oil filter
5. Electric oil filling pump
- OR
6. Manual oil filling pump

WATER CIRCUIT COMPONENTS



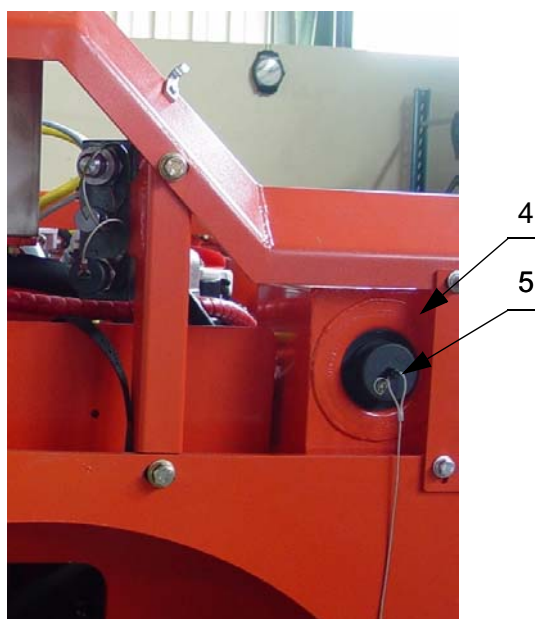
1. Water supply connection
2. Water pump
3. Oil water cooler
4. Pressure switch
5. Water circuit
(pressure reducing valve +
filter)
6. Safety valve

DIESEL POWER PACK



1. Diesel engine
2. Engine air filter
3. Exhaust gas purifier
4. Fuel tank
5. Fuel tank filling cap
6. Trimming pump
7. Trimming oil cooler
8. Accelerator pedal
9. Service brake pedal
10. Expansion tank

IF ULC/CSA FUEL TANK WITH WIGGINS SYSTEM



4. CHECKS AND INSTRUCTIONS

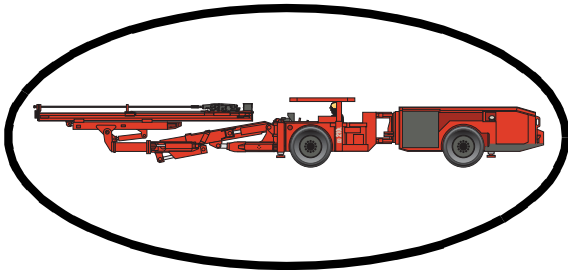
4.1. Assembly and checking of a new machine

If the machine is delivered disassembled, please pay special attention to the following points:

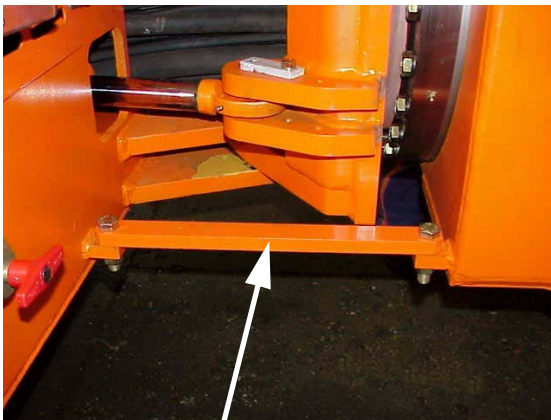
- The assembly site must be properly equipped (cleanliness, good lighting, lifting equipment, etc...).
- The assembly operation must be done by qualified personnel.
- Check that all components are delivered.
- Fasten all bolts and connections properly.
- Observe cleanliness when installing hydraulic hoses to prevent particles to enter in the hydraulic circuit.
- Lubricate all greasing points.
- Wash the machine before using it.

VISUAL CHECKING OF A NEW MACHINE

CHECK



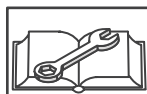
CENTRAL ARTICULATION
LOCKING BAR



LOCKING BAR
IN LOCKED POSITION

CHECK FOR :

- Possible transportation damage.
- Tyre pressure and condition.
- All oil and fuel levels.



CAUTION



WARNING

Caution. Remove the central articulation locking bar before moving the machine.

Danger. All electric safety devices must be thoroughly checked prior to attempt to start the machine.

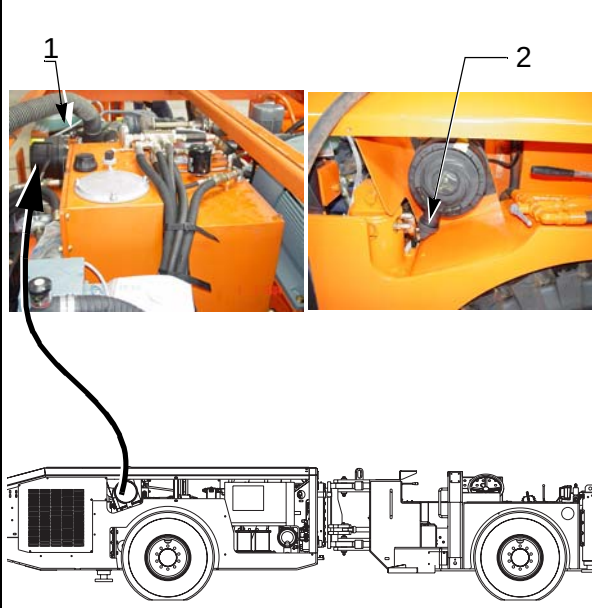
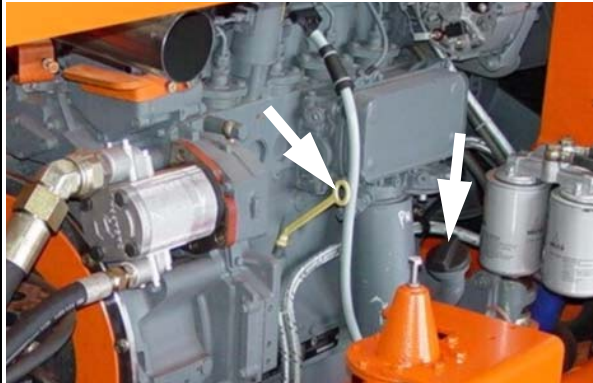
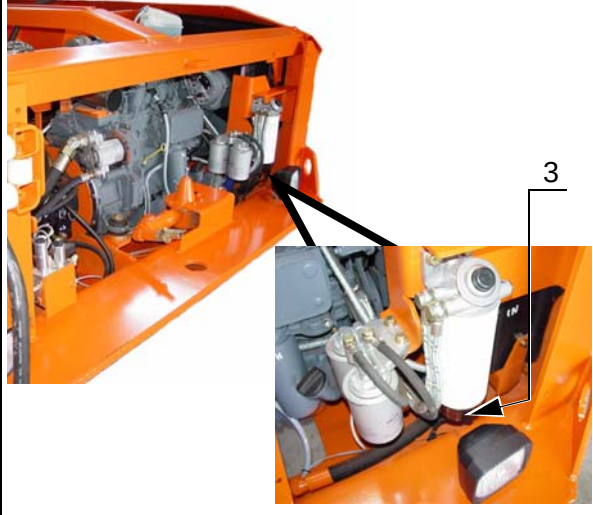
Danger. The rock drill accumulators must be inflated with NITROGEN (N₂).

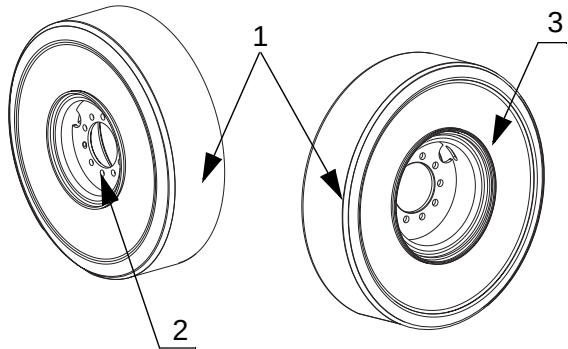
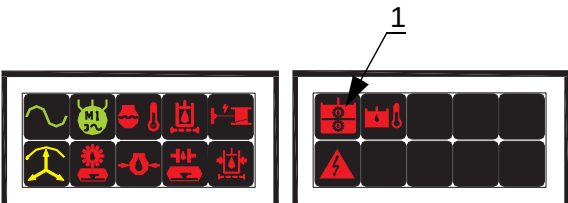
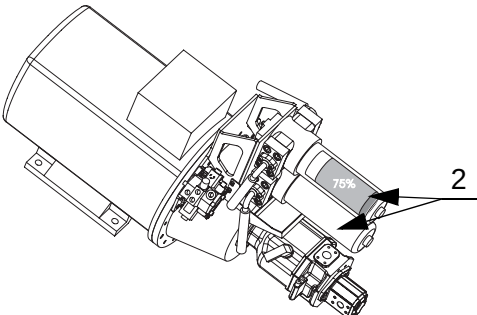
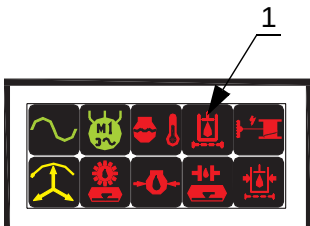
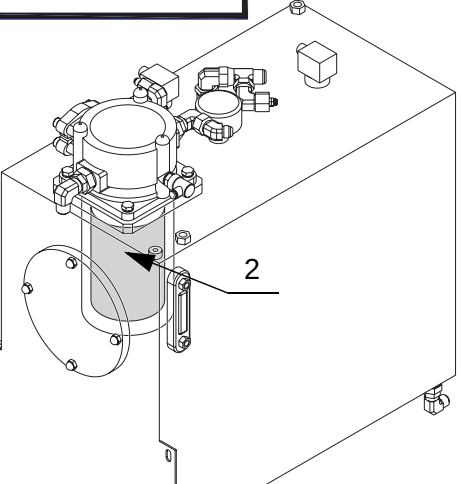
4.2. Routine checks before starting a shift



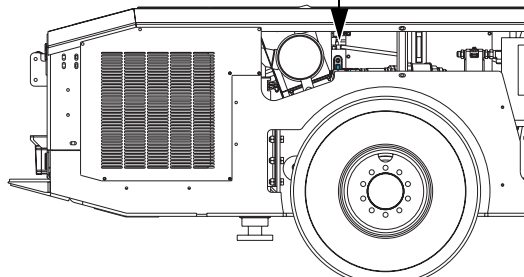
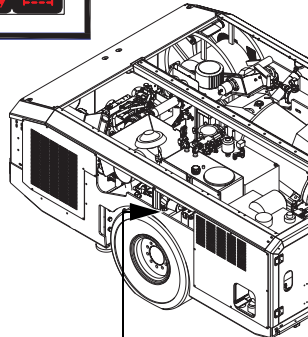
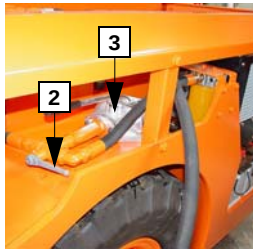
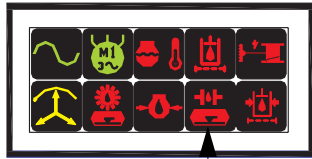
Danger. Report any damage or faulty components immediately and do not use the machine.

PINS		
	TYPE A • Lock plate (2) must be in contact to the support (1). • Fastening screws in place and tighten.	
	TYPE B • Fastening bolt (1) in place and tighten.	
	TYPE C • Fastening bolt (1) in place and tighten.	
HOSES, FITTINGS AND HYDRAULIC CONNECTIONS		
	When moving around the machine, look for hydraulic damages • Hoses • Fittings and connections • Hydraulic leaks	

ENGINE		
	AIR FILTER • Make sure that the clogging indicator (1) is in the green zone. An indicator located in the red zone calls for filter element replacement. • Expel dust from the pre-filter dust collector (2). • Check the hose between the filter and the engine intake manifold for fraying cracks and damaged clamps.	
	ENGINE OIL LEVEL • Ensure that the engine oil is between the minimum and the maximum level marks on the dipstick.	
	EXPANSION TANK • Ensure that the engine coolant level is between the minimum and the maximum level marks.	
	WATER SEPARATOR / FUEL FILTER • Open the valve (3) to evacuate contaminants and water. • Close the valve.	

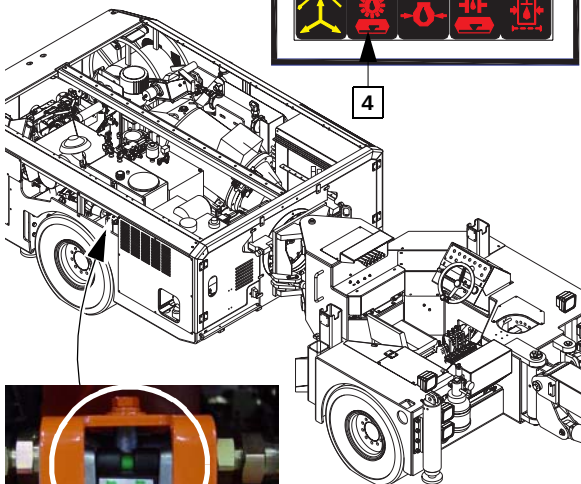
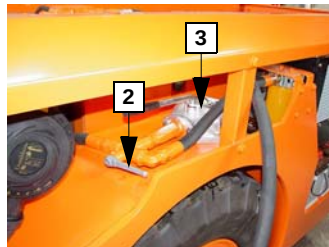
WHEELS		
FRONT BACK 	• Visually check the tyres (1), look for damages. • Make sure the nuts (2) are correctly tighten (Wheel tightening torque : 540 Nm). • Make sure the lock ring (3) is correctly in place. • If tyre are not foam filled, check front and rear pressure : 9,5 bar.	
TRAMMING HP FILTERS (OPTIONAL)		
 	• Make sure that caution light (1) is off, if is on, the tramming HP filters (2) are colmated to 75% and need to be replaced. • If the HP filters are colmated to 100%, the tramming is stopped and not allowed.	
DRILLING TANK RETURN FILTER		
 	• Make sure that caution light (1) is off, if is on, the return filter (2) is colmated and need to be replaced.	

HYDRAULIC TANKS (MANUAL FILLING PUMP)



DRILLING HYDRAULIC TANK

- Make sure that the drilling hydraulic oil level is above the minimum mark (1) of the sight glass.
- Turn ball valve (2) for select tramming tank or drilling tank.
- If needed fill up the tank to the maximum mark using the hand pump (3).
- Drilling oil level caution light (4).



TRAMMING HYDRAULIC TANK

- Make sure that the tramming hydraulic oil level is above the minimum mark (1) of the sight glass.
- Turn ball valve (2) for select tramming tank or drilling tank.
- If needed fill up the tank to the maximum mark using the hand pump (3).
- Tramming oil level caution light (4).

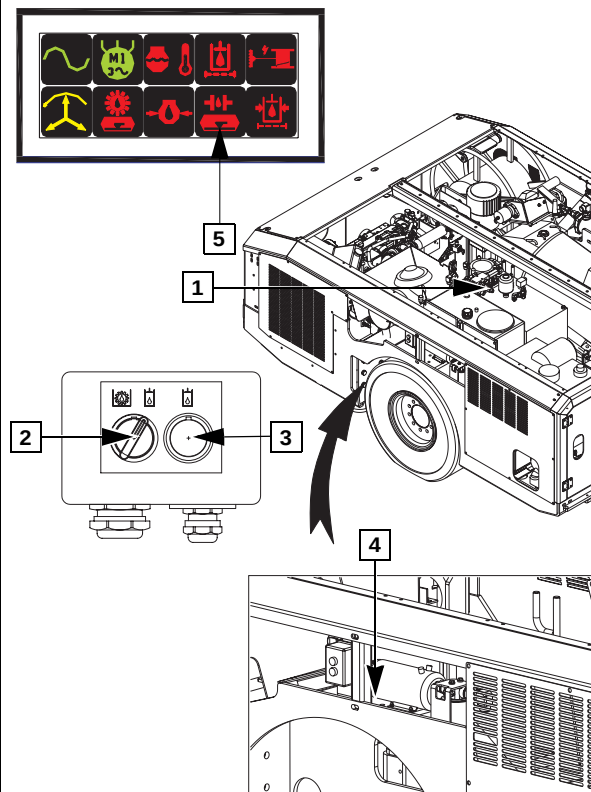


TRAMMING TANK FILLING OIL FILTER

- Make sure that the oil filter clogging indicator (A) indicates the green color. If it is red, the oil filter is colmated and need to be replaced.

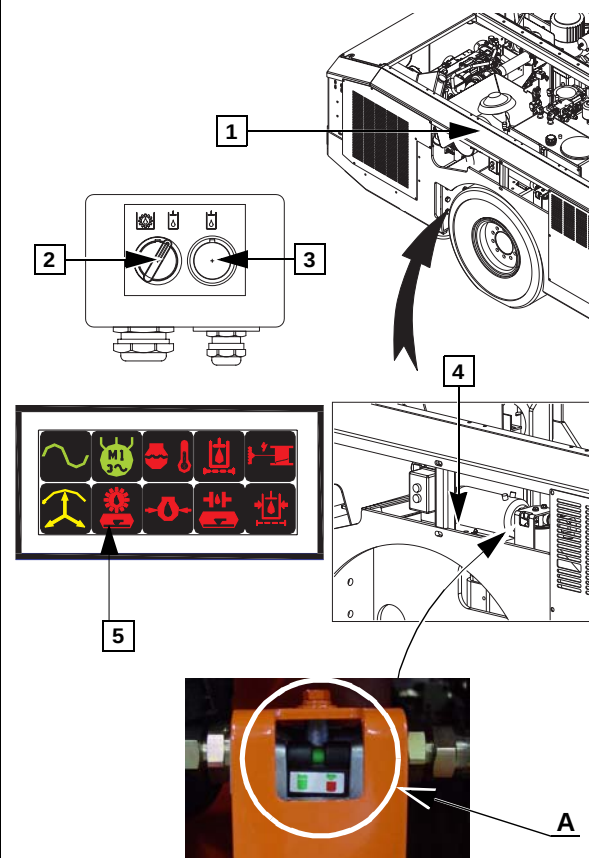


HYDRAULIC TANKS (OPTIONAL ELECTRIC FILLING PUMP)



DRILLING HYDRAULIC TANK

- Make sure that the drilling hydraulic oil level is above the minimum mark (1) of the sight glass.
- Turn switch (2) for select drilling tank and push the illuminated button (3). (During the filling operations the button (3) is on. When the tank is full, the button (3) is off).
- If needed fill up the tank to the maximum mark using the electric filling pump (4).
- Drilling oil level caution light (5) is off.



TRAMMING HYDRAULIC TANK

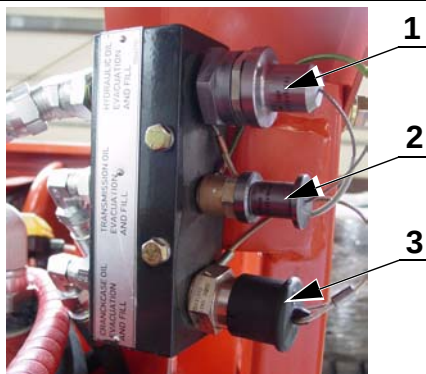
- Make sure that the trammig hydraulic oil level is above the minimum mark (1) of the sight glass.
- Turn switch (2) for select trammig tank and push the button (3). (During the filling operations the button (3) is on. When the tank is full, the button (3) is off).
- If needed fill up the tank to the maximum mark using the electric filling pump (4).
- Trammig oil level caution light (5).



TRAMMING TANK FILLING OIL FILTER

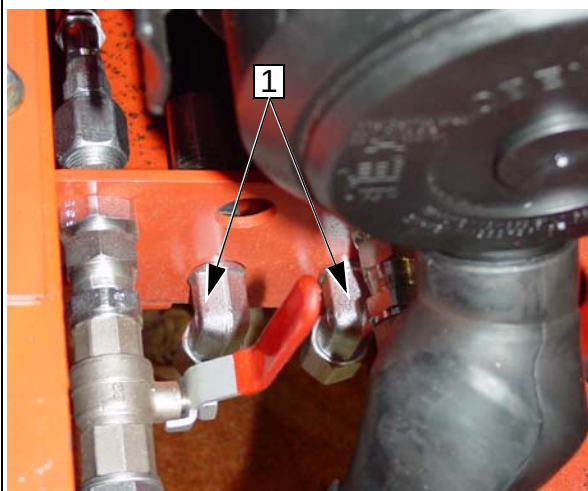
- Make sure that the oil filter clogging indicator (A) indicates the green color. If it is red, the oil filter is colmated and need to be replaced.

WIGGINS SYSTEM (OPTIONAL)



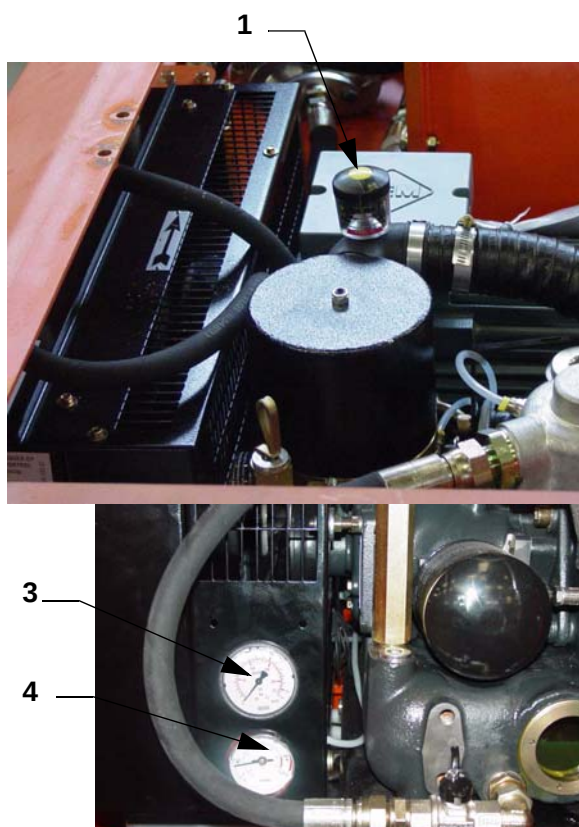
1. Drilling oil tank filling
2. Tramming oil tank filling
3. Diesel engine's crankcase oil filling

DRAINING OF TANKS



- Untighten the plugs **1** to drain the oil tramming and drilling tanks.

COMPRESSOR



- The clogging indicator (**1**) should be in the green zone.
- A clogging indicator in the red zone, calls for filter element replacement.
- Expel dust from the pre-filter dust collector (**2**).
- Check air inlet components, and inlet hoses for loose clamps and cracks in hose.

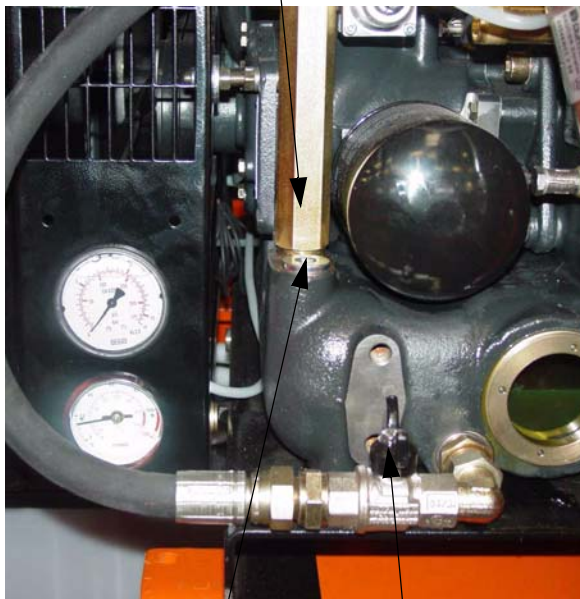
- 3 - Air circuit pressure**
--> must stay between **3 bar and 8 bar** (while running)
- 4 - Compressor oil temperature**
--> (**must stay under 100°C**).





Danger. Do not open the oil filling plug if the receiver is pressurized. Oil is hot when the compressor has just been stopped. Wait 20 minutes before doing any operation on the compressor

Level dipstick



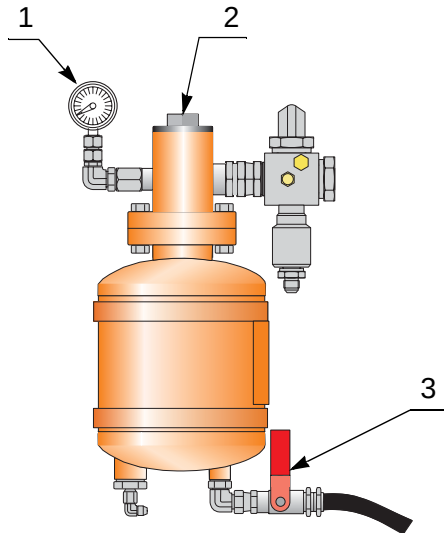
Oil filling

Oil drain

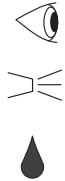
- First stop the compressor, and make sure that the receiver is pressureless. Blow-out the air circuit after stopping; then wait 15 minutes.
- Remove the level dipstick and check the oil level in the compressor.
- Remove the oil filling plug and add oil up to the top mark of dipstick.
- Screw the filling plug and the dipstick in their place.
- Start the air compressor again and stop it after a few time, then repeat the previously described operation to adjust the oil level.



KVL10 ROCK DRILL OILER

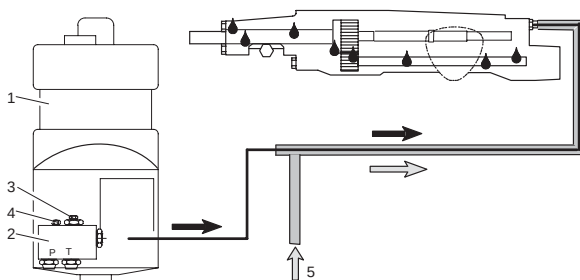


- Read the gauge (1) and be sure there is no pressure remaining in the air circuit.
- Open slowly the hand valve (3) to drain the condensed water.
- Open the cap (2), This cap includes a dipstick. Pull it up, check the rock drill lubrication oil level.
- Once a week, drain all remaining oil, fill up with new rock drill oil.



SLU ROCK DRILL OILER (OPTIONAL)

BOOST BUTTON



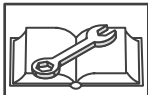
1. Oil tank
2. Pump unit
3. Bleeding screw
4. Hydraulics bleeding screw
5. Pressurized air

- BOOST BUTTON

- The Boost button is used when, for instance, oil has run out or the hose to the rock drill needs to be filled. The Boost button can also be used if a temporary increase in shank lubrication is required. When the boost button is depressed, oil output rises to 1200g/h and pumping frequency to 30 strokes per minute. In order to activate boost function, holddown the boost button until the indicator led flashes. The function is now in operation as long as the button is depressed. The boost button is of spring-return type, meaning that the pump resumes operation according to the setting as soon as the button is released.

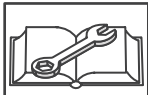
- During bleeding, the boost button is useful if the pump's working frequency is set very low.





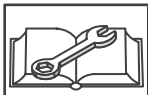
CAUTION

Caution. Flawless operation of shank lubrication is essential. Inadequate operation quickly causes serious damage on the rock drill.



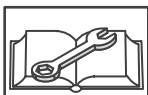
CAUTION

Caution. Always make sure that the shank lubrication oil you use meets the specifications. Choose correct oil viscosity according to ambient temperature.



CAUTION

Caution. When using just percussion or rotation separately, the warning indicator for shank lubrication goes on if no oil is reaching the shank.



CAUTION

Caution. Percussion or rotation does not stop, and the operator must decide whether to continue using these functions or not.

Caution. The pressurized air used for shank lubrication should be taken from the rig's own compressor. Air from external sources should be used in exceptional circumstances only. If an external air source is used, make sure that the air is sufficiently clean.

IP5 AIR CLEANER (OPTIONAL)

IP5 Air
cleanerIP5
Bleeding valve

WARNING

IP5
Bleeding valveIP5 Air
cleaner

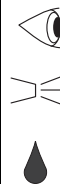
OR

- Every day, bleed the IP5 air cleaner.
- First stop the air compressor.
- Open the bleeding valve to remove the condensed water.
- Close the bleeding valve before starting the compressor.



WARNING

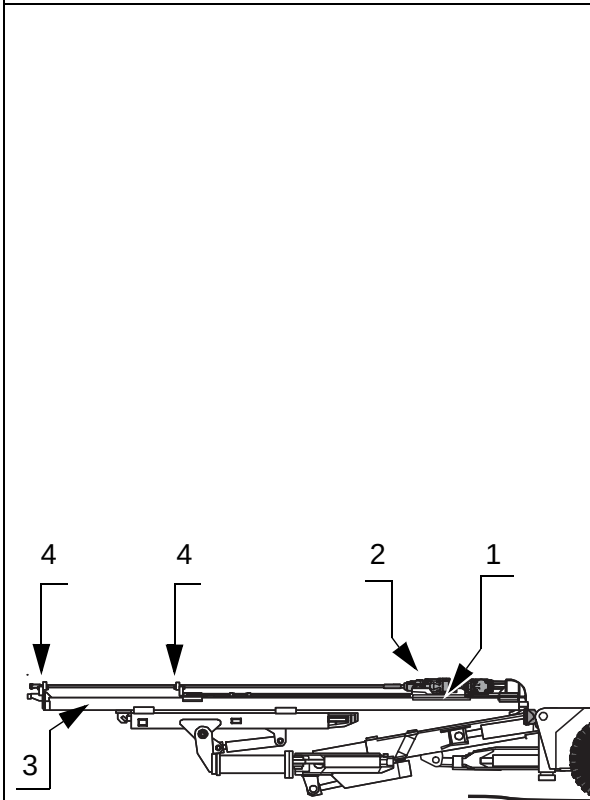
Danger. PRESSURIZED AIR: Open the bleeding valve slowly, so as to prevent heavy air blow.



