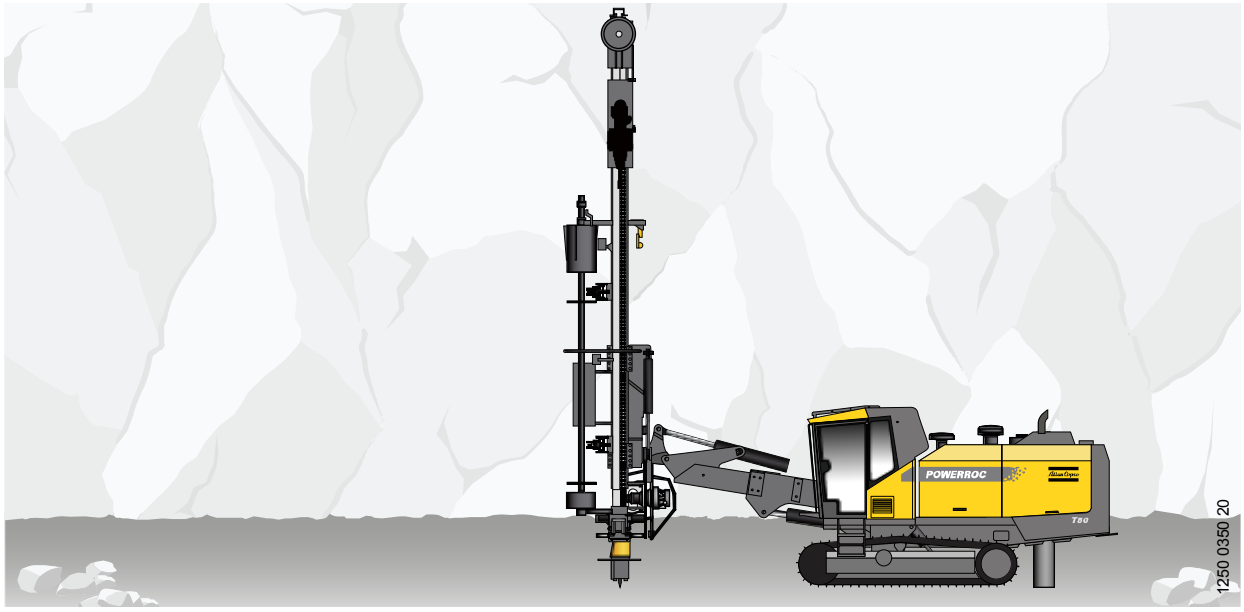
Atlas Copco

PowerROC T50 Tier 4

Maintenance instructions



PM NO.9852 3313 01a
2014-09

SAFETY INSTRUCTIONS

- Before starting, read all instructions carefully.
- Special attention must be paid to information alongside this symbol.

- Only use genuine Atlas Copco parts.

1250 0071 04

Original instruction

Atlas Copco (Nanjing) Construction & Mining Equipment Ltd.,

Nanjing, China

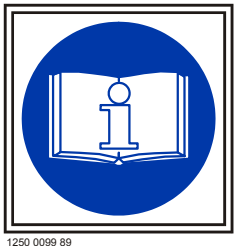
Maintenance instructions

1 Safety

1.1 Reference

Note

Always read the information in the Safety document before starting to use the rig or starting maintenance work.



1250 0099 89

2 General

2.1 General

2.1.1 Safety

When maintenance work is carried out on the rig, observe the following points:

- Never carry out service or maintenance work while the drill rig is running.
- To prevent personal injury during service and maintenance work, all components that can be brought into motion or fall down must be thoroughly secured.
- Ensure that the hydraulic and pneumatic systems are depressurized before starting work on them.
- All controls must be deactivated during service and maintenance.
- When changing hydraulic hoses, ensure they are replaced with hydraulic hoses fitted with the correct crimp couplings of correct quality and dimension. All pressurized hydraulic hoses have crimped couplings and should therefore be purchased ready made from Atlas Copco. Quality classes and hose dimensions are specified in the spare parts catalogue. Ensure also that all hose connections are clean, undamaged and securely tightened.

2.1.2 Target group and objective

Note

This chapter (General) contains general recommendations for maintenance of the drill rig and its peripheral equipment. This means that certain sections may not be fully adapted to individual components.

The maintenance instructions are intended for mechanics and personnel in maintenance and service. The user should have undergone Atlas Copco's training courses for the equipment concerned.

The objective of these maintenance instructions is to detect and rectify faults at an early stage so that breakdowns, costly secondary damage and accidents can be prevented. Regular maintenance is a precondition for planning necessary interruptions in operation such as reconditioning and repairs. This allows maintenance to be carried out when most suitable with regard to production instead of causing complete breakdown.

2.1.3 Contact us

Table 1 Addresses, telephone numbers and fax numbers to Atlas Copco companies

Country	Address	Phone- and fax number
Argentina	Estados Unidos 5335 B1667JHQ Malvinas Argentinas Buenos Aires	Phone: +54 - (0) 3327 43 18 00 Fax: +54 - (0)3327 - 43 18 66
Australia	P O Box 6134 Delivery Centre Blacktown NSW 2148	Phone: +61 - (0)2 - 9621 9700 Fax: +61 - (0)2 - 9621 9813
Austria	Postfach 108 A-1111 Wien	Phone: + 43- (0)1 -76 01 20 Fax: + 43 - (0)1 - 76 01 24 16
Bolivia	P.O. Box 290 Santa Cruz de la Sierra	Phone: + 591 - (0)2 - 211 20 00 Fax: + 591 - 0(2) - 211 78 01
Brazil	P O Box 1080 Barueri - SP 06460-970	Phone: + 55 - (0)11 - 41 96 87 00 Fax: + 55 - (0)11 - 41 95 37 22
Bulgaria	7, Iskarsko Shousse Blvd. Building 3, Office 4 1528 Sofia, Bulgaria	Phone: + 359 - (0) - 2 489 31 78 Fax: + 359 - (0) - 2 999 97 64
Canada	1025 Tristar Drive Mississauga Ontario, L5T 1L8	Phone: + 1 - 289 - 673 67 11 Fax: + 1 - 289 - 562 01 00
Chile	Panamericana Norte 5001 - Conchali Santiago, Chile 6553935 Conchali	Phone: + 56 - (0)2 - 442 36 00 Fax: +56 - (0)2 - 623 44 60
China 1	No 2 HengTai Road Nanjing Economic & Technological Development Zone Nanjing Postal code 210038	Phone: + 86 -(0) 25 - 85 75 75 00 Fax: + 86 - (0) 25 - 85 75 75 30
China 2	No. 12 Kun Ming Hu Street Shenyang Economic & Technological Development Zone CN-Shenyang 110027	Phone: + 86 -(0) 24 - 25 81 17 19 Fax: + 86 - (0) 24 - 25 81 18 67
CMT International	S-105 23 Stockholm	Phone: + 46 - (0)8 - 743 80 00 Fax: + 46 - (0)8 - 702 21 29
Colombia	A.A. 95310 Santafé de Bogotá, D.C.	Phone: +57 - (0)1 -419 92 00 Fax: +57 - (0)1 - 419 92 22
Czech Republic	Prumyslova 10 Praha 10, Post Code 102 00	Phone: + 420 - (0)2 - 25 43 42 20 Fax: + 420 - (0)2 - 25 43 42 22
Egypt	520 El-Obour Market Cairo	Phone: + 20 - (0)2 - 461 00 337 Fax: + 20 - (0)2 - 461 00 341
Finland	Tuupakankuja 1 SF-01740 Vantaa	Phone: + 358 - (0)2 - 07 18 94 35 Fax: + 358 - (0)2 - 07 18 94 02
France	BP 27055 Saint Ouen l'Aumône FR-95052 Cergy Pontoise Cedex	Phone: + 33 - (0)1 - 39 09 30 00 Fax: + 33 - (0)1 - 39 09 30 22
Germany	Postfach 10 02 25 D-46002 Essen	Phone: + 49 - (0)201 - 217 70 Fax: + 49 - (0)201 - 21 77 360
Ghana	P O B 10071 Accra North	Phone: + 233 - (0) 302 77 45 12 Fax: + 233 - (0) 302 77 61 47
Great Britain	Swallowdale Lane Hemel Hempstead Herts HP2 7EA	Phone: + 44 – (0)1442 - 26 12 01 Fax: + 44 - (0)1442 - 23 35 06
Greece	93, Koropiou - Varis, Avenue Thesi KlossariGR-194 00 Koropi	Phone: +30 - (0)210 - 349 96 00 Fax: +30 - (0)210 - 345 47 83

Country	Address	Phone- and fax number
Hong Kong	P O Box 1516 Shatin Central Post Office New Territories	Phone: + 852 - 27 97 66 00 Fax: + 852 - 23 41 43 13
India	Sveanagar Bombay Pune Road Dapodi Pune 411 012	Phone: + 91- (0)20 -39 85 24 15 Fax: + 91 - (0)20 - 27 14 59 48
Indonesia	P O Box 7021/JKS CCE Jakarta 12075	Phone: +62 - (0)21 780 10 08 Fax: +62 - (0)21 780 18 37
Iran	PO Box 13145-1311 Tehran 1345654551	Phone: +98 - (0)21 - 669 377 11 Fax: +98 - (0)21 - 669 273 14
Ireland	Kylemore Road Bluebell Dublin 12	Phone: +353 - (0)1 - 450 59 78 Fax: +353 - (0)1 - 456 7686
Italy	Casella Postale 77 IT-20092 Cinisello Balsamo MI	Phone: + 39 - (0)2 - 61 79 91 Fax: + 39 - (0)2 - 61 79 95 20
Japan	Sumitomo Fudosan Shipa Bldg 4 11F 2-13-4 Shiba, Minato-ku, Tokyo 105-00014	Phone: + 81 - (0)3 - 57 65 78 07 Fax: + 81 - (0)3 - 57 65 31 95
Kazakstan	Floor 2, 8A Kurmangaliyev Street. 050010 ALMATY	Phone: + 7 – (0)727 - 258 85 34 Fax: + 7 – (0)727 - 258 85 35
Kenya	PO Box 400 90 - 00100 Nairobi	Phone: + 254 – (0) 70 - 305 4000 Fax: + 254 – (0) 20 - 82 54 72 / (0) 20 - 82 52 15
Korea	3rd Floor, Seowon Building1515-4 Seocho 3-dongSeocho-ku Seoul	Phone: + 82 – (0)2 - 21 89 40 00 Fax: + 82 – (0)2 - 522 82 39
Malaysia	26, Jalan Anggerik Mokara 31/47 Kota Kemuning, Section 31 40460 Shah Alam, Selangor West Malaysia	Phone: + 60 – (0)3 - 5123 88 88 Fax: + 60 –(0)3 - 51 23 89 49
Mexico	Apartado Postal Box 104 54000 Tlalnepantla Edo. De Mexico	Phone: + 52 – (0) 55 - 22 82 06 00 Fax: + 52 – (0) 55 - 53 90 15 20
Marocco	P O Box 13 844 20 100 Casablanca	Phone: + 212 – (0) 522 - 63 40 00 Fax: + 212 – (0) 522 - 60 05 22
Mongolia	Building BP9, Tavan Erdene (MISHEEL) Center, 2nd Khoroo, Khan Uul District, Chinggis Avenue, Ulaanbaatar, Mongolia	Phone: + 976 – (0)11 - 34 49 91 Fax: + 976 – (0)11 - 70 13 02 23
Norway	P O Box 334 N-1401 Ski	Phone: + 47 – 64 - 86 03 00 00 Fax: + 47 – 64 - 86 03 30 30
Peru	Apartado 662 Lima 100	Phone: + 51 – (0)1 - 224 86 80 Fax: + 51 – (0)1 - 224 01 53
Philippines	P.O. Box 1373 MCPO 1200 Makati City	Phone: + 63 – (0)2 - 843 05 35 Fax: + 63 – (0)2 - 843 02 42
Poland	Aleja Krakowska 61A Sekocin Nowy PL-05-090 Raszyn	Phone: + 48 – (0) 22 - 572 68 00 Fax: + 48 – (0) 22 - 572 68 09
Portugal	Apartado 14 PT-2796-953 Linda-a-Velha	Phone: + 351 – 21- 416 85 00 Fax: + 351 – 21 - 416 01 66
Russia	15, Vashutinskoe Road, Khimki Moscow Region, 141402	Phone: + 7 – 495 - 933 55 52 Fax: + 7 – 495 - 933 55 58
Saudi Arabia	P O Box 7330 Jeddah 21462	Phone: + 966 – (0)2 - 693 33 57 Fax: + 966 – (0)2 - 693 28 92
Singapore	Jurong Point P O Box 438 Singapore 916415	Phone: + 65 – (66) 68 62 28 11 Fax: + 65 – (66) 68 63 60 98

Country	Address	Phone- and fax number
South Africa	P O Box 14110 Witfield 1467	Phone: + 27 – (0)11 - 821 90 00 Fax: + 27 – (0)11 - 821 92 02
Spain	Apartado 43 E-28820 Coslada Madrid	Phone: + 34 – (9)1 - 627 91 00 Fax: + 34 - (9)1 - 627 92 39
Sweden	SE-195 82 Märsta	Phone: + 46 - (0)8 - 58 77 85 00 Fax: + 46 - (0)8 - 59 11 87 82
Switzerland	Büetigenstrasse 80 CH-2557 Studen/Biel	Phone: + 41 – (0)32 - 374 15 00 Fax: + 41 –(0)32 – 374 15 15
Taiwan	P O Box 14-45, Chungli Tao Yuen Hsien	Phone: + 886 – (0)3 - 479 68 38 Fax: + 886 – (0)3 - 479 68 20
Thailand	125 Moo 9 Wellgrow Industrial Estate Bagna-Trad Km 36 Bnagwua Bangpakong Chachoengsao 24180	Phone: + 66 – (0)38 - 56 29 00 Fax: + 66 – (0)38 - 56 29 01
Turkey	Istasyon Mah. Ibisaga Cad. No 6 34940 Tuzla - Istanbul	Phone: + 90 – (0)216 - 581 05 81 Fax: + 90 – (0)216 - 581 05 82
Ukraine	9, Moskovskiy Avenue Building 3 04073 Kiev	Phone: + 380 – (0)44 499 18 70 Fax: + 380 – (0)44 499 18 77
USA	PO Box 1159 Commerce City CO 80022	Phone: + 1 – 303 - 287 88 22 Fax: + 1 – 303 - 217 28 39
Venezuela	Apartado 76111 Caracas 1071	Phone: + 58 – (0)212 - 300 83 00 Fax: + 58 –(0)212 - 300 83 49
Vietnam	Lot F, Street No 12, Song Than II - Industrial Zone, Di An District, Binh Duong	Phone: + 84 - (0) - 127 27 56 699 Fax: + 84 - (0) 650 - 373 84 85
Zambia	P O Box 11291 Chingola	Phone: + 260 – (0)2 - 12 31 12 81 Fax: + 260 – (0)2 - 12 31 38 77
Zimbabwe	P.O. Box CY 935 Causeway	Phone: + 263 – (0)4 - 62 17 63/64/65 Fax: + 263 – (0)4 - 62 17 94

2.1.4 Signs for outsourced components

Signs are placed on the larger components of the drill rig. When ordering spare parts or making inquiries in regard to the drill rig, the type designation and serial number must always be stated. Type designations and serial numbers are specified in a separate document, MI (Machine Identification). Spare parts can always be ordered through Atlas Copco.

2.1.5 Dismantling and assembly

CAUTION

- **Exercise extreme caution when slinging and hoisting heavy objects.**
- **Can cause personal injury.**
- **Hoisting must take place at the center of gravity.**
- **Only use slings which are intact and designed for the load they shall carry.**
- **Secure the slings in the lifting eyes, where available.**

Before transporting in shafts or the like it may be necessary to fully or partially dismantle the drill rig. Observe the following when dismantling, lifting and assembling:

- Before dismantling, hose the entire rig clean with water and/or detergent containing a grease solvent.
- Observe the strictest cleanliness when dismantling hydraulic, compressed air and water flushing hoses. Immediately plug all hoses, nipples and hydraulic oil pipes, or seal and protect them from dirt in some other suitable way.
- Mark hoses, pipes and other connections, where this has not already been done, to make reassembly easier and prevent mix-ups.
- Use properly secured lifting tackle of generous dimensions.

Note

When the drill rig is scrapped, all materials that are harmful to the environment must be disposed of in a manner prescribed by the authorities.

2.1.6 Long-term storage

The following points must be observed for long-term storage of the drill rig. In the event of special conditions e.g. a dusty or corrosive environment, additional measures may be necessary.

- The rig must have protection from rain, snow and strong sunshine.
- Untreated steel surfaces must be rustproofed.
- The water mist system must be drained and rinsed with antifreeze.

- The battery must be disconnected. If the temperature falls below freezing point then the battery must be stored indoors.
- The rock drill's shank adapter must be greased.
- The rock drill's gas accumulator must be drained.
- If the rig is to be shutdown for a long time then the rock should drill should be removed and stored protected.
- Fuel and oil tanks must be filled.

Inspection and maintenance during the shutdown period

The following action must be carried out every month.

- Check oil and coolant levels.
- Start the diesel engine and let it run until normal operating temperature has been reached.
- Operate the rig a few meters back and forth so that the tramming gears are lubricated.
- Operate the tilt cylinders, boom, feeder, drill support and rod handling so that all cylinders reach their end positions.
- Drain condensed water from the hydraulic oil tank and compressor oil tank.

2.1.7 Scrapping

When the entire drill rig or part of the rig is to be scrapped, local regulations in force regarding handling, waste management, recycling and destruction must be followed. Collect and dispose of:

- Rest oil and oil spill
- Oil waste such as filters
- Rest fuel and fuel spill
- Rest grease and grease spill
- Batteries
- Discarded refrigerant, air conditioning
- Chemicals such as flushing additives, other additives and coolants
- Metals, e.g. steel and aluminum (metals that are recyclable)
- Plastics and rubber (often marked in various classifications for recycling)
- Electrical components such as cables, electronics
- Exhaust cleaning unit

2.1.8 Tightening torque in bolted joints

All joints are tightened to the torque required by Atlas Copco Standard K 4369 unless otherwise specifically stated. In such cases, this will be specified in the maintenance instructions of the module in question.

Table 2 Atlas Copco Standard torques

Size	Strength class	Torque in Nm.	Tolerance
M6	8.8	8	2
M8	8.8	20	5
M10	8.8	41	10
M12	8.8	73	18
M14	8.8	115	25
M16	8.8	185	45
M20	8.8	355	85
M24	8.8	600	150
M12 x 1.25	10.9	135	6
M16 x 1.25	10.9	315	15
M18 x 1.25	10.9	460	20
M6	12.9	14	3
M8	12.9	34	8
M10	12.9	70	17
M12	12.9	120	30
M14	12.9	195	45
M16	12.9	315	75
M20	12.9	600	150
M24	12.9	1020	250

2.1.9 Work on painted surfaces

WARNING

- **This rig has been painted with oxyran ester paint and polyester powder.**
- **Substances are formed when the paint is heated which are hazardous to health and amongst other things could cause eczema, eye irritation, respiratory system difficulties and in severe cases asthma or other illnesses.**
- **Welding, grinding and other hot work involving paint being heated must only be carried out where sufficient ventilation can be used. In addition, use personal safety equipment: compressed air powered breathing protection, eye protection and gloves.**

2.1.10 Welding

- Applies to drill rigs equipped with one of the following engines:
  - CAT C9
  - CAT C9.3

Note

It is important to consult Atlas Copco for approval of welding and choice of electrodes.

Connections that must be disconnected prior to welding

- Alternator
- Battery
- All sensors on boom and feeder
- All cables in the cabin
- All connections to electric parts
- Engine electronic unit - ECM (See the instructions for diesel engine)
- All contacts to GPS and ProCom units.

Points to be observed when welding:

- Disconnect the cables from the alternator, the battery and the engine's electronic module
- Grind off rust and paint from the area that is to be welded and carefully prepare the joint.
- Weld in a dry area.
- Connect the welding ground cable to a clean surface as close as possible to the welding area. Avoid welding close to bearings and bushes. If these cannot be removed, connect ground cables on both sides of the weld.
- Alterations and reinforcements must not be made without previous consultation with Atlas Copco.
- Do **NOT** weld hydraulic tanks, valve blocks, compressed air tanks or pressure lines.
- Always keep a fire extinguisher for oil fires near at hand during all types of welding, cutting and grinding. Screen off the work area from flammable materials.
- Always protect hoses, cables and electric components.
- Grind off spatter after welding. If possible, also grind the surface of the weld smooth and treat it with anti-corrosion paint.

Electrode recommendations

Use only intact and clean electrodes that have been stored in a dry place. The generally recommended type of electrode is ESAB OK 48.00, ESAB OK 48.30 or the equivalent in accordance with the standard below:

Table 3 Electrode recommendations

ISO:	2560 E51 5B 120 20 H
SS:	14 3211 H10
DIN 1913:	E51 55 B10
AWS:	A/SFA 5.1 E 7018

The use of MIG welding equipment is perfectly acceptable. The generally recommended type of electrode is ESAB-OK Auto-rod 12,51 or the equivalent in accordance with the standard below:

Table 4 MIG electrodes

SS:	14 3403 3423
DIN 8559:	SG 2
AWS:	A/SFA 5.18: ER 70 S-6

If in any doubt, contact Atlas Copco for advice.

2.1.11 Fault finding

Fault finding is a logical sequence of activities to locate a fault, thereby making it possible to rectify the fault as soon as possible.

Always try to investigate the location of the fault in order to limit fault finding to a certain system or function.

2.2 Battery

2.2.1 Environmental considerations regarding batteries

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Batteries contain acids and heavy metals. For this reason, expended batteries can be hazardous to the environment and to health.**
- **Expended batteries must be sent for destruction in accordance with local regulations.**

2.2.2 Charging the battery

WARNING

- **Risk of fire and explosion!**
- **May cause serious personal injury and damage to property.**
- **Flammable hydrogen gas.**
- **Corrosive fluid.**
- **Avoid naked flames and sparks.**
- **Always detach the negative terminal first, and connect it last.**

The battery is normally charged by the drill rig's generator. If the battery is fully discharged for some reason, it must be recharged using a battery charger. Follow the instructions carefully. Cell plugs should be unscrewed but left in the holes during charging.

Explosive gas is formed in the battery during charging. A short circuit, naked flame or spark in the vicinity of the battery could cause a serious explosion. Ensure good ventilation. Always turn off the charge current before disconnecting the clips. If the density has not risen noticeably despite a number of hours of recharging, the battery is probable expended.