IF ULC/CSA MACHINE

IP5 Bleeding
valve

DRILL FEED AND BOOM



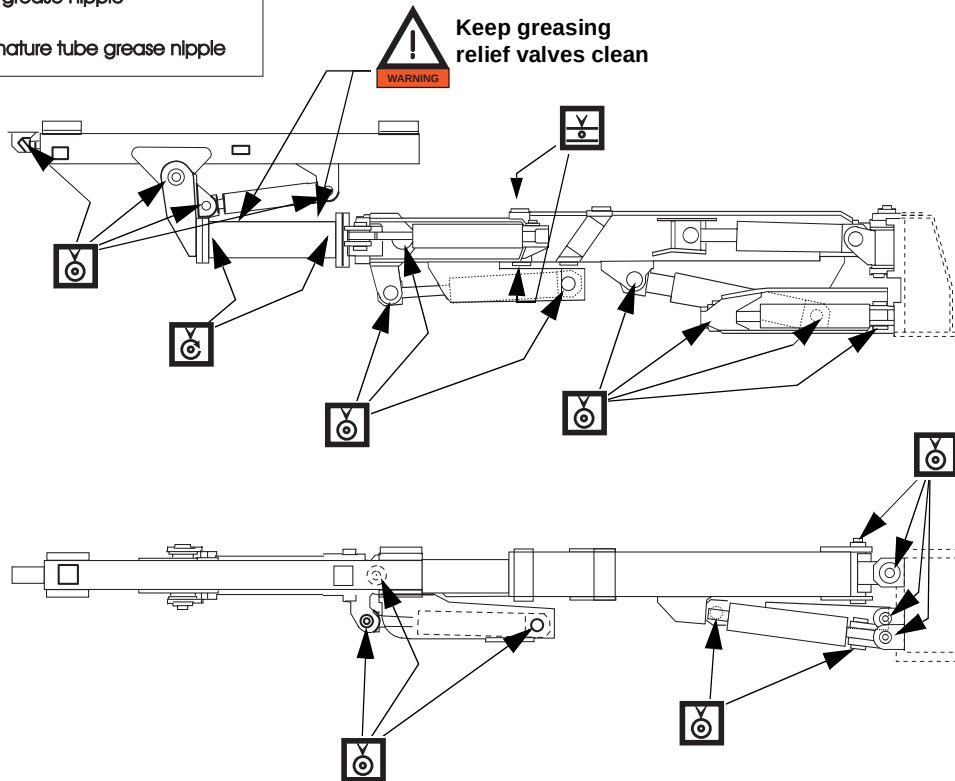
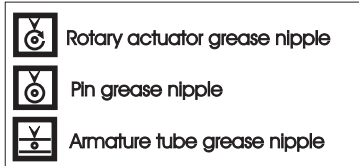
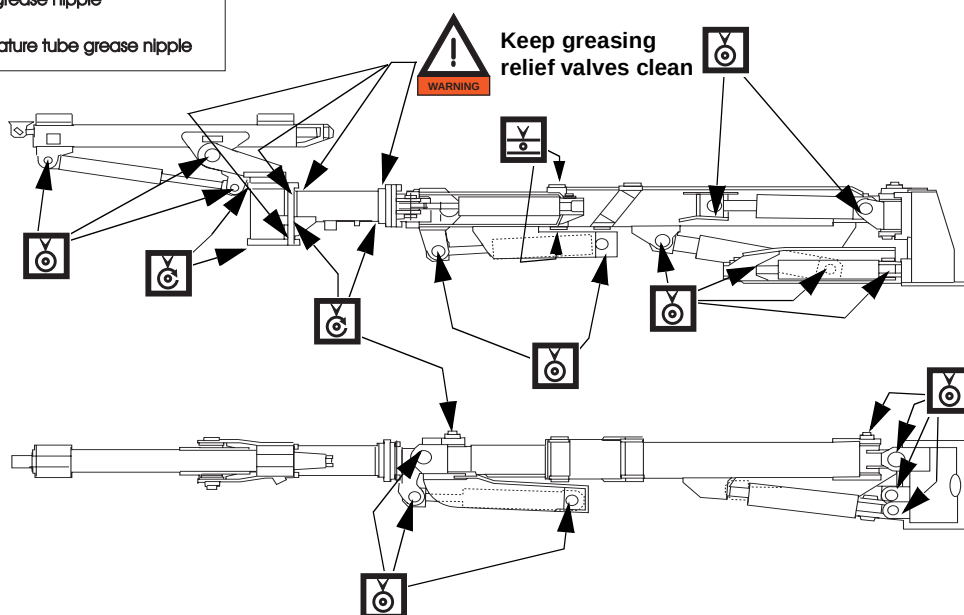
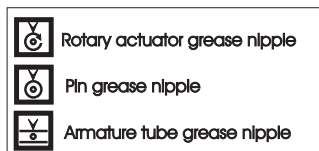
- Ensure that the rock drill (cradle) (1) guide shoes are correctly positioned and tightly in place.
- The rock drill/flushing head assembly (2) must be correctly fastened on its cradle (when separated cradle), and all screws and nuts must be tightened at the recommended torque (See rock drill and drill feed maintenance booklet).
- Ensure that the feed rails (3) are in good condition and free of dirt which could obstruct the drilling and bolting movements (wash them if necessary).
- There must be no missing or loose nuts and screws.
- Check condition of pulleys and cable.
- Check condition of centralizers (4).
- Check all the hoses for fraying or wear.

NOTE: The hoses must be kept under the protection of their spiral sheath.

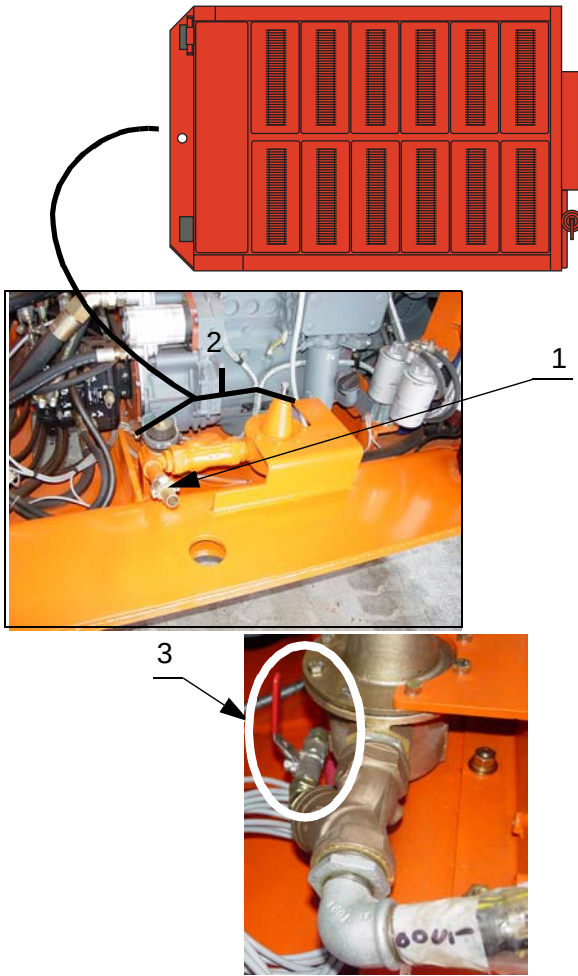
- Check and grease all pins and pulleys.

NOTE : Do not grease the rails.



B26F-B26XLF**B26NV-B26XLNV**

WATER SUPPLY



Check the water supply:

- Correct water supply connection (1).
- No leaks in water circuit components (2).
- Turn the ball valve (3) to drain water filter.

The mine water supply pressure must stay between 3 bar and 14 bar.

NOTE: A lack of water or a loss of pressure stops all drilling operations (percussion, rotation and feed halted).



WATER PUMP

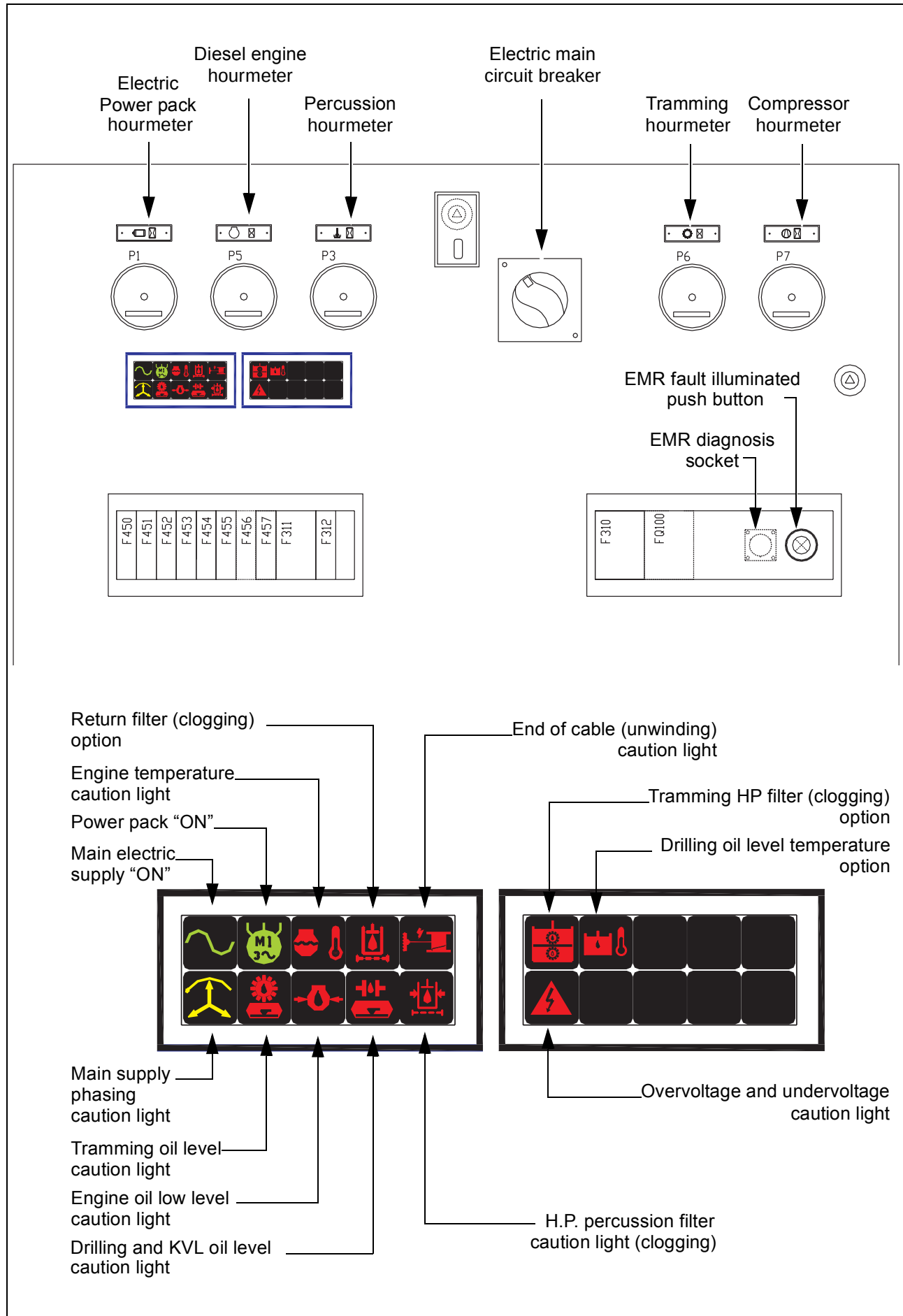


The water pump must be drained before each start and after each maintenance work on the water circuit.

- Use the drain ball valve for this operation.

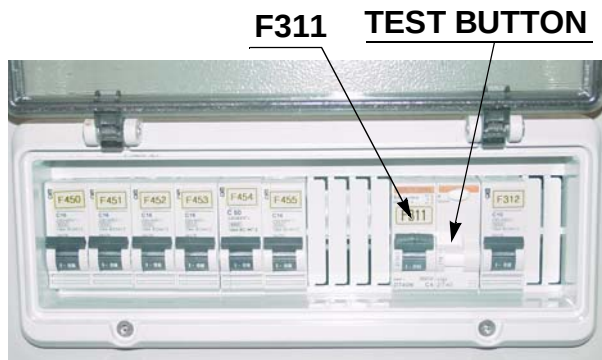


4.3. Standard electric cabinet



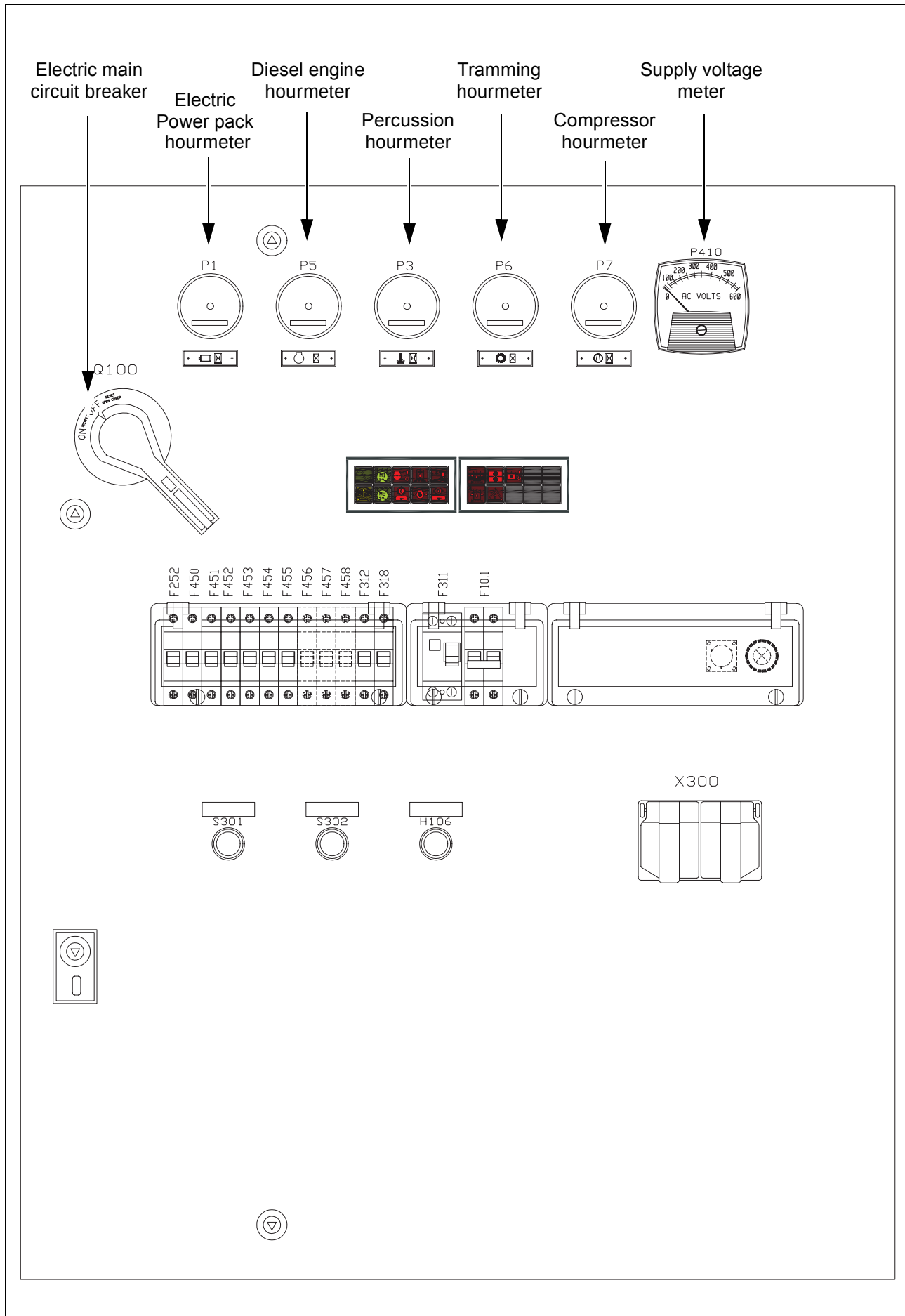
- F450:** Circuit breaker for internal 24V control voltage in main switchgear
- F451:** Circuit breaker for front and rear headlights
- F452:** Circuit breaker for contactor and emergency stop
- F453:** Circuit breaker for drilling light
- F454:** Circuit breaker for diesel supply and tramming control system (battery + diesel)
- F455:** Circuit breaker for diesel supply and tramming control system (diesel)
- F456:** Circuit breaker for EMR control
- F457:** Circuit breaker for Hydraulic pump
- F311:** Fault current circuit for internal 220V control voltage in main switchgear
- F312:** Circuit breaker for internal 220V control voltage in main switchgear
- F310:** Circuit breaker for battery load
- FQ100:** Circuit breaker for over and under voltage control supply (option)

FAULT CURRENT TEST



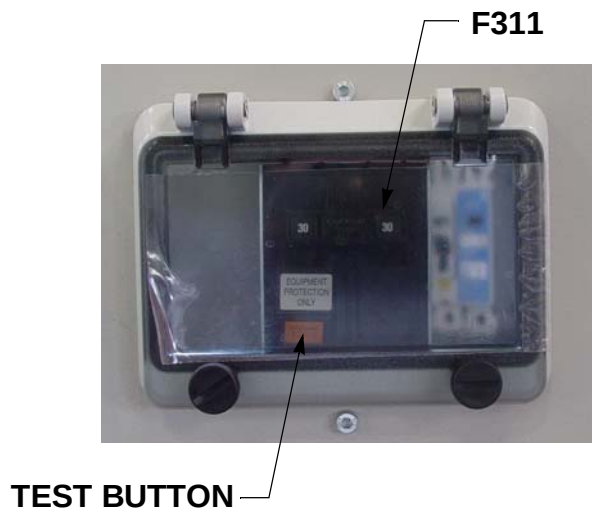
- Once a month, check the connections condition by doing a current fault test.
- To do the test, push the current fault test button at the electric box, the **F311** circuit breaker must trip.

4.4. ULC/CSA electric cabinet



Q100: Main switch; cuts off power supply.
F252 1-phase circuit breaker for sockets X430 and X431.
F450: Circuit breaker for internal 24V control voltage in main switchgear
F451: Circuit breaker for front and rear headlights
F452: Circuit breaker for contactor and emergency stop
F453: Circuit breaker for drilling light
F454: Circuit breaker for diesel supply and tramming control system (battery + diesel)
F455: Circuit breaker for diesel supply and tramming control system (diesel)
F456: Circuit breaker for EMR control
F457: Circuit breaker for Hydraulic pump
F458: Circuit breaker for central greasing unit and stabilizer safety
F312: Circuit breaker for internal 220V control voltage in main switchgear
F318: Circuit breaker for power source of 24 VDC.
F10.1: Circuit breaker for battery charger.
F310: Circuit breaker for battery load
FQ100: Circuit breaker for over and under voltage control supply (option)
S301: Power supply from gate-end box start. (UL/CSA)
S302: Power supply from gate-end box stop. (UL/CSA)
H106: For pilot and ground control.
X300: 1-phase socket outlet is equipped with 5mA ground fault sensing unit.

FAULT CURRENT TEST

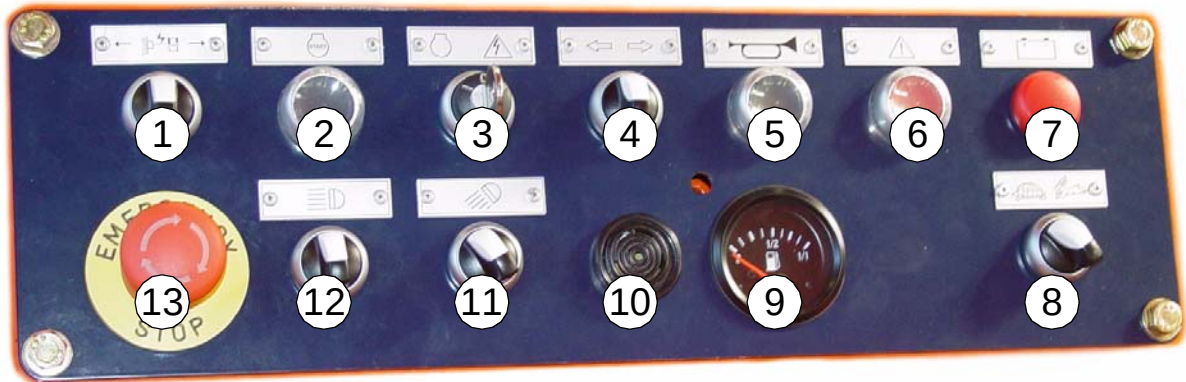


- Once a month, check the connections condition by doing a current fault test.
- To do the test, push the current fault test button at the electric box, the **F311** circuit breaker must trip.

4.5. Tramming compartment



TRAMMING CONTROL PANEL



OR



1. Cable reel control switch
2. Engine starter
3. Electric/Diesel selector switch
4. Forward/reverse tramming direction
5. Horn
6. Main caution light
7. Alternator caution light
8. Slow/ fast tramming speed selector switch.
9. Fuel gauge
10. Buzzer caution device

11. Forward/reverse tramming lights
12. Switch rear/front light
13. Emergency stop button
14. ABA brakes push button (optional)
15. ABA brake by-passing switch (optional)
16. ABA brakes buzzing red caution light (optional)
17. Rear stabilizers lights (optional)
18. Front stabilizers lights (optional)
19. Brakes test

(O) EMERGENCY/PARKING BRAKES

**(O) EMERGENCY / PARK BRAKE
PUSH BUTTON**



When tramming in emergency situation:

- Release the accelerator pedal
- Push the emergency/parking brakes red button.

ELECTRIC OR OPTIONAL ABA BRAKES

Electric brakes or
optional ABA brakes
push button

Optional ABA brakes bypassing
switch for machine's towing

Optional ABA brakes
buzzing red caution light



- PUSH TO ACTIVATE THE BRAKES



- Pull to release the brakes

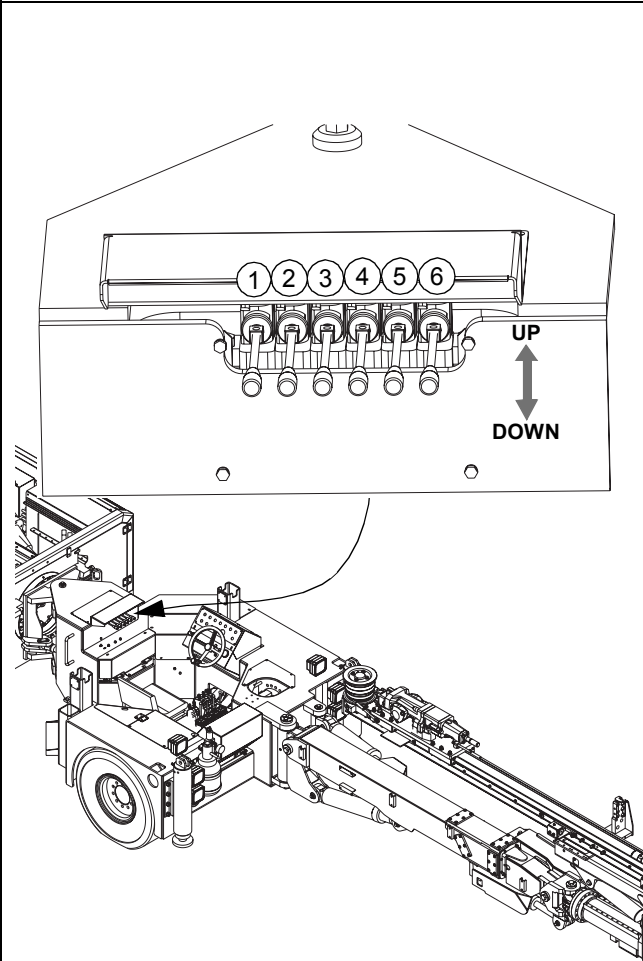


- Valve in normal position

If the brake system is released the push button red light turns off

The red ABA brakes caution light turns on and buzzes, if there is a braking circuit pressure falling down: **STOP IMMEDIATELY THE MACHINE AND NOTIFY MAINTENANCE.**

STABILIZERS AND DIESEL BOOM SUPPLY CONTROL VALVE



1. Front right jack.
2. Front left jack.
3. Rear right jack.
4. Rear left jack.
 - Levers **UP** to bring the stabilizers in contact to the ground, front stabilizers first.
 - Levers **DOWN** to retract the stabilizers in tramming position, rear stabilizers first.
5. Supplies oil pressure to boom valve (for maintenance use only) while diesel engine is running and HP cleaning device (Optional).
6. Safety canopy.

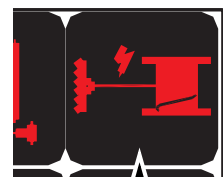
CABLE END LIMIT SWITCHES



Caution. For machines delivered with electric cable, cable end limit switches are adjusted at factory. For others machines, the operation must be done when the cable is connected to the machine, as follows:

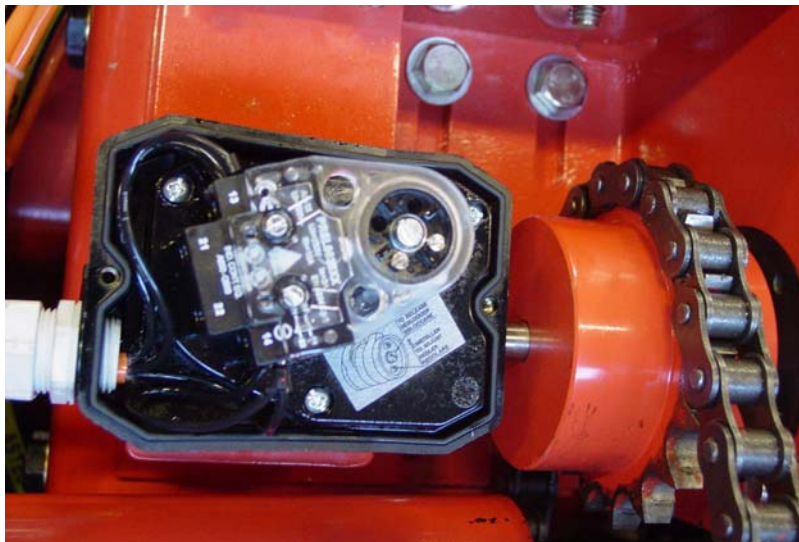
- First safety S32 : 6 cable reel revolutions left.
- Second safety S33 : 3 cable reel revolutions left.

1. Remove the cable end limit switches cover.
2. Untighten the central screw which is locking in place the detection cams.
3. Adjust each detection cam positioning with its adjusting screw according to the right number of cable revolution left.
4. Tighten the central screw which is locking in place the detection cams.
5. Put back in place the cable end limit switches cover.



Cable reel's end caution light

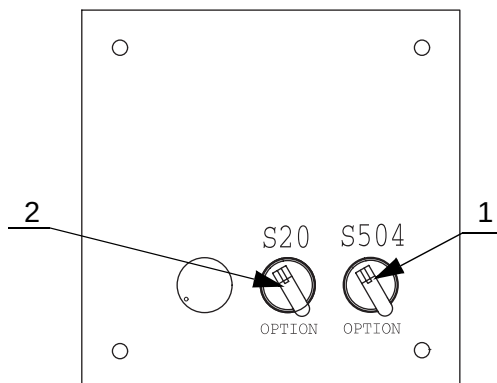
(See photos on next page)



Detection cam

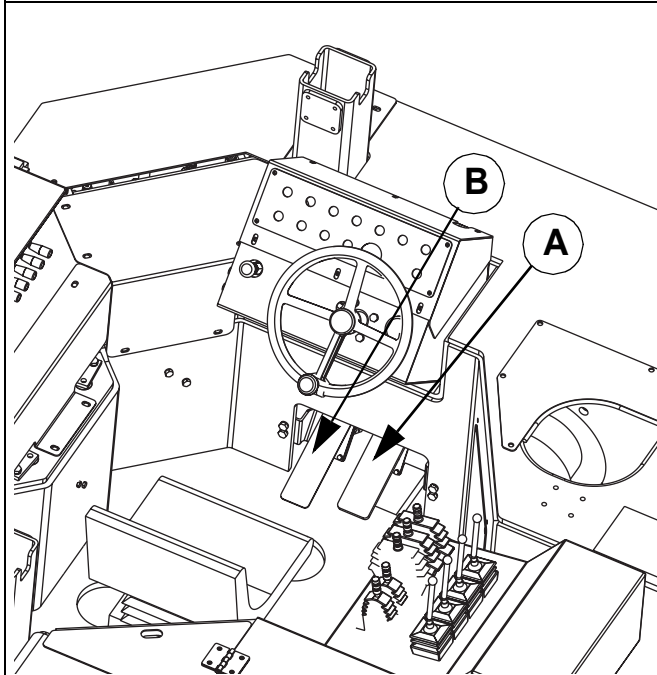
Detection cam's
adjusting screw

Locking screw

**UNDER CANOPY SWITCHES**

- Turn the switch **(1)** to the left, the courtesy light is on.
- Turn the switch **(1)** to the right, the courtesy light is off.
- Turn the switch **(2)** to the left, the warning beacon is on.
- Turn the switch **(2)** to the right, the warning beacon is off.

FOOT PEDALS

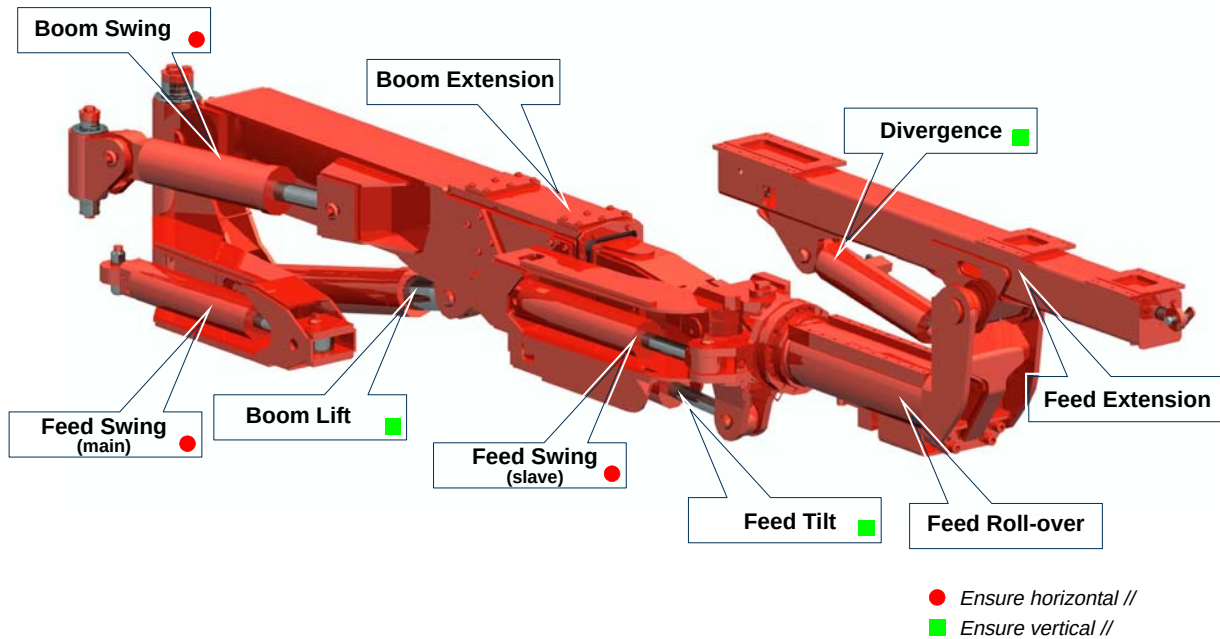
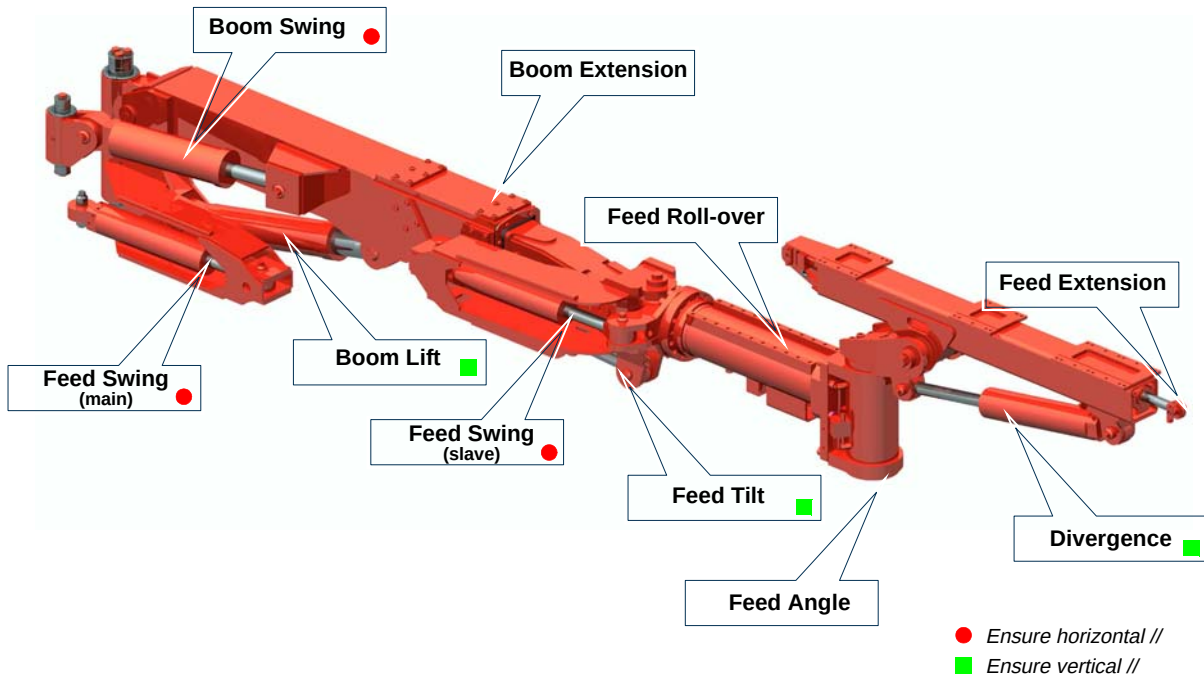


- Pedal **A**: Diesel accelerator.
- Pedal **B**: Service brake pedal.

NOTE: To stop the machine or to reduce the speed in a decline, release first the accelerator pedal and, if needed, push the service brake pedal.

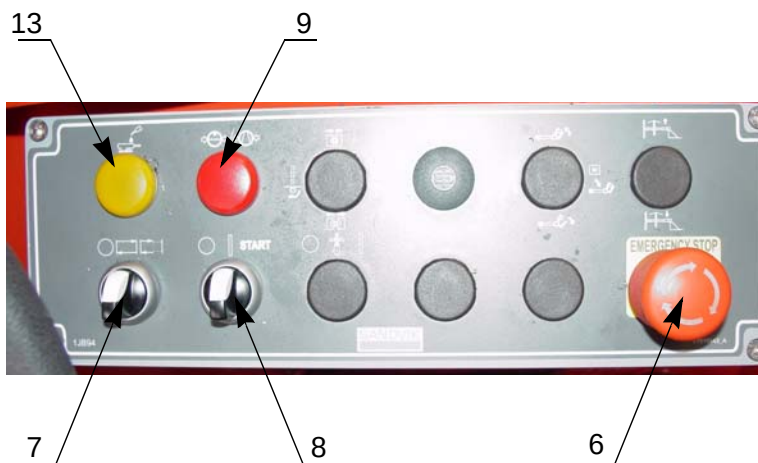
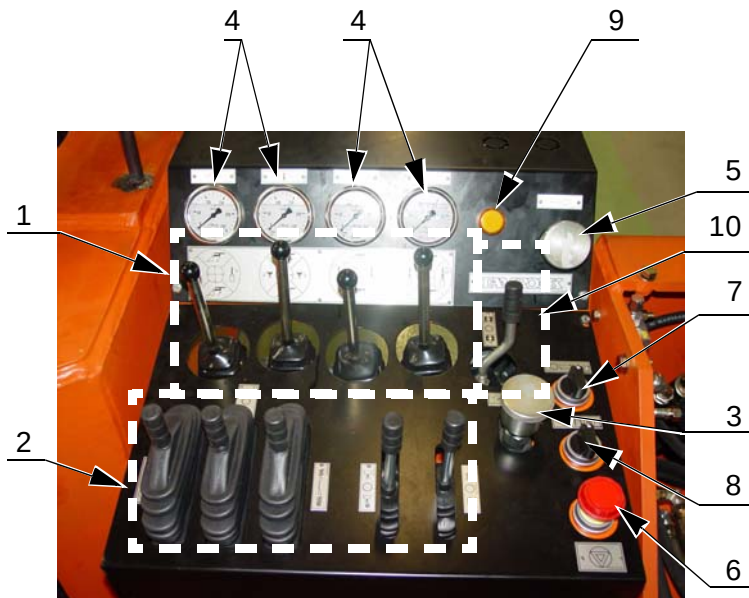
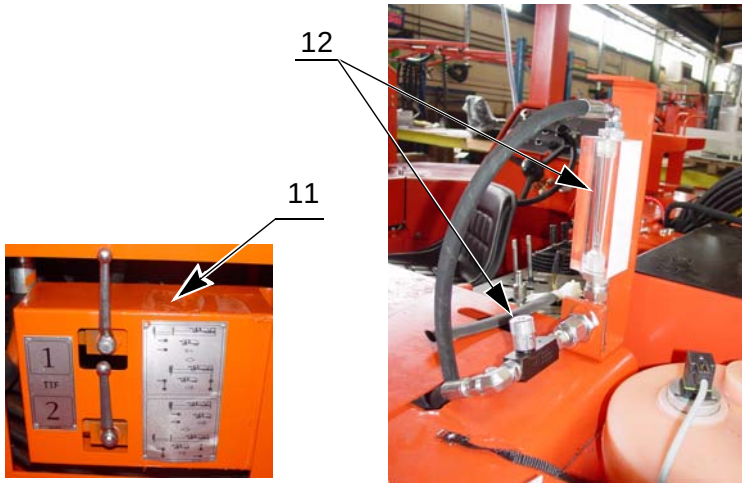
NOTE: Use pedal (**A**) and pedal (**B**) with right foot.

4.6. Boom movements

B26 F-XLF**B26 NV-XLNV**

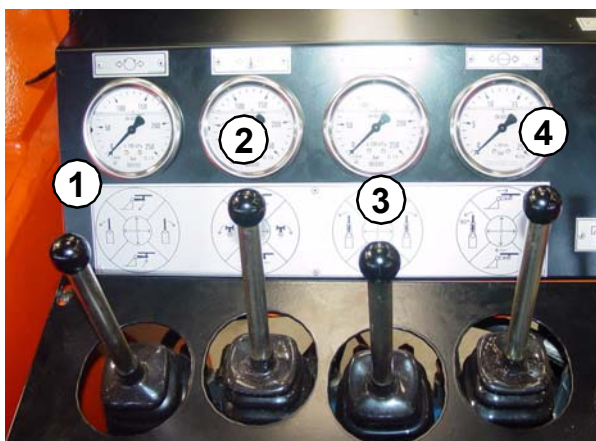
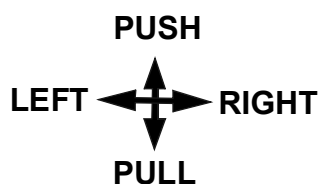
4.7. Drilling compartment

MAIN COMPONENTS



1. Boom controls
2. Drilling controls
3. Feed force regulating valve
4. Gauges
5. Rotation speed control valve
6. Emergency stop push button
7. Automatic return automatic selector switch
8. Powerpack starting switch
9. Air / water caution light
10. Optional lever for B26NV & B26XLNV
11. TTF or TFX feed setting ball valves
12. Air mist flow control valve and flowmeter
13. SLU rock drill oiler caution light (optional)

BOOM CONTROLS

**LEVER 1 - BOOM LIFT & SWING**

- Push : Boom down.
- Pull : Boom up.
- Right : Right boom swing.
- Left : Left boom swing.

LEVER 2 - BOOM EXTENSION & FEED ROLL-OVER

- Push : Boom extension.
- Pull : Boom retraction.
- Right : Right feed roll-over.
- Left : Left feed roll-over.

LEVER 3 - FEED TILT & SWING

- Push : Down feed tilt .
- Pull : Up feed tilt.
- Right : Right feed swing.
- Left : Left feed swing.

LEVER 4 - FEED EXTENSION & DIVERGENCE

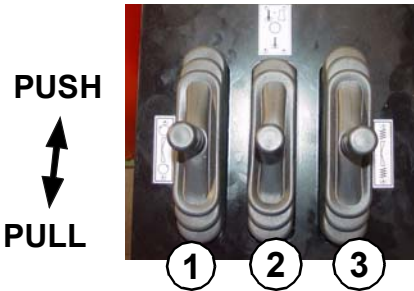
- Push : Feed extension.
- Pull : Feed retraction.
- Right : Down feed divergence.
- Left : Up feed divergence.

OR FEED ANGLE FOR NV BOOM

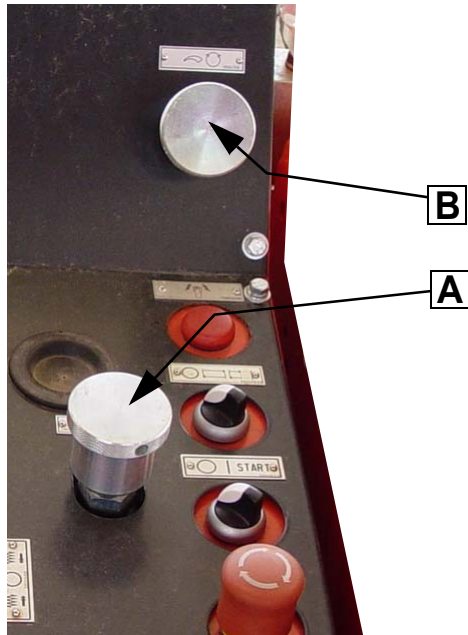
- Right : Right feed angle.
- Left : Left feed angle.

**LEVER 5 - OPTIONAL LEVER FOR NV BOOM DIVERGENCE**

- Push : Down feed divergence.
- Pull : Up feed divergence.

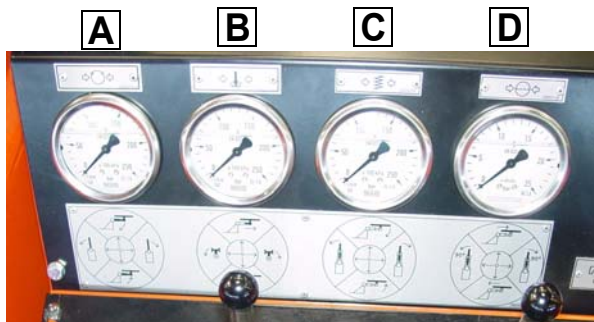
DRILLING CONTROLS	
	LEVER 1 - ROTATION • Push : Reverse rotation. • Pull : Drilling rotation (counterclockwise).
LEVER 2 - PERCUSSION • Push : Manual percussion (thread and drill bit loosening). • Pull : Normal drilling percussion.	LEVER 3 - FEED • Push : Feed return. • Pull : Feed thrust.
	
LEVER 4 - AIR/WATER FLUSHING & OPTIONAL AIR MIST • Push : Air flushing. • Pull : Water flushing or Air mist (optional). NOTE: - Percussion activates automatically water flushing. - Percussion + air flushing activate optional air mist.	LEVER 5 - FAST FEED • Push : Fast feed return. • Pull : Fast feed thrust.

ADJUSTMENT KNOBS



- **A** : Feed pressure control knob. Turn clockwise to increase pressure, counter clockwise to decrease pressure.
- **B** : Rotation speed control knob. Turn clockwise to increase RPM, counter clockwise to decrease RPM.

PRESSURE GAUGES



- **A** : Rotation pressure gauge.
- **B** : Percussion pressure gauge.
- **C** : Feed pressure gauge.
- **D** : Water pressure gauge.

POWER PACK SWITCH



P-PACK

**EMERGENCY STOP
PUSH BUTTON**

OR



P-PACK

**EMERGENCY STOP
PUSH BUTTON**

- Ensure that all the control levers for the hydraulic control valves, particularly the drilling control levers, are in the NEUTRAL POSITION.
- Turn the **P-PACK** switch to the right (**1**) power pack is under tension, turn to the right (**START**) power pack starts and switch automatically returns to position (**1**). Turn to the left (**0**) power pack stops.



Caution. Wait several seconds before using any one of the control lever.

FEED AUTOMATIC RETURN SWITCH



**AUTO
RETURN**

**EMERGENCY STOP
PUSH BUTTON**

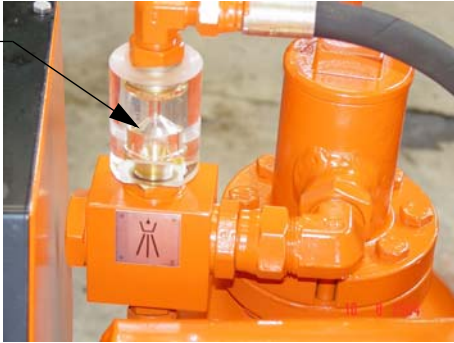
OR



**AUTO
RETURN**

**EMERGENCY STOP
PUSH BUTTON**

- Left position: Manual feed return using control levers, all 3 drilling joystick levers free.
- Middle position: Automatic feed return at the end of drilling operation, all 3 drilling levers hold in full drilling position.
- Right position: While drilling, if there is an need for stopping the drilling process, it moves the rockdrill backward immediatly and resets the 3 drilling levers to neutral. From this position the switch returns to middle position when it is not maintained.

KVL10 ROCK DRILL OILER SIGHT GLASS**1**

The rock drill shank is lubricated with oil mixed in pressurized air.

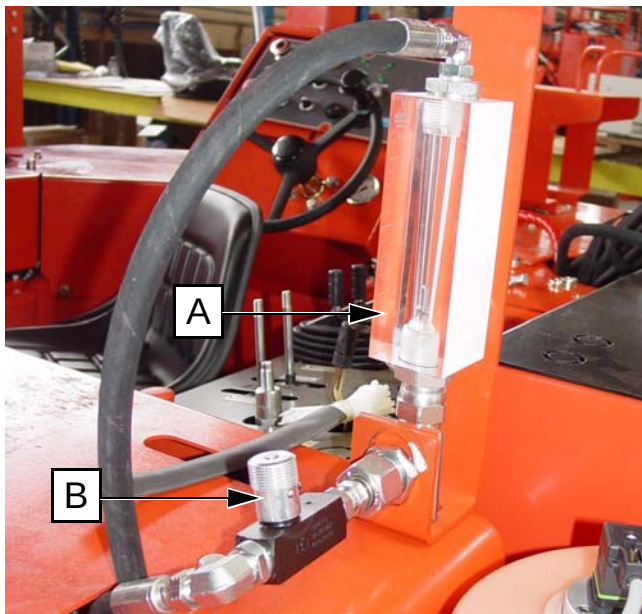
- While drilling, air/oil mix must flow through the sight glass (**1**). If the glass seems dry, stop drilling operation and check the oiler.
- Check the caution light at electrical cabinet.

NOTE: A loss of air pressure stops all drilling operations (percussion, rotation and feed halted).

SLU ROCK DRILL OILER (OPTIONAL)

The rock drill shank is lubricated with oil mixed in pressurized air by the SLU oiler which is one of the most important component of the machine.

- Check the yellow caution light at drilling compartment (1JB94).

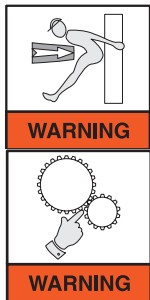
AIR MIST (OPTIONAL)

Air mist flushing is activated by activating percussion + air flushing.

- **A:** Air mist flowmeter
- **B:** Turn flow controller to adjust water flow

5. TRAMMING

5.1. Starting the engine



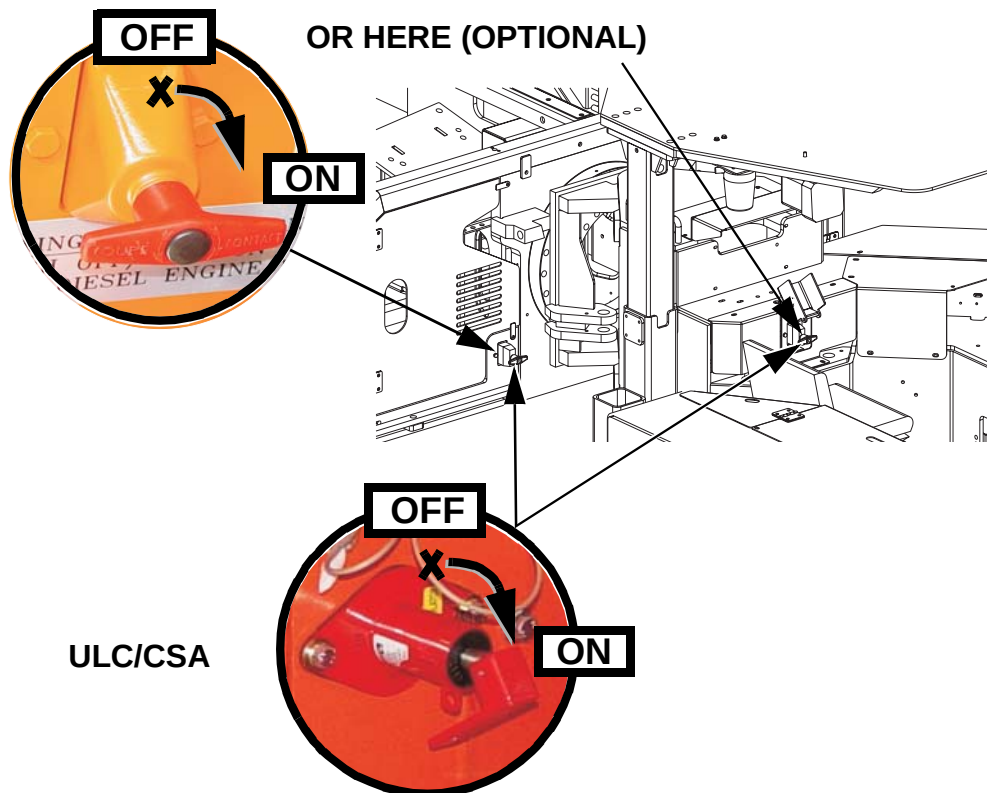
Danger. Always make sure before starting the engine that there is no unauthorized persons in the danger areas around the machine and that no controls are in operating position.

The operator must fasten his seat belt before starting the engine .

Danger. Sound the horn to warn any person of your intention to start and move the machine.

Make sure that all covers and protective hoods and doors are installed and properly closed.

BATTERIES MASTER SWITCH



- Turn the batteries master switch to the ON position.

ELECTRIC SWITCHES



OR



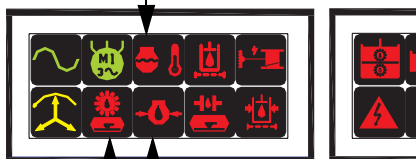
- Rotate the selector switch (1) to the left in Diesel position.
- Make sure the tramming direction switch (2) is in the center in neutral position.
- Turn the tramming light switch (3) to the right
- Rotate the speed selector (4) to the left in slow speed position (turtle).
- Sound the horn (5) to inform everybody of your intention to start the engine.
- Depress the starting button (6).



Caution. Do not run the starter longer than 10 seconds at a time. Wait the starter to cool down before new starting attempt (10 seconds).

WARNING LIGHTS

Engine temperature
caution light



Tramming oil level
caution light

Engine oil pressure
caution light

- If the buzzer sounds while the engine is running, a caution light turns on and inform you about the problem (See: paragraph 4.3. page 54).
- Stop the engine and notify maintenance.

TRAMMING CHARGE PRESSURE GAUGE



1

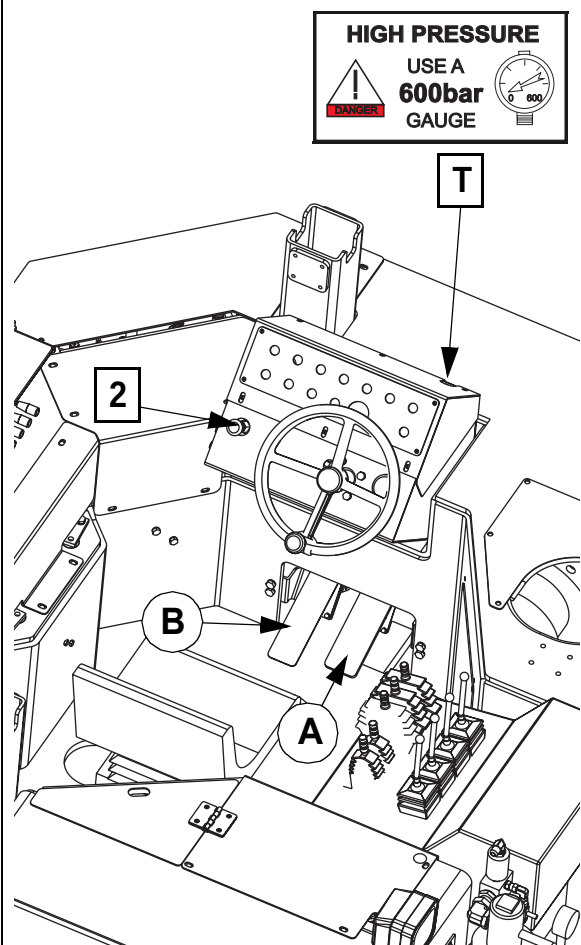
- Let the engine in idle position and check the tramming charge pressure gauge (1), it must show a minimum of **12 bar**.

5.2. Emergency/park and service brakes tests

BRAKES TESTS PROCEDURE

**1. TEST PREPARATION**

- Turn the tramming speed selector (1) to low speed range (turtle).

**2. EMERGENCY/PARK BRAKE TEST**

- Install a 600 bar gauge at the tramming test point (T).

Danger. USE ONLY 0-600 bar GAUGE DUE TO THE HIGH PRESSURE.



- Apply the brakes by pressing the red button (2).
- Select one tramming direction and accelerate slowly (A) until the engine reaches full RPM.

=> The tramming pressure must increase to **440 bar** and no wheel must turn.

NOTA: The two directions have to be tested.



Danger. If the wheels turn, do not use the machine and inform a responsible person immediately.

3. SERVICE BRAKE TEST

- Release the park brake by pulling the button (2).
- Select one tramming direction, push the brake pedal (B), and at the same time, accelerate slowly (A), until the engine reaches full RPM.

=> No wheel must turn.

NOTA: the two directions have to be tested.



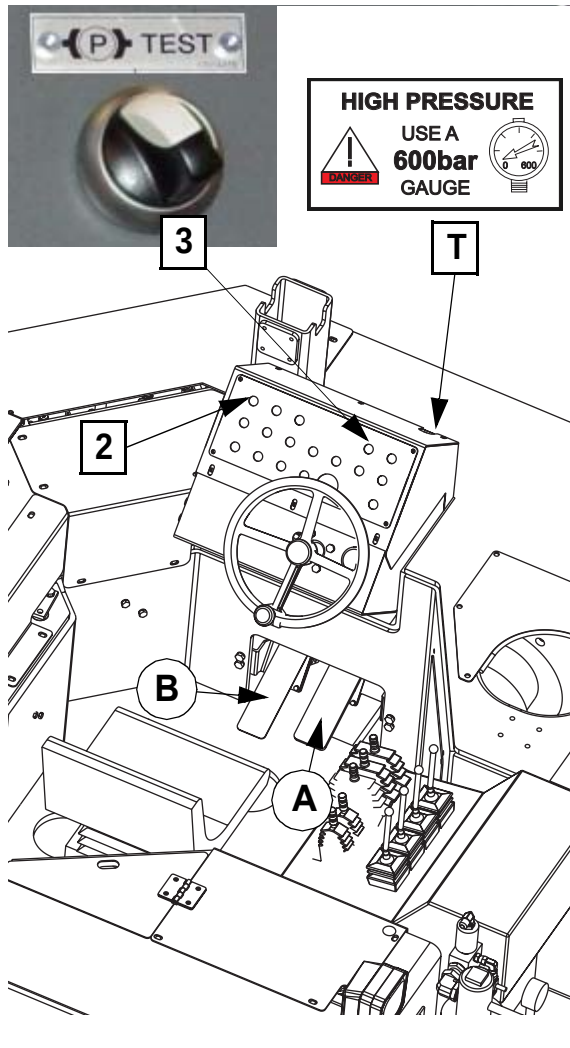
Danger. In case the brakes are faulty, do not use the machine and inform a responsible person immediately.

ELECTRICAL BRAKES TESTS PROCEDURE



1. TEST PREPARATION

- Turn the tramming speed selector (1) to low speed range (turtle).



2. ELECTRIC EMERGENCY/PARK BRAKE TEST

- Install a **600 bar** gauge at the tramming test point (T).

Danger. USE ONLY 0-600 bar GAUGE DUE TO THE HIGH PRESSURE.



- Apply the brakes by pressing the red button (2).
- Select one tramming direction, turn and keep the brake test button (3) to **TEST** position and accelerate slowly

=> The tramming pressure must increase to **440 bar** and no wheel must turn.

NOTA: The two directions have to be tested.



Danger. If the wheels turn, do not use the machine and inform a responsible person immediately.

3. SERVICE BRAKE TEST

- Release the park brake by pulling the button (2).
- Select one tramming direction, push the brake pedal (B), and at the same time, accelerate slowly (A), until the engine reaches full RPM.

=> No wheel must turn.

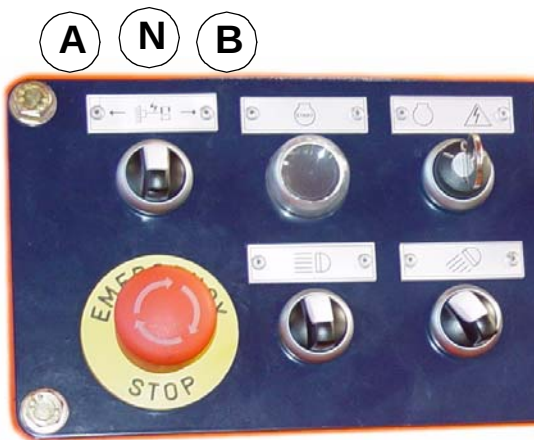
NOTA: the two directions have to be tested.



Danger. In case the brakes are faulty, do not use the machine and inform a responsible person immediatly.

5.3. Electric cable

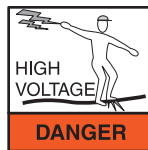
CABLE REEL CONTROL SWITCHES



OR

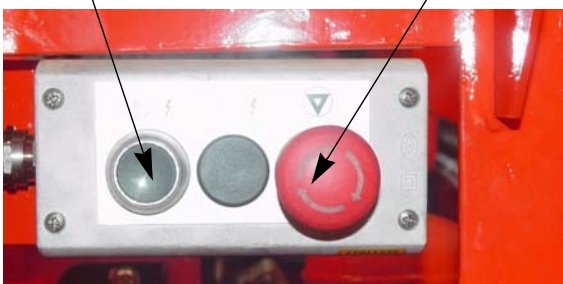


- Position the cable reel control switch in the neutral position (N).
- Ensure that the power supply from the mine electric box to the machine is OFF.
- Plug the cable into the mine electric box.
- Secure the cable on the support provided by the mine.
- Turn the switch to position (B) for unreeling cable.
- Tram to the face to be drilled.
- Turn the switch to position (A) for reeling cable.



Danger. During manual cable unwinding, keep tension on the cable to avoid loss loop and so cable damages between the drum and the carrier.

1

EMERGENCY STOP
PUSH BUTTON

- Push button (1) to reel the cable



Danger. Never use an electric cable unless it is firmly positioned on its support. this will prevent unnecessary tension on the cable which may result in the plug being pulled from its socket.

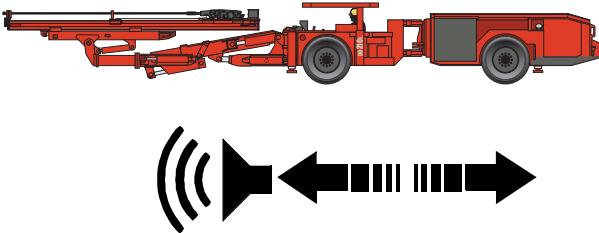
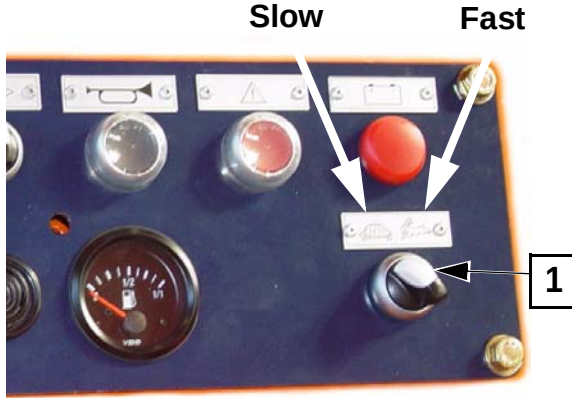
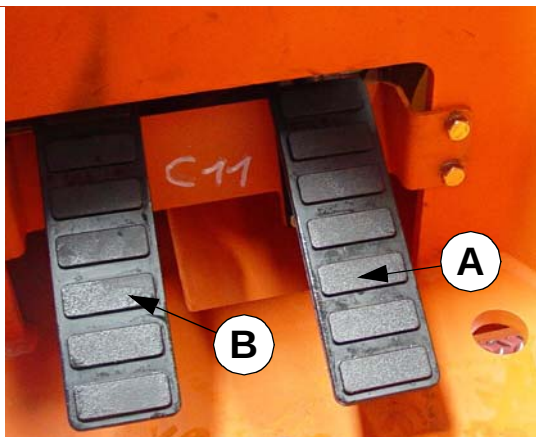
The cable must never be live before the machine is ready to drill and the cable itself has been placed in its support and support hooks.

NEVER HANDLE A LIVE CABLE.

Never move the machine if the cable is live.

To ensure that no vehicle will drive over the cable, lay the cable in hooks which have been placed in the sidewall along the length of the gallery being drilled.

5.4. Moving the machine

FORWARD / BACKWARD	
 Danger. Sound the horn to warn people before moving the machine. 	• Always refer to the maximum gradient angle (See: paragraph 2.6. page 14). • Make sure the boom is in tramming position (See: paragraph 2.8. page 15). • Retract the stabilizers (rear first then front). • Pull up the brake valve to release the brakes. • Select the direction you want by turning the switch (2) to the left to move forward, to the right to move backward. • Depress on the accelerator pedal (A). The speed depends on the Diesel engine RPM.
WHERE USING LOW SPEED RANGE?	
	• Turn the tramming speed selector (1) to the left in low speed range (turtle symbol) in incline, decline, in busy or crowded areas and in working areas. • Drive slowly around corners, sound the horn and warn people in areas you cannot see. • Observe mine speed limit regulation.
HOW TO STOP THE MACHINE?	
	In normal tramming conditions to stop the machine you must: • Release the accelerator pedal (A) to reduce machine's speed. • Slowly push on the service brake pedal (B).