Rapid charging, when carried out correctly, will not damage the battery. However, it should not be undertaken too often and is not recommended for old batteries.

Repeated discharging for long periods, especially with low current such as leaving the lights on while the engine is stationary, will impair the service life of the battery. Discharging with high current is not normally harmful. The battery must be left to rest between start attempts, however.

Since the drill rig's 24V electrical system is powered by two 12V batteries in series, the following points should be observed:

- The batteries must have the same capacity (Ah).
- The batteries must be the same age. This is because the charging current required to bring a battery up to a certain voltage changes with age.
- The batteries must not be loaded unevenly.

- Series coupling maintains the same capacity but increases the voltage (double). When 2 x 12V 60Ah batteries are connected in series, the voltage will be 24V but the capacity remains at 60Ah.
- Ensure that the correct voltage is used before connecting a battery charger. Use a 24V charger when recharging both batteries and a 12V charger when charging each battery individually.

Proceed as follows (24V charger)

Before charging

1 Turn off the battery isolation switch (S300).

2 Detach the cable between chassis ground and the negative cable on the battery G1B.

3 Connect the positive battery charger cable to the positive terminal on G1A.

4 Connect the negative charger cable to the negative terminal on G1B.

5 Start the battery charger.

After charging

1 Turn off the battery charger.

2 Detach the battery charger's negative lead from the negative terminal on G1B.

3 Detach the battery charger's positive lead from the positive terminal on G1A.

4 Connect the cable between chassis ground and the negative terminal on G1B.

5 Activate battery isolation switch S300.

Proceed as follows (12V charger)

Before charging

1 Turn off the battery isolation switch (S300).

2 Dismantle the jumper lead between the negative terminal on battery G1A and the positive terminal on battery G1B.

3 Connect the positive battery charger cable to the positive terminal on G1A.

4 Connect the batter charger's negative lead to the negative terminal on G1A.

5 Start the battery charger.

6 **Once battery G1A is fully charged**: Turn off the battery charger.

7 Detach the battery charger's negative lead from the negative terminal on G1A.

8 Detach the battery charger's positive lead from the positive terminal on G1A.

9 Detach the cable between chassis ground and the negative cable on the battery G1B.

10 Repeat steps 3 - 8 on G1B.

After charging

1 Turn off the battery charger.

2 Reconnect the jumper lead between the negative terminal on battery G1A and the positive terminal on battery G1B.

3 Connect the cable between chassis ground and the negative terminal on G1B.

4 Activate battery isolation switch (S300).

2.2.3 Starting with an auxiliary battery

Note

Owing to the surge of current, the batteries could explode if a fully-charged battery is connected to a completely flat one.

The connections to the drill rig's batteries must under no circumstances be broken during operation as this could lead to faults arising in the generator.

For this reason, proceed as follows:

1 Check that the auxiliary starting batteries (1) have the same voltage as the batteries on the chassis.

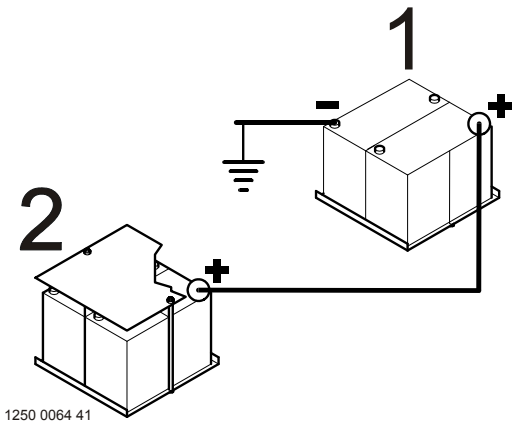


Figure 1 Starting assistance

1 Auxiliary batteries

2 Chassis batteries

2 First connect the positive terminal of the auxiliary battery to the positive terminal of the chassis battery (2).

3 Then connect the negative terminal of the auxiliary battery (1) to ground on the chassis (not to the chassis battery's negative terminal).

4 Once the engine has started, first remove the starter cable between the chassis and the negative terminal on the auxiliary battery (1).

5 Then remove the cable between the positive terminals of the batteries.

2.3 Steel cables

2.3.1 Scrapping guidelines for steel cables

Steel cables should be scrapped when they display any of the following:

- Wire break at attachment
- Occurrence of strand breaks
- Concentrations of wire breaks
- Effects of heat
- Occurrence of wire breaks due to operating time
- Reduced elasticity
- Decreased cable diameter
- Certain number and type of wire breaks
- Corrosion
- Surface wear
- Deformation of the cable
- Permanent extension of the cable

Wire break at cable mounting

Broken wires at rope ends indicate that they have been heavily loaded and can be caused by faulty end attachments.

Shorten the rope and reattach it. Check that the remaining rope is sufficiently long.

Occurrence of strand breaks

If there are strand breaks, the rope must be scrapped.

Concentrations of wire breaks

If there are concentrations of rope breaks, the rope must be scrapped.

If such concentrations occur within a length less than 60 cm or on an individual strand, the rope must be scrapped.

If this is the case, the rope must be scrapped even if the number of wire breaks is less than the maximum specified in the table.

Effects of heat

Ropes exposed to extreme heat must be scrapped. The effects of heat can be established through annealing color.

Occurrence of wire breaks due to operating time

Wire breaks occur first after a certain operating time depending on operating conditions and subsequently occur more frequently.

If this is the case, the number of wire breaks in relation to the operating time should be determined and documented.

This can then be used to estimate the future increase in wire breaks and the foreseeable time point for scrapping.

Reduced elasticity

Under certain conditions, the rope loses its elasticity.

Reduced elasticity is difficult to detect. If in doubt, consult a specialist.

If the rope has lost elasticity, the following characteristics usually appear:

- Decrease in rope diameter
- Extension of the rope
- No gap between individual wires and between the strands. This is caused by its components being pressed together.
- Fine, brown dust inside the strands.
- Even if there are no visible wire breaks, the rope is noticeably stiffer.
- The rope's diameter decreases more quickly than during normal wear of the individual rope strands.

Reduced elasticity can lead to sudden rope breaks during heavy loads. The rope should be scrapped.

Decrease in rope diameter

Decrease in rope diameter through material fatigue in the rope can have the following causes:

- Inner surface wear and surface wear nicks
- Inner surface wear through friction between the strands and wires in the rope
- Fatigue of plastic core
- Break in steel core
- Break in inner layer in multi-strand rope

If the rope's diameter decreases more than 10% in relation to the nominal diameter of the rope, it must be scrapped.

It should be scrapped even if no wire breaks have been detected.

Certain number and type of wire breaks

The rope drums are designed in such a way that the ropes do not have an unlimited service life. Wire breaks can therefore occur during operation.

On 6 and 8-strand ropes, wire breaks are primarily superficial.

The ropes should be scrapped if the number of wire breaks specified in the table have been detected

Number of load-bearing wires in the outer strand [1] n	Number of visible wire breaks [2] that require scrapping			
	Machine groups M1 and M2			
	Cross lay		Equal lay	
	Over a length of		Over a length of	
	6d	30d	6d	30d
201 - 220	9	18	4	9
221 - 240	10	19	5	10

d = Cable diameter

[1] = Filler wire is not considered load-bearing

In cables with several layers of strands, only the outer, visible layer is considered.

In cables with steel cores, the core is regarded as an inner strand and is not included.

[2] = In the event of a wire break, two ends can be visible.

Corrosion

Corrosion is especially problematic in marine environments and in areas where the air is polluted by industrial emissions.

Corrosion can reduce operational strength through rust spots and static tensile strength through a reduction in the cross section of the metallic cable.

Severe corrosion can reduce elasticity.

Outer corrosion: Outer corrosion can be easily detected through visual examination.

Inner corrosion: Inner corrosion is more difficult to detect. Inner corrosion is characterized by the following:

- Absence of gap between the strands in the outer layer of the cable, often in combination with wire breaks in the strands.
- The cable diameter varies.

The parts of the cable that are bent over disks usually have a decreased diameter. At any sign of corrosion, the cable should be checked by an authorized person. If inner corrosion is detected, the cable must be scrapped.

Surface wear

Inner surface wear is caused by friction between the wires and the strands.

Outer surface wear is caused by friction between the rope drums (rolls) and the rope under pressure (acceleration and braking). Outer surface wear is visible through the formation of reflected images on the outer wires.

Surface wear is increased through faulty or no lubrication, thereby increasing the effect of dirt and dust.

Surface wear reduces static tensile strength through reduction in the rope's metallic cross section and dynamic strength through surface wear nicks.

If the rope's diameter decreases more than 7% in relation to the nominal diameter of the rope, it must be scrapped.

It should then be scrapped even if no wire breaks have been detected.

Deformation of the rope

Deformations are characterized by visible deviations from the rope's normal form that lead to uneven voltage distribution in the rope.

The following are the primary types of deformations:

- Wire displacement
- Strand displacement
- Waviness
- Cracking
- Kinks
- Flattening
- Local rope diameter decrease
- Local rope diameter increase
- Basket formation

Wire displacement

Individual wires or wire groups stick out like hairpins on the side facing away from the drum. Wire displacement is caused by spasmodic loads.

Cables with wire displacement must be scrapped.

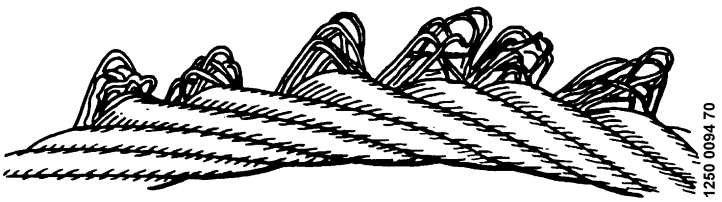


Figure 2 Example of wire displacement

Strand displacement

Strand displacement, which often occurs in conjunction with basket formation, is when the steel core pushes out between the strands.

Ropes with strand displacement must be scrapped.

Waviness

Waviness is a deformation that gives the rope's longitudinal axis a helical curve.

Even though wave formation does not necessarily cause weakening of the rope, such a deformation can cause a pulsing movement.

After a long time of operation, this can increase surface wear and wire breaks.

In the event of waviness, the rope should be scrapped if

$d_1 > 4d/3$

d = Rope's nominal diameter

d_1 = Diameter of the circle that would be formed if the rope were not deformed.

Check over a length not exceeding 25d.

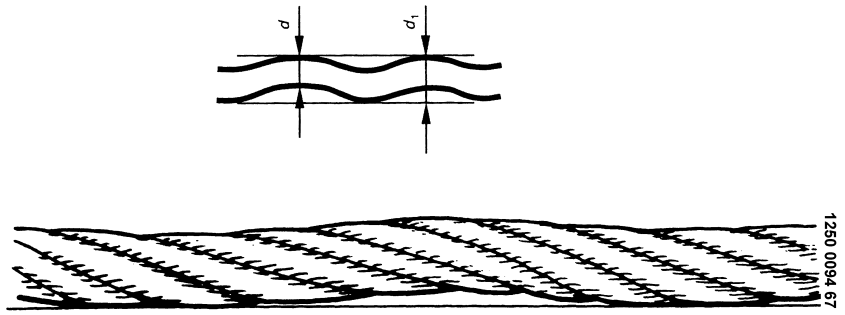


Figure 3 Waviness

Cracks

Cracks are deformations through outer, violent influences.

Cables with cracks must be scrapped.

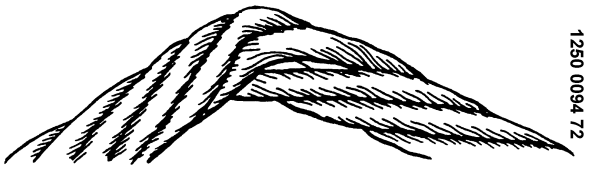


Figure 4 Cracks

Kinks

A kink is a deformation caused by the rope forming an eye that is contracted with out the rope being able to rotate around its own axle.

Strand pitch is altered, which leads a great deal of surface wear and, in severe cases, very low static strength.

Ropes with kinks must be scrapped.

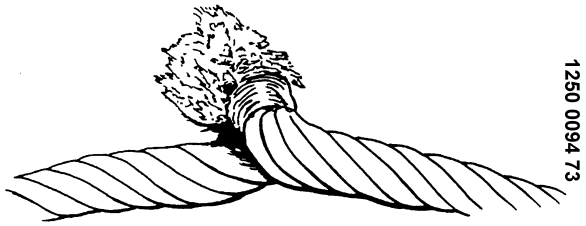


Figure 5 Kinks

Flattening

Flattening is deformation caused by mechanical damage.

Ropes with severe flattening must be scrapped.

Figure 6 Flattening

Local rope diameter decrease

Local decrease in rope diameter is often connected to core break.

The area near the end attachments must be inspected especially carefully as it can be difficult to detect rope diameter decrease at these spots.

Ropes with severe rope diameter decrease must be scrapped.

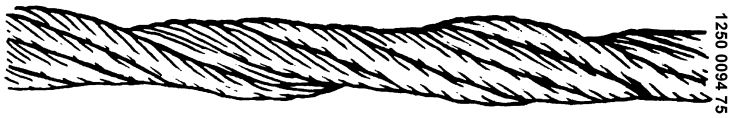


Figure 7 Local rope diameter decrease

Local cable diameter increase

This means repeated thickening of the cable over a long stretch. At the thicker spots, the core pushes out of the cable and causes unevenness of the outer strands.

Cables with severe cable diameter increase must be scrapped.

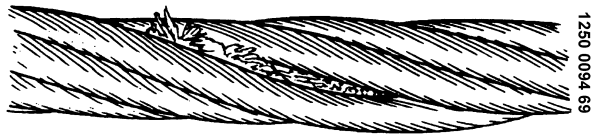


Figure 8 Local cable diameter increase

Basket formation

Basket formation occurs on ropes with steel reinforcement or steel core when the outer strand layer becomes longer than the inner strand layer.

Basket formation can also be caused by shock loads on slack ropes.

Ropes with basket formation must be scrapped.

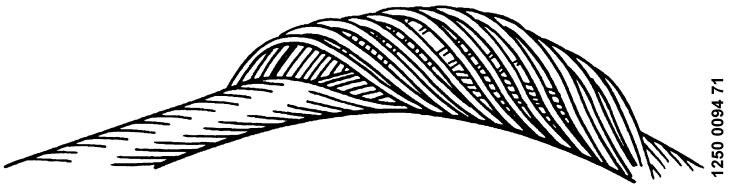


Figure 9 Basket formation

2.3.2 Tensioning the crawler tracks

Track tension is checked between the front wheel (3) and support roller (1) when the drill rig is parked on a level surface with the tracks are under normal load.

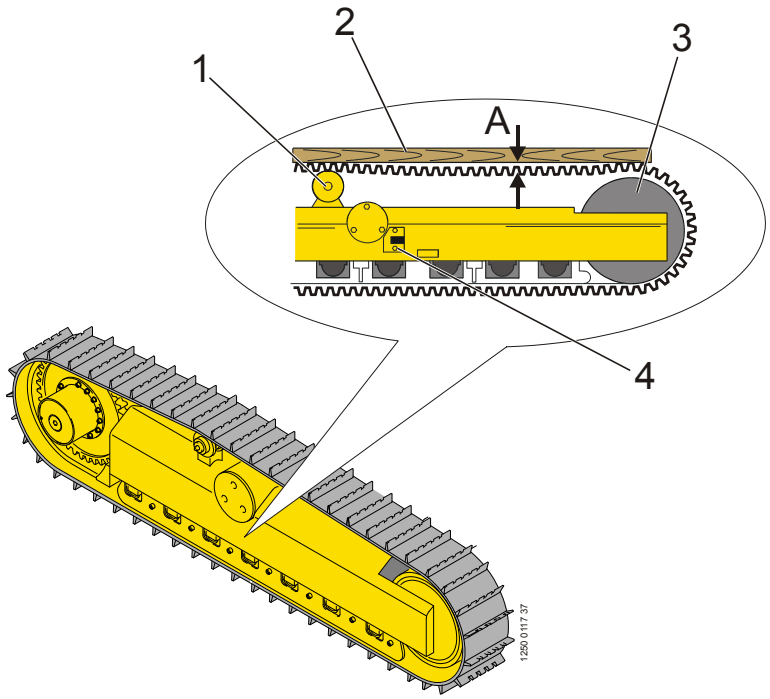


Figure 10 Crawler track

Note

The clearance (A) between the wooden plank and the crawler track should be between 25 and 50 mm (0.9" and 1.9").

Note

The grease nipple should not be filled with grease during normal inspection.

1 Place a wooden plank (2) on top of each track.

2 Pack with grease via the nipple (4) to tension the track.

3 If necessary, remove the grease from the tension cylinder by unscrewing the nipple (4).

2.4 Air conditioning

2.4.1 Safety

WARNING

- **Refrigerant under pressure.**
- **Risk of serious personal injury!**
- **Service of refrigerant must always be carried out by authorized personnel**

Note

Do not use the system with too little refrigerant, leakage or any other fault until it is rectified. Otherwise, there is risk of the compressor breaking down.

2.4.2 Environmental issues when handling refrigerant

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Discarding air conditioning refrigerant can be hazardous to the environment.**
- **Air conditioning refrigerant must be sent for destruction in accordance with applicable local regulations.**

2.4.3 Changing air filter

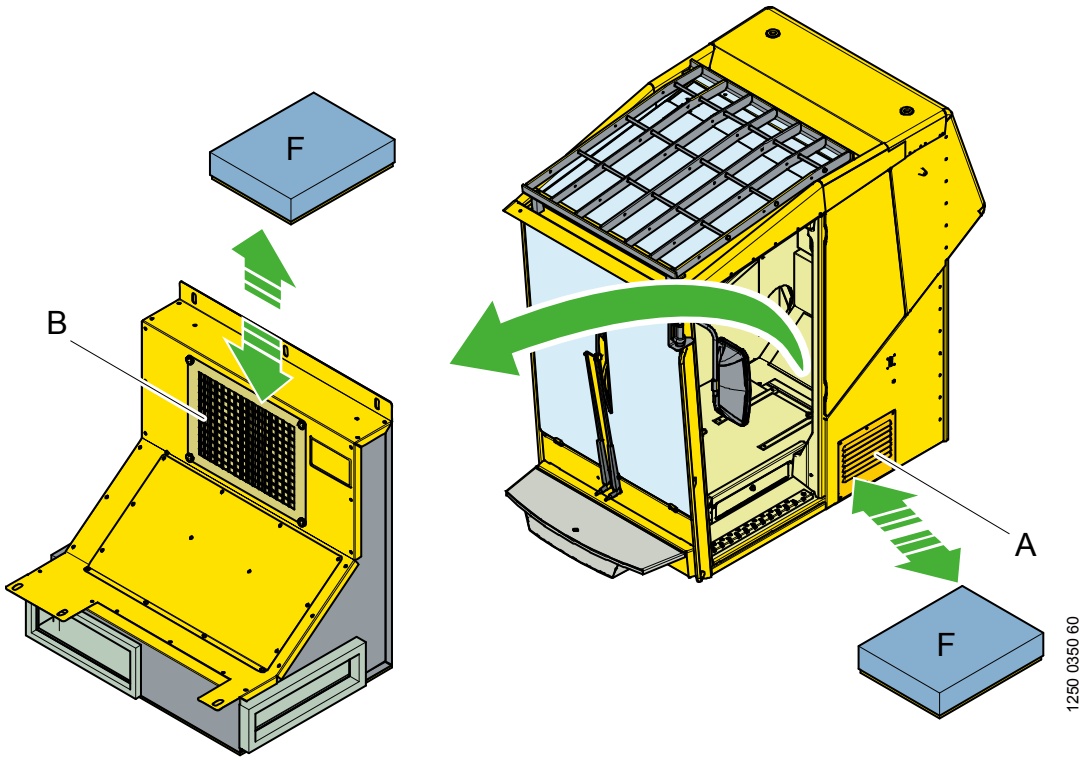


Figure 11 Filter - air conditioning

Changing the main filter:

1 Disassemble the screws around the cover (A).

2 Open the cover and lift out the filter (F).

3 Fit the new filter in place and screw back the cover.

Changing the circulation filters:

1 Disassemble the screws on the covers (B).

2 Lift away the covers and the filters (F).

3 Fit the new filters in place and screw back the covers.

2.4.4 Fault finding

No cooling

Check the following points:

- Fuses, electric connections, compressor earth, electromagnets, switches and pressure switches
- Transmission belt and compressor
- Expansion valve and temperature control valve
- Coolant hoses

Poor cooling

Check the following points:

- Fresh-air fan and transmission belt tension
- That the air does not evade the evaporator in the unit
- That the evaporator and condenser are not clogged by rubbish and the filter in the air intake is not dirty
- That the expansion valve capillary tube is firmly against the evaporator outlet pipe
- That the thermostat does not cut out too early

Uneven cooling

Check the following points:

- That connections to switches, magnetic coupling or pressure switch are not loose
- That the expansion valve is not clogged
- That the system is filled and the thermostat is not defective

Abnormal noise

Check the following points:

- That the transmission belt to the compressor is thoroughly tightened and that the compressor retaining bolts are tightened.
- That the system is filled sufficiently and not overfull
- That the expansion valve is in working order
- That the airflow across the evaporator is sufficient
- That the condenser is clean and the airflow is sufficient

Abnormal system noise is often connected to incorrectly assembled components. If the compressor is noisy at a certain speed, for instance, and the noise disappears when the speed increases or decreases, there is probably nothing wrong with the compressor itself.

The difference between the pressure on the suction side and the pressure side also affects the level of noise. A compressor with low suction makes more noise than a compressor with high suction. Likewise, a compressor with high high-pressure makes more noise because it puts more load on bearings.

3 Transport instructions

3.1 Hoisting

WARNING

- **Hanging load.**
- **May cause serious personal injury and damage to property.**
- **Do not approach a hanging load.**
- **Only use lifting equipment and lifting straps with adequate lifting capacity.**
- **Risk of tipping.**
- **Lock the track oscillation cylinders before the drill rig is raised.**

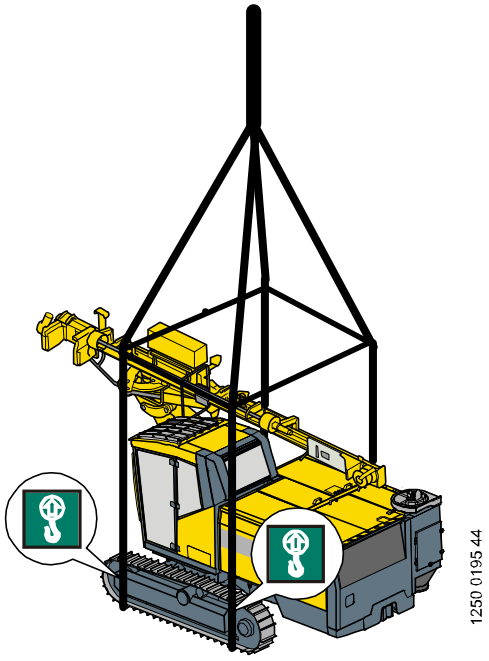


Figure 12 Hoisting

Make sure the chassis is not damaged when you position the feed in the transport/ hoisting position.