EMERGENCY STOPPING



OR

(O)



In case of emergency, push the red button (O) to activate the emergency brake.



Danger. As the machine may come to an abrupt halt, the operator must be correctly seated with the safety belt fastened and attentive at all times.

TRANSPORTING PASSENGERS AND STANDING UP WHILE TRAMMING IS STRICTLY FORBIDDEN.



Danger. Memorise the location of this brake valve in order to be able to activate it rapidly in case of emergency.

Danger. The tramming wheel motors braking technology only enables 10 emergency stops. After 10 emergency braking, all wheel motors braking disks must be replaced in order to ensure a safe operating of the machine.

Emergency braking must be counted and immediately reported, Sandvik also recommends to always get wheel motors braking disks kits in stock.

5.5. Parking the machine

To park the machine safely, select an area clear of personnel and a location where the machine will not obstruct passage of other equipment.

- Bring the machine to a full stop. Release the accelerator pedal and press on service brake pedal.
- Apply the emergency/parking brakes.
- Position the two (2) rear stabilizing jacks and the two (2) front jacks firmly on the ground. The distance between the wheels and the ground must not be more than 13 mm (1/2").
- The machine must be turned into a bank or rib to prevent it from running away. Place a stop block on the wheels when parking a gradient.
- Allow the diesel engine to idle several minutes to allow critical components to cool gradually.
- Stop the engine by pressing the "OFF" button.
- Turn the battery master switch to the "OFF" position.

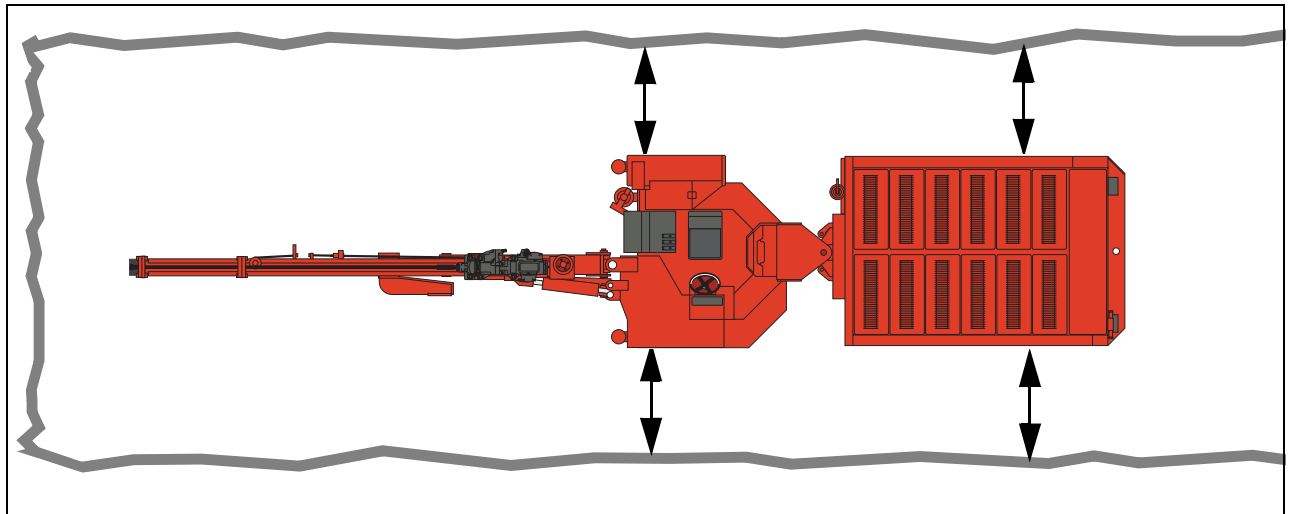


Danger. NEVER LEAVE THE MACHINE WHILE THE ENGINE IS RUNNING.

6. DRILLING

6.1. Setting-up the machine in the drift

- Place the machine lengthways of the drift at an equal distance from the sidewalls.



For optimum stability, and perfectly parallel holes, the chassis must be on line with the gallery being drilled.

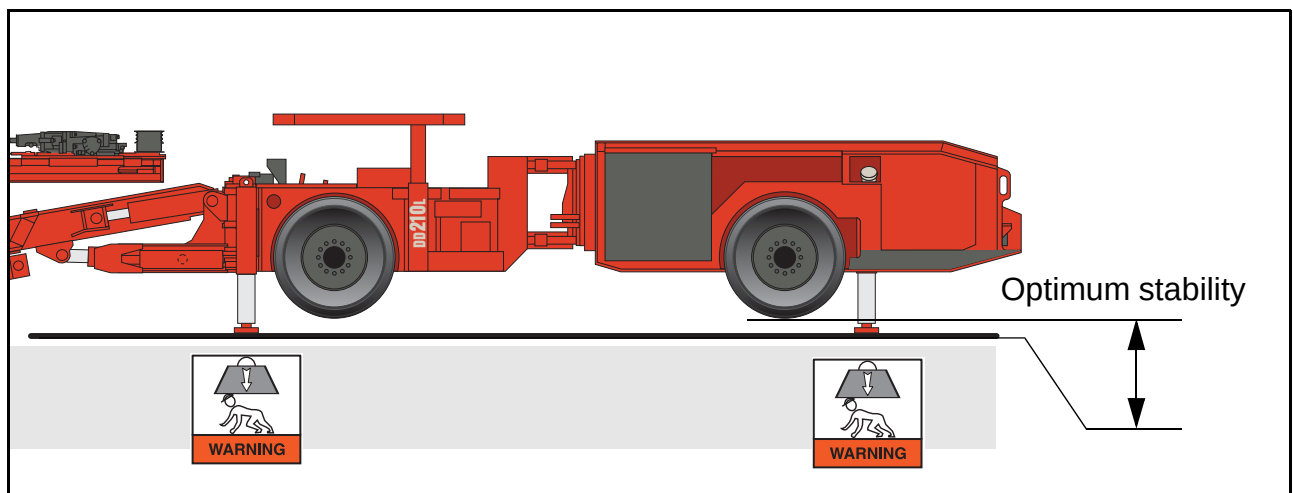
- Stop the machine so that the distance between the machine and the face to be drilled = the length of the drill feed + 300 mm (1 foot).

This position will allow the drill feed to access the lifters which are directly aligned with the machine

- Place the stabilizers firmly on the ground, do not over lift the chassis for optimum stability.
- Bring the stabilizers until sufficient pressure (on the tramming compartment, the green lights ON) then the drilling mode is available. (optional)



Danger. When placing the stabilizers, pay attention that nobody is close to them.

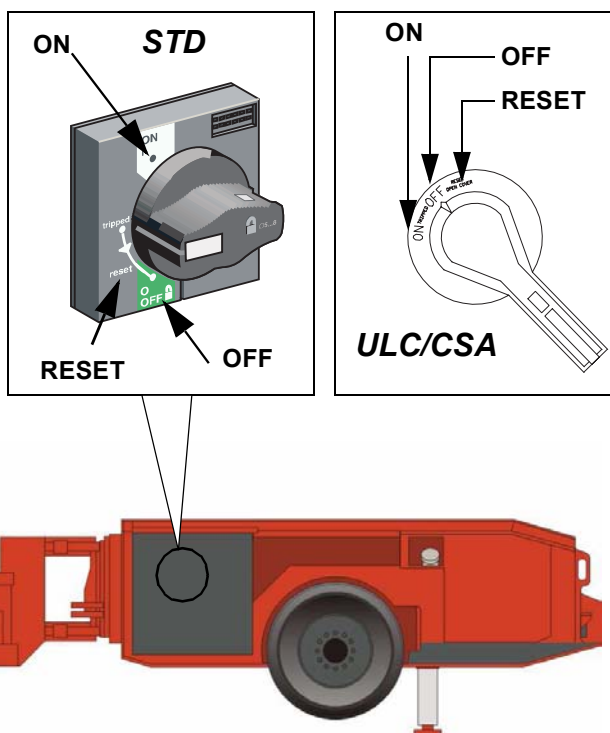


6.2. Electric power

Check following points before switching the mine circuit-breaker ON.

- Machine correctly installed
- Water hose connected
- Air hose connected (optional)
- Electric cable carefully positioned along the sidewall

MACHINE CIRCUIT BREAKER



NOTE: To be able to use the machine circuit-breaker you should turn first the battery master switch ON.

Rotate then the main circuit-breaker in position ON.

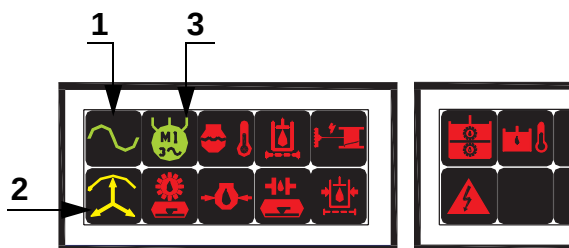
After using of the emergency stop button the main circuit breaker will be placed automatically in TRIPPED position.

To reset the power to the machine

- Rotate the lever fully to RESET position.
- Then rotate clockwise in ON position.

NOTE: Do not use the emergency stop button in normal process to stop any of the power pack, use dedicated stop button.

CAUTION LIGHTS



When power is applied to be able to start the power packs:

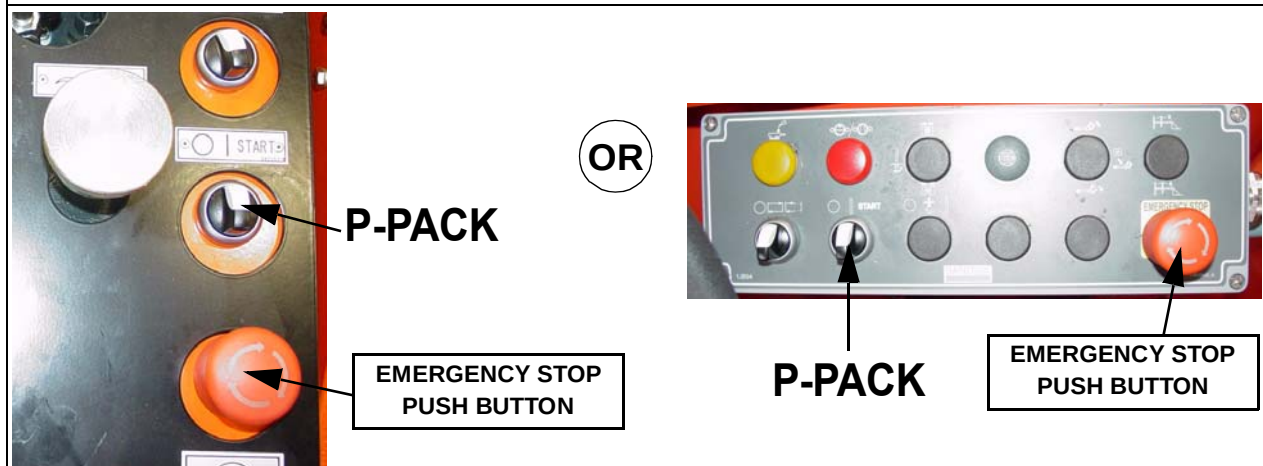
- Green light (1) should glow which indicates that the power is ON.
- Yellow or red light (2) turns on when power is not correctly connected.
- When power pack is running the caution light (3) will glow.

BEFORE STARTING THE POWER PACK



- Rotate the selector switch (1) to the right in electric position.

POWER PACK



- Ensure that all the control levers for the hydraulic control valves, particularly the drilling control levers, are in the NEUTRAL POSITION.
- Turn the **P-PACK** switch to the right (1) power pack is under tension, turn to the right (**START**) power pack starts and switch automatically returns to position (1). Turn to the left (0) power pack stops.



Caution. Wait several seconds before using any one of the control lever.

6.3. Parallelism setting

INITIAL POSITION SETTING

- The front frame of the machine should be levelled and in the axis of drilling direction.

Boom position:

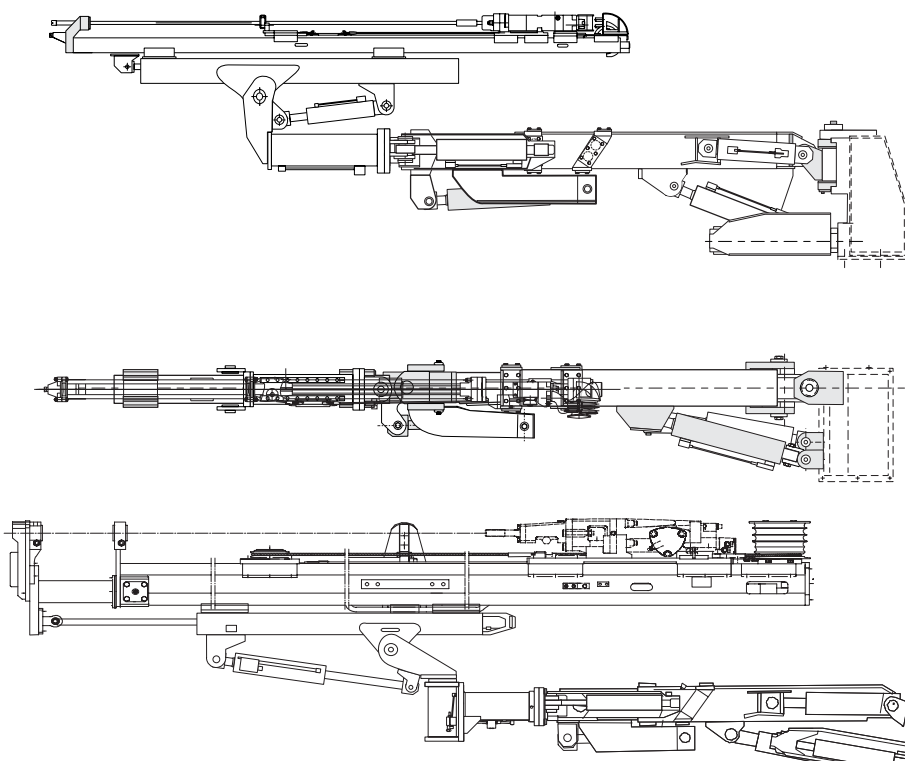
- Use the boom lift lever to bring the boom in horizontal position.
- Use the boom swing lever to line up the boom with the front carrier axis.

Drill feed position:

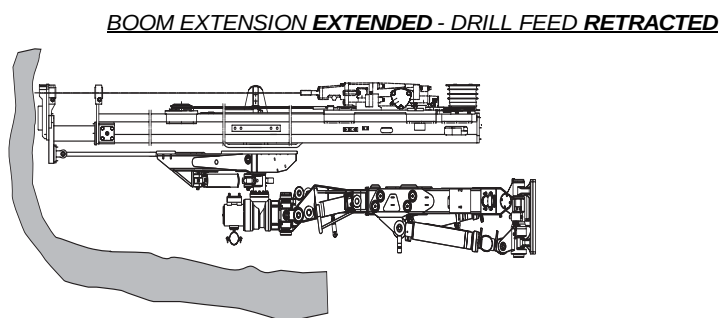
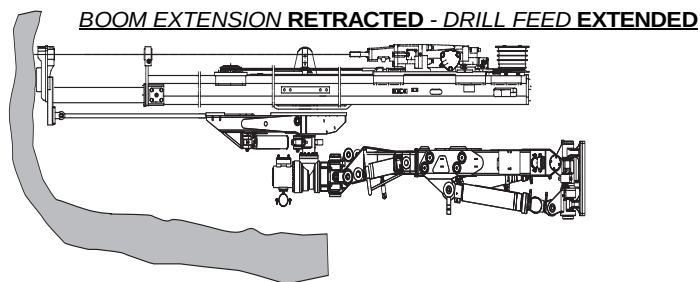
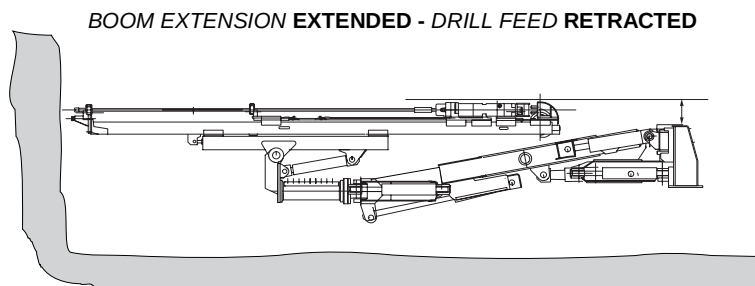
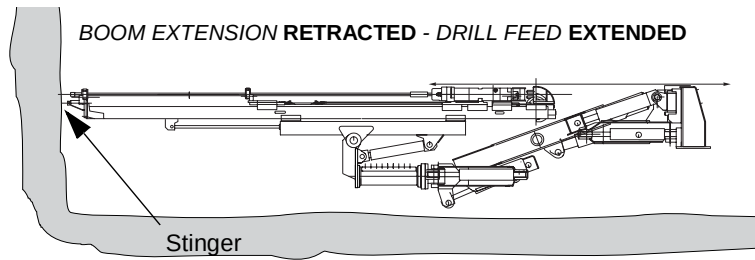
- Use the roll-over lever to bring the drill feed support cradle to the position shown below.
- Use the feed swing and the drill feed tilt lever to line up the roll over axis with the front carrier axis.
- Use the divergency lever to bring the drill feed to the horizontal position

NOTE: The boom is now set. If the last 3 movements are not used, the drill feed will remain in the parallel drilling mode.

NOTE: For overall improved rigidity of the boom, it is recommended to use the boom extension when approaching the drill feed to the face instead of the feed extension cylinder.



HOW TO REDUCE THE DEAD ANGLE?



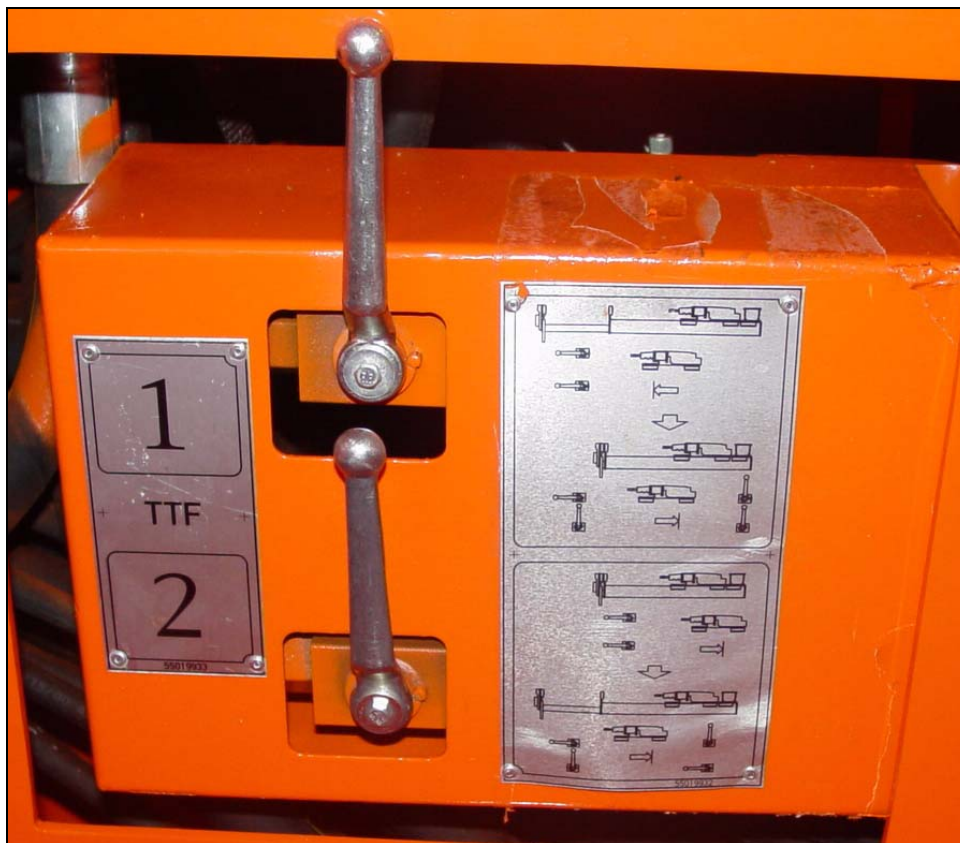
A dead angle zone, when the rear section of the drill feed interferes with the boom, can occur when drilling the blast hole (burn cut).

- Extend the feed extension movement cylinder to near maximum capacity.
- Position the drill feed near the zone to be drilled, by using the boom extension, swing and lift movements.
- Anchor the stinger with the remaining feed extension travel.

NOTE: it is the only position where drilling is recommended using the feed extension fully extended.

6.4. Setting drill feed TTF and TFX

1. Open the ball valves (1) and (2) fully.
2. Feed the rock drill forward until the whole system is as short as possible (refer to Figure 2 'Maximum and minimum length').
3. Close the ball valve (2) fully.
4. Feed the rock drill backward until it is facing the rear stopper.
5. Run the rock drill backward against the rear stopper for about 10 seconds.
6. Close the ball valve (1) fully.
7. Check that both ball valves (1) and (2) are fully closed. (Also see the shield on the next page).



Setting TFX 500 to different lengths by using an instruction as a reminder.

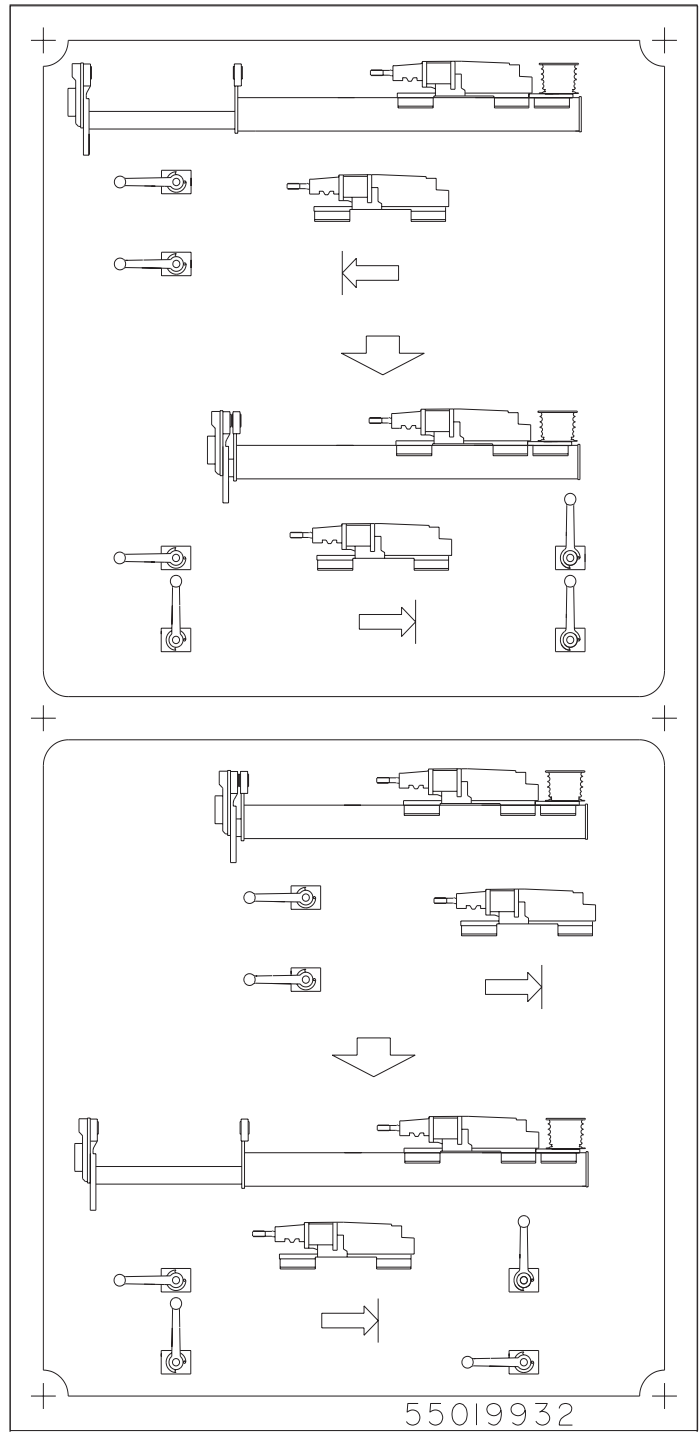
For setting the length to minimum, follow the steps (1 to 5) which are described on the plate's upper picture.

For setting the length to intermediate or maximum, follow all the steps (1 to 11) which are described on the plate.

The steps are read from left to right and top to bottom.

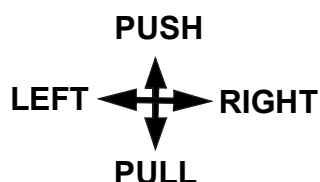
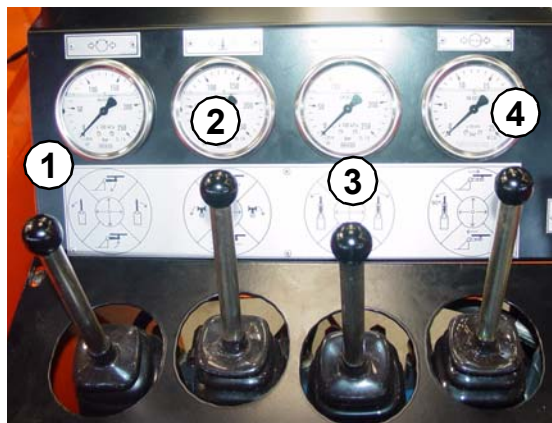
STEPS:

1. Open the ball valves (1) and (2)
2. Feed the rock drill forward until the whole system has the shortest position.
3. Close the ball valve (2) fully.
4. Feed the rock drill until it is facing the rear stopper for approximately 10 seconds.
5. Close the ball valves (1) and (2)
6. Open the ball valves (1) and (2).
7. Run the feed's inner tube into desired length by running the rock drill against the rear stopper.
8. Close the ball valve (2).
9. Feed the rock drill against the rear stopper for approximately 10 seconds.
10. Close the ball valve (1) fully.
11. Open the ball valve (2) fully.

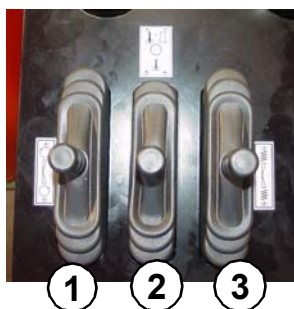
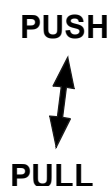


6.5. Collaring a hole

DRILL FEED POSITIONING



- Using lever (1) and (2) move the drill feed in the position you need to drill a hole.
- Push the lever (4) to bring the drill feed stinger in firm contact with the rock.



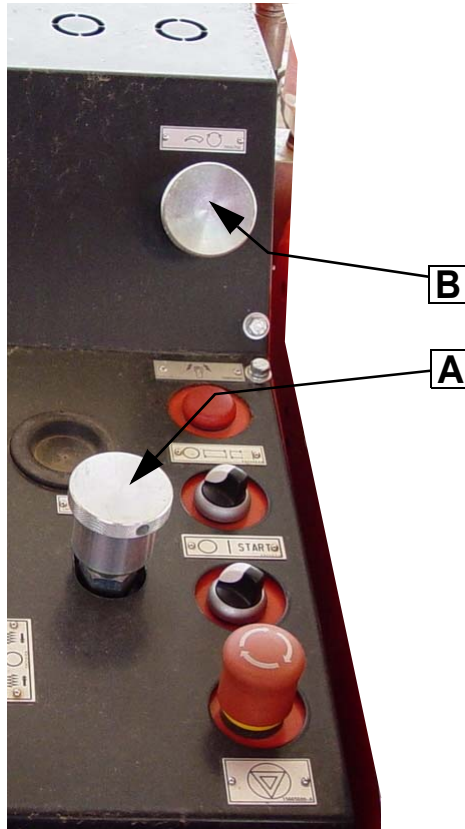
- Pull percussion lever (2) fully
- For smooth collaring pull slowly rotation lever (1) and lever (3). Keep the levers (3) and (1) in the position where the movements have started.
- Let the bit penetrated the face until it reaches solid rock.

When the bit has reached solid rock, collaring process is achieved.
Full drilling power can be used.

6.6. Normal drilling

DRILLING OPERATION	
PUSH PULL P-PACK EMERGENCY STOP PUSH BUTTON OR AUTO RETURN P-PACK	Collaring is carried out as soon as the bit has penetrated one foot (33cm) into the rock. PROCEED TO NORMAL DRILLING : • Push the lever (2) to activate percussion. • Pull the rotation control lever (1) as far as it will go. • Pull the feed lever (3) fully downward. AUTOMATIC FEED RETURN SWITCH: • Left position: Manual feed return using control levers, all 3 drilling joystick levers free. • Middle position: Automatic feed return at the end of drilling operation, all 3 drilling levers hold in full drilling position. • Right position: While drilling if there is a need for stopping the drilling process, it moves the rockdrill backward immediately and resets the 3 drilling levers to neutral. From this position the switch returns to middle position when it is not maintained. CAUTION Caution. Be sure that the rock-drill lubrication oil flows regularly by looking to the greasing sight glass. NOTE: If the water pressure is insufficient (bad connection to the machine, blocked hoses, etc.) or the lubrication air pressure is too low, the drilling process stops immediately. Optional: automatic air flushing with automatic feed return. NOTE : Use the emergency stop button only in case of emergency. In normal process use dedicated button to stop any operation.

DRILLING ADJUSTMENT



While drilling the operator can adjust the rotation speed (RPM) as well as the feed pressure.

NOTE: Always adjust both rotation and feed at the best level acceptable according to your ground condition.

Rotation over-speed will result in a faster wear of the bit carbide inserts, mainly in abrasive rock.

Under-feeding will result in rapid wear of the rod, shank and coupling threads. A smoking coupling indicates under feeding, increase the feed pressure when the coupling smokes.

Over-feeding will result in an increase in the rotation pressure which indicates an over-torque. That reduces the life time of the rotation mechanism of the rock drill.

While drilling keep the rotation pressure to an average value of 50 bar.

- **A:** Feed pressure control knob. Turn clockwise to increase pressure, counter clockwise to decrease pressure.
- **B:** Rotation speed control knob. Turn clockwise to increase RPM, counter clockwise to decrease RPM.

DRILLING IMPERATIVES

The following rules guarantee optimum drilling performance, resulting in high productivity at low operating costs.

The bit:

A correct clearance angle and proper water pressure, evacuate the cutting as soon as they have been broken from the face.

Drilling with a worn bit results in an increase in rotation torque and loss of penetration rate.

To increase productivity a worn bit should be replaced with a new or re-sharpened one.

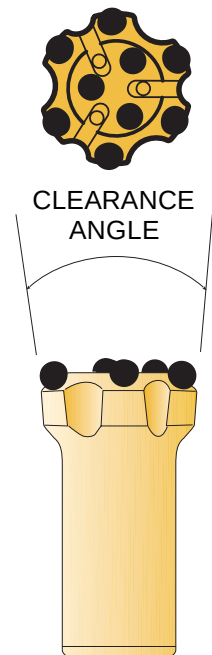
Drill steel and shank adaptor:

These tools are essential to productive drilling.

They transmit percussion and rotation energy to the bit if kept correctly on line.

Correct alignment allows optimal energy transmission, reduced wear of the drill steel against the guide shoes, perfect hole alignment, minimum drill steel torsion, and prevents premature breaking of the shanks and drill steels.

NOTE: Often control the guiding elements, the shank and the flushing head and report immediately noticed anomalies on every parts of the drill feed and rock drill.



6.7. Rod uncoupling

Recommended procedure for uncoupling the bit or the shank adaptor.

- Anchor the drill feed and then open the water circuit.
- DO NOT USE THE ROTATION.
- Using the *Feed Lever*, advance the rockdrill.
- Move the Feed Lever to the "MAXIMUM feed" position. This allows the full percussion energy to be activated for a better breaking capability.

6.8. Ending a shift

When you stop the drilling process at the end of the shift or for any other reason, carry on following operations:

- Tilt the front end of the drill feed downward, the stinger in contact to the ground.
- Stop all powerpack.
- Close the water supply valve at the mine line.
- As to prevent the alternator to be damaged, stop the diesel engine prior to turn the battery master switch to the "OFF" position.
- Place the main circuit breaker to the "OFF" position.
- Shut OFF the power at the mine electric box.
- Wash the machine mainly the drill feed and the boom.
- Fill-up the shift report form.
- Report any defects that you have noticed.

7. TRANSPORTATION

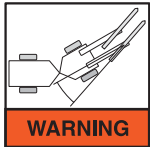
7.1. Transportation on a platform



Danger. Before driving the machine onto a transport platform, move the boom and the feed to the tramming position. never exceed the maximum side and slope limitation.

While moving the machine NEVER SWING THE BOOM.

When driving the machine onto a transport platform, use ramps. this should always be done on level ground.



Danger. Always use low speed and observe special caution when coming from the ramps to the platform.



Danger. Install the locking bar at the central articulation before moving the platform.

Lower all stabilizers against the platform floor.

Move the boom as low as possible and fasten it to platform.

Fasten the machine chassis to the platform using proper straps or chains.

7.2. Towing the machine

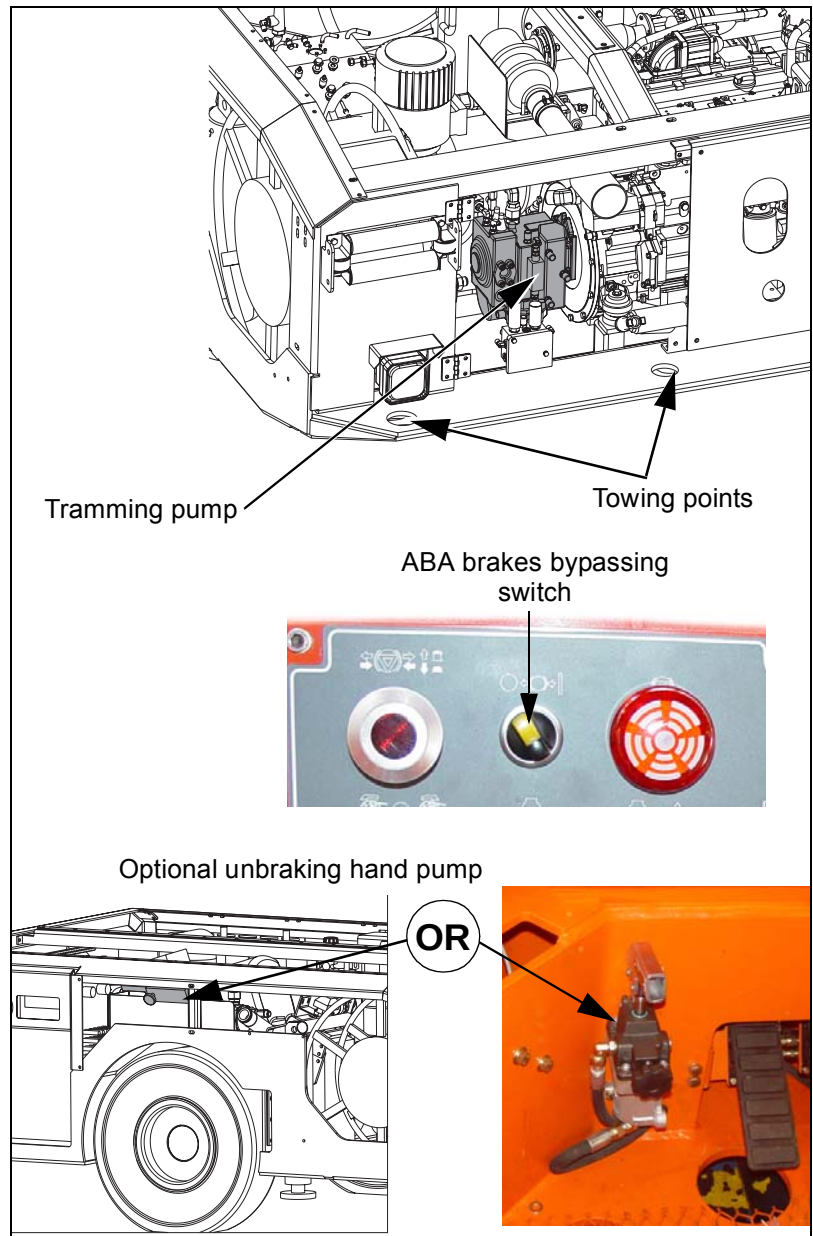


Danger. THE MAXIMUM TOWING SPEED MUST BE 1 KM/H. This to prevent the tramming component to be damaged and operator affect at drilling compartment.

Danger. THE USE OF CABLE OR CHAIN IS STRICTLY FORBIDEN. While towing, one operator should be at the tramming compartment ready to apply the brake in a case of emergency or operate the steering valve to allow the steering cylinder to move.

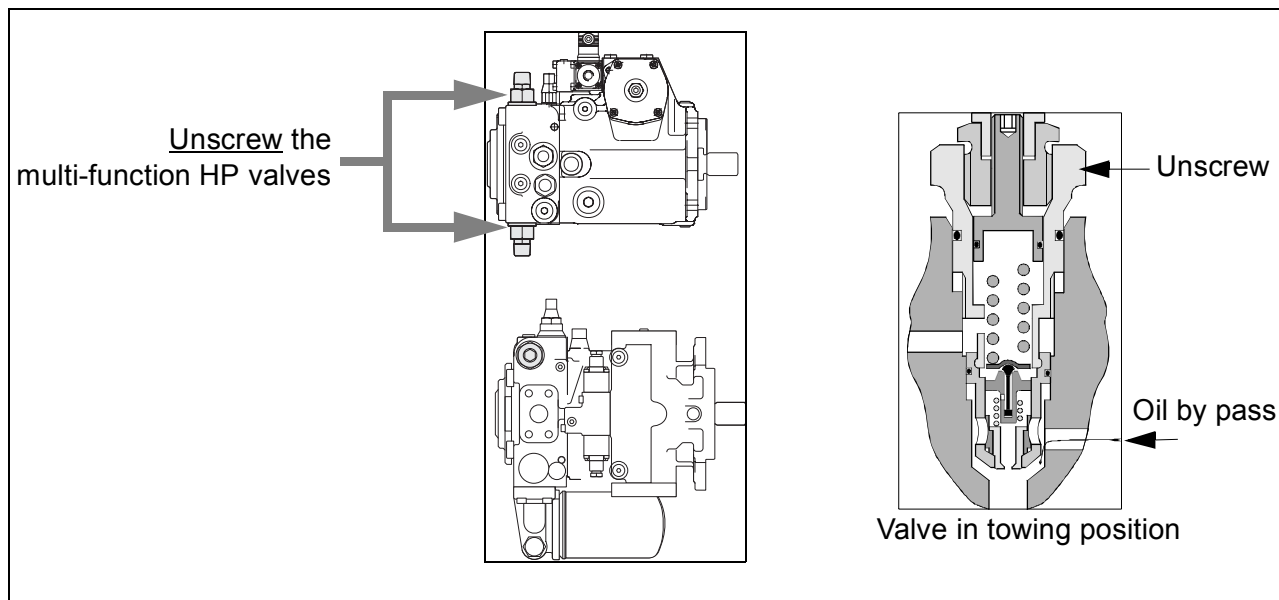
If it is necessary to tow the machine, comply to the following procedure:

- Ensure that the power supply from the mine electric box to the machine is OFF.
- Unplug the cable into the mine electric box.
- Connect up the towing machine to the towed machine with a RIGID BAR. Hook the bar at the towing points located at the rear of the machine (see the figure below).



Caution. Never try to tow the machine if the multi-function HP valves, located on the tramming pump (see figures below) are tightened. The maximum towing distance allowed is 1/2 km, over this distance the hydraulic motor(s) could be damaged due to lack in internal lubrication.

- For a machine with optional ABA brakes, turn the ABA brakes bypassing switch to the right in position (1), in order to bypass the ABA brakes safety device.
- Untight the both valves and turn them four revolutions counter-clockwise, to bypass the oil flow. The tramming motor can now turn without resistance.



- Release the emergency/park brake valve by pulling, fully upward, the red knob.
- Close the ball valve of the unbraking hand-pump.



Danger. This ball valve must be always open in normal use of the machine. If not, the park brake may not work, don't forget to reopen the ball valve after towing the machine.

- Use the unbraking hand pump to pressurize the brake cylinders. The pressure build up by the hand pump is sufficient to release the brakes.

NOTE: The brake valve is always functioning. To apply the brakes push downward the red knob, as you do in normal conditions.

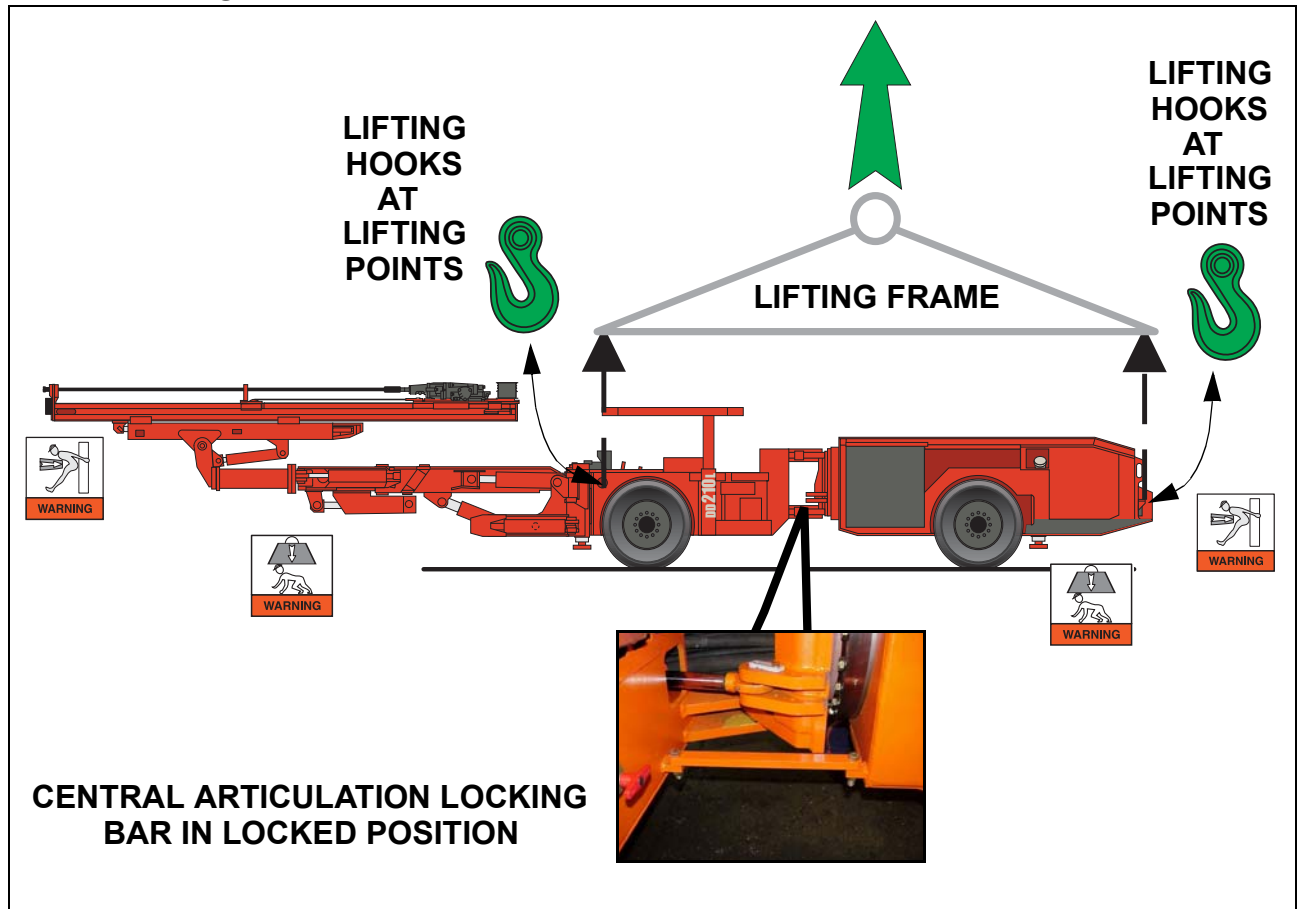


Danger. Never try to tow a machine which presents problems on tramming components



Danger. The HP valves should be retighten as soon as the towing process as been completed. NEVER START THE ENGINE THE HP VALVES IN UNTIGHTEN TOWING POSITION.

7.3. Lifting the machine



Danger. Always respect the law and all the local safety regulations in lifting work.

Keep in mind the total weight of the rig, given in the technical data pages at the end of this manual.

Move the boom and the drill feed to the tramming position.

Install the locking bar at the central articulation. Install 4 hooks and chains or cables at the front and rear lifting points.



Danger. Do not stand under the machine during lifting process. Use proper lifting devices as hooks, cables or chains for a safe work.

Use a lifting frame to maintain all 4 four chains or cables perfectly vertical and parallel.

- The lifting device used must be of the correct type and have sufficient lifting capacity.
- The rig or parts of it must not be lifted with any devices that are not specifically designed for lifting purposes.
- You must always know the exact weight of the load, and never exceed the lifting capacity specified by the manufacturer of the lifting device.
- Lifting routes should be planned so that the load is not moved over persons or such places where persons may be present.
- Make sure that the lifting equipment is in proper condition Wire ropes and chains used for lifting must be checked regularly. Damaged wire ropes must be marked clearly and discarded at once.

- Lift the load only a few centimetres at first to make sure that it is properly fastened and in balance. Do not continue lifting until you are sure of proper fastening and balance.
- The lifting wire ropes must be fastened according to the manufacturer's instructions.

7.4. Storing the machine

- The storing place temperature should be higher than the freezing point, and protected against direct sunlight and rain.
- Wash the machine if it has been used or transported by sea using a high pressure steam washing machine.
- Drain and blow air through the water circuit. Blow some anti-freeze (rust inhibitor) through the circuit.
- Lubricate all greasing points.
- Bring the stabilizers in contact to the ground.
- The drill feed stinger should be in contact to the ground.
- The nitrogen rockdrill accumulator should be empty, PLACE A TAG TO REMIND THAT THE ACCUMULATORS HAVE BEEN DISCHARGED.
- Coat the cylinder rod with grease.
- Drain the air reservoir(s).
- Replace all fluids: engine, hydraulic axle and gear oil.
- Spray a dust and corrosion inhibitor product on all electric devices.
- As to prevent the alternator to be damaged, stop the engine prior to turn the battery master switch to the "OFF" position.

8. TROUBLESHOOTING

FAULT	POSSIBLE REASON/CHECK
Diesel engine does not start.	• Check that the carrier main switch is on. • Check that the emergency/park brake is applied. • Check that the drive selector is in middle neutral position. • Check the fuel level. • Check the condition of the battery. • Check that any of the emergency stop push buttons is not activated.
Power pack does not start.	• Check the electric panel for possible alarm. • Check the power supply's connection and make sure that the main switch is on. • Check that any of the emergency stop push buttons is not activated. • Check that any of the circuit breakers on the main switchgear cabinet door is not tripped.
Power pack's main contactor is clapping during starting the power pack.	• Power supply network is too weak. Check supply voltage with overvoltage and undervoltage caution light and FQ100 (Optional). • Voltage should remain inside given limits during idling, starting the power pack and drilling with full power.
Power pack stops.	• Check the electric panel for possible alarm. • Check that the water pump and the compressor control switches are in position 1 or if external water or air is used, that inlet pressure is sufficient. • Check that any of the circuit breakers on the main switchgear cabinet door is not tripped. • Check that any of the emergency stop push buttons is not activated.
Automatic drilling is stopped after 30 seconds.	• Check that shank lubrication disturbance light is not on. • Check the electric panel for possible alarm.

8.1. EMR 2 Deutz electronic regulator (optional)

The EMR 2 is an engine control system that obtains information from the engine, from sensors and from you.

For instance, EMR 2 compares speed you request with the actual speed and adjust the optimal fuelling rate.

At the same time, it takes note of the exhaust limit values and enables maximum acceleration values.

8.1.1. Description of functions

N°	FUNCTIONS	OPTIONS	DESCRIPTION
1	Engine speed	All speed governor	Pure all speed governor without additional or switching function.
2	Max torque curve	Max torque curve 1	Fuelling is limited to the limiting torque curve (limiting torque curve 1).
3	Droop	P-gradients 1/2	Switching between two fixed P-gradient. For limiting the P-gradient relationship of the mechanical governor, provision is made for a speed-dependent P-gradient function by means of a characteristic curve with eight speed support points.
4	LDA function		The fuelling during acceleration and application of dynamic load is limited as a function of the turbo boost pressure to prevent smoke emission.
5	Temperature dependent start control		The starting fuelling, speed ramping and governor parameters are altered as a function of temperature to prevent smoke emission and to optimise the governor behavior.
6	Temperature monitoring	Warning	The operator is warned by a lamp which blinks when the coolant temperature exceeds the warning limit temperature.
7	Oil pressure monitoring	Warning alone	The operator is warned by a lamp which blinks when the oil pressure fall below the warning limit. After a certain warning time, the engine is shut down.
8	output function	Warning signal, coolant temperature	Warning signal for too hot coolant temperature.
		Warning signal, oil pressure	Warning signal for insufficient oil pressure.
9	Interface	ISO 9141	Series interface according to ISO 9141 for programming and diagnosis at the end of the production line.
10	Self diagnosis		Monitoring the EMR system components. Diagnosis and failure report when a problem occurs in the system.

N°	FUNCTIONS	OPTIONS	DESCRIPTION
13	Limp home	1200 rot/min	<i>In case of a potentiometer, pressure or speed sensor fault, a damaged working mode is activated.</i>
14	Warning lamp		<i>Serve to warn the operator of a failure in the system. A constantly burning warning lamp means that a problem has occurred, but the system can still be operated within limitations. A blinking lamp means that the system is no longer functioning.</i>
15	Start/stop key switch	Engine stop by EMR alone	<i>The engine is stopped by cutting off the EMR electric supply.</i>
16	Pre-settings	Pedal position transmitter (PWG)	<i>The setting is determined by a potentiometer on the pedal position sensor input. The reference voltage of 5V is provided by the EMR.</i>
20	Diagnosis button		<i>Simplified diagnosis without Serdia.</i>
21	Protection		<i>No engine stop in case of overspeed.</i>

8.1.2. Troubleshooting

AUTO DIAGNOSTIC WITH DEFAULT LIGHT

The EMR regulator has engine safety and functional check ability.

With the informations provided by the various sensors, the electronic box analyses the level of seriousness of the noticed failures and consequently determines an adaptation in the running mode of the engine.

According to the importance of the noticed failure:

- **If the engine can going on running > the light turns on continuously.**
- **If the engine is about to stop > the light blinks.** (With some programmed electronic box, there could be a drop in the output power of the engine before complete stop).

LIGHT STATUS	POSSIBLE CAUSE	REPAIR
• The light turns on and comes back to off after a while. • The engine goes on running correctly.	<i>Brief over-heating of the cooling circuit, cooling liquid briefly exceeds maximum temperature level.</i>	<i>Check the cooler condition.</i>
	<i>The oil pressure has shortly fallen under the minimal limit.</i>	<i>Check the oil pressure</i>

• The light turns on continuously. • The engine goes on running.	Engine speed potentiometer and/or engine speed regulation box do not work properly.	• Using a multimeter (voltmeter, ammeter, ohmmeter) check the connections and wiring. Look for corroded or loosened connections. • Check the engine speed potentiometer. • Check the engine speed regulation box.
	Turbo-charger pressure switch.	• Check the pressure switch. • Using a multimeter check the connections and wiring of the turbo-charger pressure switch. Look for corroded or loosened connections.
	Engine over-heating. Defective engine temperature sensor.	• Check and clean the engine cooler. • Using a multimeter check the temperature sensor. • Check the connections and wiring of the temperature sensor. Look for corroded or loosened connections.
	Oil pressure insufficient. Oil pressure sensor	• Check the oil pressure. • Using a multimeter check the connections and wiring of the sensor. Look for corroded or loosened connections.
• The light turns on continuously. • The engine stops.	Engine over-speeding.	Shut down the engine and re-start.
• The light blinks (with engine performance drop).	Engine over-heating.	• Check the engine cooler. • Using a multimeter check the temperature sensor and the check the condition of its wiring.
	Oil pressure	• Check the oil pressure. • Using a multimeter check the connections and wiring of the sensor. Look for corroded or loosened connections.
	Defective engine speed sensor.	• Check the connections and wiring of the speed sensor. Look for corroded or loosened connections.
• The light blinks (Engine stopped)	Defective rack position sensor.	• Check the connections and wiring of the rack position sensor. Look for corroded or loosened connections.
	Bad connection with the engine speed sensor.	• Check the connections and wiring of the speed sensor. Look for corroded or loosened connections. • Using a multimeter check the speed sensor.
	Engine temperature too high or oil pressure too low.	
	Defective actuator	Replace actuator.
	Defective electronic control box	Replace electronic control box.

9. TECHNICAL SPECIFICATIONS

Technical Specification
6-475 S-D
2007-06-01

Sandvik DD210L



APPLICATION

Sandvik DD210L is a low profile single boom electro hydraulic drilling machine designed to work in excavations with headroom as low as 1.7 m.

The robust universal boom have a large optimum shaped coverage, 360° rotation and full automatic parallelism for fast and easy face drilling. The boom can also be used for cross-cutting, the hose layout is specifically designed to maximize protection in low headings.

The exceptional «V» shape layout is designed for good visibility and balance, this and the powerful four-wheel-drive articulated carrier ensure fast and safe maneuvering even in low headroom conditions.

The high performance drilling system allows high drilling performance with good drill steel economy and high machine reliability.

The operator environment and added automatic functions allow the operator to concentrate on safe, fast and accurate drilling.

All the service points are well protected but easy to access.

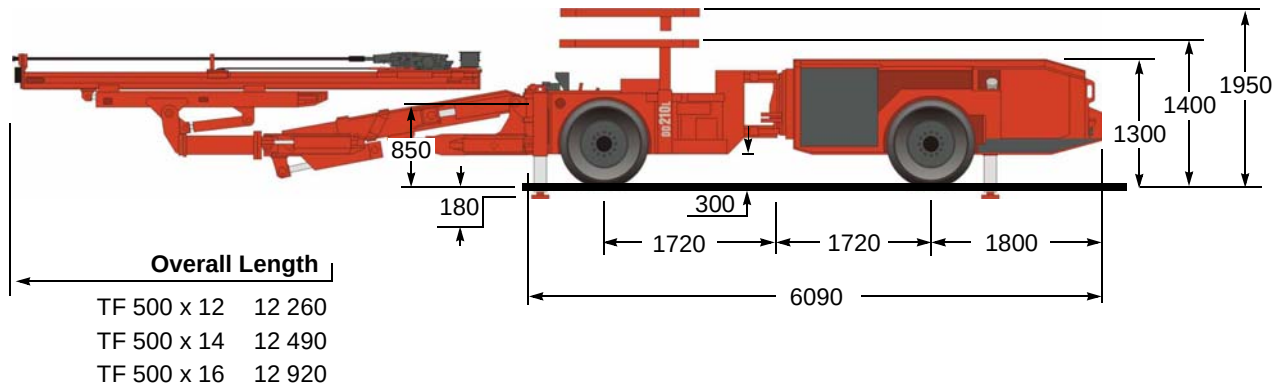
MAIN SPECIFICATIONS

Carrier	1 x TC LP
Safety canopy	1 x FOPS (ISO 3449)
Rock drill	1 x HLX5
Boom	1 x B 26 XL F
Feed	1 x TF 500 x 12
Control system	1 x THC 560
Powerpack	1 x HP 560 (55 kW)
Shank lubrication device	1 x KVL 10-1
Air compressor	1 x CT 10
Water pump	1 x WBP 1
Cable reel	1 x TCR LP
Length	12 260 mm
Width	carrier, front part 2 250 mm
	carrier, rear part 2 200 mm
Height	carrier, front part 1 190 mm
	carrier, rear part 1 300 mm
Weight	11 150 kg
Tramming speed	
	horizontal 12 km/h
	13%=1:7=8° 5 km/h
Gradeability, max	30 %
Noise level	< 98 dB(A)

Technical Specification
6-475 S-D
2007-06-01

Sandvik DD210L

GENERAL DIMENSIONS



All dimensions in mm

HLX5 ROCK DRILL

(Technical specification 2-1852)

Weight	210 kg
Length	955 mm
Profile height	87 mm
Power class	20 kW
Max working pressure	- Percussion 225 bar
	- Rotation 175 bar
Max torque (80 ccm motor)	400 Nm
Hole size	43 - 64 mm
Recommended steel	T38- H35-R32
	T38-H35-alpha 330
	T38-R39-R35
Shank adapter	7304-7585-01 (T38)
Flushing water pressure	10 - 20 bar

TF 500 FEED

(Technical specification 3-1400)

Feed type	Cylinder - wire rope
Feed force	25 kN

	<i>Standard</i>	<i>Optional</i>	<i>Optional</i>
TF 500	500x12	500x14	500x16
Total length (mm)	5270	5880	6490
Drill steel length (mm)	3700	4305	4915
Hole depth (mm)	3440	4050	4660
Net weight (kg)	500	530	560

B 26 XL F BOOM

(Technical specification 4-300 S)

Type	Parallel holding
Weight (with hoses)	2 100 kg
Feed roll-over	360°
Boom extension	1 700 mm
Feed extension	1 600 mm

THC 560 CONTROL SYSTEM

Power control	Adjustable full power
	Adjustable collaring power
Rotation control	Adjustable rotation speed
	Reversible rotation
Automatic functions	Collaring
	Feed controlled percussion
	Anti-jamming
	Flushing
	Stop-and-return
Boom controls	Fully proportional

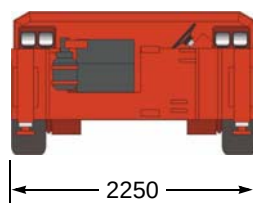
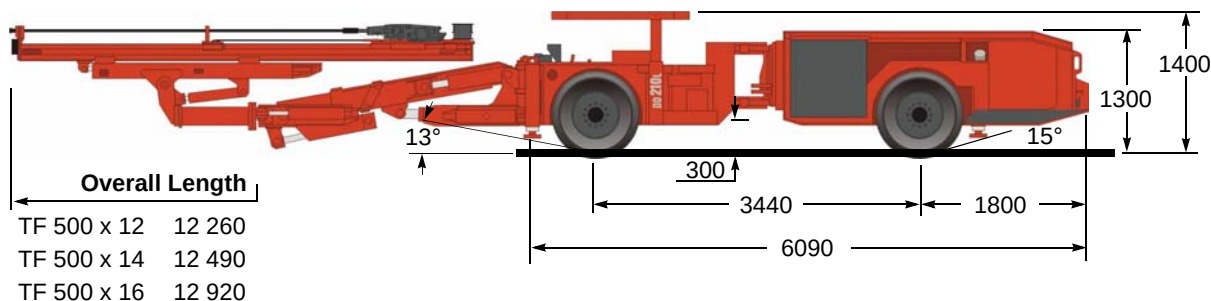
HP 560 POWER PACK

Electrical motor	1 x 55 kW (75 hp)
	3-phase motor
Pump types	
- Percussion, feed & boom	Axial piston,
	1 x 130 l/min variable displacement
- Rotation	1 x 60 l/min gear pump
Filtration	- Pressure 1 x 20 micron
	- Return 1 x 10 micron
Hydraulic tank volume	160 liters

Technical Specification
6-475 S-D
2007-06-01

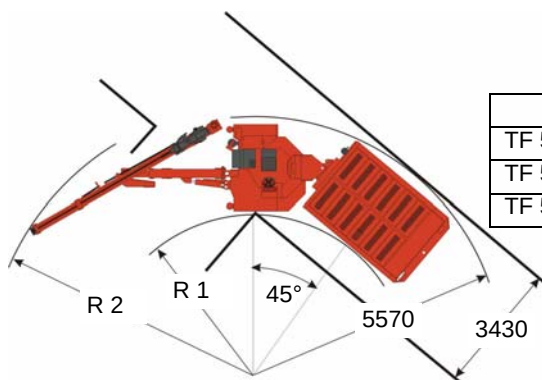
Sandvik DD210L

TRAMMING DIMENSIONS



All dimensions in mm

TURNING RADIUS



	R 1	R 2
TF 500 x 12	3030	6440
TF 500 x 14	3030	6600
TF 500 x 16	3030	6740

TC LP CARRIER

Diesel engine	Deutz BF4M 2012, 74 kW (100 hp)
- Exhaust	Catalyser
Automotive hydrostatic transmission	
- One pump	Variable displacement
	Axial piston, 0-71 cm ³ /rev
- Four wheel-motor	Axial piston
Tires	10.00 x 15
Steering	Frame steering, 2 x 45°
Oscillation	Center point, 2 x 15°
Brakes - Service	Hydrostatic transmission
- Emergency, neutral & parking	Spring applied, hydraulically released fail safe type
- Manual brake release	Hand pump
Stabilizers	2 hydraulic jacks, front
	2 hydraulic jacks, rear
Telescopic safety canopy	Hydraulic, 550 mm
Fuel tank volume	60 liters
Hydraulic tank volume	50 liters

AIR CIRCUIT

Compressor	C.T. 10, screw type
- Capacity	1000 l/min at 7 bar
Electric motor	7.5 kW (10 hp)
Shank lubrication device	1 x KVL 10-1
- Air consumption	250-350 l/min
- Oil consumption	180-250 g/h

WATER CIRCUIT

Water booster pump	Centrifugal type
- Capacity	30 l/min at 11 bar
- Electric motor	4 kW (5.5 hp)
Oil cooler	OW 30, water-actuated counterflow
- Cooling capacity	30 kW
Min water supply pressure	2 bar

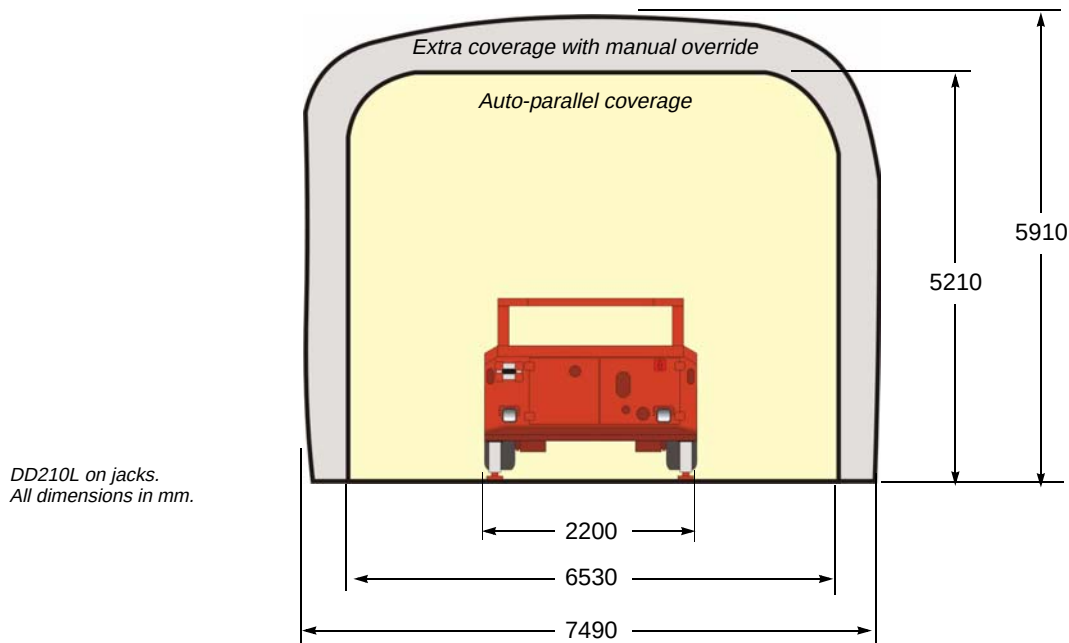
ELECTRICAL SYSTEM

Total installed power	70 kW
Voltage	380 - 660 V (±10%)
Phase sequence indicator	
Frequency	50 or 60 Hz
Starting method	Star / Delta
Thermal overload protection	
5 x hourmeters (Engine, Powerpack, Percussion, Compressor, Tramming)	
Reverse alarm	
Cable reel	TCR LP type, with spooling device
- Capacity	See specification 5-4100
Lighting	
- Working lights	4 x 70 W, 24 V
- Tramming lights	front 2 x 70 W, 24 V
	rear 2 x 70 W, 24 V
	(the 2 front lights are also used as working lights)
Batteries	voltage 2 x 12 V
	rating 120 Ah
Transformer rating	1.3 kVa

Technical Specification
6-475 S-D
2007-06-01

Sandvik DD210L

COVERAGE AREA



OPTIONAL EQUIPMENT

DRILLING SYSTEM

- *) Telescopic feed TTF 500 series.
- *) Rod retainer TRR 1.
- B 26 XL NV boom.
- Drill angle measuring instrument TMS D1.
- Automatic hole flushing on rock drill return with 60 l air tank.