- Run the rock drill to its rearmost (upper) position.
- Use the boom and feed controls to lower the feed onto the feed support.
- Make sure that the hydraulic jack is retracted (only for the machine equipped with hydraulic jack).
- Set the switches (S445) to LOCK position (b) to lock the track oscillation cylinders.

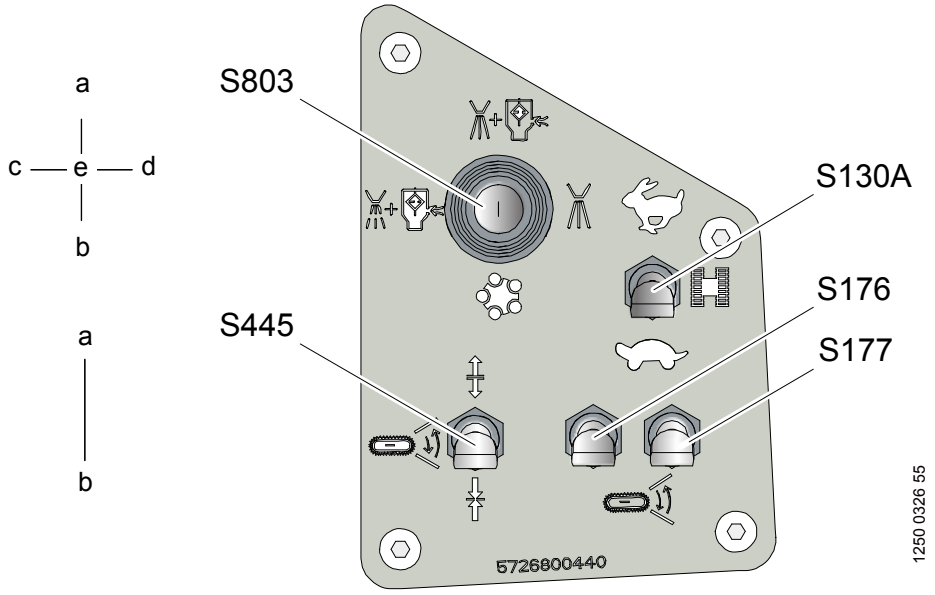


Figure 13 Tramming control panel

- Make sure that none of the hoses, controls or any other components can fasten or sustain damage when the hoisting slings are tensioned and under load.
- Place the hoisting slings under both crawler tracks (*See Figure 12 Hoisting*).

3.2 Transport

WARNING

- **Risk of tipping!**
- **May cause serious personal injury and damage to property.**
- **Lock the track oscillation cylinders before the drill rig is raised.**
- **Transportation equipment must be adapted for the dimensions and weight of the drill rig.**
- **All bodywork hatches must be correctly installed and locked.**

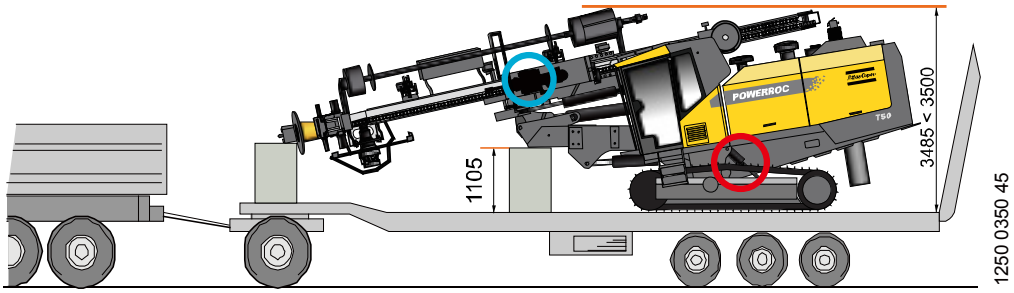


Figure 14 Tramming position

3.2.1 Before loading the drill rig onto the transport vehicle

1 Lower the preseparator and unmount the ladder.

2 Set the tramming switch (S445) to position (a) and operate the switches (S176, S177) to lower the front of the rig utmost.

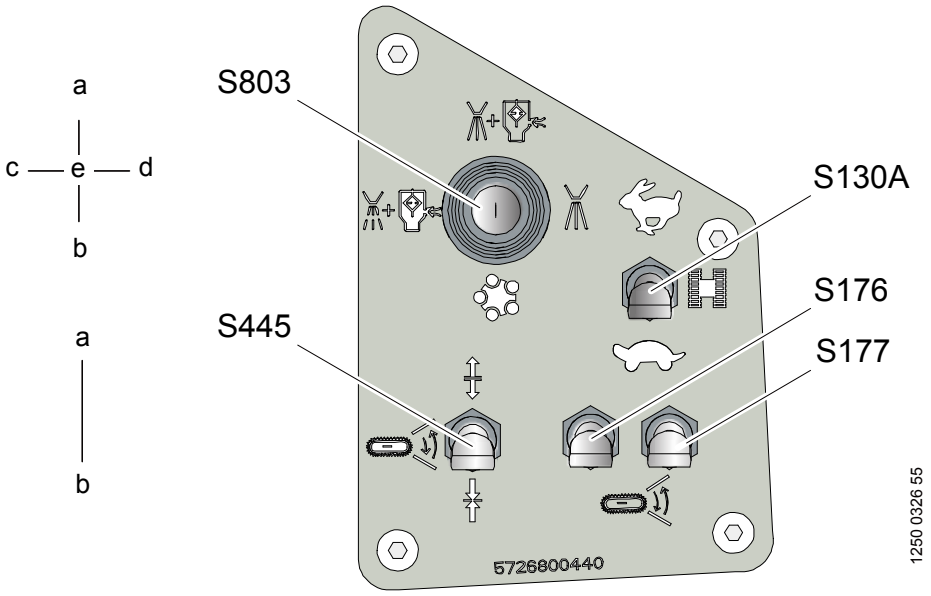


Figure 15 Tramming control panel

3 Run the rock drill upon the boom head (see the blue ring, *See Figure 14 Tramming position*)

4 Make sure the boom is retracted and use the boom controls to run the boom as horizontal as possible.

5 Use the feed controls to run the feed as forward as possible.

6 Make sure the height of the machine is less than 3500 mm before transporting the machine.

3.2.2 Once the drill rig is loaded onto the transport vehicle

1 Lower the hydraulic jack (only for the rigs equipped with hydraulic jacks).

2 Set the switch (S445) to position (b) to lock the track oscillation cylinder.

3 Support the feed beam against the vehicle to prevent overloading.

4 Switch off the diesel engine.

5 Strap the drill rig securely onto the vehicle.

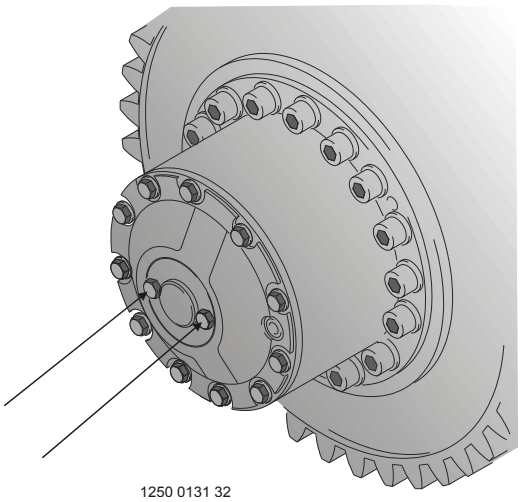
– Attach straps or chains to the lifting eyes on the machine and vehicle.

3.3 Towing

WARNING

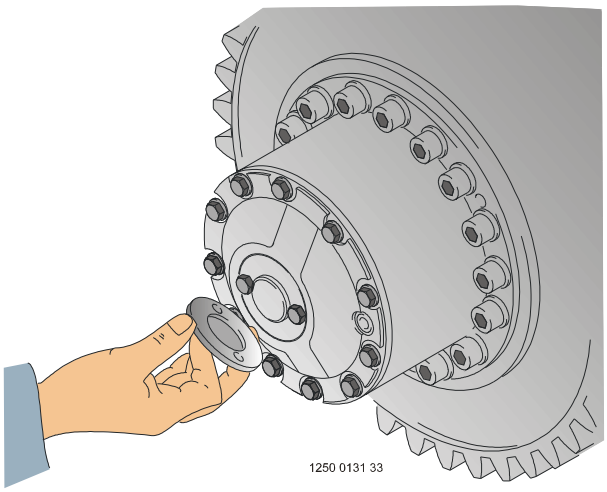
- **Danger of moving parts!**
- **May cause serious personal injury and damage to property.**
- **Place a wedge under both of the track frames, before disengaging the traction gears.**

1 Remove the two M8 bolts from the cover plate.



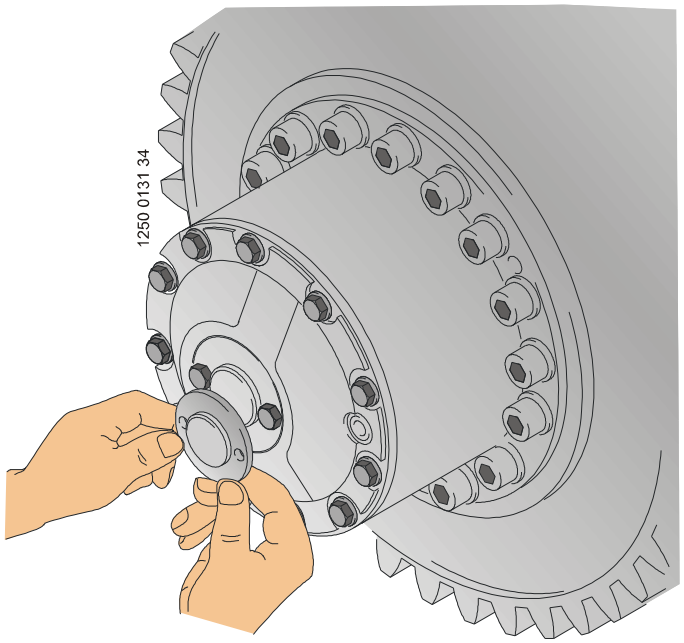
1250 0131 32

2 Remove the cover plate and turn the outside inwards.

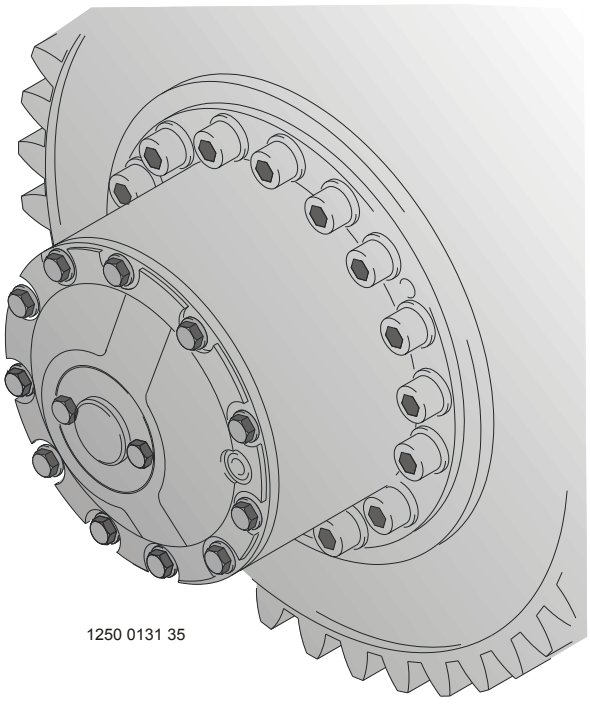


1250 0131 33

3 Refit the cover plate by means of the two M8 bolts.



4 When the cover plate is in place, the drill rig is ready for towing.



Proceed in the same way on the other track frame.

The drill rig can be towed now.

4 Drill system

4.1 Adjusting the damper pressure

CAUTION

- **Danger of serious equipment damage!**
- **An incorrectly adjusted damper pressure can cause serious damage to equipment.**
- **Adjustment of damper pressure should only be carried out by trained staff.**

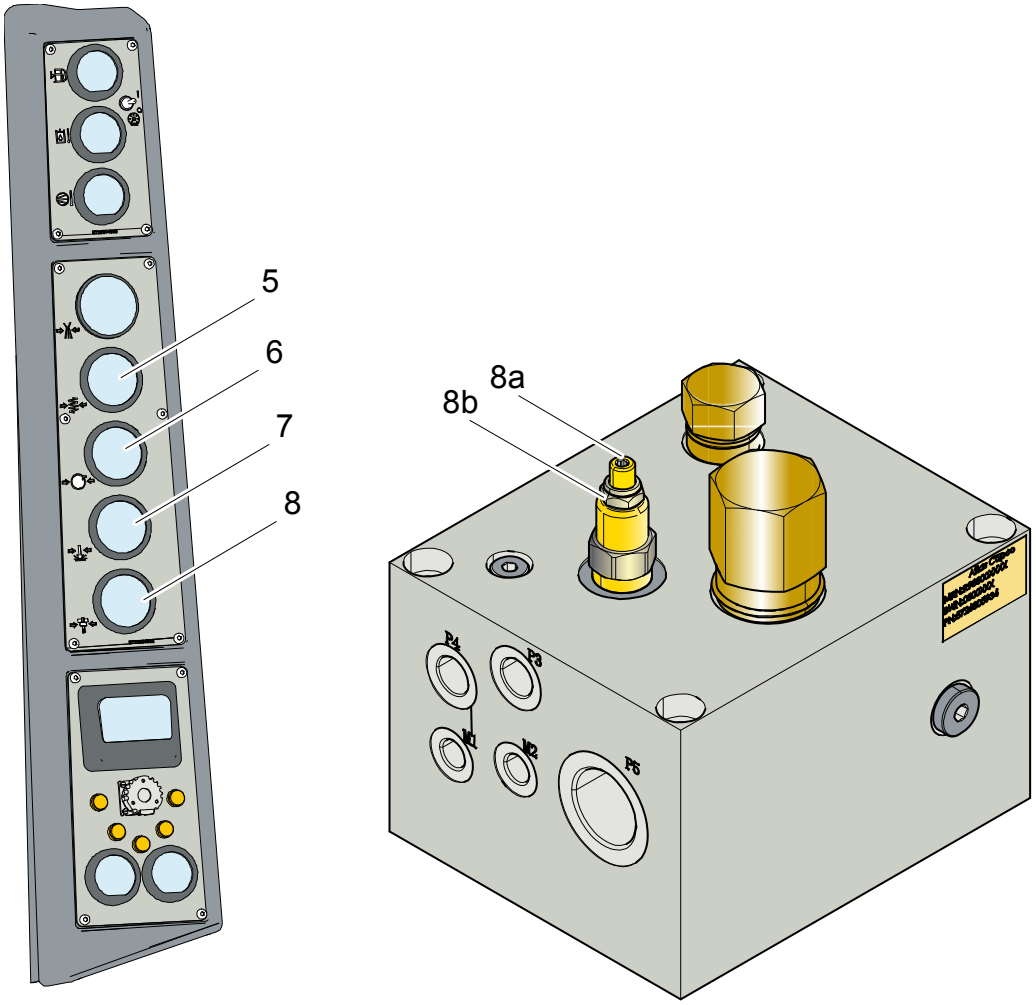


Figure 16 Pressure gauge panel and percussion valve block

The rock drill's damper circuit is supplied with oil via a constant flow valve integrated into pump 1. The desired flow value (8 L/min) through the damper circuit is equivalent to the pressure (27 bar) when the damper piston is unloaded, that means the rock drill's percussion rod is in its front end position. Setting damper pressure must always be performed without pipes connected to the adapter and with the rock drill in vertical position. Damper pressure must only be set once the hydraulic oil has reached operating temperature, normally 40 °C (104 °F).

Note

See also separate rock drill instructions.

---

1 Connect a pressure gauge between the damper pressure connection and the damper pressure hose on the rock drill.

2 Start the diesel engine and let it run at 1200 rpm.

3 Check that the rock drill's percussion rod/shank adapter is in its front end position.

4 Turn the tramming/drilling switch (S130) to DRILLING position (a).

5 Undo the lock screw (8b) and adjust the damper pressure by turning the knob (8a) clockwise to reduce the pressure or anticlockwise to increase it. The pressure shown on the rock drill pressure gauge should read 25 bar and on the pressure gauge panel in the cabin it should read 30 bar.

6 Tighten the locking screw (8b) once the setting is correct.

For detailed information on rock drill pressure settings, refer to separate instructions "**Maintenance instructions**" for the relevant rock drill.

Note

The percussion should stop automatically if the damper pressure exceeds 120 bar or drops below 30 bar. Incorrect damper pressure may lead to damage to the rock drill, drill rig and drill string. Damper pressure should only be adjusted by trained Atlas Copco personnel.

4.2 DPCI system, COP 3060

4.2.1 Function

The DPCI (Damper Pressure Control Impact) system controls the percussion function by sensing the damper pressure during drilling. Depending on the damper pressure, percussion may be permitted, stopped or switched between high and low percussion pressure. This takes place by means of a couple of sequence valves in the rig's hydraulic system.

The damper pressure is too low

The activation of percussion is prevented if the damper pressure falls below 30 bar or in event of hose ruptures or a valve malfunctions for example.

The damper pressure is too high

The activation of percussion is prevented if the damper pressure exceeds 120 bar, in the event of the feed pressure being abnormally high or if a mechanical fault arises in the damper for example.

Switch low/high percussion

The activation of high percussion pressure will be permitted if the damper pressure exceeds 50 bar.

4.2.2 Adjusting

WARNING

- **Incorrect settings can lead to damage to the rock drill, drill rig and drill string.**
- **Settings should only be made by Atlas Copco service technicians.**

The DPCI system can be adjusted either in the workshop or at the drill site. Adjusting in the work shop generally gives a more exact setting. On the other hand, adjusting during drilling can result in a setting well adapted to the rock conditions and other system settings.

Table 5 Guide value for setting sequence valves

Rock Drill	Low	High	Transition value low/high
COP 3060ME	30 bar	120 bar	50 bar
COP 3060MEX	25 bar	120 bar	50 bar

4.2.3 Settings during drilling

Low pressure sequence valve setting during drilling:

1 Make sure that the damper pressure is adjusted according to "**Adjusting the damper pressure**".

2 Start drilling with low percussion pressure and collaring feed pressure.

3 Reduce the feed pressure by turning the adjusting screw (C) counterclockwise, observe the damper pressure gauge (8) simultaneously.

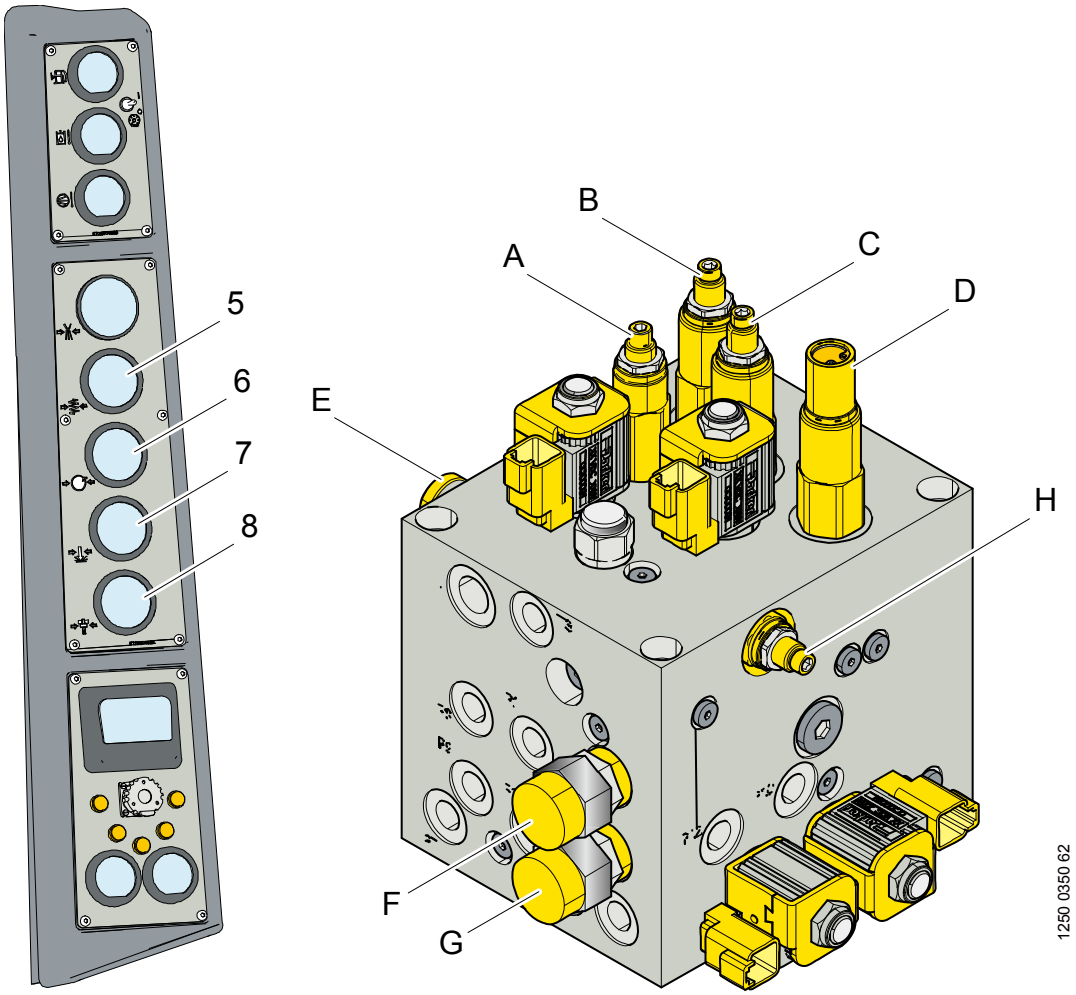


Figure 17 Pressure gauge panel and anti-jamming valve block

4 When the damper pressure falls below 30 bar, percussion will be switched off automatically.

5 If necessary, adjust low pressure sequence valve (G) clockwise to increase the setting value or counterclockwise to decrease it.