ELECTRICAL SYSTEM

- Ground fault and overcurrent unit VYK 200.
- Electric cable rubber or PUR.
- *) 2 x 35 W High Density Discharge (HID) working lights.

CARRIER

- Fume diluter.
- Complete spare wheel.

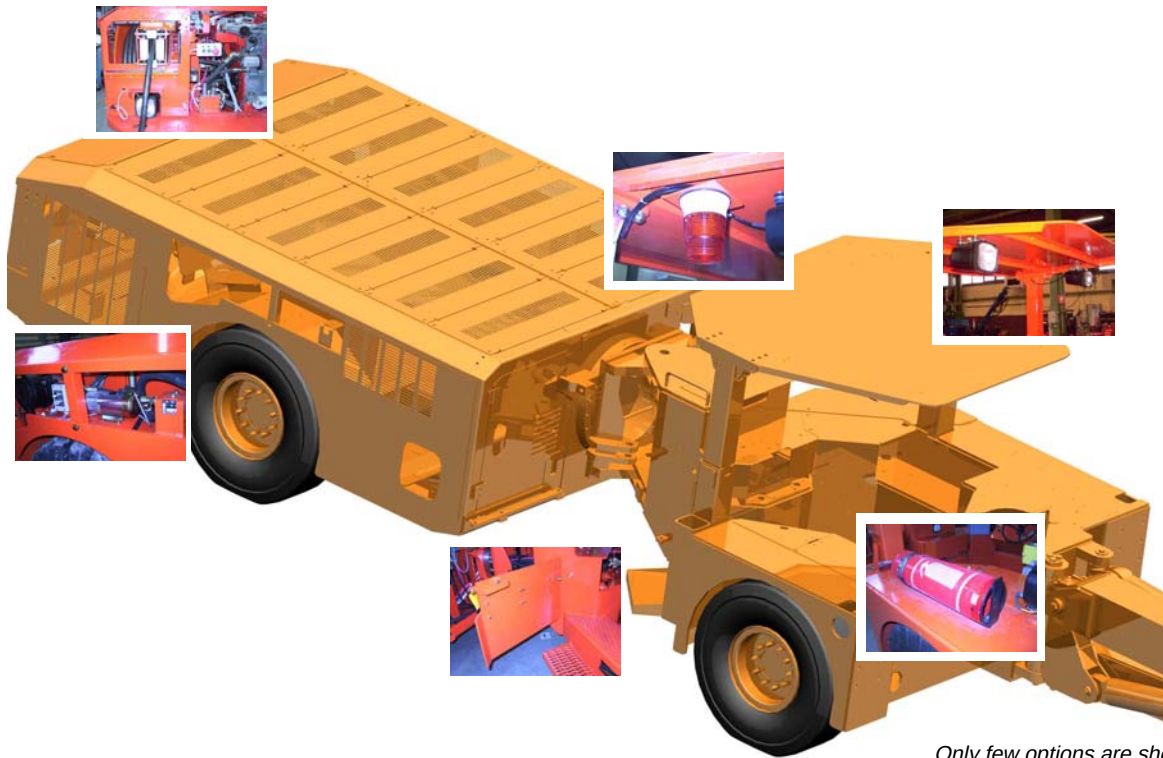
OTHER OPTIONAL EQUIPMENT

- Fire suppression system ANSUL, 6 nozzles.
- South African Specification LP (SAS LP) package (see specification sheet 5-905 S).
- *) Electric oil filling pump.
- Central lubrication system.
- Additional HP filters on tramming circuit.
- High pressure washing system.
- Manuals other than French/English language.

*) replaces standard component

Technical Specification
5-905 S-B
2007-06-01

South African Specification for Low Profile Underground Drilling Rigs (SAS LP)



Only few options are shown

APPLICATION

The SAS LP package is designed for South African mining requirements. It contains the most common requested extra items for Safety, Health, Environmental, Risk and Quality Management of underground mobile trackless equipment.

The package shown in this technical specification only applies to the following machines :

- DD210L
- DD220L
- DD210L-V
- DS210L
- DS210L-M
- DS210L-V
- DL230L-5

MAIN SPECIFICATIONS

EMR11 version for Deutz engine.
Additional filter on tramming circuit.
Operator door-brake interlock switch.
Ansul fire suppression system (6 nozzles).
2 x Portable fire extinguisher (9 kg each).
*) Electric oil filling pump.
*) 2 x 35 W High Intensity Discharge (HID) working lights (Instead of std 70 W).
*) KVL 10-1 lubricator with low level cut-off.
Orange flashing light.
Pre-wiring for red and green lights.
Cut off Powerpack on low levels water and air pressure.
2 x Stops blocks.
Red and green reflector tape on side of carrier.
Foam fill tires.

*) replaces standard component

Technical Specification
5-905 S-B
2007-06-01

South African Specification for Low Profile Underground Drilling Rigs (SAS LP)



2 x 35 W HID working lights



Orange flashing light



Electric oil filling pump



Operator door-brake interlock switch



Additional filter on tramming circuit



2 stop blocks



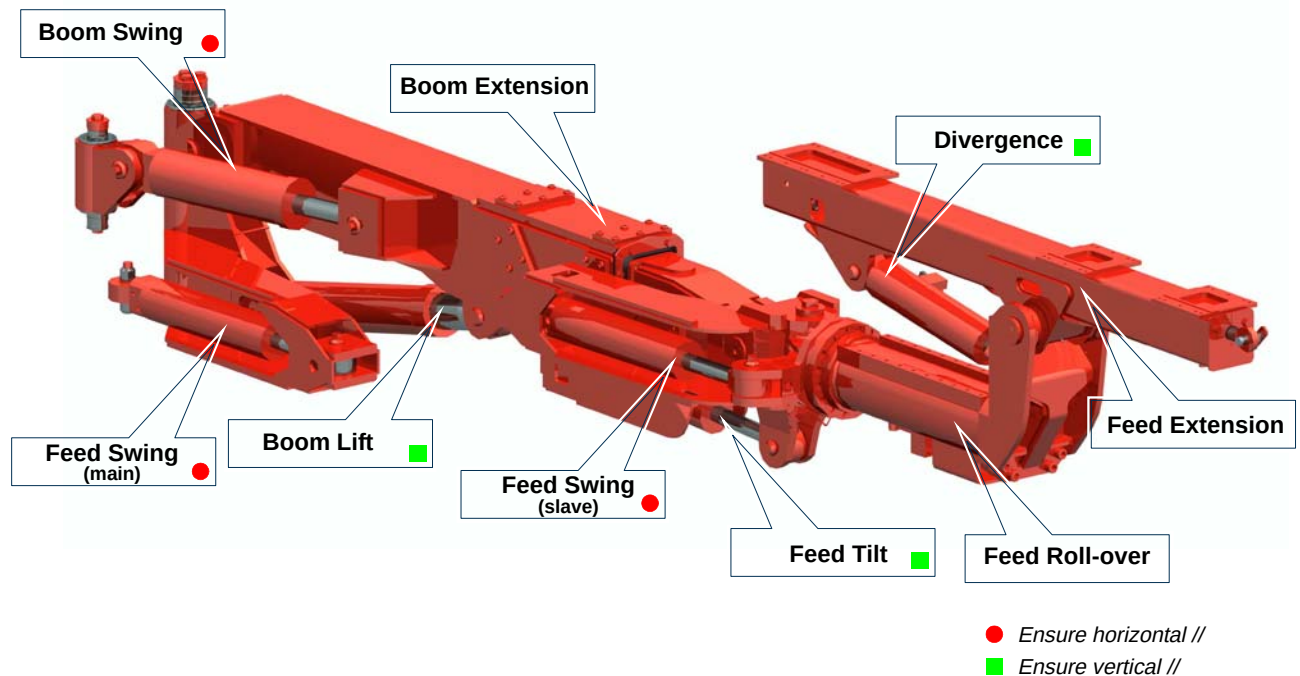
Ansul Fire suppression system



Portable Fire extinguisher

Technical Specification
4-200 S-E
2007-06-01

B 26 F Boom



APPLICATION

B 26 F boom is designed for Sandvik DD310 and DD320 jumbos.

B 26 F boom is a hydraulic universal roll-over boom for mechanized tunnelling, drifting, cross-cutting and bolt-hole drilling in medium sections. It can also be used for production drilling with cut-and-fill and room-and-pillar methods.

This parallel holding telescopic boom offer large «true» rectangular face coverage area.

DESCRIPTION

The x-y coordinated boom movements together with 360° actuator roll-over make the use of the boom simple and logical. Accurate automatic parallel holding both in vertical and horizontal plane improves the drilling performance and accuracy.

Large dimensioned rectangular profile, adjustable and sealed boom extension wear-pieces, large diameter bearings, sealed main joints, expanding pins in cylinder joints and use of super strong cast pieces in most stressed areas are some of the features that are included to the boom design for improved reliability.

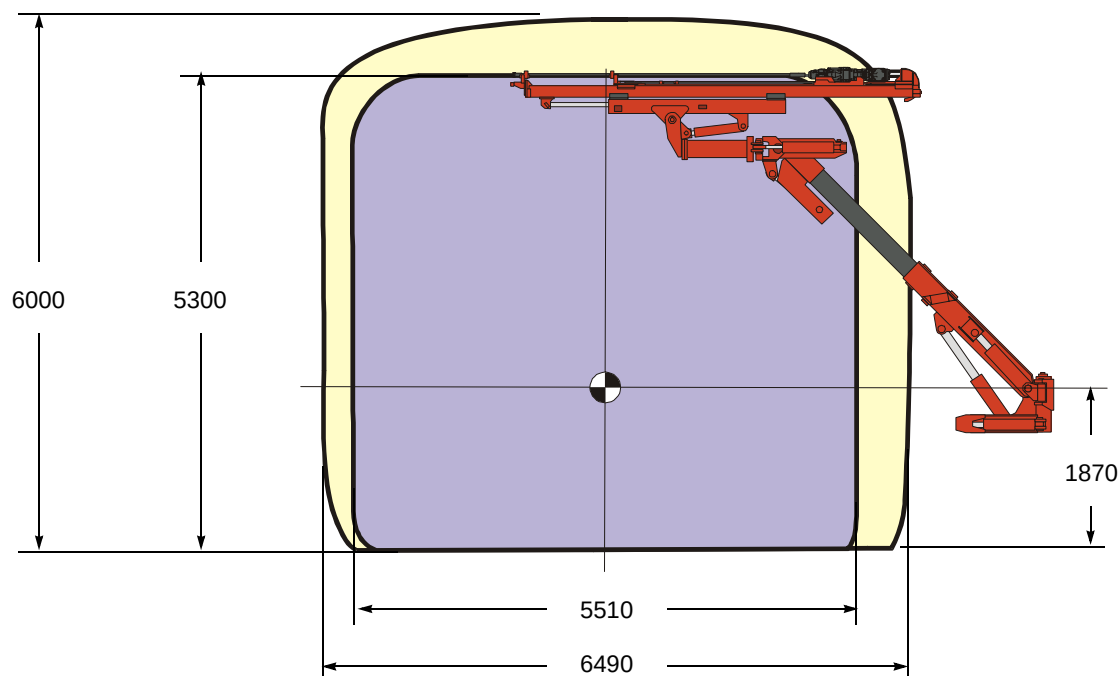
TECHNICAL DATA

Coverage with parallelism holding	29,2 m ²
Coverage with manual override	38,9 m ²
Weight, without hoses	1 850 kg
Weight allowed	1 050 kg
Boom telescopic extension	1 200 mm
Boom lift, up and down	45° and 16°
Boom swing, symmetric	± 45°
Feed tilt, up and down	25° and 50°
Feed swing, symmetric	± 50°
Divergence, up and down	3° and 90°
Feed extension	1 600 mm
Feed roll-over	360°

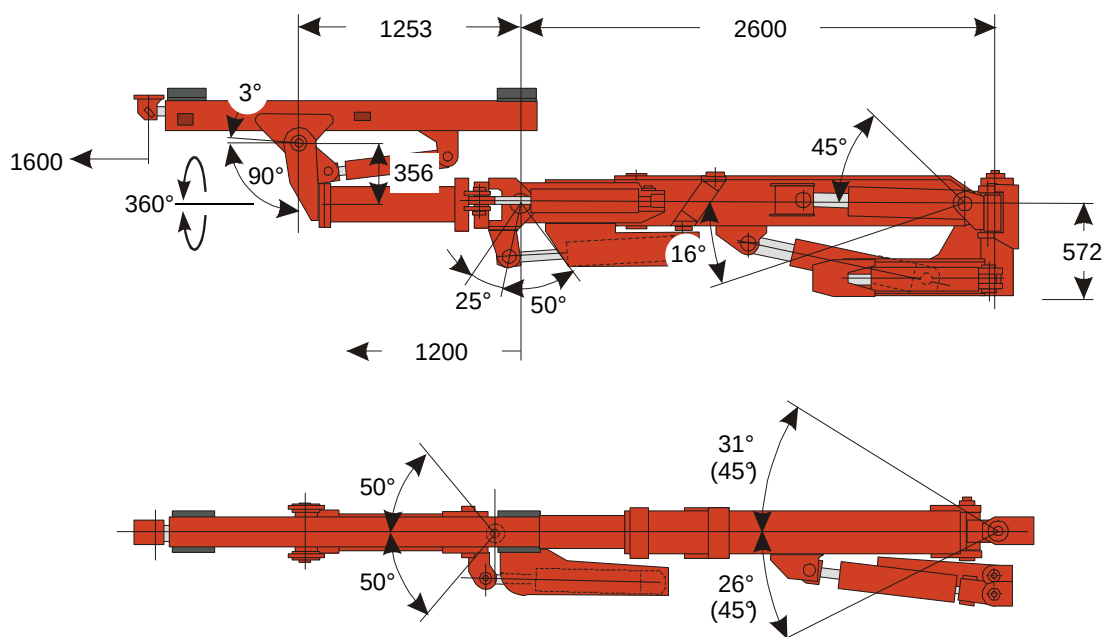
Technical Specification
4-200 S-E
2007-06-01

B 26 F Boom

COVERAGE AREA

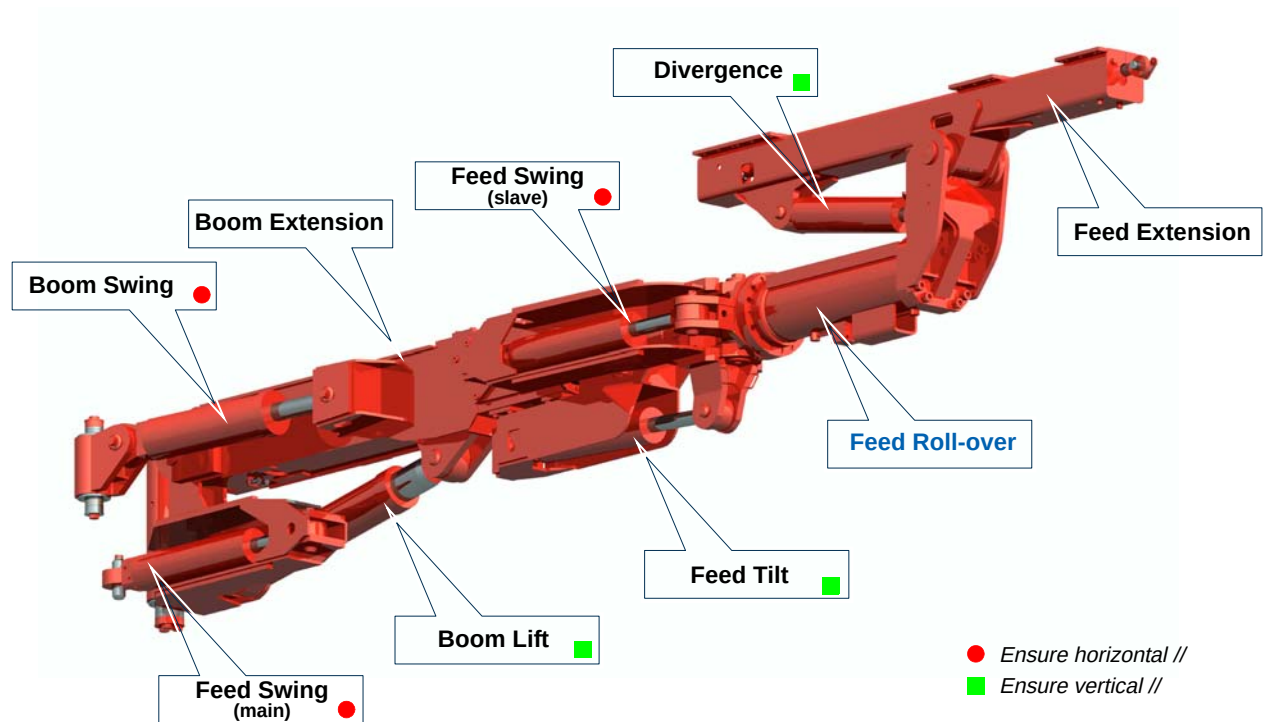


GENERAL DIMENSIONS



Technical Specification
4-300 S-D
2007-06-01

B 26 XL F Boom



APPLICATION

B 26 XL F boom is designed for Sandvik DD310, DD310-T, DD210L and DD220 jumbos.

B 26 XL F boom is a hydraulic universal roll-over boom for mechanized tunnelling, drifting, cross-cutting and bolt-hole drilling in medium sections. It can also be used for production drilling with cut-and-fill and room-and-pillar methods.

This parallel holding telescopic boom offer large «true» rectangular face coverage area.

DESCRIPTION

The x-y coordinated boom movements together with 360° actuator roll-over make the use of the boom simple and logical. Accurate automatic parallel holding both in vertical and horizontal plane improves the drilling performance and accuracy.

Large dimensioned rectangular profile, adjustable and sealed boom extension wear-pieces, large diameter bearings, sealed main joints, expanding pins in cylinder joints and use of super strong cast pieces in most stressed areas are some of the features that are included to the boom design for improved reliability.

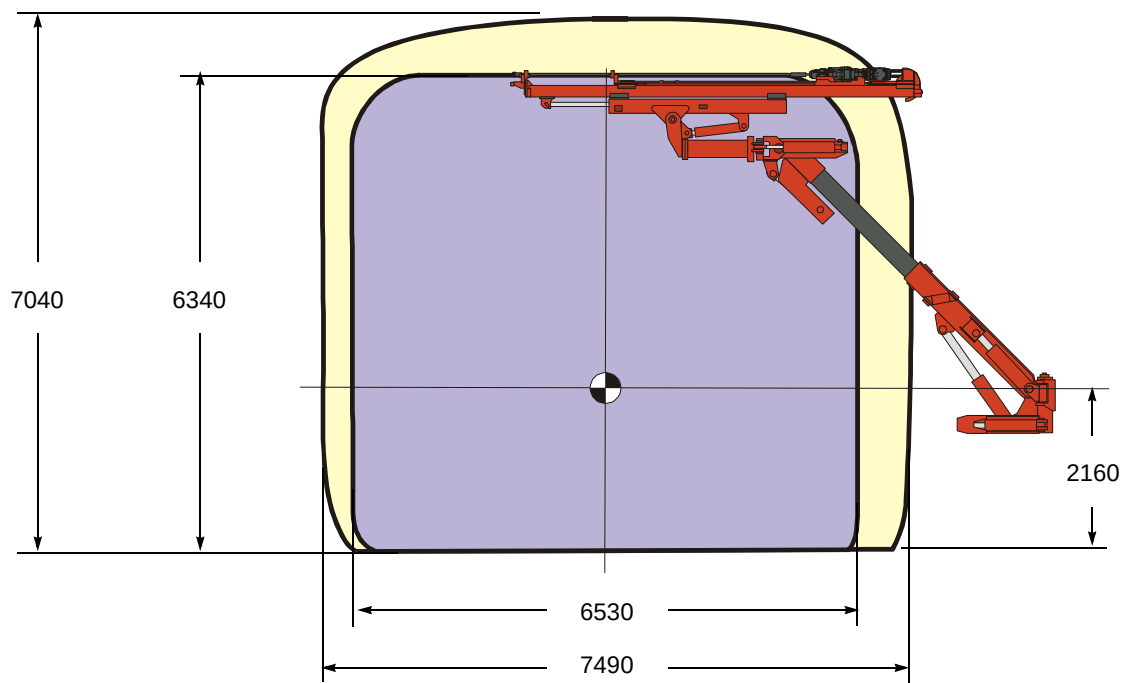
TECHNICAL DATA

Coverage with parallelism holding	41,4 m²
Coverage with manual override	52,7 m²
Weight, without hoses	1 960 kg
Weight allowed	850 kg
Boom telescopic extension	1 700 mm
Boom lift, up and down	45° and 16°
Boom swing, symmetric	± 45°
Feed tilt, up and down	25° and 50°
Feed swing, symmetric	± 50°
Divergence, up and down	3° and 90°
Feed extension	1 600 mm
Feed roll-over	360°

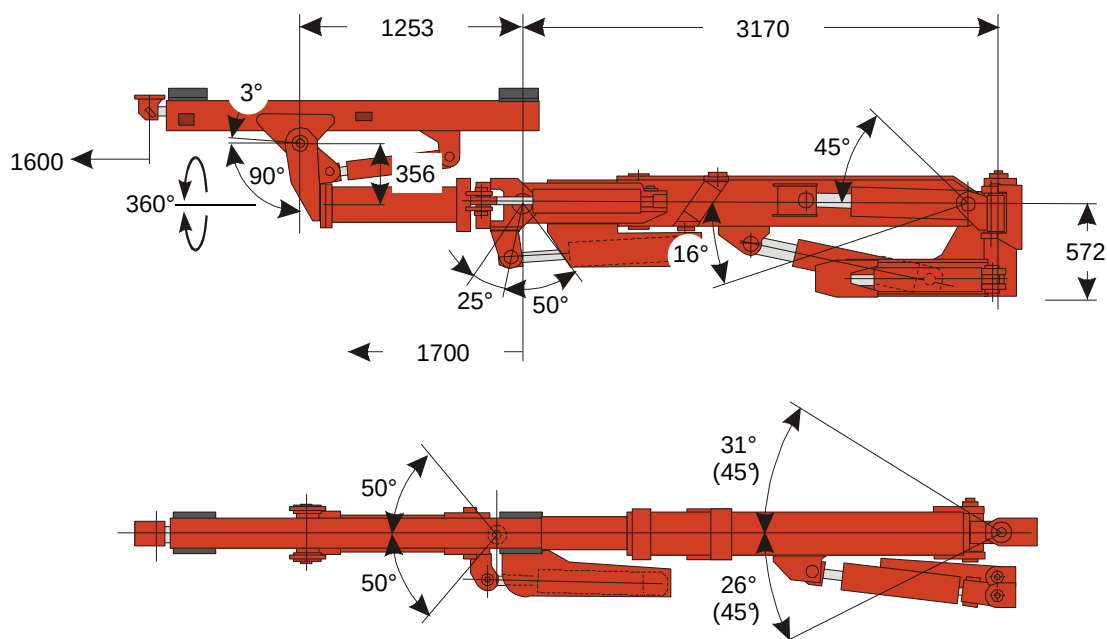
Technical Specification
4-300 S-D
2007-06-01

B 26 XL F Boom

COVERAGE AREA

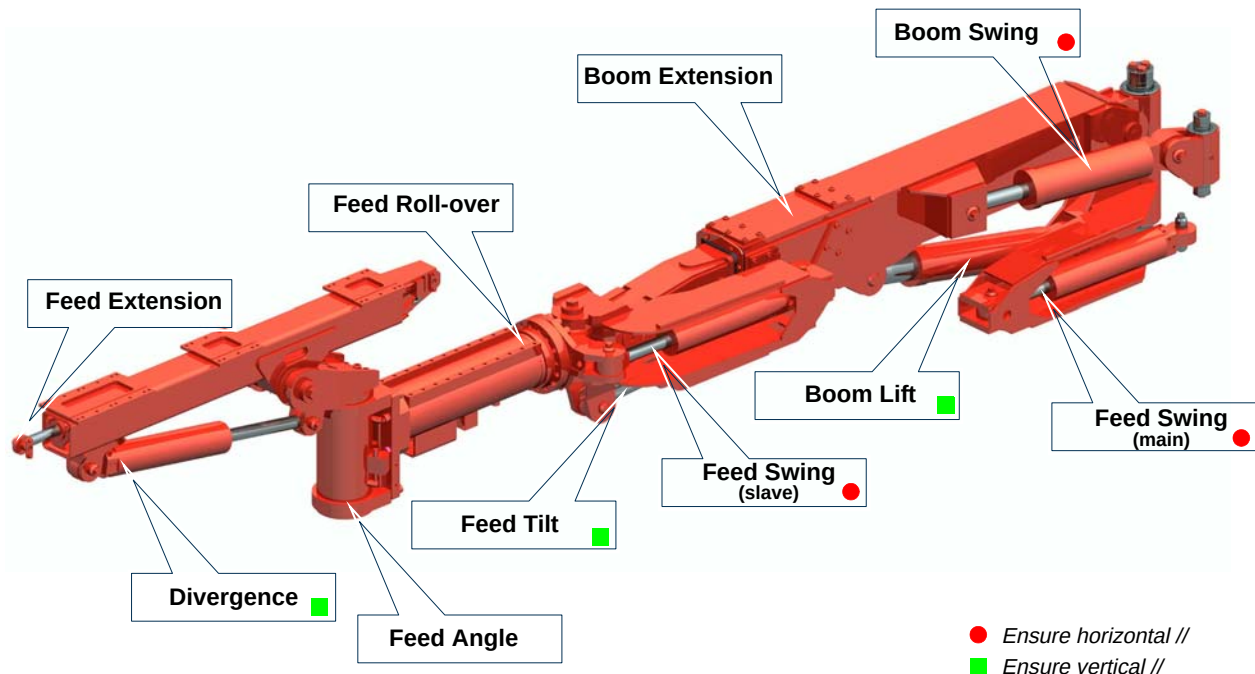


GENERAL DIMENSIONS



Technical Specification
4-501 S-D
2007-06-01

B 26 NV Boom



APPLICATION

B 26 NV boom is designed for Sandvik DD310, DD320, DD210L and DD220L jumbos.

B 26 NV boom is a multi-purpose hydraulic boom for mechanized tunnelling, drifting, cross-cutting and bolt-hole drilling in medium sections. It can also be used for production drilling with cut-and-fill and room-and-pillar methods.

This parallel holding telescopic boom offer large «true» rectangular face coverage area.