6 Test the function by starting drilling on low percussion pressure and collaring feed pressure. When the drill cradle comes to a stop against the mechanical end stop, percussion should be shut off immediately. If not, the setting value of low pressure valve should be increased.

Note

The setting of the low pressure sequence valve should be as high as possible without making it difficult to activate percussion. That means high collaring feed and damper pressures call for a higher setting value than normal condition.

Transition pressure valve setting during drilling:

1 Make sure that the damper pressure is adjusted according to "**Adjusting the damper pressure**".

2 Start drilling. Perform a thorough collaring and then activate high percussion pressure.

3 Reduce the feed pressure, observe the damper pressure gauge (8) simultaneously.

4 The percussion pressure should change from high to low when the damper pressure falls below 50 bar.

5 If necessary, adjust transition valve (E) counterclockwise to decrease the setting value and clockwise to increase it.

High pressure sequence valve setting during drilling:

1 Make sure that the damper pressure is adjusted according to "**Adjusting the damper pressure**".

2 Start drilling on low percussion pressure.

3 Increase the feed pressure by turning the adjusting screw (C) clockwise, observe the damper pressure gauge (8) simultaneously.

4 When the damper pressure exceeds 120 bar, impact should be stopped automatically.

5 If necessary, adjust high pressure sequence valve (F) counterclockwise to decrease the setting value and clockwise to increase it.

Note

This setting procedure involves an increased risk of jamming during setting due to the increased feed pressure.

Note

In soft rock conditions it may be difficult to force the damper pressure high enough. In this case the damper pressure regulator can be adjusted temporarily to 120 bar.

4.2.4 Settings in the workshop

Low pressure sequence valve setting in the workshop:

1 Detach and plug the percussion pressure hose on the rock drill.

2 Start the diesel engine and turn switch (S130) to DRILLING position.

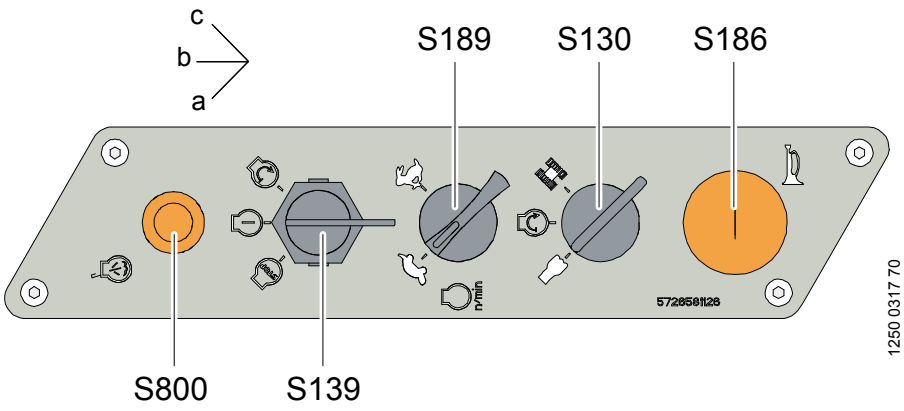


Figure 18 Engine control panel

3 Adjust the damper pressure to 30 bar, read on the damper pressure gauge (8) in the cabin.

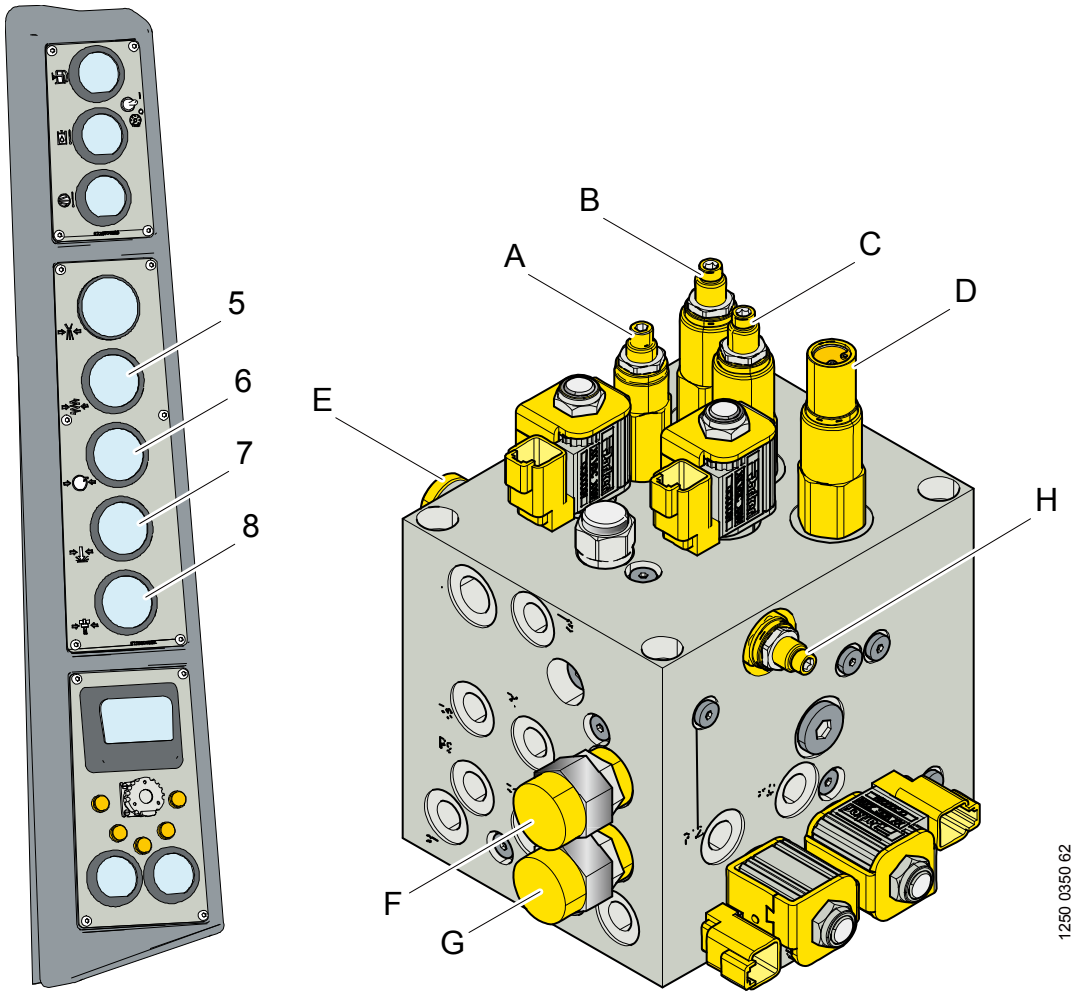


Figure 19 Pressure gauge panel and anti-jamming valve block

4 Activate low percussion pressure. Check the pressure on the percussion pressure gauge (7) in the cabin.

5 Slowly adjust the low pressure sequence valve (G) forward and backward to find the activation point where the percussion pressure disappears from the gauge. Clockwise increases the activation point and counterclockwise decreases it. Following which, slowly adjust counterclockwise until the percussion pressure appears on the gauge again.

6 Verification: Increase and decrease damper pressure several times to make sure that percussion is stopped when the damper pressure falls below 30 bar.

7 Deactivate percussion and feed, then turn off the diesel engine.

8 Tighten the lock nut on low pressure sequence valve (G) without changing the setting and reconnect the percussion pressure hose on the rock drill.

9 Adjust the damper pressure according to "**Adjusting the damper pressure**". By means of test drilling, verify that percussion can not be activated unless the drill bit is pressed against the rock.

Transition pressure valve setting in the workshop:

1 Detach and plug the percussion pressure hose on the rock drill.

2 Start the diesel engine and turn switch (S130) to DRILLING position.

3 Adjust damper pressure to 50 bar, read on the damper pressure gauge (8) in the cabin.

4 Activate drill rotation.

5 Activate high percussion pressure. Check the pressure on the percussion pressure gauge (7) in the cabin.

6 Slowly adjust the transition valve (E) forward and back to find the activation point where the percussion pressure switches between high and low. Clockwise increases the activation point and anticlockwise decrease it. Following which, slowly adjust clockwise until the percussion pressure switches to low.

7 Verification: Increase and decrease damper pressure several times to make sure that the percussion pressure changes when the damper pressure passes 50 bar.

8 Deactivate percussion, feed and rotation, and turn off the diesel engine.

9 Tighten the lock nut on transition valve (E) without changing the setting and reconnect the percussion pressure hose on the rock drill.

10 Adjust damper pressure according to "**Adjusting damper pressure**". By means of test drilling, verify that percussion switches from high to low if the damper pressure falls below 50 bar when the feed pressure is decreased.

High pressure sequence valve setting in the workshop:

1 Detach and plug the percussion pressure hose on the rock drill.

2 Start the diesel engine and turn switch (S130) to DRILLING position.

3 Adjust damper pressure to 120 bar, read on the damper pressure gauge (8) in the cabin.

4 Activate low percussion pressure. Check the pressure on the percussion pressure gauge (7) in the cabin.

5 Slowly adjust the high pressure sequence valve (F) forward and backward to find the activation point where the percussion pressure disappears from the pressure gauge (7). Clockwise increases the activation point and counterclockwise decrease it. Following which, slowly adjust clockwise until the percussion pressure disappears from the gauge again.

6 Verification: Increase and decrease damper pressure several times to make sure that percussion is switched off when the damper pressure exceeds 120 bar.

7 Deactivate percussion and feed, and turn off the diesel engine.

8 Tighten the lock nut on high pressure sequence valve (F) without changing the setting and reconnect the percussion pressure hose on the rock drill.

9 Adjust the damper pressure according to "**Adjusting damper pressure**". By means of test drilling, verify that percussion is switched off when the damper pressure exceeds 120 bar when the feed pressure is increased to the maximum.

4.3 Adjusting percussion pressure

4.3.1 General

Note

Percussion pressure should only be set during drilling and the hydraulic oil must have reached operating temperature, normally 40°C (104°F).

Percussion pressure can be checked on the pressure gauge on pressure gauge panel in the cab.

4.3.2 Low percussion pressure

The adjustment should be made during drilling.

Note

Pressure ex works is 130 bar (factory setting).

The percussion pressure switch (S446A) on the drilling lever must be in position LOW PERCUSSION PRESSURE.

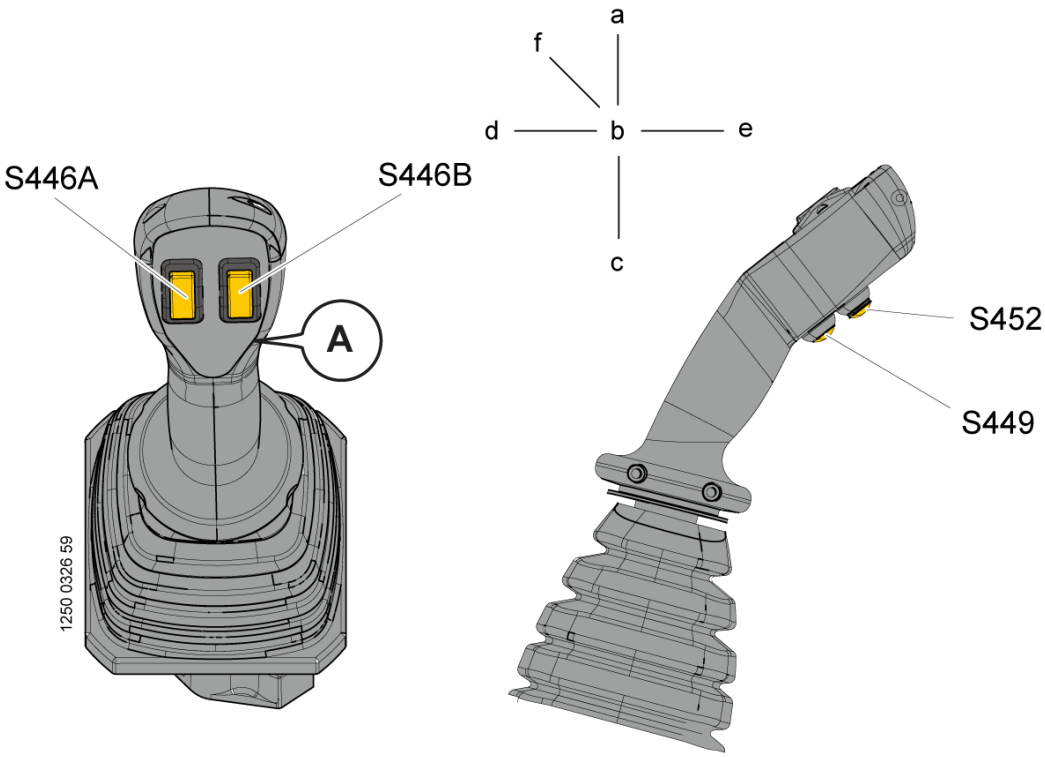


Figure 20 Drilling lever

1 Undo the lock nut.

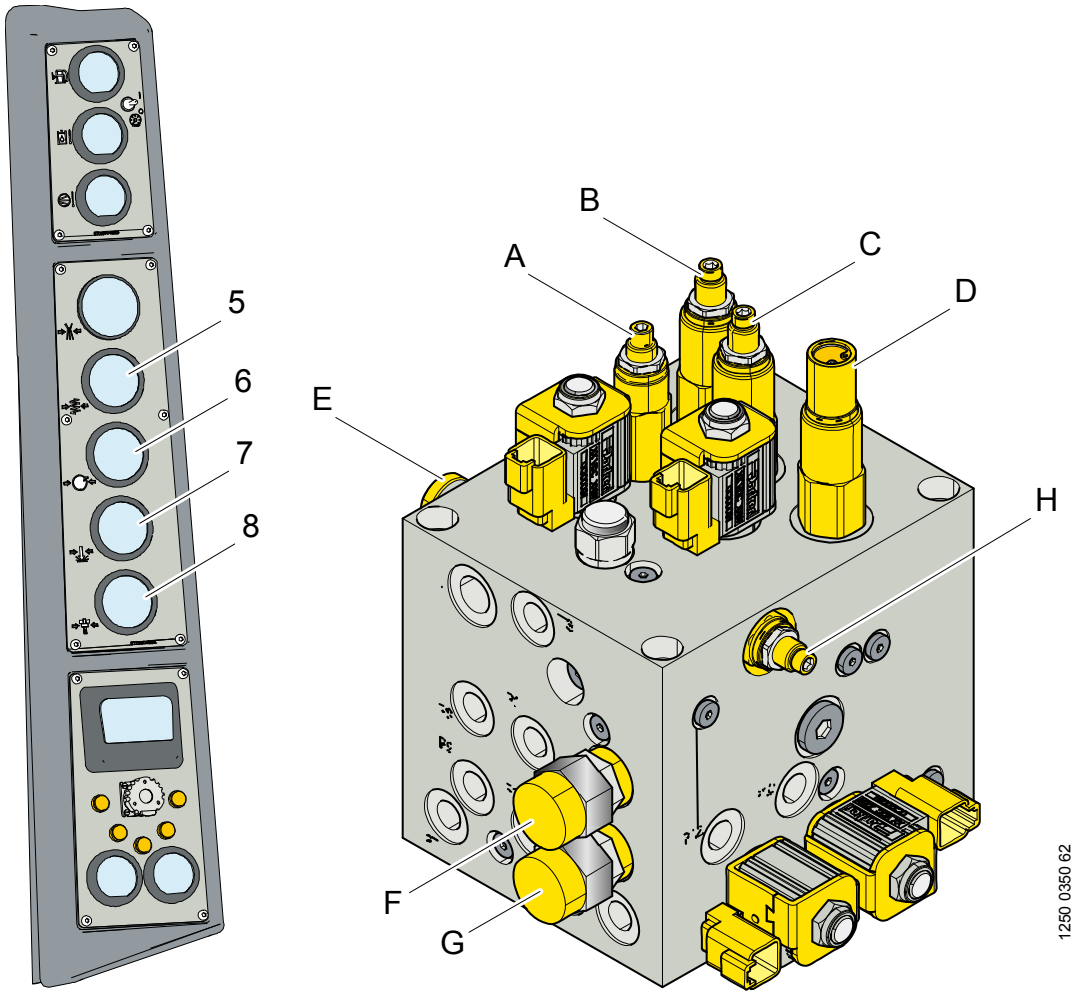


Figure 21 Pressure gauge panel and anti-jamming valve block

2 Turn the adjusting screw (B) clockwise to increase percussion pressure.

3 Turn the adjusting screw (B) counterclockwise to decrease percussion pressure.

4 Tighten the lock nut.

4.3.3 High percussion pressure

The adjustment should be made during drilling.

Note

Pressure ex works is 200 bar (factory setting).

The percussion pressure switch (S446A) on the drilling lever must be in position HIGH PERCUSSION PRESSURE.

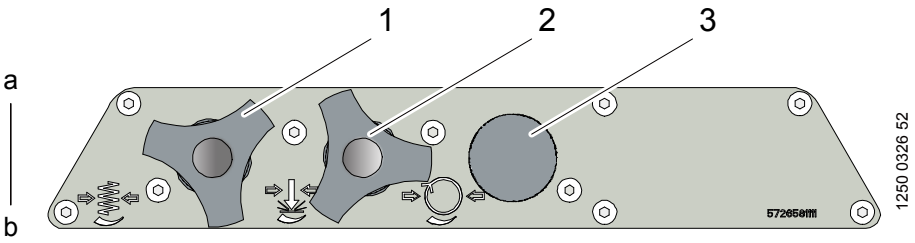


Figure 22 Hydraulic pressure control panel

1 Turn the adjusting knob (2) clockwise to increase percussion pressure.

2 Turn the adjusting knob (2) counterclockwise to decrease percussion pressure.

4.4 Adjusting drill feed pressure

4.4.1 General

Note

Feed pressure should only be adjusted during drilling.

The hydraulic oil should be at operating temperature, normally 40 °C (104 °F).

4.4.2 Low drill feed pressure

Note

Factory setting is 30-35 bar.

Make sure that:

Tramming/drilling switch in DRILLING position.

Percussion pressure switch (S446A) in LOW PERCUSSION PRESSURE position (c).

Drilling lever in DRILLING position (f).

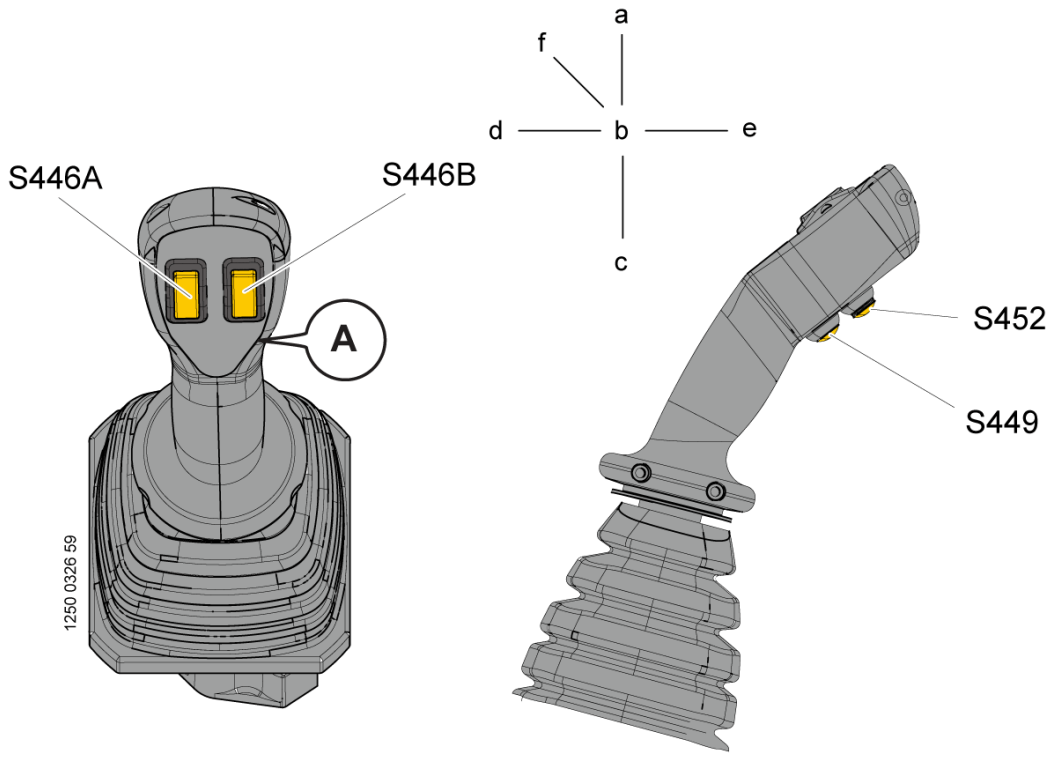


Figure 23 Drilling lever

DCT/RHS control lever (S803) in position REDUCED AIR, DCT ON.

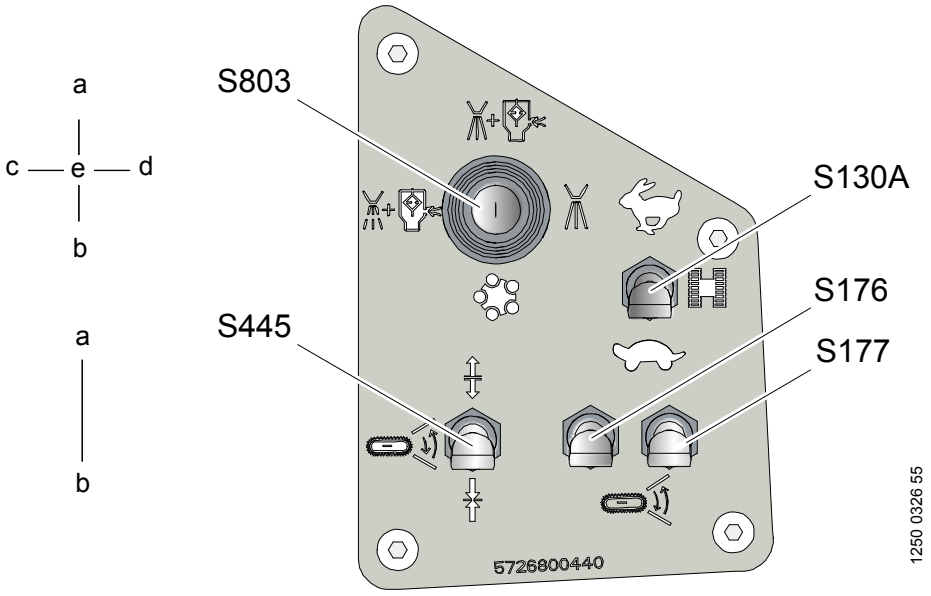


Figure 24 Tramming control panel

1 Undo the lock nut.

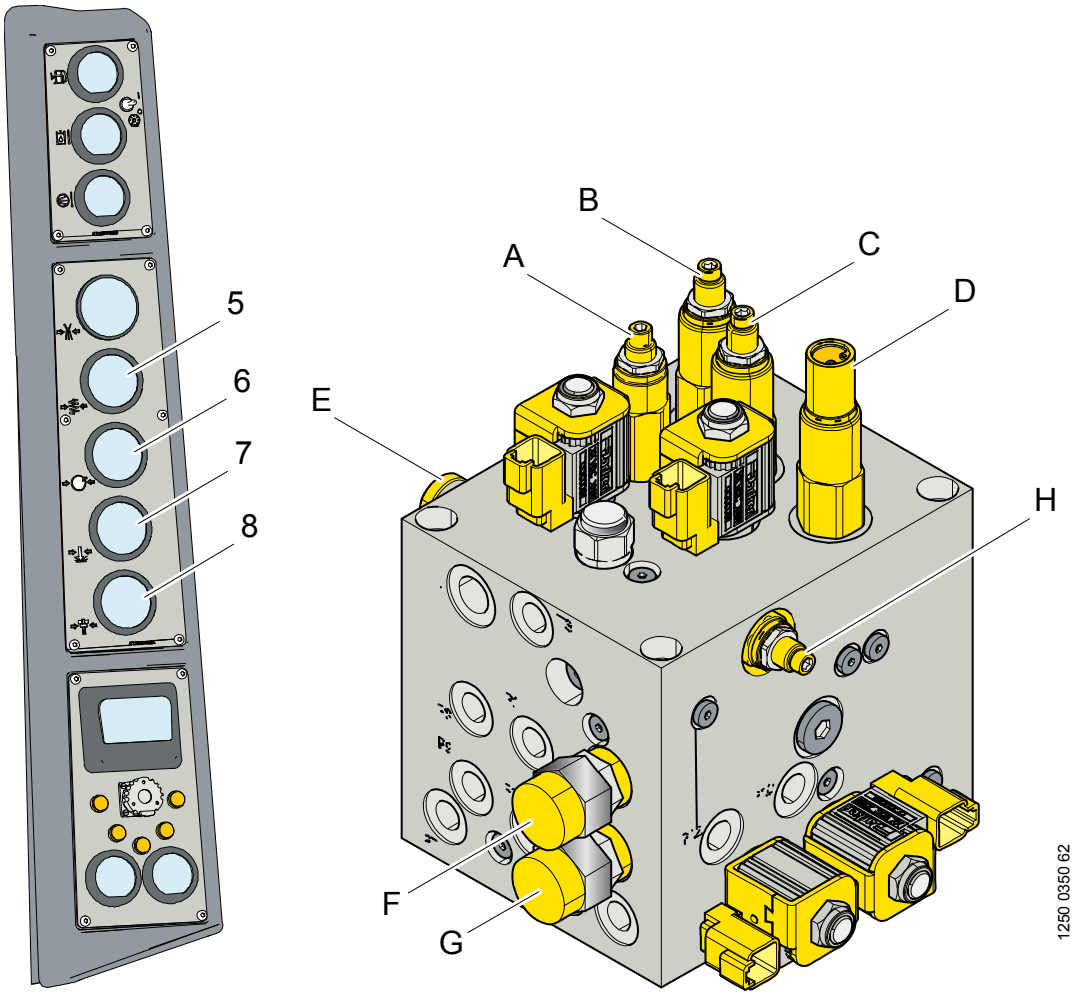


Figure 25 Pressure gauge panel and anti-jamming valve block

2 Turn the adjusting screw (C) clockwise to increase drill feed pressure.

3 Turn the adjusting screw (C) anticlockwise to decrease drill feed pressure.

4 Tighten the lock nut.

High drill feed pressure

Note

Factory setting is 70-75 bar.

Make sure that:

Percussion pressure switch (S446A) in position HIGH PERCUSSION PRESSURE.

DCT/RHS control lever (S803) in position FULL AIR, DCT ON.

Drilling lever in position DRILLING.

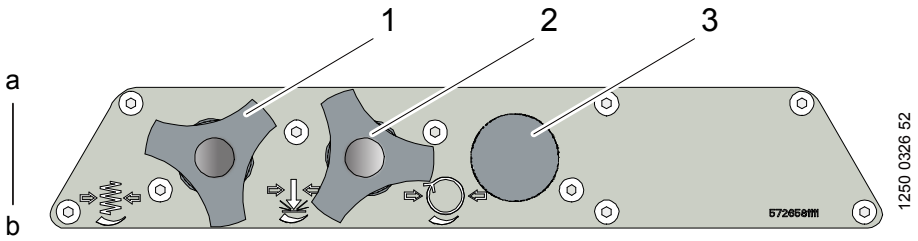


Figure 26 Hydraulic pressure control panel

1 Turn the adjusting knob (1) clockwise to increase drill feed pressure.

2 Turn the adjusting knob (1) anticlockwise to decrease drill feed pressure.

4.5 RPCF system

4.5.1 General

RPCF (Rotation Pressure Controlled Feed) is used to regulate the drill feed pressure in order to maintain the rotation pressure at a sufficient level to keep the joins tight. This is done by the RPCF valve detecting the rotation pressure while drilling. When the rotation pressure exceeds the preset value for the RPCF valve, the feed pressure will be lowered to minimum the low drill feed pressure. As the feed pressure drops, so will the rotation pressure. This means that the feed pressure shown on the pressure gauge while drilling in many cases will not be the same as the high feed pressure setting but a lower pressure. For a more detailed description, refer to the rock drill's “Maintenance instructions”.

4.5.2 Adjusting

The RPCF valve is only to be adjusted while drilling with two drill rods in the drill string and after the hydraulic oil has reached normal operating temperature 40 °C (104 °F). In order to be able to make a good setting, the rock should be reasonably homogeneous so that a stable rotation pressure is obtained.

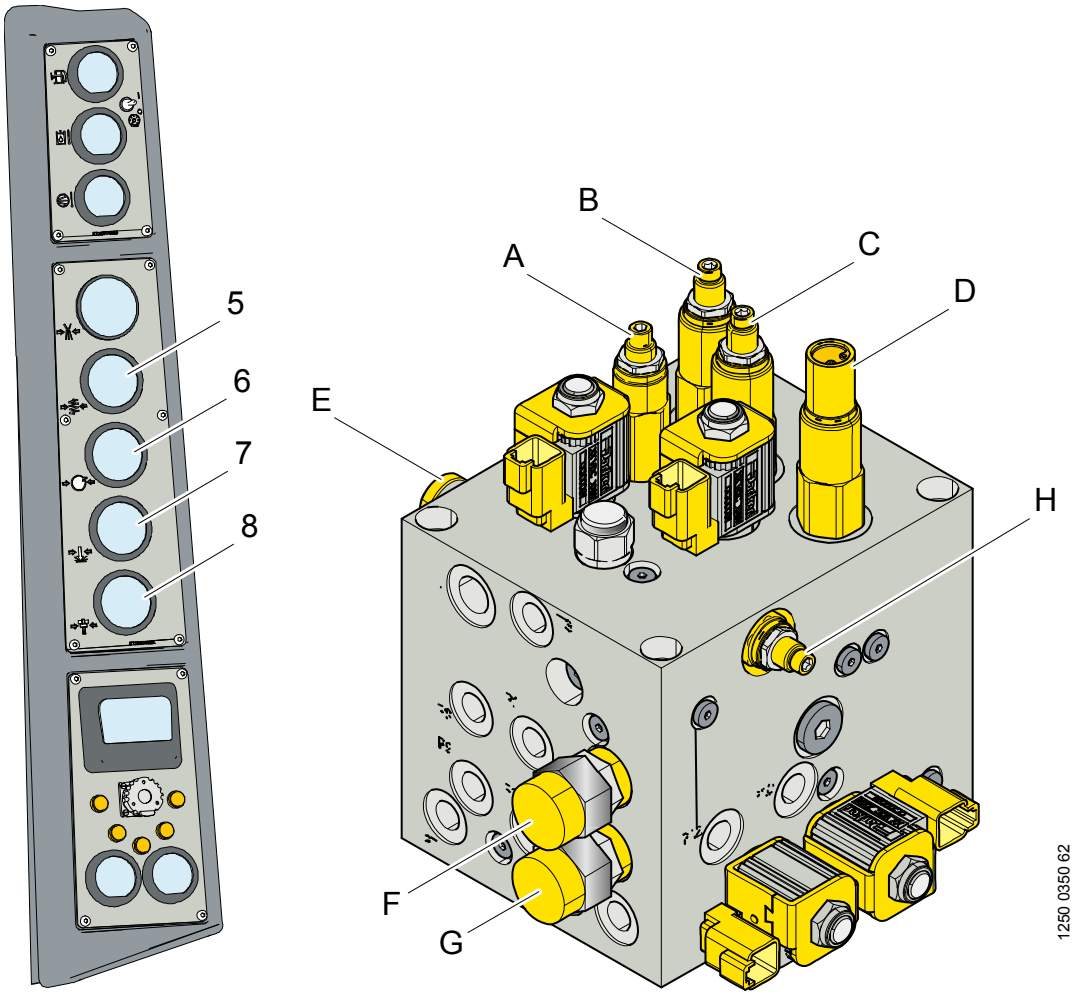


Figure 27 Pressure gauge panel and anti-jamming valve block

1 Undo the lock nut and turn the adjusting screw (D) clockwise until it stops to disengage the function. Oil may run out from around the adjusting screw while the adjustment is being made.

2 Start drilling and set in a suitable feed pressure, percussion pressure and rotation speed according to the rock drill's "**Maintenance instructions**". See also the chapter on pressure setting in this manual.

3 Once an even and stable rotation pressure is achieved (see gauge 6), the RPCF valve adjusting screw must be turned counterclockwise until the feed pressure (see gauge 5) starts to drop.

4 Screw back the adjusting screw clockwise a little way, about 1/2 a turn. The feed pressure will now drop automatically if the rotation pressure exceeds the normal.

5 Tighten the lock nut.

4.6 Adjusting rotation speed

The adjusting knob (3) for controlling rotation speed is located inside the cab (on the right).

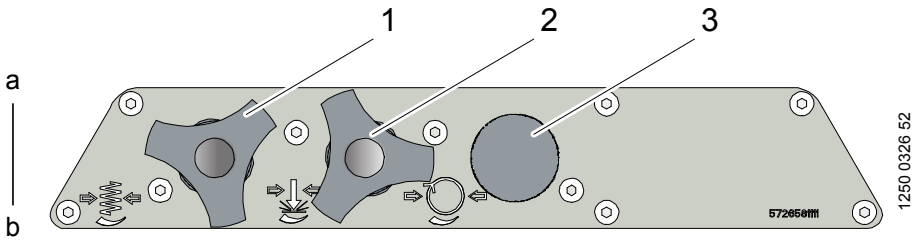


Figure 28 Hydraulic pressure control panel

- Turn adjusting knob (3) counterclockwise to decrease rotation speed.
- Turn adjusting knob (3) clockwise to increase rotation speed.

Note

Rotation speed can be set without drilling. The setting must be made when the diesel engine is at maximum rpm.

The hydraulic oil should be at operating temperature, normally 40 °C (104 °F).

To measure rotation speed, count the number of revolutions the drill string completes per minute (make a mark on the drill rod). Alternatively, use an electronic instrument.

Correct rotation speed should be set according to the type of the drill bit and the properties of the rock.

Observe the following guidelines:

Table 6 Basic setting for ordinary button drill bits

Size of drill bit (mm)	102	115	127	140	152
Size of drill bit (inches)	4	4 1/2	5	5 1/2	6
Rotation speed (rpm)	90	70	60	50	45

- Type of drill bit
  - X drill bits (cross-drill bits) require a higher speed than button drill bits (higher than 10-20 rpm).
- Rock properties

  - Soft types of rock normally require a higher speed, harder rock requires a lower rotation speed.
- Jerky rotation
  - If rotation speed is jerky during drilling (not rotating at even speed), this could indicate that rotation speed is too low.
  - In certain types of rock, ballistic drill bits can cause jerky rotation.
- Drill bit wear
  - Diametric wear can be reduced if rotation speed is lowered
- Drilling rate
  - High rotation speed can give a higher drilling rate.
  - Ballistic button drill bits normally give a higher drilling rate.
  - X drill bits give a lower drilling rate.

Note

In the case of heavy wear on drill bit diameter (skirt), reduced flushing air must be used.

4.7 Adjustment of thread feed speed and thread feed pressure for threading and unthreading

Feed speed and rotation pressure in the jointing function may require adjustment now and then due to variations in friction with the feed beam and pipe grippers.

The friction can vary due to the degree of wear and adjustment of the slide pieces, as well as whether or not these are lubricated. There is also a difference between threading and unthreading with or without a drill rod due to the difference in weight. The setting must be adjusted to the higher load, for example: threading a drill rod in the rod grippers and unthreading a rod in the rod grippers.

Before adjusting the speed and pressure, make sure that:

the tramming/drilling switch (S130) is in DRILLING position.

the DCT/RHS control lever (S803) is in RHS position.

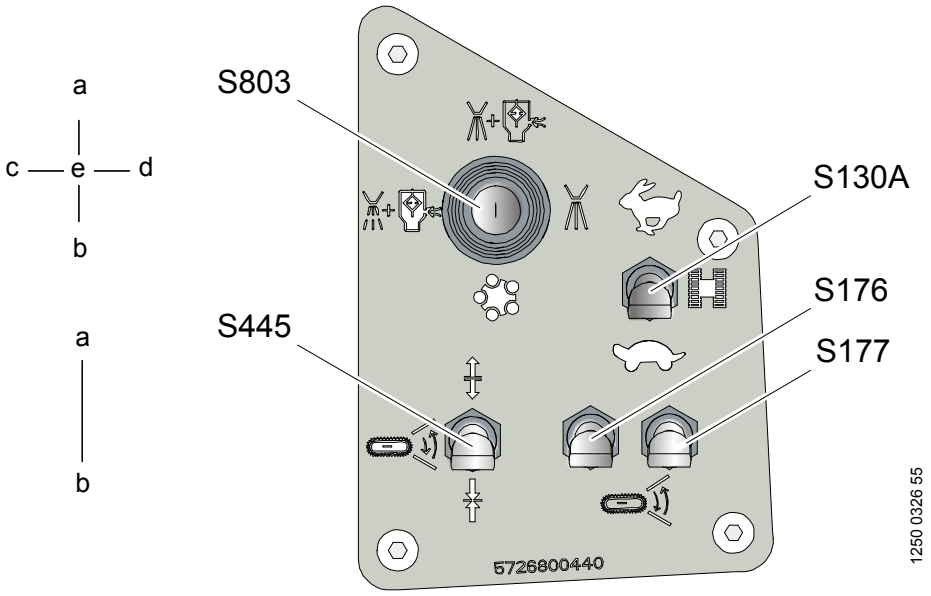


Figure 29 Tramming control panel

4.7.1 Threading

1 Activate jointing by operating the drilling lever to position (d).

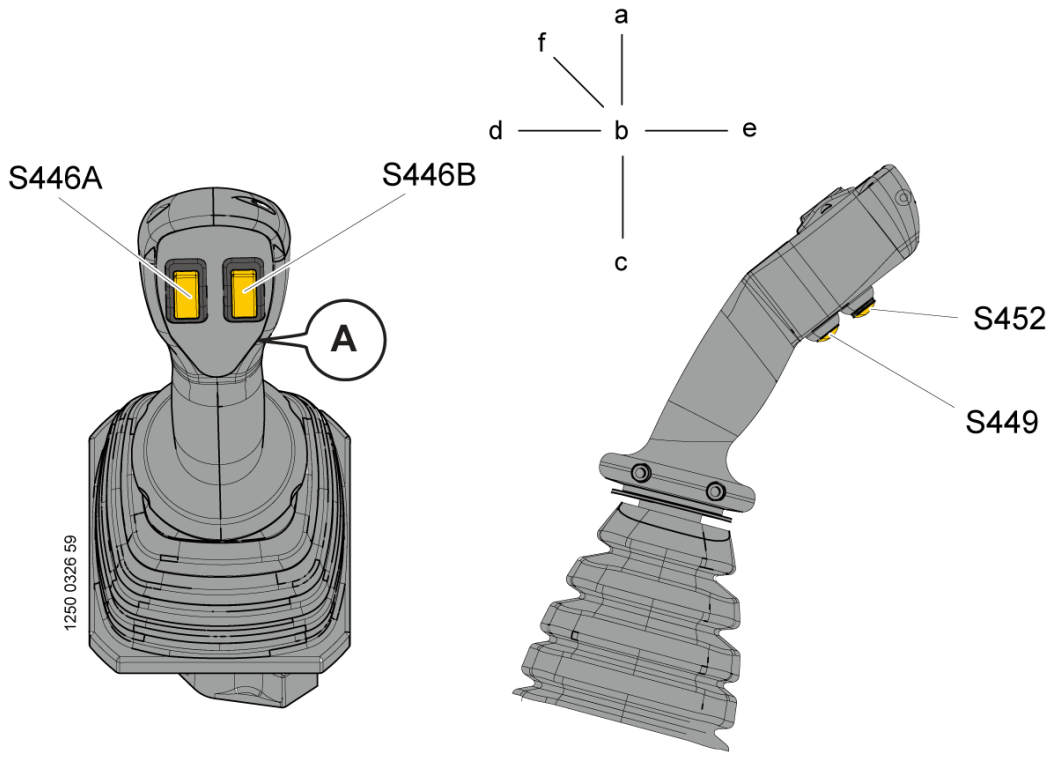


Figure 30 Drilling lever

2 Undo the lock nut on the adjusting valve (1).

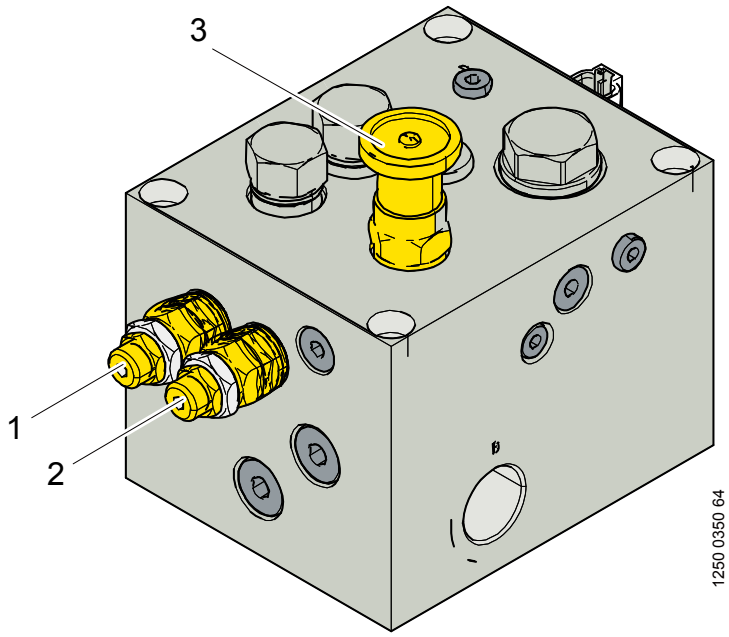


Figure 31 Feed speed valve block

3 Turn the adjusting valve (1) clockwise/anticlockwise to increase/decrease the thread feed pressure. In general, the setting should be the lowest possible for the cradle to move smoothly on the feed beam with a rod in drill center and the grippers in guide position.

4 Tighten the lock nut on the adjusting valve.

Note

There are two pressure relief valves inside of the feed speed valve used to give a feed pressure that corresponds to a feed speed that matches the pitch of the drill steel threads.

4.7.2 Unthreading

1 Activate unthreading by operating the drilling lever to position (e).

2 Undo the lock nut on the adjusting valve (2).

3 Turn the adjusting valve (2) to increase or decrease the thread feed pressure.

4 Tighten the lock nut on the adjusting valve.

4.8 Pressure regulator adjustment

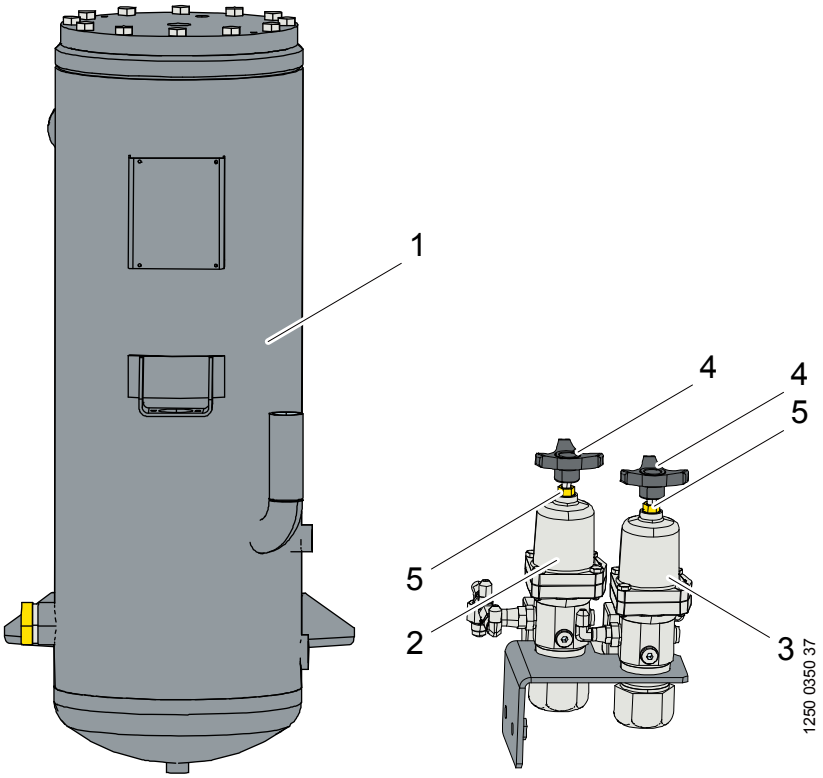


Figure 32 Air pressure regulator

1 Compressor tank
2 Reduced air pressure regulator
3 Full air pressure regulator
4 Regulator knob
5 Lock nut

Note

Air pressure adjusting can only be performed by trained personnel from Atlas Copco.

In drilling mode, when reduced air flushing is selected, solenoid valves Y210B and Y115 (refer to air system diagram) are not activated and the air flows via Y116 and can then be regulated with a control valve. The factory setting for the reduced air pressure is 7±0.5 bar.

In drilling mode, when full air flushing is selected, solenoid valves Y210B and Y115, Y116 (refer to air system diagram) are activated and the air flows via Y115 and Y116 and can then be regulated with a control valve. The factory setting for the full air pressure is 10±0.5 bar.