TECHNICAL DATA

Coverage with parallelism holding	29,2 m ²
Coverage with manual override	38,9 m ²
Weight, without hoses	1 900 kg
Weight allowed	850 kg
Boom telescopic extension	1 200 mm
Boom lift, up and down	45° and 16°
Boom swing, symmetric	± 45°
Feed tilt, up and down	25° and 50°
Feed swing, symmetric	± 50°
Divergence, up and down	20° and 90°
Feed extension	1 400 mm
Feed roll-over	360°
Feed angle	± 95°

DESCRIPTION

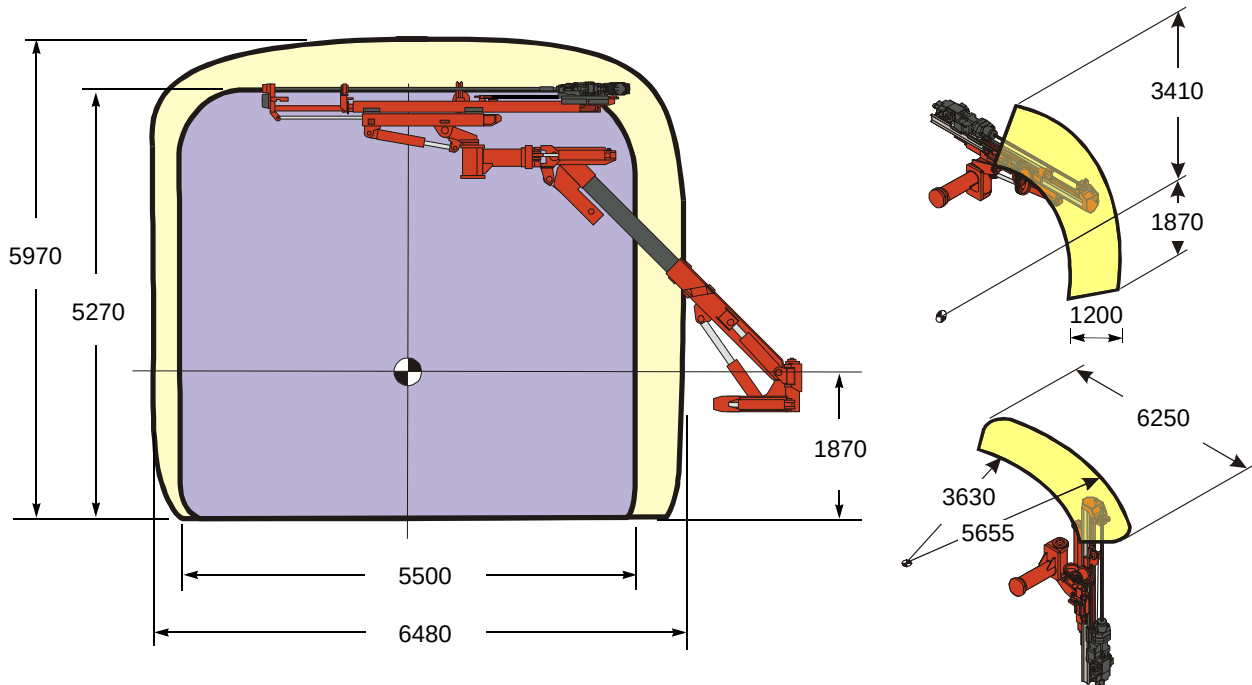
The x-y coordinated boom movements together with double rotation device allows a vertical positioning of the feed on both side of the boom and the possibility to drill extremely close to the hanging and foot walls, both to the right and left, with the rock drill always in the operator's sight line. Accurate automatic parallel holding both in vertical and horizontal plane improves the drilling performance and accuracy.

Large dimensioned rectangular profile, adjustable and sealed boom extension wear-pieces, large diameter bearings, sealed main joints, expanding pins in cylinder joints and use of super strong cast pieces in most stressed areas are some of the features that are included to the boom design for improved reliability.

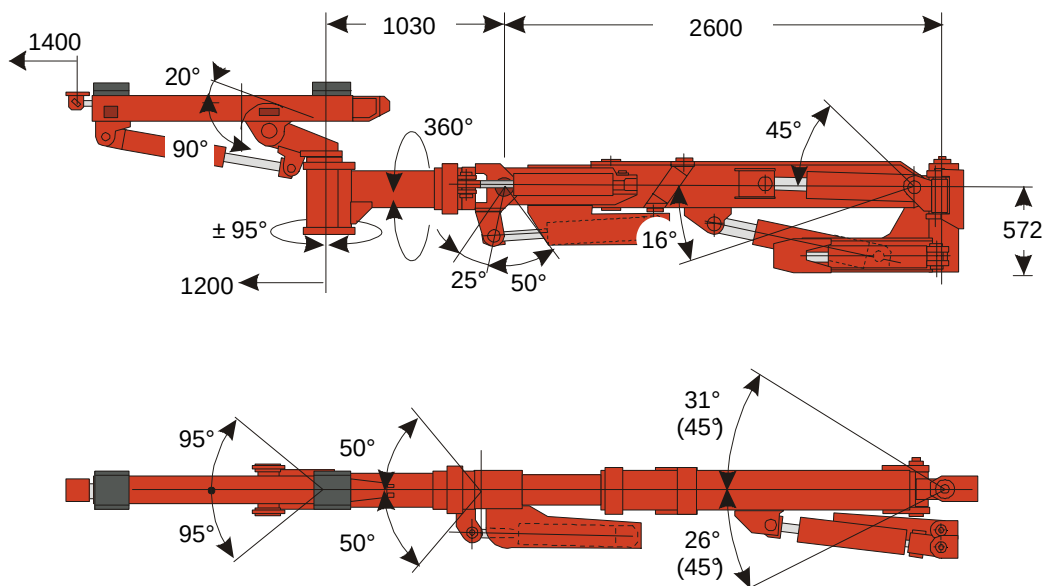
Technical Specification
4-501 S-D
2007-06-01

B 26 NV Boom

COVERAGE AREA

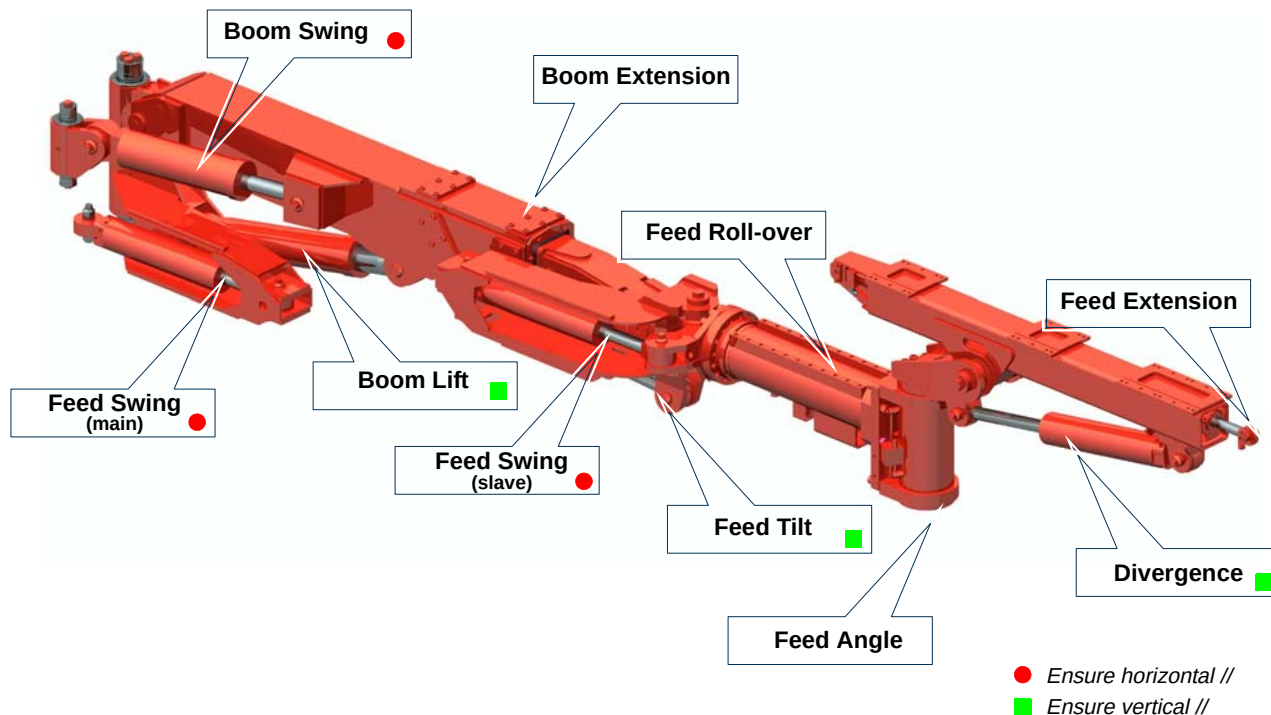


GENERAL DIMENSIONS



Technical Specification
4-503 S-C
2007-06-01

B 26 XL NV Boom



APPLICATION

B 26 XL NV boom is designed for Sandvik DD310, DD320, DD210L and DD220L jumbos.

B 26 XL NV boom is a multi-purpose hydraulic boom for mechanized tunnelling, drifting, cross-cutting and bolt-hole drilling in medium sections. It can also be used for production drilling with cut-and-fill and room-and-pillar methods.

This parallel holding telescopic boom offer large «true» rectangular face coverage area.

TECHNICAL DATA

Coverage with parallelism holding	40,8 m ²
Coverage with manual override	50,7 m ²
Weight, without hoses	2 010 kg
Weight allowed	850 kg
Boom telescopic extension	1 700 mm
Boom lift, up and down	45° and 16°
Boom swing, symmetric	± 45°
Feed tilt, up and down	25° and 50°
Feed swing, symmetric	± 50°
Divergence, up and down	20° and 90°
Feed extension	1 600 mm
Feed roll-over	360°
Feed angle	± 95°

DESCRIPTION

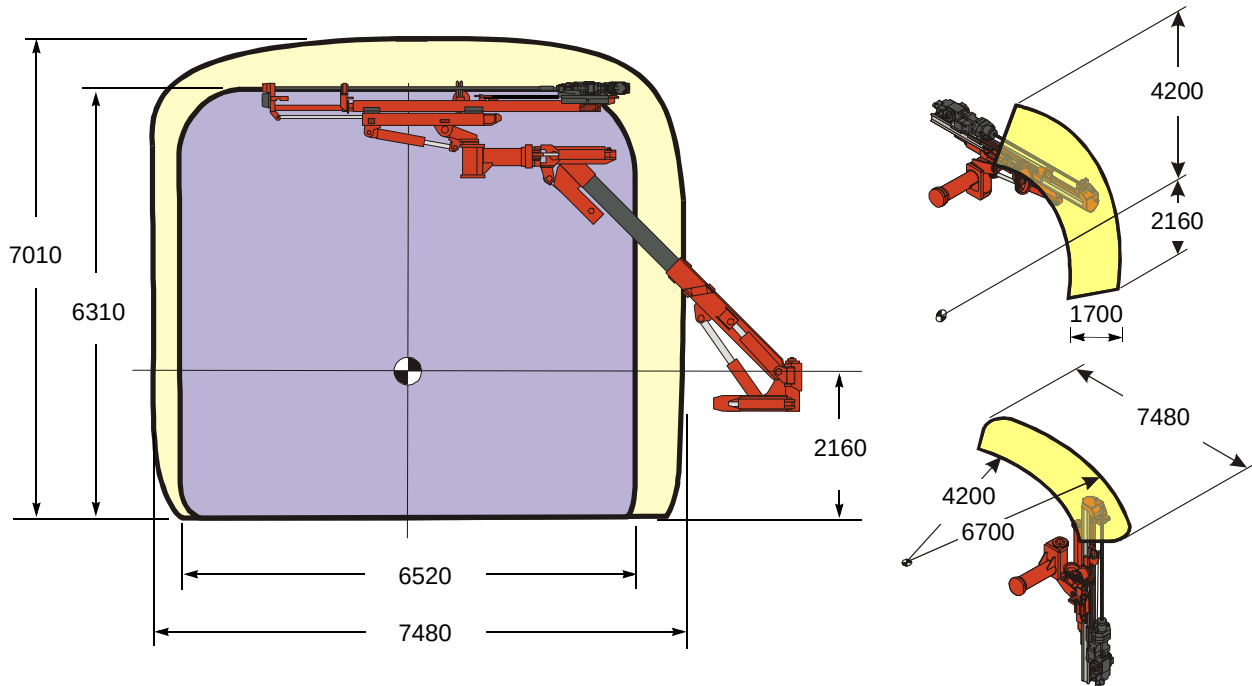
The x-y coordinated boom movements together with double rotation device allows a vertical positioning of the feed on both side of the boom and the possibility to drill extremely close to the hanging and foot walls, both to the right and left, with the rock drill always in the operator's sight line. Accurate automatic parallel holding both in vertical and horizontal plane improves the drilling performance and accuracy.

Large dimensioned rectangular profile, adjustable and sealed boom extension wear-pieces, large diameter bearings, sealed main joints, expanding pins in cylinder joints and use of super strong cast pieces in most stressed areas are some of the features that are included to the boom design for improved reliability.

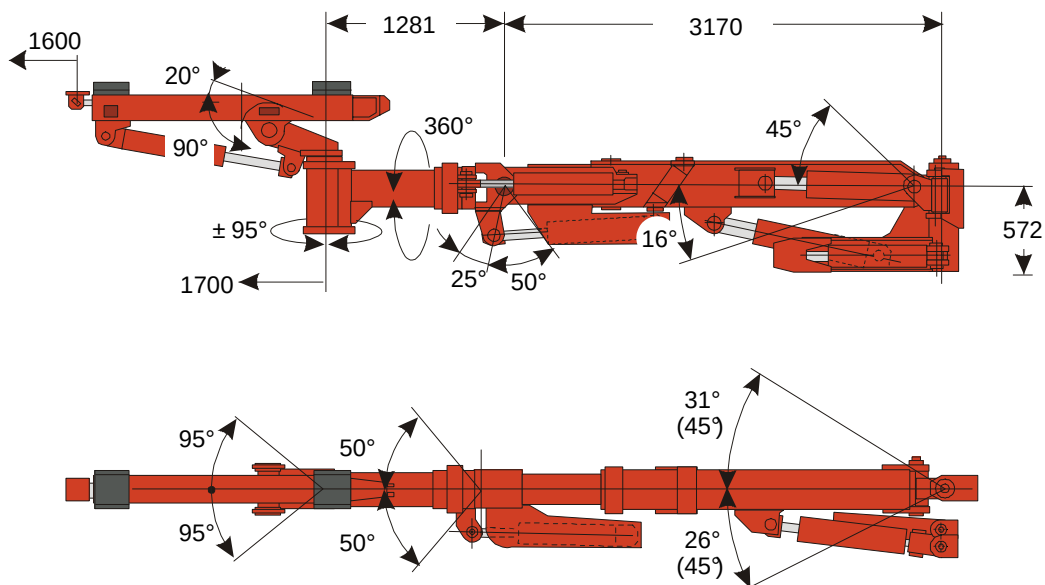
Technical Specification
4-503 S-C
2007-06-01

B 26 XL NV Boom

COVERAGE AREA



GENERAL DIMENSIONS



Technical Specification
3-100 S-D
2005-05-02

CC 2500 Series Feed



APPLICATION

A series of rugged hydraulic steel feed intended for drifting, bolt hole and cross-cuttings.

Three models are available.

CC 2500 feeds are designed for Tamrock Axera jumbos with X 2 and Hydrastar 200 rock drills.

CC 2500 EV feeds, with central hose reel, are designed for restricted area when cross-cuttings are needed.

CC 2500 R are designed for use with RHR 50 or RHR 80 rotary drills.

DESCRIPTION

The CC 2500 hydraulic cylinder feeds are made from heavy duty steel alloy profile. The high corrosion and high torsional resistance steel beam is equipped with easily replaceable guiding rails fixed with large diameter studs and bolts.

The carriage for rock drill have special wrap around connecting shoes.

The drill rod centralizers are equipped with hardened steel wear-pieces and are designed for optimum visibility and durability.

The hose support is a conical clamping system that allows easy individual tensioning of each hose.

TECHNICAL DATA

Advance thrust force (100 bar)	up to 12 kN
Return force (150 bar)	up to 0.8 kN
Advance speed (unloaded)	up to 7 m/min
Return speed (unloaded)	up to 14 m/min

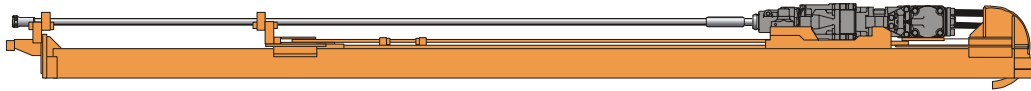
OPTIONAL EQUIPMENT

Hydraulic drill rod retainer for extension drilling.
Connecting shoes fitted with special polymer sliding wear-pieces.
Mechanized one rod adding system, S.E.R.H., for occasional long-hole drilling.

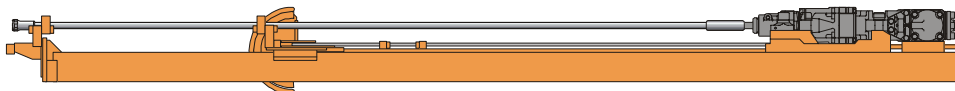
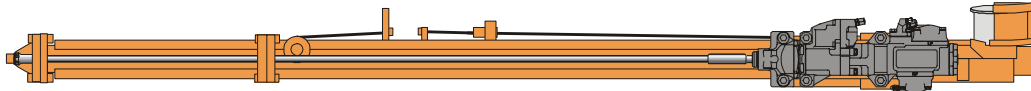
Technical Specification
3-100 S-D
2005-05-02

CC 2500 Series Feed

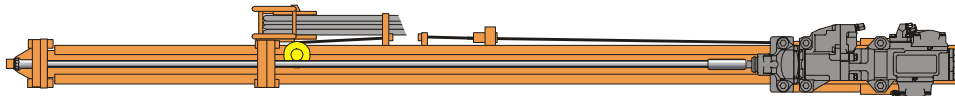
GENERAL DIMENSIONS



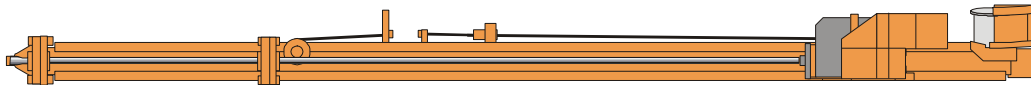
CC 2500



CC 2500 EV



CC 2500 R

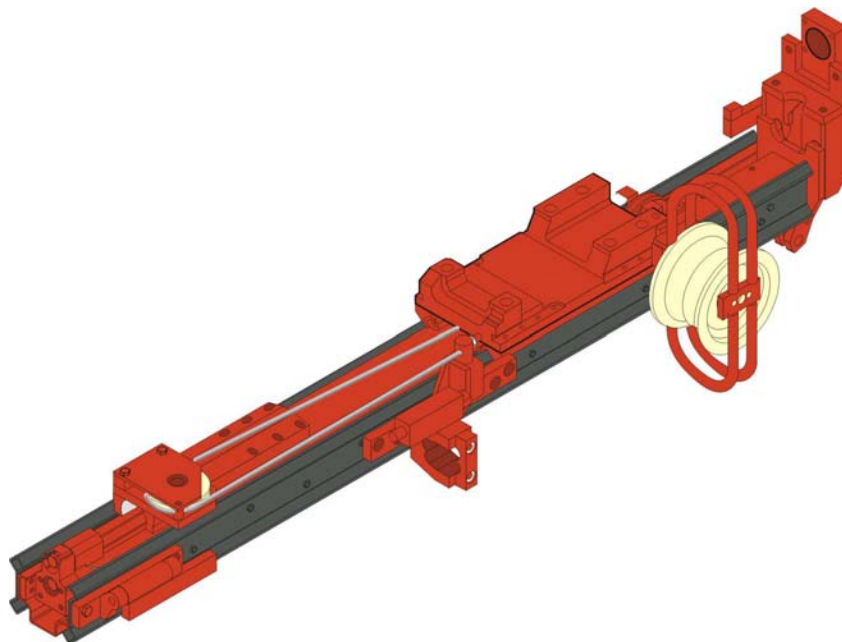


TYPE	Roto-percussive Rock drill			Rotary drill			Net Weight kg
	Rod length mm (ft)	Total length mm	Hole length mm	Rod length mm	Total length mm	Hole length mm	
CC 2508	2475 (8)	4055	2090	<i>Depend of the rotary type used (RHR 50 or RHR 80), please con- sult us.</i>	4055	2090	300
CC 2510	3090 (10)	4665	2700		4665	2700	360
CC 2512	3700 (12)	5275	3310		5275	3310	420
CC 2514	4305 (14)	5880	3910		5880	3910	480
CC 2516	4915 (16)	6490	4520		6490	4520	520

For CC 2500 EV model, leaves 400 mm from the total length

Technical Specification
3-401 S-D
2007-12-05

NVTF Telescopic Feed



APPLICATION

A series of multi-purpose telescopic drill feed capable to match 3 different rod lengths for face development, long hole drilling and bolting in confined environments.

NVTF feeds are designed for Sandvik DD210-V narrow vein jumbo with Hydrastar 200 rock drill.

TECHNICAL DATA

Advance thrust force (100 bar)	up to 12 kN
Return force (150 bar)	up to 8.4 kN
Advance speed (unloaded)	up to 7 m/min
Return speed (unloaded)	up to 14 m/min
Total extension	1 225 mm

DESCRIPTION

The NVTF hydraulic cylinder telescopic feeds are made from heavy duty steel alloy profile. The high corrosion and high torsional resistance steel beam is equipped with easily replaceable guiding rails fixed with large diameter studs and bolts.

The carriage for rock drill have special wrap around connecting shoes fitted with special polymer sliding wear-pieces.

Two types of front centralizer are available.

The solid SFC, for face drilling and rock bolting, the clamping FCC, hydraulic safe-type for long hole drilling.

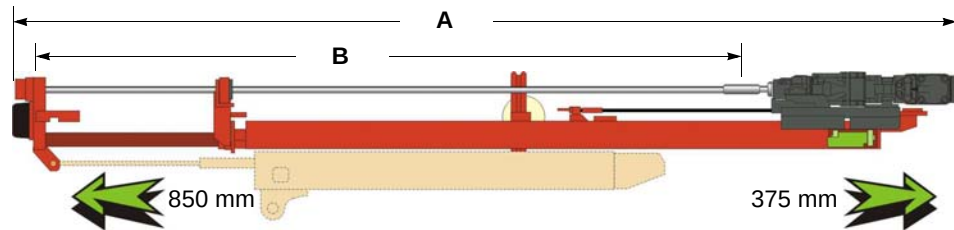
Telescoping is ensured by a front hydraulic cylinder and a rear mechanical extension system.

OPTIONAL EQUIPMENT

Rear anchoring hydraulic stinger (600 mm extension).

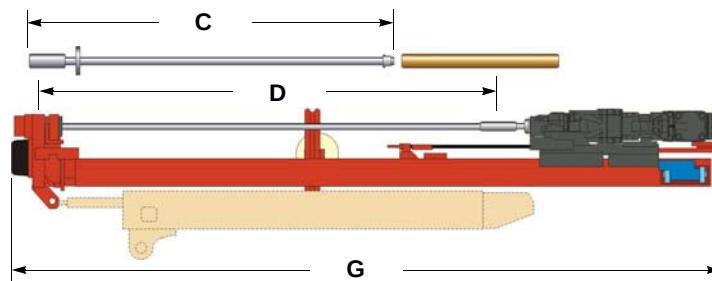
GENERAL DIMENSIONS

FEED EXTENDED
For Face Drilling



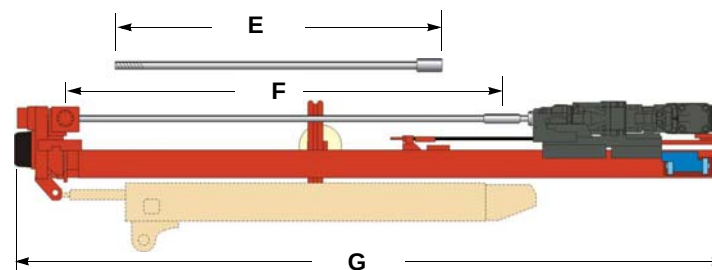
TYPE	Rod length -B-	Hole length	Total length -A-	Weight
NVTF 6/10	10 ft - 3090 mm	2870mm	4100 mm	450 kg
NVTF 8/12	12 ft - 3700 mm	3380 mm	4870 mm	480 kg
NVTF 10/14	14 ft - 4305 mm	4000 mm	5480 mm	510 kg

FEED RETRACTED
For Bolting & Cross-Cutting



TYPE	Rod length -D-	Hole length	Total length -G-	Bolt length -C-	Heading -mini-
NVTF 6/10	6 ft - 1830 mm	1630mm	3060 mm	5 ft	3200 mm
NVTF 8/12	8 ft - 2475 mm	2140 mm	3670 mm	6 ft	3800 mm
NVTF 10/14	10 ft - 3090 mm	2760 mm	4275 mm		4400 mm

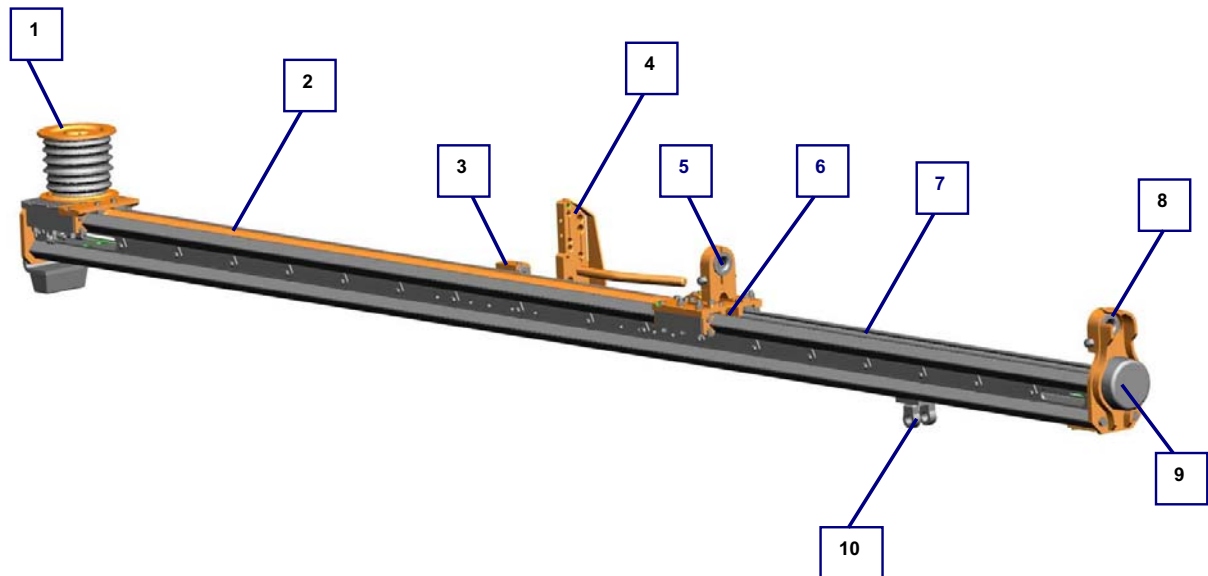
FEED RETRACTED
For Long Hole Drilling



TYPE	1 st MF-Rod length -F-	MF-Rod length -E-	Total length -G-	Heading -mini-
NVTF 6/10	6 ft - 1830 mm	4 ft - 1220 mm	3060 mm	3200 mm
NVTF 8/12	8 ft - 2475 mm	6 ft - 1830 mm	3670 mm	3800 mm

Technical Specification
3-1400-D
2005-01-31

TF 500 HYDRAULIC CYLINDER FEED



APPLICATION

TF 500 feeds are designed for Tamrock face drilling jumbos with HLX5 or HL500 series rock drills.

DESCRIPTION

The design of the feeds aims at simplicity of structure and ease of maintenance.

The TF 500 feeds are made from extruded special aluminum profile. Box shaped bottom part of the profile gives high resistance against bending and torsion. Stainless steel strips provide good guidance and durability against wearing on all sliding surfaces.

Adjustable v-shaped special wear pieces under rock drill, travelling centralizer and hose reel are fastened with bolts.

The drill rod centralizers are equipped with hardened steel wear pieces and are designed for optimum visibility and durability.

The hose support is a 2-sided clamp that allows easy individual tensioning of each hose.

MAIN COMPONENTS

1. Hose reel
2. Feed cylinder
3. Impulse cylinders for stop-and-return automatics
4. Hose support
5. Travelling centralizer
6. Feed wire ropes and rope tensioning assembly
7. Feed beam
8. Front drill rod centralizer
9. Buffer
10. Bracket for feed extension cylinder

OPTIONAL EQUIPMENT

TRR 1 hydraulic drill rod retainer for extension drilling
(Note! Reduces hole depth by 35 mm)

Internal hosing

Connections parts for boom

Connections parts for rock drill

Centralizer wear pieces of different sizes

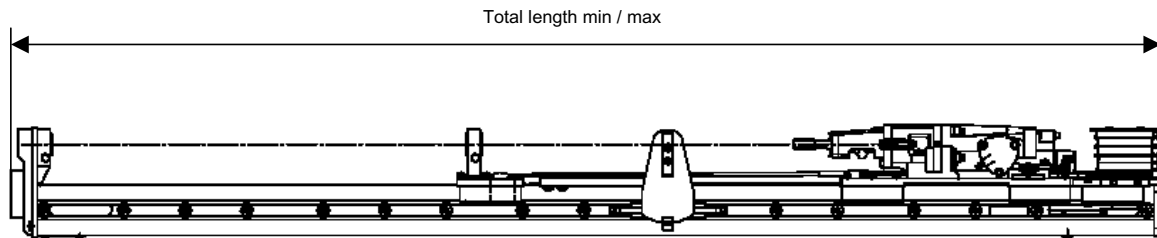
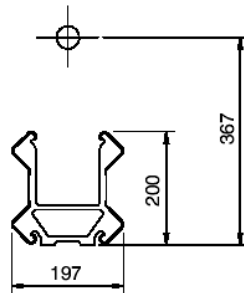
TECHNICAL DATA

Max feed force	25 kN
Free speed	0.5 m/s

Technical Specification
3-1400-D
2005-01-31

TF 500 HYDRAULIC CYLINDER FEED

DIMENSIONS



* The TF assembly doesn't include the rock drill

TF 500 feeds	Total length (mm)	Hole length (mm)	Rod length (mm)	Net Weight (kg)
500 x 8*	4 050	2 220	2 480	440
500 x 10*	4 660	2 830	3 090	470
500 x 12	5 270	3 440	3 700	500
500 x 14	5 880	4 050	4 305	530
500 x 16	6 490	4 660	4 915	560
500 x 18	7 100	5 270	5 525	590
500 x 20	7 710	5 880	6 135	620
500 x 21	8 015	6 185	6 440	640

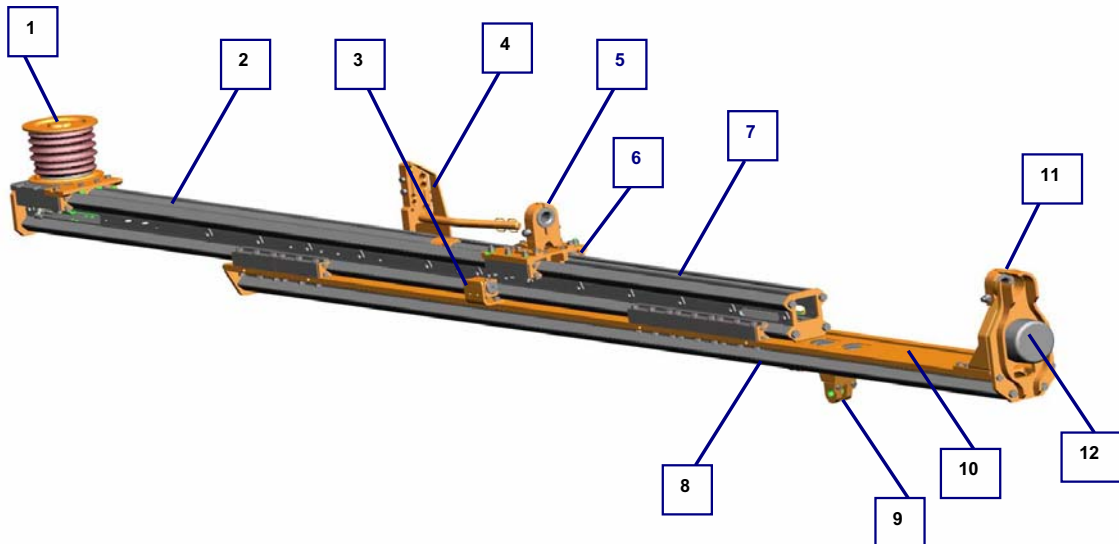
* The stroke in feed extension cylinder is limited

www.tamrock.sandvik.com

SANDVIK TAMROCK reserves the right to change this specification without further notice

Technical Specification
3-1600
2005-02-15

TFX 500 TELESCOPIC CYLINDER FEED



APPLICATION

TFX 500 telescopic feeds are designed for Tamrock face drilling jumbos with HLX5 series rock drills. A versatile feed for face drilling, bolt hole drilling and cross-cuttings in a limited space where both long and short rods have to be used.