4.8.1 Setting the reduced air pressure regulator

1 Operate the tramming/drilling lever in DRILLING position.

2 Set the DCT/RHS control lever (S803) in REDUCED AIR, DCT ON position.

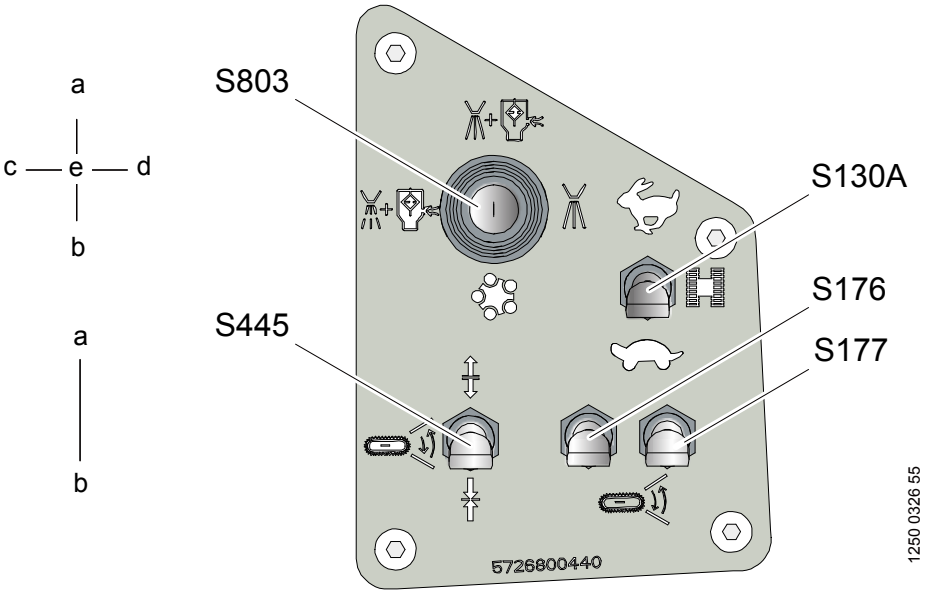


Figure 33 Tramming control panel

3 Unplug the solenoid valve Y116.

4 Undo the lock nut (5) of the reduced air pressure regulator (2).

5 Adjust the regulator knob (4) of the reduced air pressure regulator (3) according to factory settings.

6 Tighten the lock nut and plug the solenoid valve Y116 back.

4.8.2 Setting the full air pressure regulator

1 Operate the tramming/drilling lever in DRILLING position.

2 Set the DCT/RHS control lever (S803) FULL AIR, DCT ON position.

3 Unplug the solenoid valve Y115 and Y116.

4 Undo the lock nut (5) of the full air pressure regulator (3).

5 Adjust the regulator knob (4) of the full air pressure regulator (3) according to factory settings.

6 Tighten the lock nut and plug solenoid valve Y115 and Y116 back.

4.9 Anti-jamming protection

The drill rig is equipped with two types of anti-jamming protection.

- Air flow switch.
- Anti-jamming valve

Both variants reverse the feed direction if they are activated by insufficient flushing air flow or excessive drill rotation pressure respectively in order to avoid jamming.

Only when the auto-drilling switch (S809) is set to ON position, the anti-jamming function could be obtained.

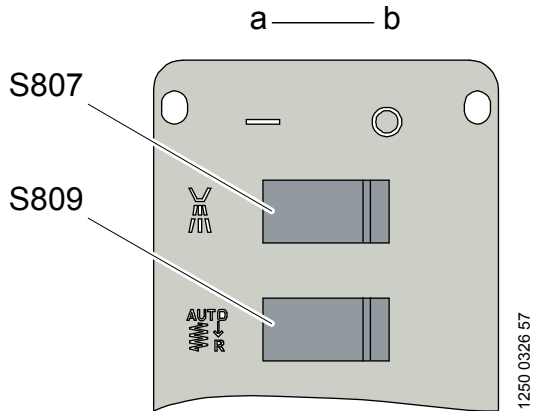


Figure 34 Auto-drilling control panel

4.9.1 Air flow switch, B188

The air flow switch is connected after the flushing air valves and detects a drop in pressure through a restriction in the flushing air line. A reduced or non-existent air-flow, e.g. if the drill bit is clogged, means the drop in pressure will be reduced or disappear completely. The rock drill will then reverse automatically until the pressure drop/flow returns to normal.

4.9.2 Anti-jamming valve

A considerable increase in rotation pressure indicates that the drill is becoming jammed. If the rotation pressure exceeds the pressure set, the rock drill will reverse automatically. The reverse feed will continue for 2 seconds or until the pressure drops below the set value again.

4.9.3 Adjusting activation pressure for anti-jamming valve

WARNING

- **Risk of serious personal injury!**
- **During the procedure the rock drill will reverse automatically.**
- **Make sure that nobody is within the operating range of the rock drill.**

The activation pressure of the anti-jamming protection is adjusted on anti-jamming valve (H). The pressure is factory set at 80 bar. A suitable guide value is about 15 bar above normal rotation pressure.

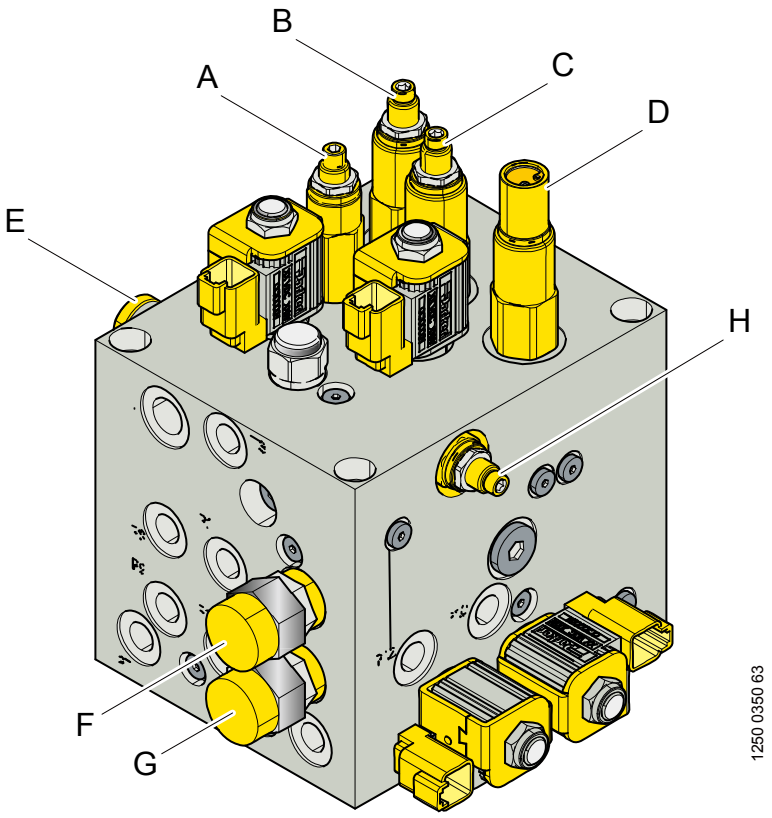


Figure 35 Anti-jamming valve block

The activation pressure may be difficult to adjust during drilling as it is often difficult to force the rotation pressure sufficiently high. For this reason, a simulation can be carried out instead.

1 Turn the knob (3) for adjusting the rotation speed anticlockwise until you feel the spring pressure release. The rotation speed will now be 0 rpm.

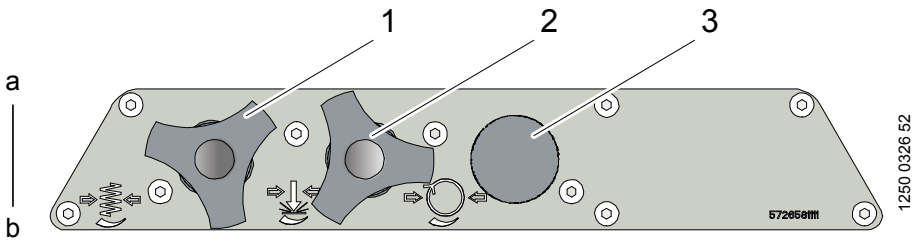


Figure 36 Hydraulic pressure control panel

2 Run the rock drill down until the pipe adapter is between the upper drill-steel support. Close the drill-steel support to secure the sleeve.

3 Activate drill rotation.

4 Activate drill feed.

5 Slowly turn the adjusting knob (3) clockwise while observing the pressure gauge for the rotation pressure. When the pressure exceeds the rotation pressure switch setting, the feed direction will reverse. This can be seen from the pressure on the feed pressure gauge dropping to 0 and the rock drill trying to pull away from the drill-steel support.

6 Turn the adjusting knob (3) anticlockwise to reduce the rotation pressure and allow the feed to move down again.

7 If the activation pressure setting needs to be changed, it can be done by turning its adjusting screw clockwise to increase the activation pressure or anticlockwise to reduce it.

8 Repeat steps 1 - 6 to check the new setting.

9 Restore the rotation speed to its normal setting.

4.10 Setting lubrication to the rock drill

4.10.1 General

Electric control lubrication (ECL) to the rock drill is controlled by a electronic piston pump and relays on the printed circuit board (PCB). The PCB is located in the back of cab. The pulse length and pause length can be adjusted on the relays.

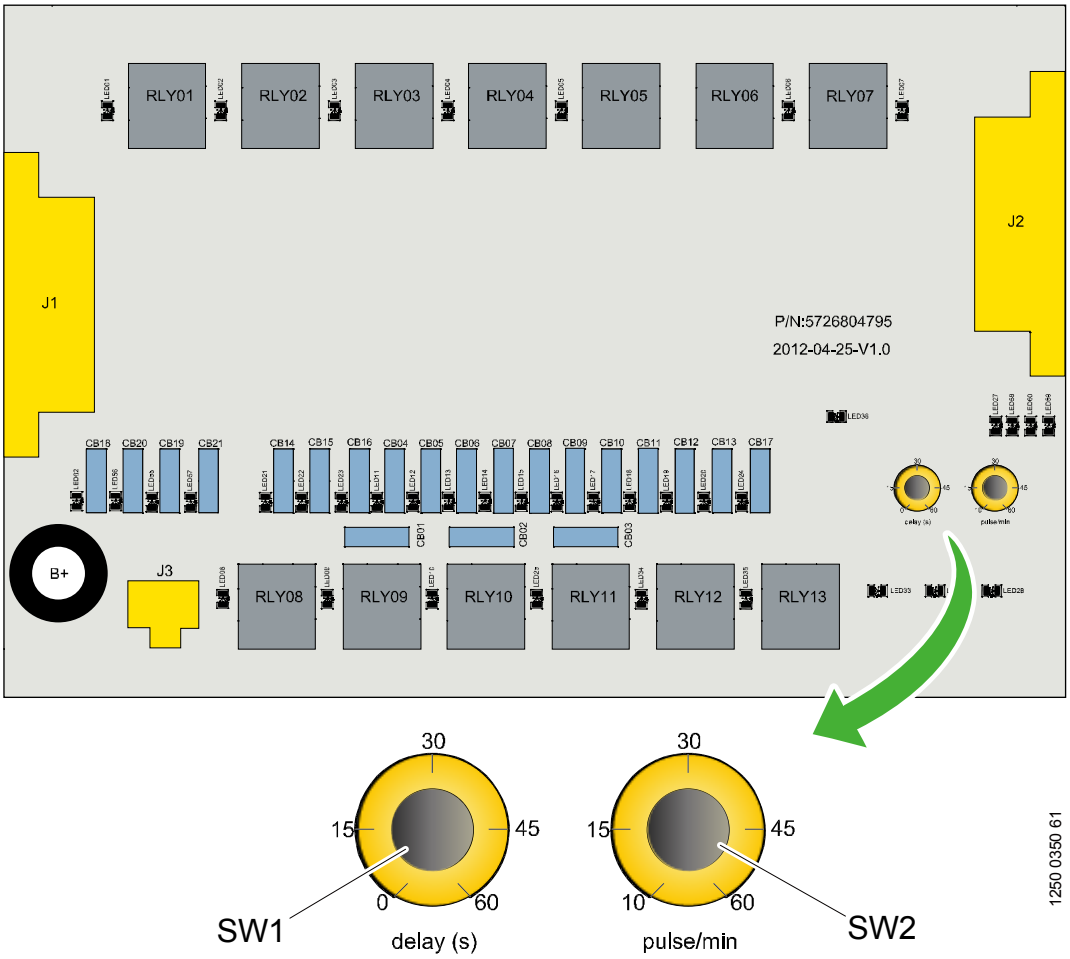


Figure 37 Printed circuit board

4.10.2 Adjusting the parameters

The right adjusting screw on the PCB adjusts the pulses/min and the left adjusting screw adjusts the delay time.

Factory settings ECL:

- Time pulse: 400ms
- Pulses: 40 pulses/min

- Extended time: 45 seconds

Extended time adjustment

1 Press and hold the adjusting screw (SW1) for 3 seconds until the power indicator (on the PCB) is not flicking, that means it’s in setting mode.

2 Turn the screw (SW1) clockwise to increase the extended time and counterclockwise to decrease the extended time (factory setting is 45s).

3 Turning the screw (SW1) to the suitable position.

4 Press the screw (SW1) again. The ECL controller will be in working mode and output the setting value.

Pulse time adjustment

1 Press and hold the adjusting screw (SW2) for 3 seconds until the power indicator is not flicking, that means it’s in setting mode.

2 Turn the screw (SW2) clockwise to increase the pulse time and counter clockwise to decrease the pulse time (factory setting is 40 pulse/min, which is correspond to 40 drops/min).

3 Turning the screw (SW2) to the suitable position.

4 Press the screw (SW2) again. The ECL controller will be in working mode and output the setting value.

4.11 ECL collection (option)

4.11.1 Function

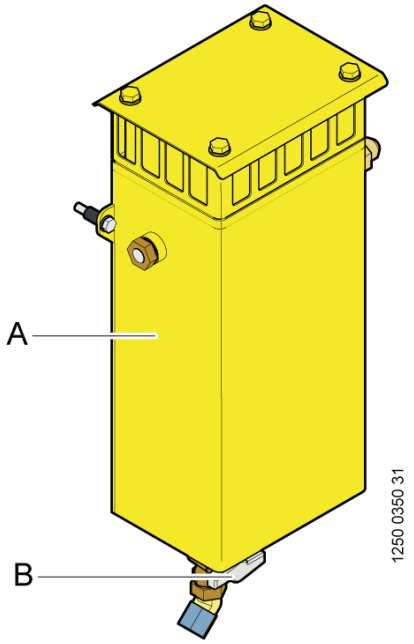


Figure 38 Collecting tank

The system consists of a collecting tank. The system collects the ECL oil that has passed the rock drill via a hose to the collecting tank (A).

The collecting tank must be emptied via the cock (B) underneath the tank once ECL oil tank is filled.

Note

The collected oil must be sent for disposal and not reused!

---

5 Hydraulic Systems

5.1 Environmental considerations when handling oil

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Leaking hydraulic connections and lubrication grease are environmentally hazardous.**
- **Changing oils, replacing hydraulic hoses and different types of filter can be environmentally hazardous.**
- **Always collect oil residue, oil spill, oily waste and grease residue and spill. Treat according to applicable local regulations.**
- **Use biodegradable hydraulic fluids and lubrication oils for Atlas Copco products wherever possible. Contact your local Atlas Copco office for further information.**

5.2 General

WARNING

- **Danger of burn injuries!**
- **The hydraulic oil may reach a temperature of 80 °C.**

CAUTION

- **Hazardous hydraulic oil pressure!**
- **Risk of personal injury!**
- **Working on the hydraulic system can involve a high risk of danger. Ensure the system is depressurized before starting work.**
- **The hydraulic system may also be pressurized for a short time after the motor has been switched off.**

Note

The pressure in the hydraulic hoses may vary depending on the operating mode selected.

CAUTION

- **Hazardous hydraulic oil and water pressure!**
- **Can cause personal injury.**
- **Never replace high pressure hoses with hoses of lower quality than the originals or with hoses fitted with removable couplings.**

The hydraulic system is sensitive to impurities. The environment in which a drill rig normally operates is usually unsuitable for repairing hydraulic components. Work on the hydraulic system on-site should therefore be limited to changing components. When changing valves, the unit in question must be well strapped and supported. Components should then be repaired in a suitable environment.

Observe the following points to avoid breakdowns and interruptions in operation due to fouled hydraulic oil:

- Keep the drill rig clean. Hose it down at regular intervals, preferably with an added grease solvent.
- Before opening any connection, clean the area round it thoroughly.

- Use clean tools and work with clean hands.
- Always plug hydraulic connections immediately after they have been detached.
- Use clean protective plugs.
- Hydraulic components, such as hoses, valves, motors, must always be kept with suitable protective plugs fitted.
- Spare parts for hydraulic components must always be kept in sealed plastic bags.
- Change filter cartridges as soon as the filters indicate clogging.

5.3 Repairing hydraulic components

Repairing and/or reconditioning hydraulic components should be carried out by expert personnel and in a suitable place. The following alternatives are possible:

- Suitable premises for hydraulic repairs to be arranged at the workplace. Repairs to be carried out by your own specially trained personnel, the manufacturer's technicians or Atlas Copco personnel.
- Components to be sent to the manufacturer's local agent for repair.
- Component repairs are carried out by Atlas Copco. Overhauling Instructions are available for the most important and most complicated hydraulic components.

5.4 Replacement of hydraulic hoses

The high system pressure with safety valves set to 250 bar, together with the vibration and other mechanical strain, puts high demands on the hydraulic hoses. All hydraulic hoses are fitted with pressed couplings and should therefore be purchased ready-made from Atlas Copco. Hose dimensions and qualities are specified in the spare parts lists for the drill rig.

5.5 Hydraulic workshops

Workshops used for the repair of hydraulic components must:

- Be separate from activities which generate dust and particles, such as welding, grinding, the transportation of vehicles and so on.
- Have their own suitable washing equipment which is required for repairing the components.
- Have the necessary tools, both standard and special, that are only used in the hydraulic workshop.
- Have a ventilation system that does not admit dust into the premises.

- Have well-trained mechanics.

5.6 Filter

5.6.1 Return oil filter

General

The return oil filter cleans the oil before it returns to the tank.

There is a return oil filter on the drill rig. A return oil filter consists of a tube containing a filter insert. The tube is mounted inside the hydraulic oil tank.

The filter insert must be changed according to the maintenance schedule, but if the indicator (14) for the return oil filter indicates “filter clogged” (the indicator comes on), the return oil filter must be changed immediately.

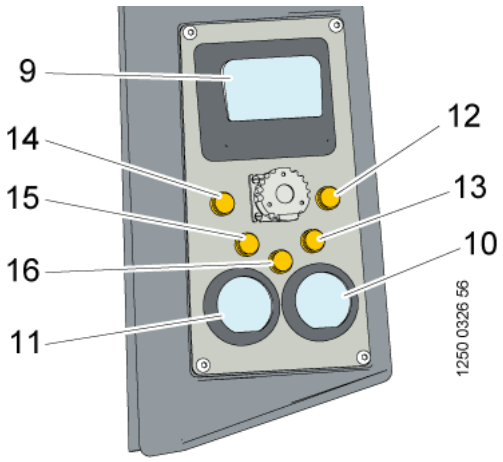


Figure 39 Indicator for return oil filter

Note

The filter cartridges cannot be cleaned but must be replaced when it is clogged.

Changing the return oil filter

The filter inserts can be dismantled by removing the cover and lifting them up.

1 Clean on and around the filter cap and unscrew the nuts (A).

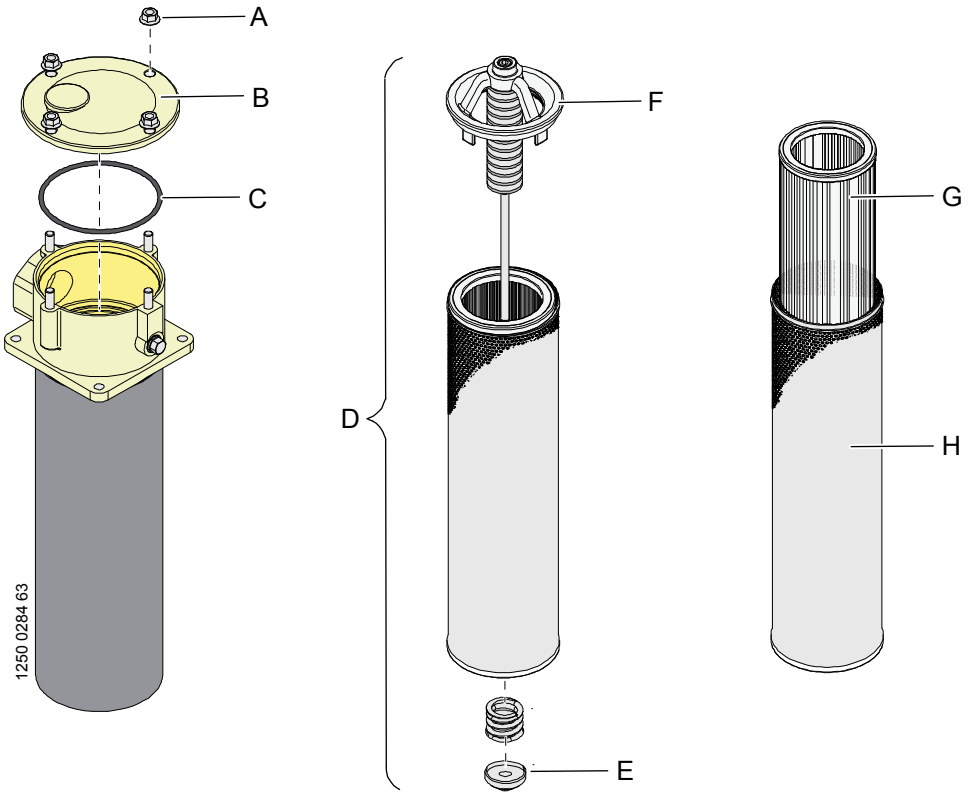


Figure 40 Changing filter

2 Remove the cover plate (B).

3 Replace the O-ring (C) if it is damaged.

4 Lift out the entire filter canister (D).

5 Unscrew the filter by releasing the nut (E).

6 Clean the magnetic rod (F).

7 Unscrew the filter element (G) from the filter sleeve (H).

8 Screw a new filter element to the filter sleeve (H).

9 Re-assemble the return oil filter and place in the filter canister. Screw on the cover plate.

5.6.2 Breather filter

General

There is a breather filter (A) fitted on the hydraulic oil tank. The purpose of the breather filter is to equalize the pressure differences in the tank that would otherwise arise when the level in the tank changes if, for example, a jack is lowered.

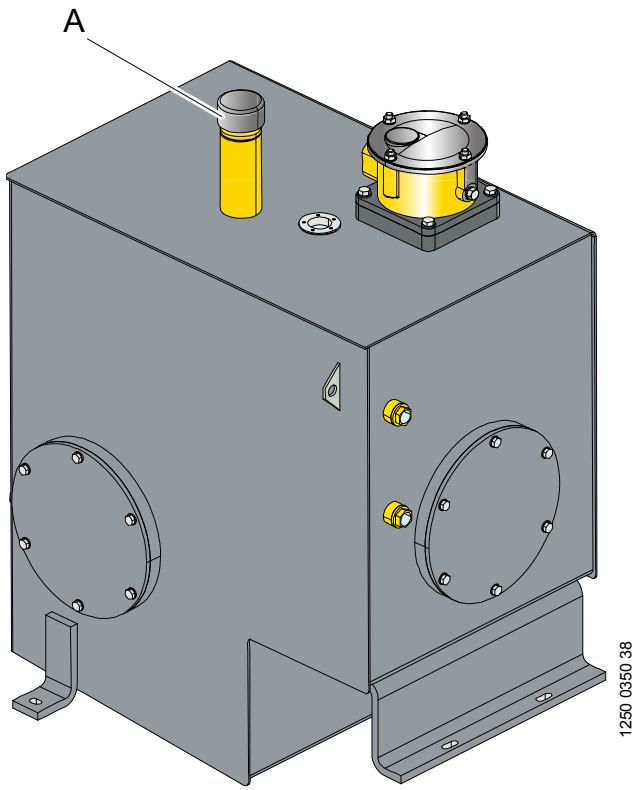


Figure 41 Breather filter

The breather filter must be replaced as set forth in the maintenance schedule and also if it is severely fouled.

Note

If the breather filter becomes covered in oil it will be ruined. This can happen if the tank is overfilled. The filter must then be changed.

Changing the breather filter

1 Wash clean on and around the filter (A).

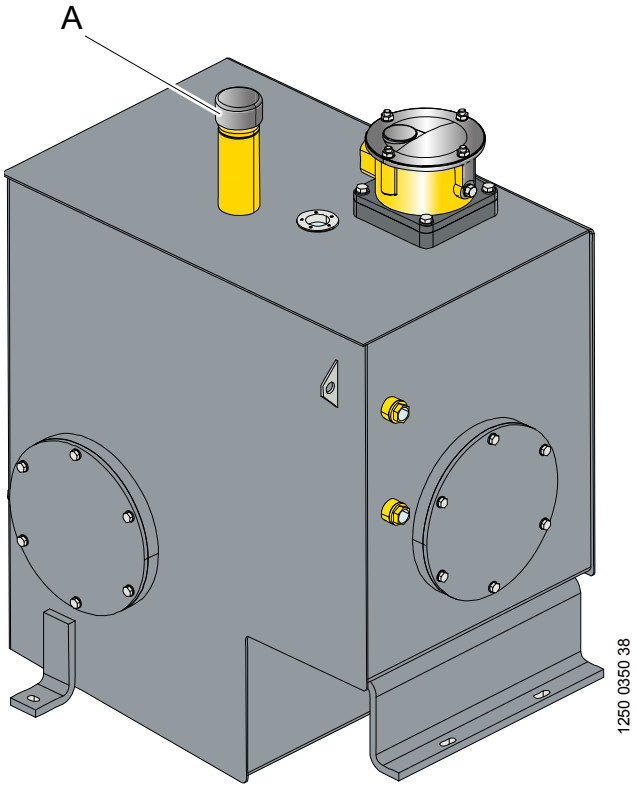


Figure 42 Breather filter

2 Unscrew the old filter.

3 Fit a new filter.

4 Tighten the filter by hand.

Condensation in the hydraulic oil tank

Water in the hydraulic oil can seriously damage components in the hydraulic system and cause corrosion.

Before draining the hydraulic oil tank, the system must stand unused for approximately 12 hours so that any condensation can sink to the bottom of the tank. The water can then be drained off through the ball valve on the bottom of the tank.

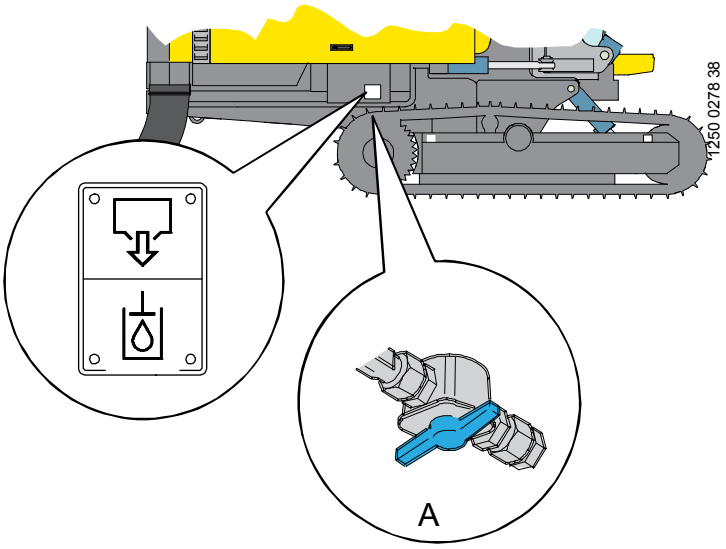


Figure 43 Ball valve underneath the hydraulic oil tank

Draining condensation from the hydraulic oil tank

1 Underneath the hydraulic oil tank is a ball valve. On the ball valve there is a plug. Remove the plug.

2 Place a receptacle under the ball valve.

3 Open the ball valve and allow the water to run out.

4 Close the valve when the water has been replaced with oil.

5 Screw back the plug to protect the valve.

6 Feeder

6.1 Assembling the rock drill

6.1.1 Preparation

Preparatory measures:

Clean the feeder free from rust inhibitor.

6.1.2 Assembly

1 Remove burrs, paint or other coatings from the cradle and the contact surfaces on the rock drill.

2 Remove the mounting bolts from the cradle.

3 Position the rock drill with any shims on the cradle and refit the bolts. Make sure the rock drill fits firmly in place.

4 Tighten the rock drill into place. Tighten the bolts (four pcs.) alternately until a torque of 200 Nm has been attained.

5 Connect and fit the hoses to the rock drill.

6 Adjust slide rails and hoses according to the directions in this instruction manual.

6.1.3 Check after four hours

1 Check and tighten all bolted joints.

2 Check and adjust the tension of the ropes.

3 Check all hoses for leaks.

4 Tighten and adjust the tension of the hoses if necessary.

5 Check and adjust the slide rail alignment on the feed beam.

6.2 Chain feed tension

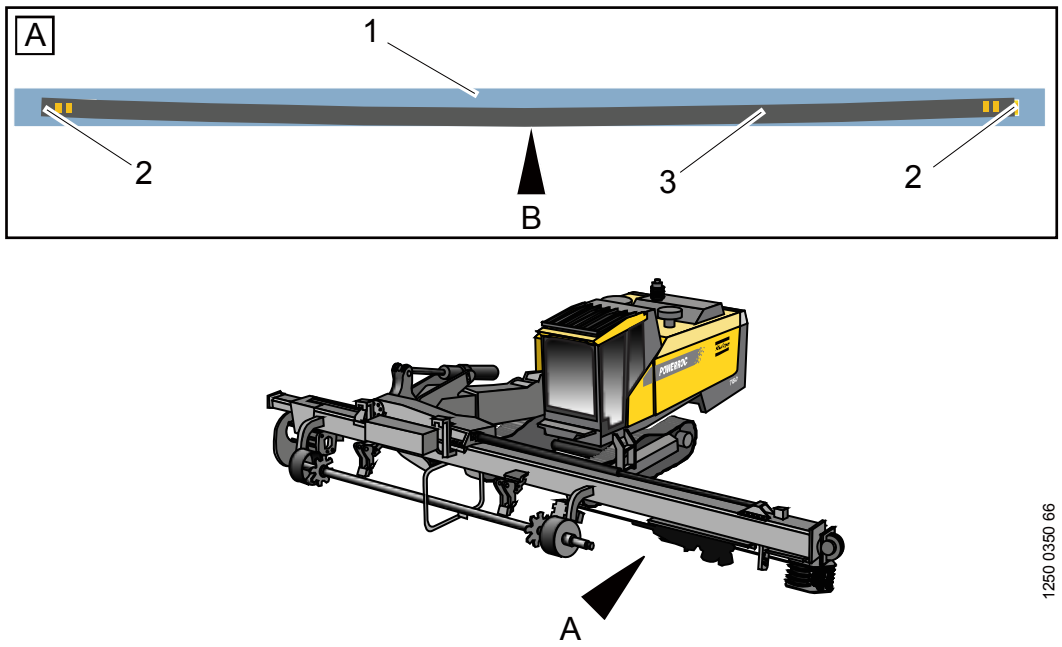


Figure 44 Correct chain feed tension

1 Feed beam

2 Gear

3 Chain

It is important to ensure that the chain feed is correctly tensioned. A poorly tensioned chain causes increased wear on both the chain and associated parts.

When the chain feed is correctly tensioned, it should come into contact with the inner edge on the lower prism on the feed beam at point (B) when the feed is placed in a horizontal position, e.g. transport position.

6.2.1 Chain feed tension

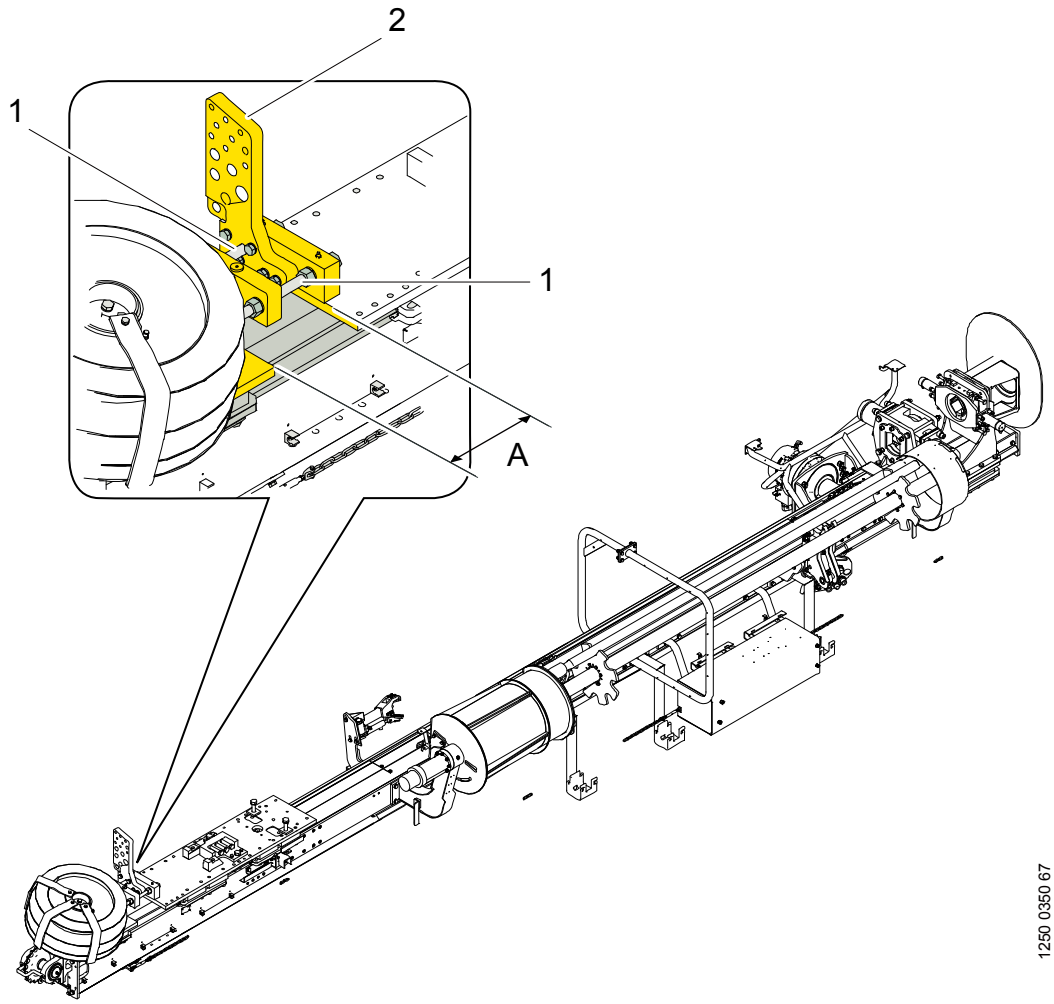


Figure 45 Chain feed tension

Tighten or loosen the chain feed with the bolts (1).

If it is necessary to change the chain feed tension, lubricate the bolts (1) before starting adjustment using the grease nipples (2). A little grease should also be placed directly on the threads at the same time.

The distance (A) must be between 220 mm and 280 mm.

6.3 Jack chain

6.3.1 Lubrication of sprocket wheel and checking feed chain cover

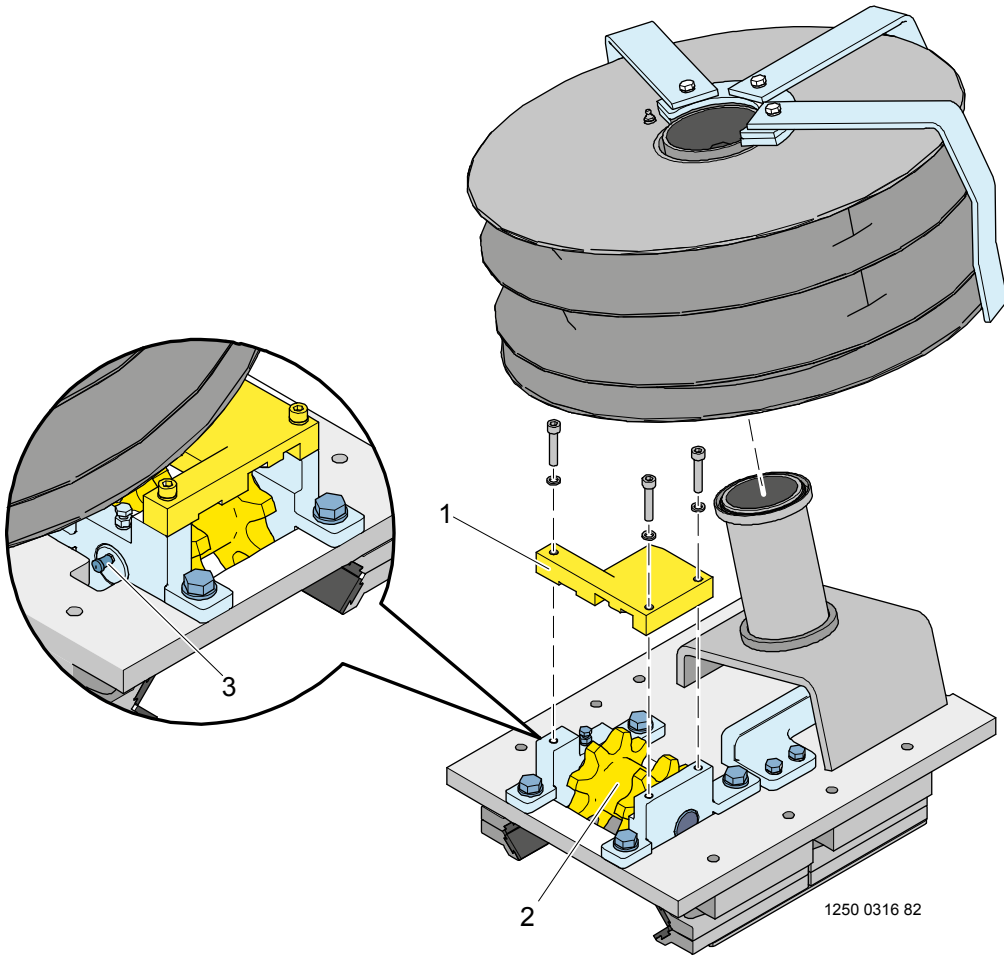


Figure 46 Jack chain sprocket wheel and jack chain cover

Lubricate the jack chain drive (2) by adding 2 - 3 pump strokes of grease in the grease nipple (3) on the drive shaft.

If the jack chain cover (1) is worn, it must be replaced.

After a while the chain links will start to chafe against the jack chain cover. When this takes place, replace the jack chain cover.

6.4 Bearing unit and checking the chain guide

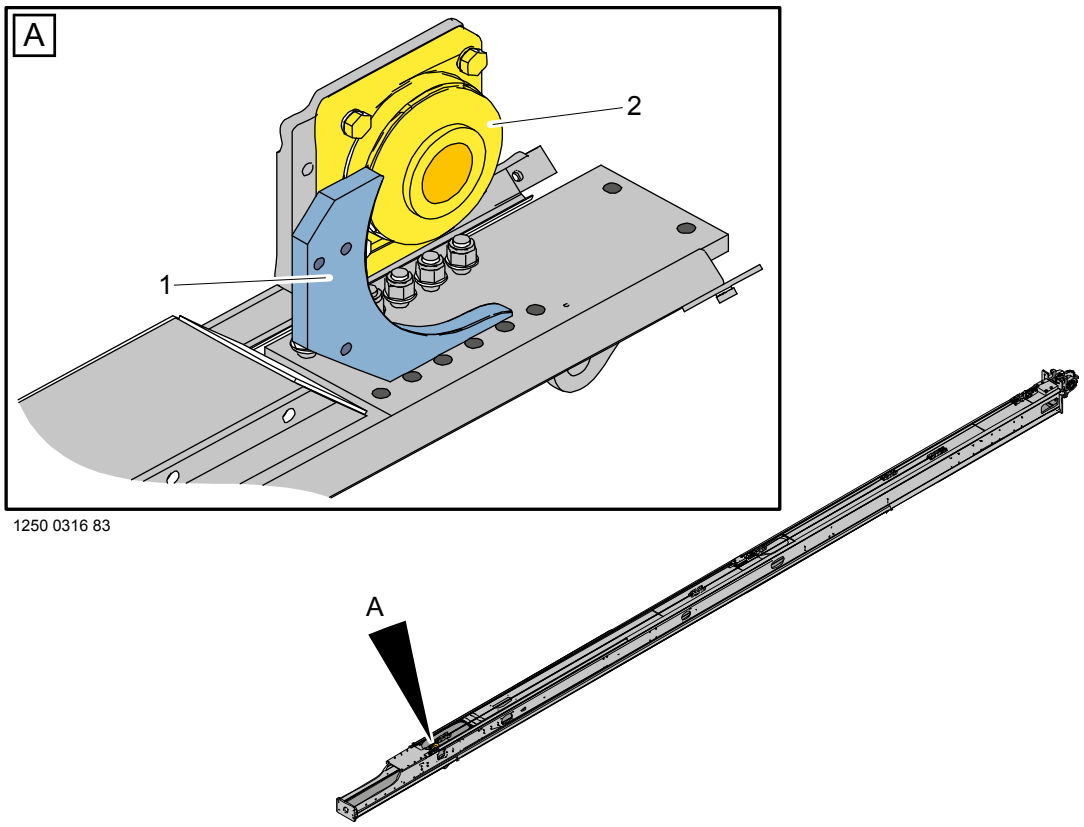


Figure 47 Bearing unit (2) and chain guide (1)

6.4.1 Changing the bearing unit

After 5000 engine hours, the bearing unit (2) should be replaced with a new unit.

Every 500 engine hours, check the chain guide (1) for wear. If it is damaged or overly worn, it should be replaced with a new one.

6.5 Protective plate

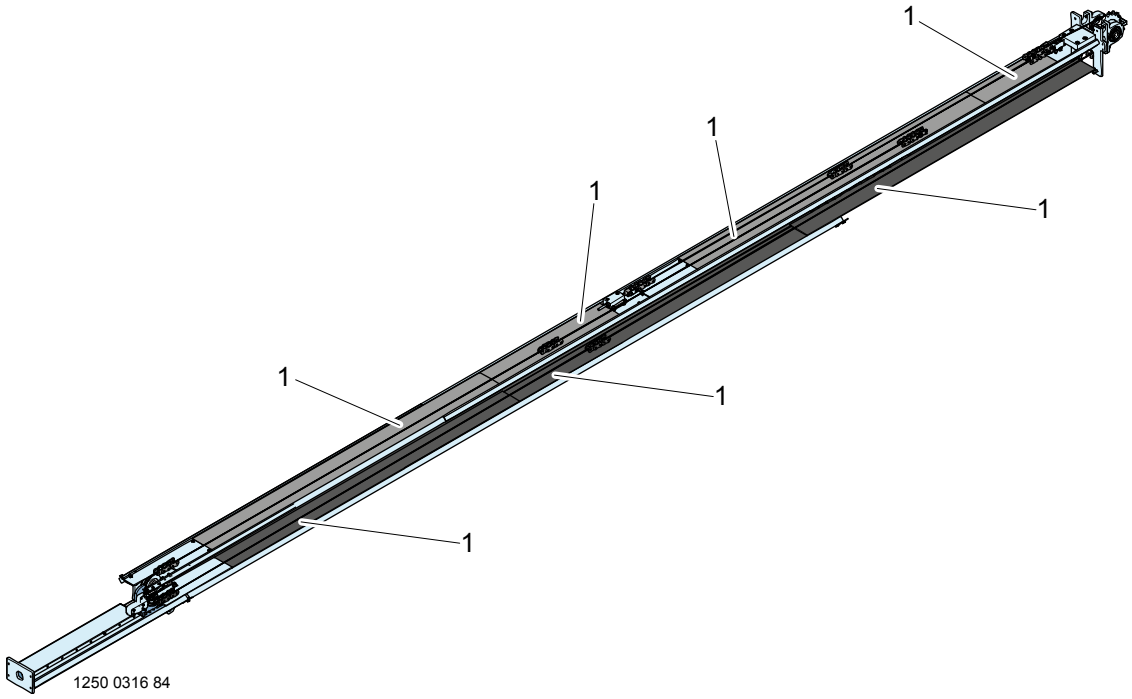


Figure 48 Chain feed protective plates

The feed beam is fitted with a black protective plastic (1). This is designed to prevent the chain and beam from damaging each other. When they are worn, they must be replaced.