DESCRIPTION

The design of the feeds aims at simplicity of structure and ease of maintenance. The TFX feed consists of TF feed and TFX extension kit.

When the TFX 500 feed is in minimum length, short holes can be drilled and while in maximum length, long holes can be drilled. The extension of feed can be adjusted stepless between minimum and maximum.

During drilling the buffer is pushed to the rock by feed extension cylinder. The TF feed beam moves on the lower beam by lower feed cylinder.

The beams are made of special aluminum profile with sliding surfaces faced with stainless steel strips.

The drill rod centralizers are equipped with hardened steel wear pieces and are designed for optimum visibility and durability.

MAIN COMPONENTS

1. Hose reel
2. Feed cylinder
3. Impulse cylinders for stop-and-return automatics
4. Hose support
5. Travelling centralizer
6. Feed wire ropes and rope tensioning assembly
7. Feed beam
8. Lower feed cylinder
9. Bracket for feed extension cylinder
10. Lower feed beam
11. Front drill rod centralizer
12. Buffer

OPTIONAL EQUIPMENT

TRR 1 hydraulic drill rod retainer for extension drilling
Internal hosing
Connections parts for boom
Connections parts for rock drill
Centralizer wear pieces of different sizes

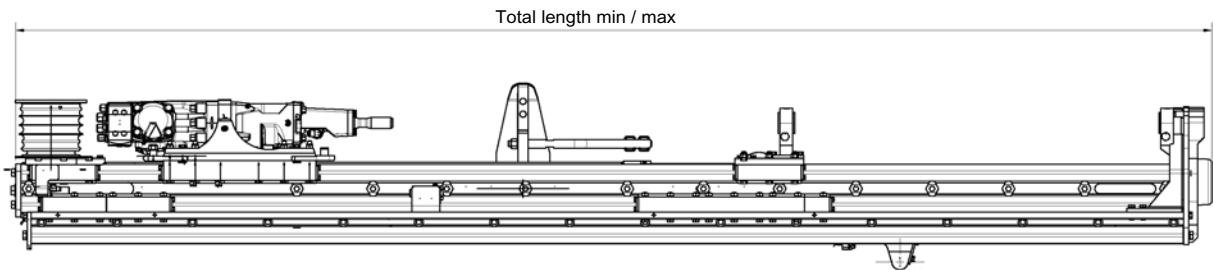
TECHNICAL DATA

Max feed force	25 kN
Free speed	0.5 m/s

Technical Specification
3-1600
2005-02-15

TFX 500 TELESCOPIC CYLINDER FEED

DIMENSIONS

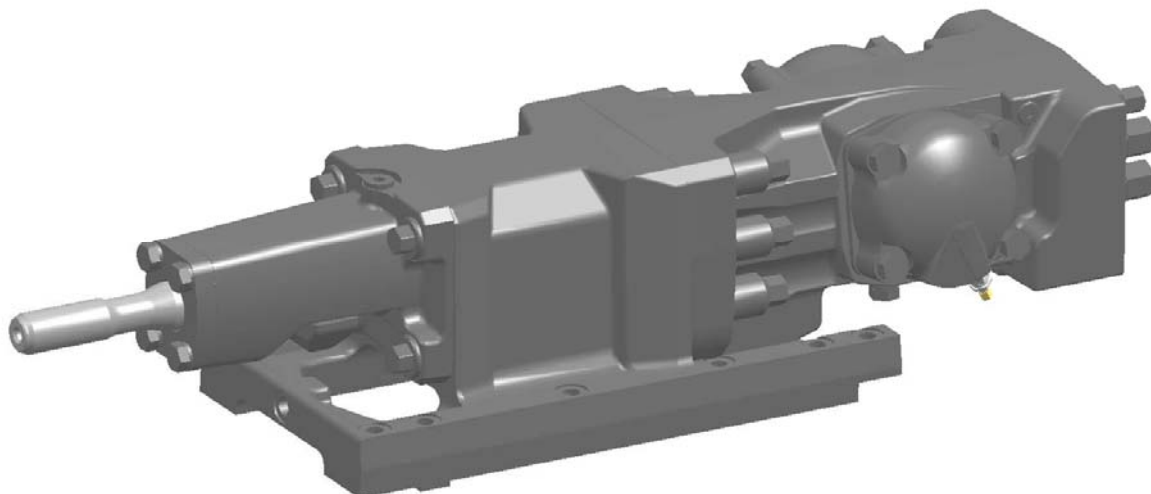


* The TFX feed doesn't include the rock drill

TFX 500	6/12	8/14	10/16
Total length (mm)	3480 / 5310	4090 / 5920	4700 / 6530
Feed travel (mm)	1610 / 3440	2220 / 4050	2830 / 4660
Net Weight (kg)	636	673	710
With optional TRR1 rod retainer: - 1. rod length (ft)	6, 8, 10, 12	6, 8, 10, 12	6, 8, 10, 12
With following TB booms	40, 60, 90, 120, 150	40, 60, 90, 120, 150	60, 90, 120, 150
With following B26 booms	F, XLF, NV, XLNV	F, XLF, NV, XLNV	F, XLF, NV, XLNV

Technical Specification
2-1852-B
2007-06-28

Hydraulic rock drill HLX 5



APPLICATION

HLX 5 hydraulic rock drill is designed for underground face, bolt and long hole drilling. HLX 5 is standard rock drill f.ex on Sandvik hydraulic controlled mining and tunneling jumbos.

MAIN CHARACTERISTICS

HLX 5 is a compact, robust and universal hydraulic percussive rock drill. It is known of its hydraulic efficiency and high penetration rates. HLX 5 has excellent serviceability through modular construction and visual wear indicators. Robustness is achieved by only few pressurized seems between the functional modules.

Shank lubrication drain is lead to feed surfaces to reduce lubrication oli fume enabling more ergonomic working environment.

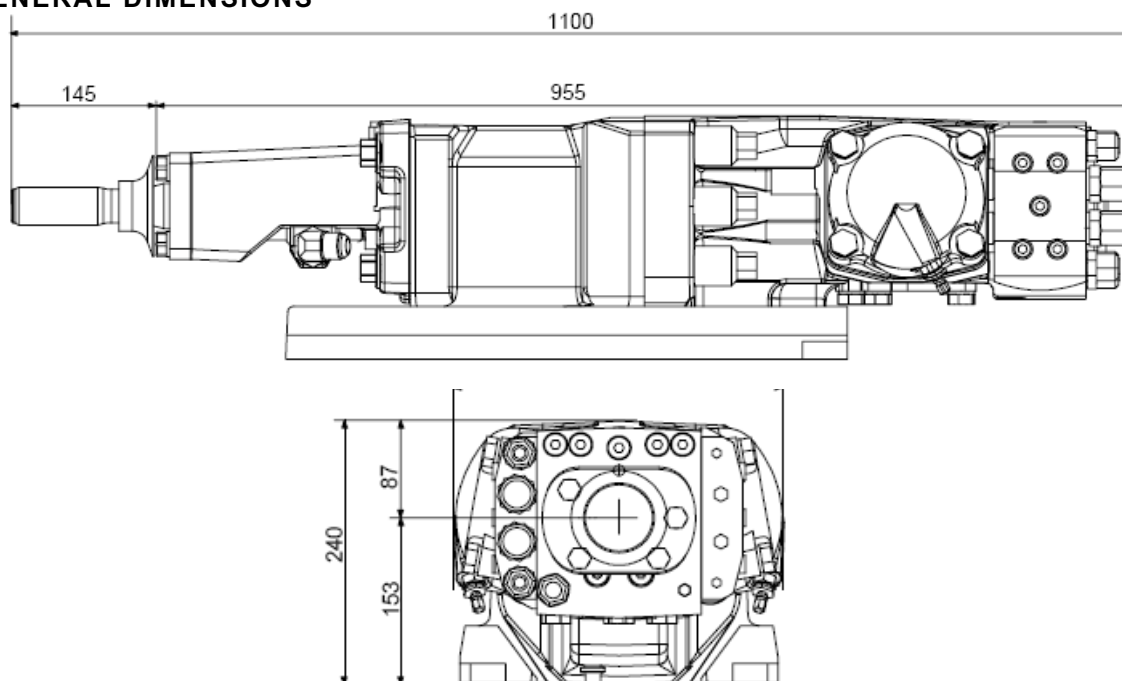
MAIN SPECIFICATIONS

Hole diameter	
Drifting	43...64 mm
Cut hole drilling	76...127 mm
Power class	20 kW
Percussion rate	67 Hz
Operating pressure	
Percussion	120-220 bar
Rotation (max)	175 bar
Rotation motor type	OMS 80/125/160
Drill steels	R 39 or Hex 35 mm drifter rods, MF-rods highly recommended
Shanks	Ø 45 / T 38

Technical Specification
2-1852-B
2007-06-28

Hydraulic rock drill HLX 5

GENERAL DIMENSIONS



TECHNICAL DATA

MAIN DIMENSION

Length	955 mm
Profile height	87 mm
Width	295 mm
Weight	210 kg

ROTATION MECHANISM

Motor	Orbit type (3 options)
Motor type 1	OMS 80
Torque (at 175 bar)	400 Nm
Rotation speed	0...250 rpm
Flow (at max speed)	46 l/min
Motor type 2	OMS 125
Torque (at 175 bar)	625 Nm
Rotation speed	0...250 rpm
Flow (at max speed)	72 l/min
Motor type 3	OMS 160
Torque (at 175 bar)	780 Nm
Rotation speed	0...200 rpm
Flow (at max speed)	74 l/min

FLUSHING

Max pressure (air/water)	20 bar
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ACCUMULATORS

Accumulator gas	Nitrogen N2
High pressure (HP)	50 bar
Low pressure (LP)	4 bar
Filling valve	Vg8 DIN 7756

SHANK LUBRICATION

Air flow (at 6 bar)	250...350 l/min
Pressure	4...7 bar
Oil consumption	180...250 g/h

OIL RECOMMENDATION

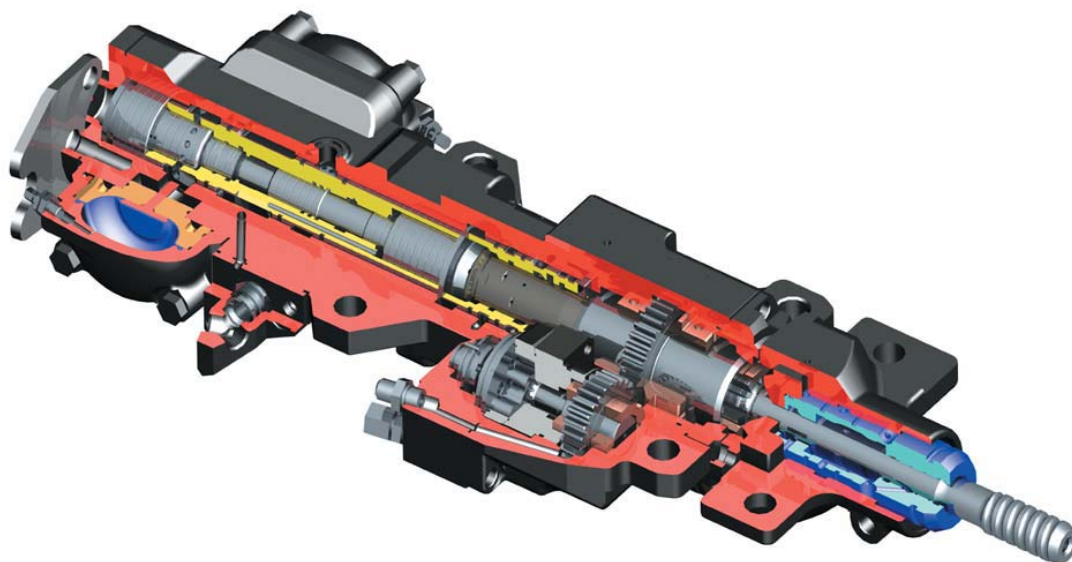
Oil operating temperature	+40...+60 °C
Oil recommendation	See Sandvik drill rigs lubricant recommendation for detailed information

OPTIONS

Special tools for HLX 5, ID 55006507

Technical Specification
2-310 S-C
2003-11-27

X2 Series Rock Drill



APPLICATION

The X2 hydraulic rock drill is designed for tunneling and mine development drilling with Tamrock Axera jumbos. It is also suitable for bolt hole and long hole drilling.

DESCRIPTION

The X2 series is a hydraulic percussive rock drill with independent reversible rotation and low profile height.

Two X2 models are available.

The X2 F, designed for face drilling or rock bolting, equipped with :

- a 125 cm³ rotation motor,
- a stainless flushing head (optional) with stainless steel water cartridge replaceable without removing the shank.

The X2 L, designed for long hole drilling, equipped with :

- a high-torque 200 cm³ rotation motor,
- a flushing enabling retro-percussion (optional).

It is possible to switch over from version X2 F to version X2 L simply by changing the rotation motor and the flushing head.

TECHNICAL DATA

Drill steel	drifting	H32 - H35 drifter rods
	long hole drilling	Ø39 - Ø45 mm MF rods
	bolt hole drilling	T38 - T45 tube
Shank	male	H25 - H28
		R38 - T38 - T45 - R32
Hole diameter	blast hole	43 - 51 mm
	burn cut hole	76 - 127 mm
	long hole T38	64 - 76 mm
	long hole T45	76 - 89 mm
	bolt hole	35 51 mm
Weight (w/o flushing head)		135 kg
Length (w/o shank)		969 mm
Profile height		87 mm
Impact rate		52 Hz
Impact power		14 -21 kW
Percussion hydraulic pressure		160-210 bar

OPTIONAL EQUIPMENT

Flushing head.
Special tools for X2

Technical Specification
2-310 S-C
2003-11-27

X2 Series Rock Drill

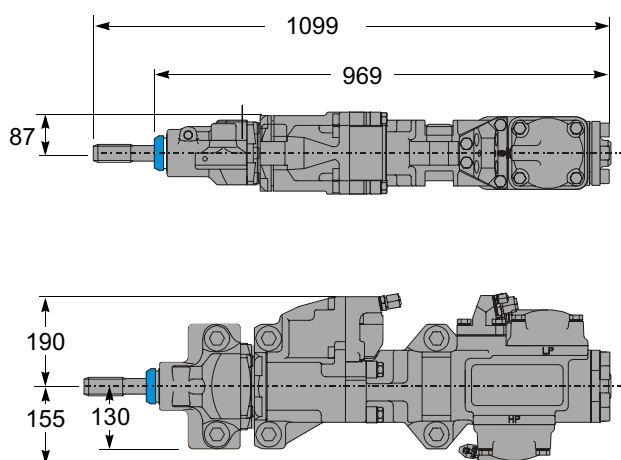
WORKING PARAMETERS

	X2 F	X2 L (<30 m)	X2 L (>30 m)
Percussion mechanism			
Operating pressure	160 - 210 bar	175 - 210 bar	
Percussion power	14 - 19 kW	15 - 19 kW	16 - 21 kW
Percussion rate	52 - 59 Hz	57 - 59 Hz	53 - 55 Hz
Flow	90 l/min	90 l/min	
Rotation mechanism			
Motor	Orbit type, 125 ccm	Orbit type, 200 ccm	
Flow	40 - 70 l/min	40 - 70 l/min	
Rotation speed	220 - 350 rpm	135 - 240 rpm	
Pressure	175 - 210 bar	140 - 175 bar	
Torque	390 - 470 Nm	500 - 620 Nm	

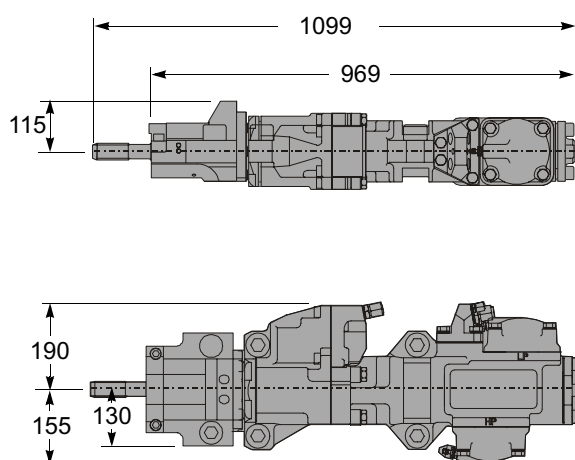
Accumulator gas	Nitrogen N2	Shank lubrication	
High pressure (HP)	55 bar	Air flow (at 2.5 bar)	250 NI/min
Low pressure (LP)	4 bar	Pressure	2.5 bar
Filling valve	Vg8 DIN 7756	Oil consumption	100 g/h
Flushing		Hose fitting size	
Water flow	25 l/min (12 bar)	Percussion	JIC 1 1/16 - 3/4
Water pressure	12-15 bar	Rotation	X2 F JIC 7/8 - 5/8
Working temperature (water flushing)		X2 L JIC 1 1/16 - 3/4	
Ambient temperature	+0...+40° C	Lubrication	JIC 9/16 - 3/8
Oil operating pressure	+40...+60° C	Flushing	JIC 7/8 - 1/2
		Drain	X2 F JIC 3/4 - 1/2
			X2 L JIC 7/8 - 5/8

GENERAL DIMENSIONS

X 2 F

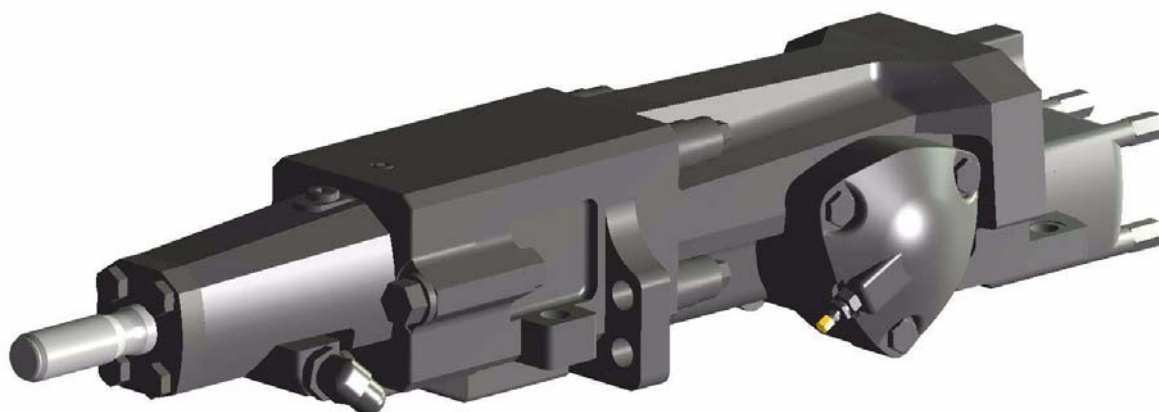


X 2 L



Technical Specification
2-1150-C
2007-05-10

Hydraulic rock drill HL 510 S/F



APPLICATION

HL 510 S/F hydraulic rock drill is designed for face, bolt and long hole drilling.
HL 510 S-45 for face drilling rigs.
HL 510 S-38 for bolters and long hole drilling rigs.
HL 510 F for bolters.

MAIN CHARACTERISTICS

HL 510 S/F is a compact, robust and universal hydraulic rock drill. It is known of its hydraulic efficiency and high penetration rates. HL 510 S/F has excellent serviceability through modular construction and visual wear indicators. Robustness is achieved by only few pressurized seams between the functional modules. Thus HL 510 S/F high efficiency in action with minimized down time.

MAIN SPECIFICATIONS

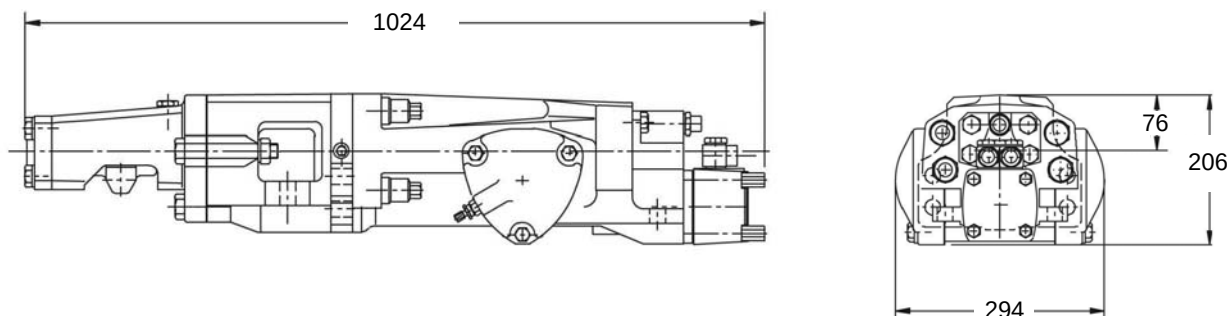
Hole diameter	
Drifting	43...51 mm
Reaming	76...127 mm
Bolt drilling	32...45 mm
Long hole drilling	48...64 mm
Power class	16 kW
Percussion rate	59 Hz
Operating pressure	
Percussion	120 - 175 bar
Rotation (max)	175 bar
Rotation motor type	OMS 80/125
Drill steels	
Drifting	H32 or H35 drifter rods
Bolting	H25 or H28 drifter rods Ø32 integral steels
Long hole drilling	R39 or H35 MF-rods
Shanks	
HL 510 S-45	Ø 45/500 - T38 (R38)
HL 510 S-38	Ø 38/460 - R32
HL 510 F	Ø 45/350 - R32

Technical Specification
2-1150-C
2007-05-10

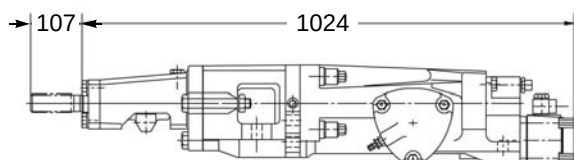
Hydraulic rock drill HL 510 S/F

GENERAL DIMENSIONS

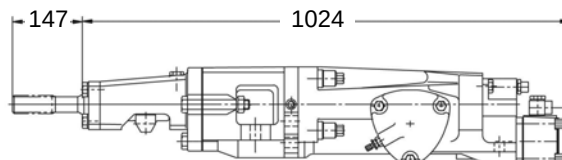
HL 510 F



HL 510 S-38



HL 510 S-45



TECHNICAL DATA

MAIN DIMENSION

Length	1 024 mm
Profile height	76 mm
Width	294 mm
Weight	130 kg

ROTATION MECHANISM

Motor	Orbit type (2 options)
Motor type 1	Orbit, OMS 80
Torque (at 175 bar)	400 Nm
Rotation speed	0...250 rpm
Flow (at max speed)	46 l/min
Motor type 2	Orbit, OMS 125
Torque (at 120 bar)	625 Nm
Rotation speed	0...250 rpm
Flow (at max speed)	72 l/min

FLUSHING

Water pressure	10...20 bar
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ACCUMULATORS

Accumulator gas	Nitrogen N2
High pressure (HP)	50 bar
Low pressure (LP)	4 bar
Filling valve	Vg8 DIN 7756

SHANK LUBRICATION

Air flow (at 6 bar)	250...350 l/min
Pressure	4...7 bar
Oil consumption	200...300 g/h

OIL RECOMMENDATION

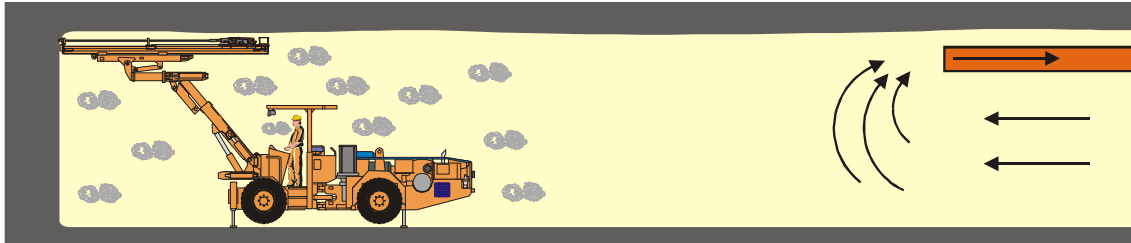
Oil operating temperature	+40...+60°C
Oil recommendation	See Sandvik drill rigs lubricant recommendation for detailed information

OPTIONS

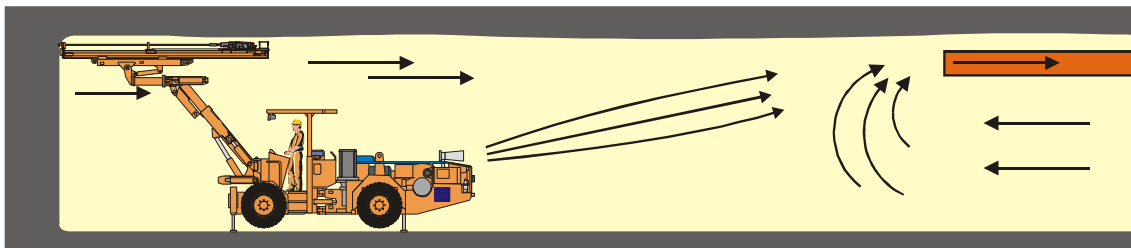
Complete special tools kit for HL 510, ID 152 257 68.
Field special tools kit for HL 300 S, ID 880 817 19.

Technical Specification
5-200 S-B
2007-06-01

Exhaust Systems



Typical exhaust fume problem encountered during underground tunnel driveage.



The fume diluter projects the exhaust gas fumes towards the auxiliary ventilation system.

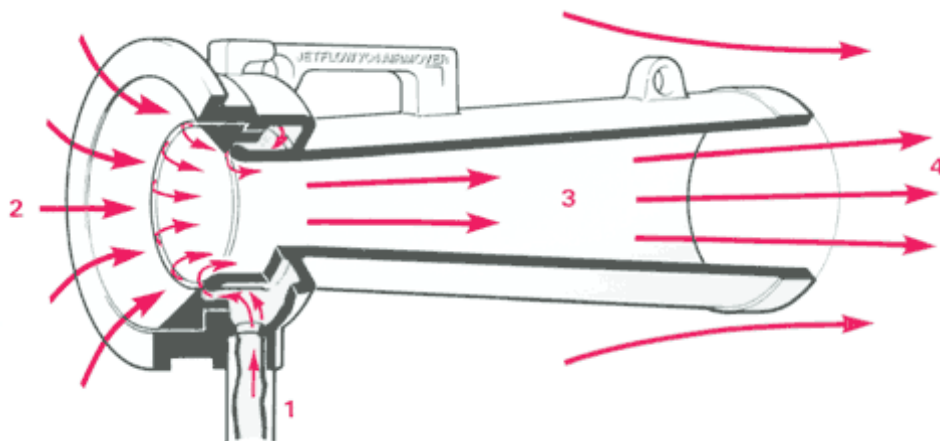
FUME DILUTER

Fume diluters are compressed air driven and when low pressure air passes over an aerofoil surface it both clings to the surface and accelerates the "Coanda Effect".

The diagram below shows how the fume diluter puts this effect into practice for efficient ventilation.

AVAILABILITY

- Sandvik DD310 Range.
- Sandvik DD210L Range.
- Sandvik DD210 Range.



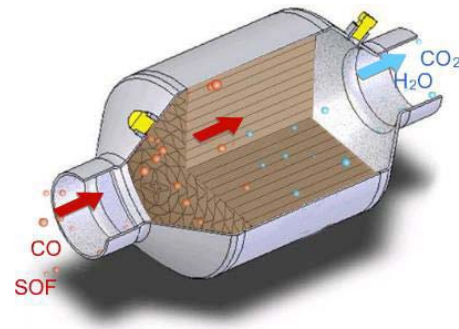
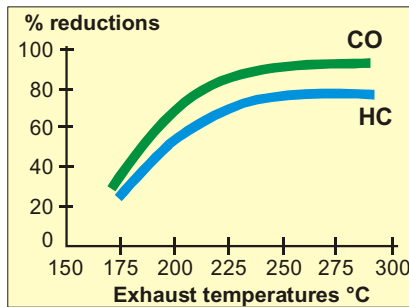
EXHAUST CATALYSER

Exhaust catalyser consist of a metallic monolith coated with advanced precious metal catalysts and packaged into stainless steel housings.

These purifiers oxydise hazardous carbon monoxide (CO) and hydrocarbons (HC) to form harmless carbon dioxide and water.

AVAILABILITY

- Sandvik DD320, DD420, DD530 Mining jumbos.
- Standard on Sandvik DD310, DD210L, and DD210 Ranges.
- Included in EU norms package.



WATER SCRUBBER

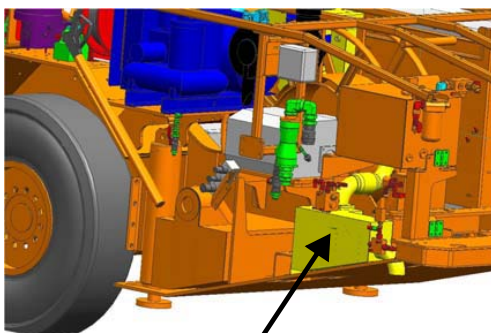
The water scrubber is used to cool down and wash engine exhaust gases which go through a tank of water. Its internal configuration avoid a dispersion of the water at the gas outlet.

The sizes of the two tanks are tailored to the Diesel engine power level

Example : Water scrubber on the Sandvik DL320 carrier

AVAILABILITY

- Sandvik DD320, DD420, DD530 Mining jumbos.
- Sandvik DD210 Range.



Main tank through which the exhaust fumes are passing.

Additional tank filled by the machine water circuit to increase the autonomy