6.6 Checking the wear on the chain sprocket wheel

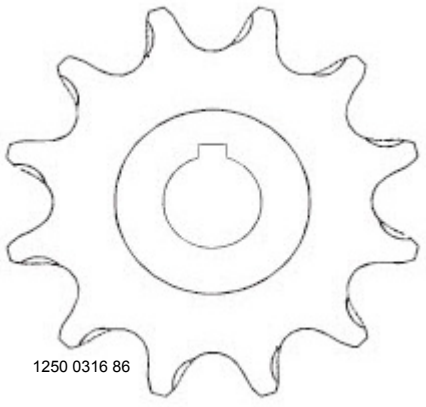


Figure 49 A worn chain sprocket wheel

Check whether there are uneven patches or whether it is catching when the chain is coupled in and out of the sprocket wheel.

Inspect the teeth for reduced areas and sharp points. If the teeth are too worn, the sprocket wheel should be replaced. (*See Figure 48 Chain feed protective plates*).

Do not run a new chain on a worn sprocket wheel. This will cause the new chain to wear very quickly.

Do not run a worn chain on a new drive as this will cause the new drive to wear out quickly.

As a general rule, replace the drive on every third chain change.

6.7 Sealing disc

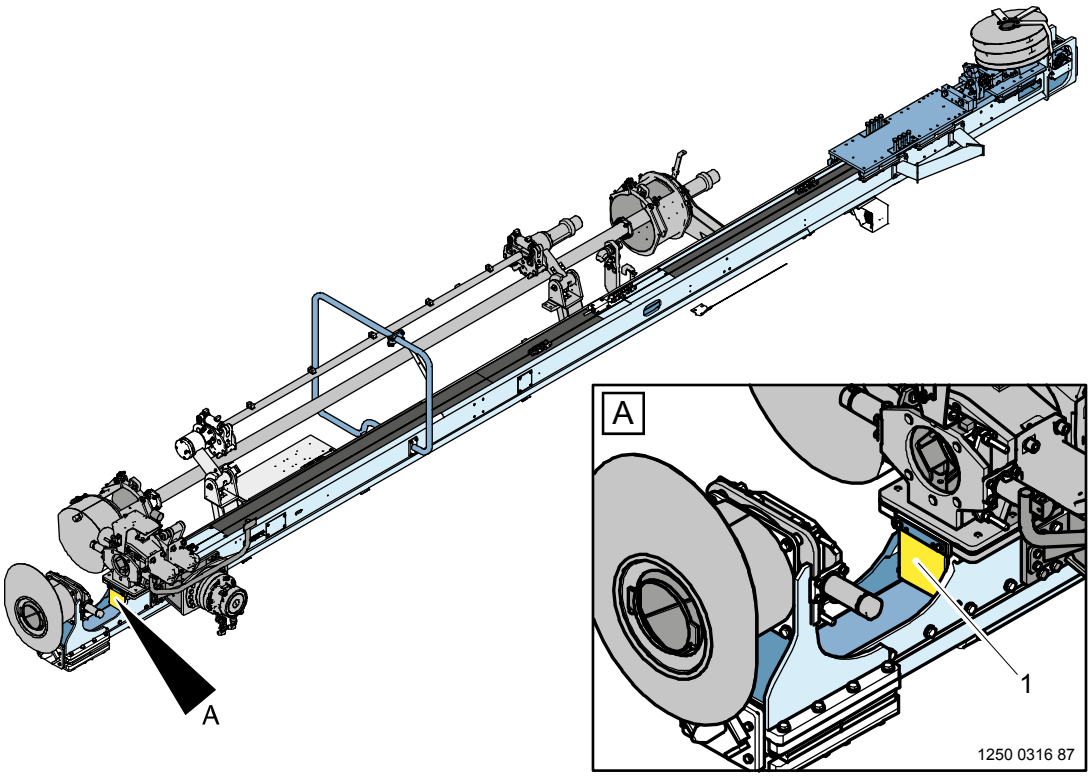


Figure 50 Sealing disc

Cuttings collect over time behind the sealing disc (1). There is a risk that the cuttings can damage the chain and drive. Bend the sealing disc down to clean out dust which has collected behind it.

6.7.1 Adjusting the cradle on the feed beam

The cradle plates for the rock drill, the intermediate drill-steel support and the hose drum are guided along the feed beam with the help of holder A. Each pair of holders is locked in position with screws B. The screw holes in the holders have been made as angled grooves. By offsetting the holders longitudinally, the cradle can be adjusted on the feed beam. Make sure the holders are turned as shown in the figure so that the outer part of the angled grooves is turned to the back of the beam. Make sure the feeder is horizontal and that the drill steel is threaded onto the rock drill.

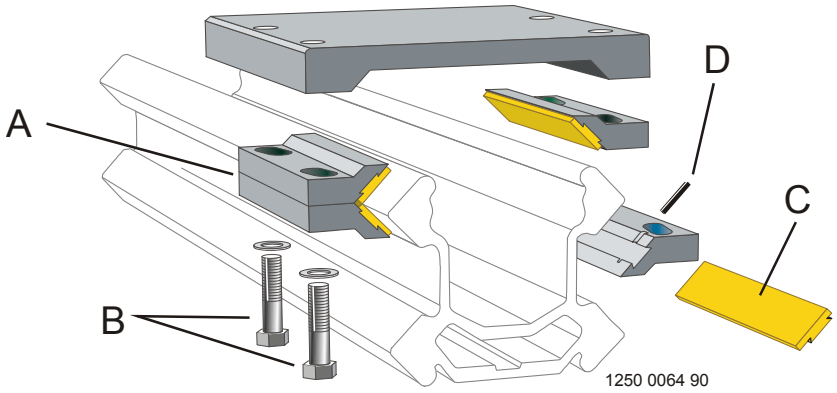


Figure 51 Adjusting the cradle holders

1 Remove the bolts B securing the holders.

2 Start by adjusting the upper holders so the cradle is lying straight on the beam and is 5 - 7 mm above the beam. In this way, the rock drill adapter will be at the correct height.

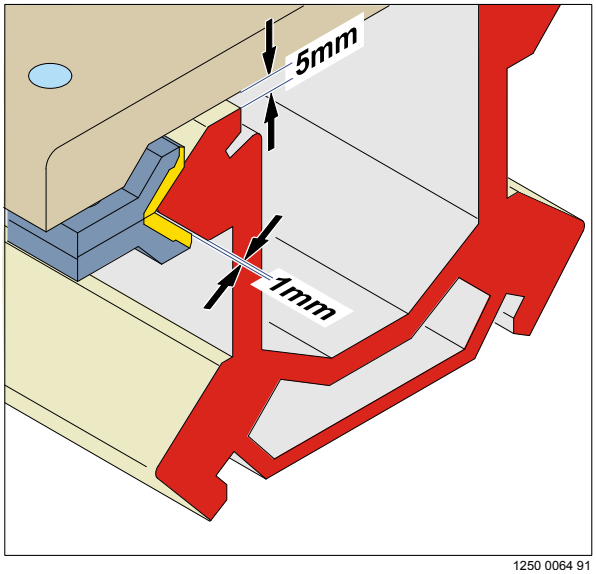


Figure 52 Adjustment measurement

3 Then shift the lower holders length-ways until a clearance of 1 mm has been attained between the lower holder and feed beam.

4 Tighten the bolts B.

5 Check by running the cradle along the entire beam. The pressure required to run the cradle forwards should be max 30 bar with the hydraulic oil at operating temperature. If the pressure exceeds 30 bar, this means that the holders are too tight and must be readjusted.

6 Replace damaged hoses and tighten leaking connections. The hoses are correctly adjusted when they do not hang down when the feeder is in the horizontal position.

6.7.2 Replacing the slide pieces in the holder

Each holder has replaceable slide pieces. The slide piece C is kept in place by three keys D. The slide pieces must be replaced at regular intervals so that the steel in the older does not wear against the beam. Replace if there is less than 1 mm of wear allowance on the slide piece. It is a good idea to change all the slide pieces at the same time, even if some of them are slightly thicker.

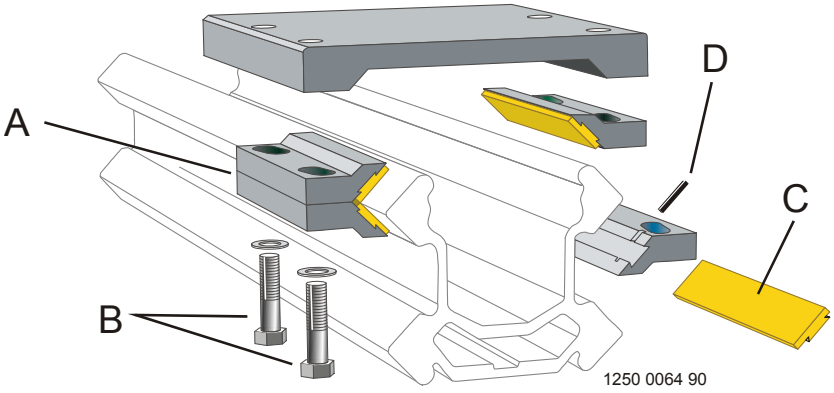


Figure 53 Replacing slide pieces

1 Prise off the slide pieces (C) from the holder using a screwdriver and remove the keys (D).

2 Slide a new slide piece into the holder track and fit the new keys.

3 Makes sure that the holders are refitted to the cradle correctly and that they are adjusted so that the total lateral play is 2-3 mm.

6.7.3 Replacing slide rails

Slide rails should be replaced if they are worn or severely scratched.

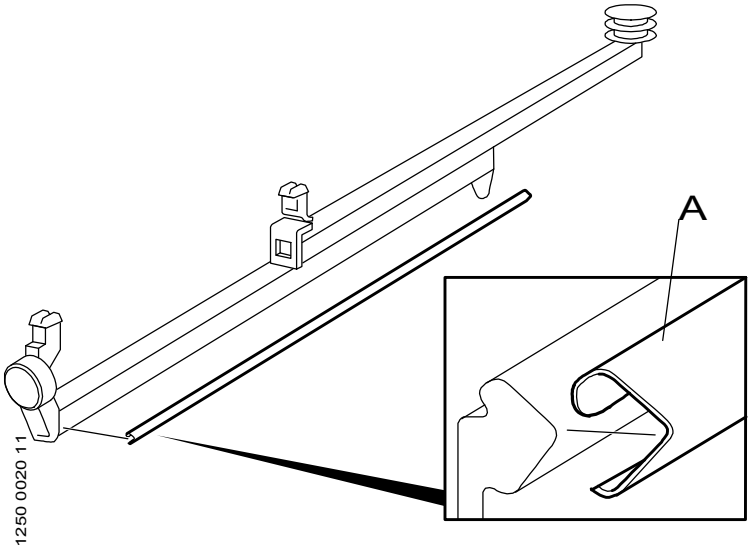


Figure 54 Replacing slide rails

1 Remove the cradle for the rock drill, intermediate drill-steel support and the hose drum from the beam.

2 Remove the old slide rails A by prising the lower edges of the bars outwards using a screwdriver.

3 Clean the beam surfaces thoroughly.

4 Fit the new slide rails. The larger edge on the slide rail must be facing upwards. The rails should be pressed in place by hand.

5 Refit the rock drill cradles, intermediate drill-steel support and water-hose drum. Adjust the holders on the cradles as described in the instructions.

Note

Always replace the slide pieces when replacing slide rails!

---

7 Boom

7.1 General

The telescopic boom can be extended out 500 mm at most. Check the tightness of all bolts and nuts on the boom using suitable tools.

7.2 Checking the condition of extension cylinder

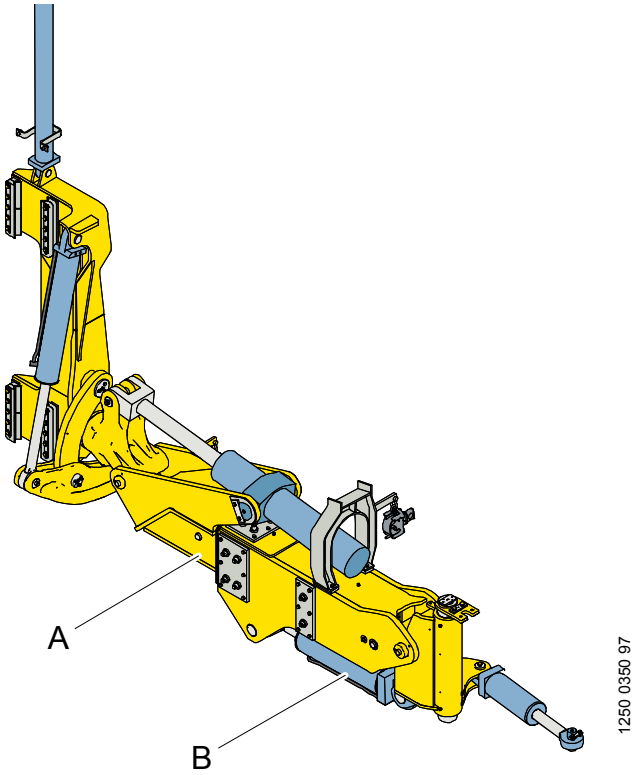


Figure 55 Checking the extension cylinder

1 Extend the telescopic boom (A) to its extreme position.

2 Tilt the boom as vertical as possible by adjusting tile cylinder (B) and make sure the feeder is lifted from the ground.

3 Check if the extension cylinder is in normal status.

4 Replace faulty cylinders if necessary. Only trained personnel from Atlas Copco is allowed to carry out the replacing.

7.3 Checking the tightness of the wear pad

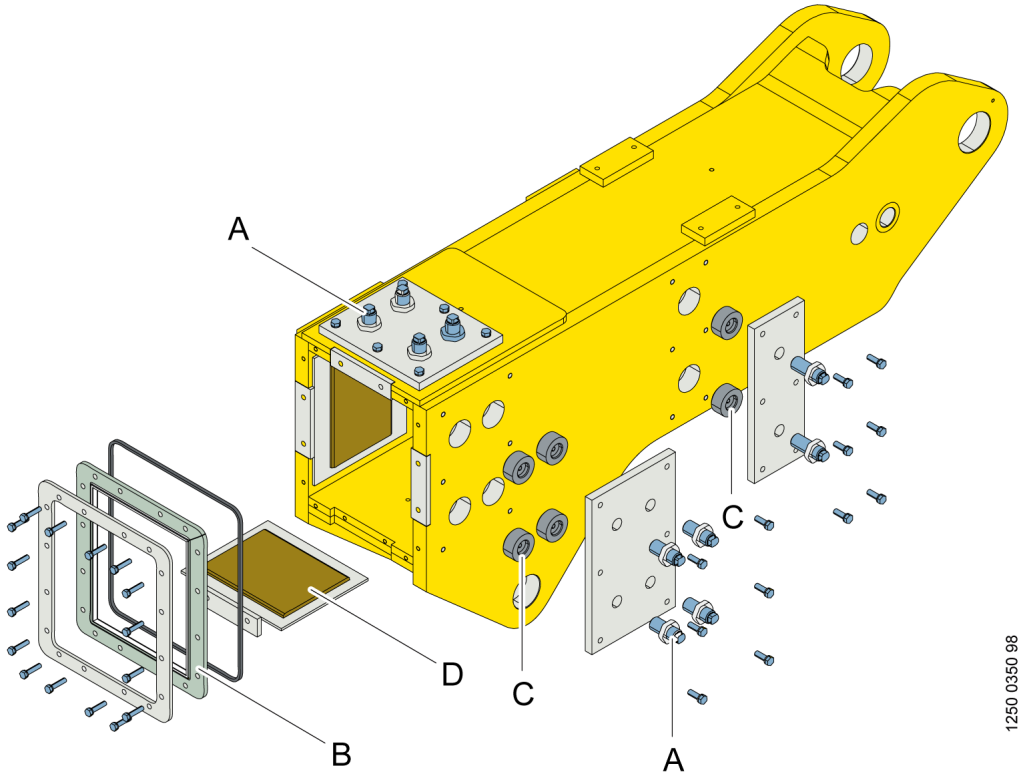


Figure 56 Checking the wear pad

1 Run the boom to horizontal position.

2 Make sure the telescopic boom is fully retracted into the outer boom.

3 Check the tightness of the mounting bolts (A), adjust the bolts if necessary.

– The clearance between the telescopic boom and outer boom must be as small as possible but still sufficient for the boom to move easily when the telescopic boom is used.

4 Keep the telescopic boom is laterally centered and in line with the outer boom.

7.4 Replacing the wear pad of outer boom

The wear pad between the telescopic boom and the outer boom should be replaced when the adjust bolts (A) are screwed towards the boom for 5-6 mm. It's recommended to replace the wear pads (D, 4 pcs.) one by one.

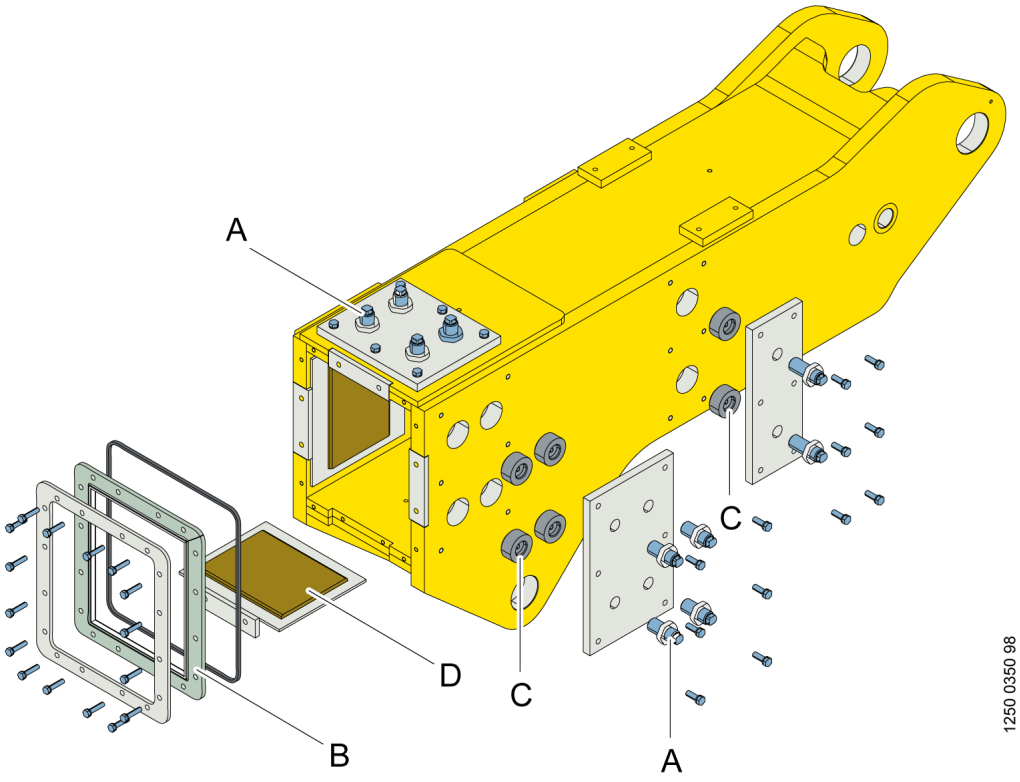


Figure 57 Replacing the wear pad of outer boom

1 Run the boom to horizontal position, the feeder to vertical position to support the extended boom.

2 Detach all the mounting bolts, seal (B) and plates from the outer boom head.

3 Detach the mounting bolts (A) from the outer boom and remove the cover plates.

4 Take out the retainer with wear pads (D) and check the thickness of the wear pads, replace the wear pads with new ones while the thickness is less than 6 mm.

5 Reinstall the mounting nuts and plates. Replace the old seal with new one if necessary.

7.5 Checking the seal of outer boom

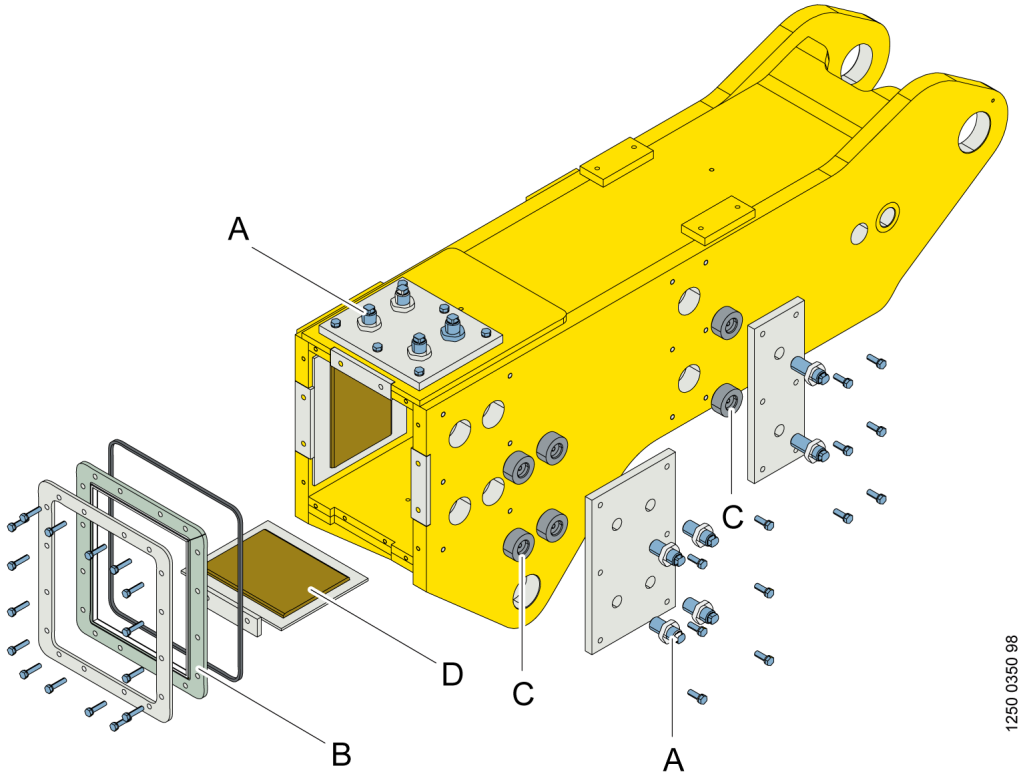


Figure 58 Checking the seal of outer boom

1 Run the boom to horizontal position, the feeder to vertical position to support the extended boom.

2 Detach the mounting bolts and cover plate from the outer boom head.

3 Check the condition of the seal (B).

4 If the seal is damaged, it must be replaced with new one.

5 Undo the mounting bolts and cover plates around the outer boom head.

6 Replace the damaged seal with new one and make sure the cut of the seal is on the top.

7 Reinstall the mounting bolts and cover plate in reverse order of the removal steps.

7.6 Checking the shim of outer boom

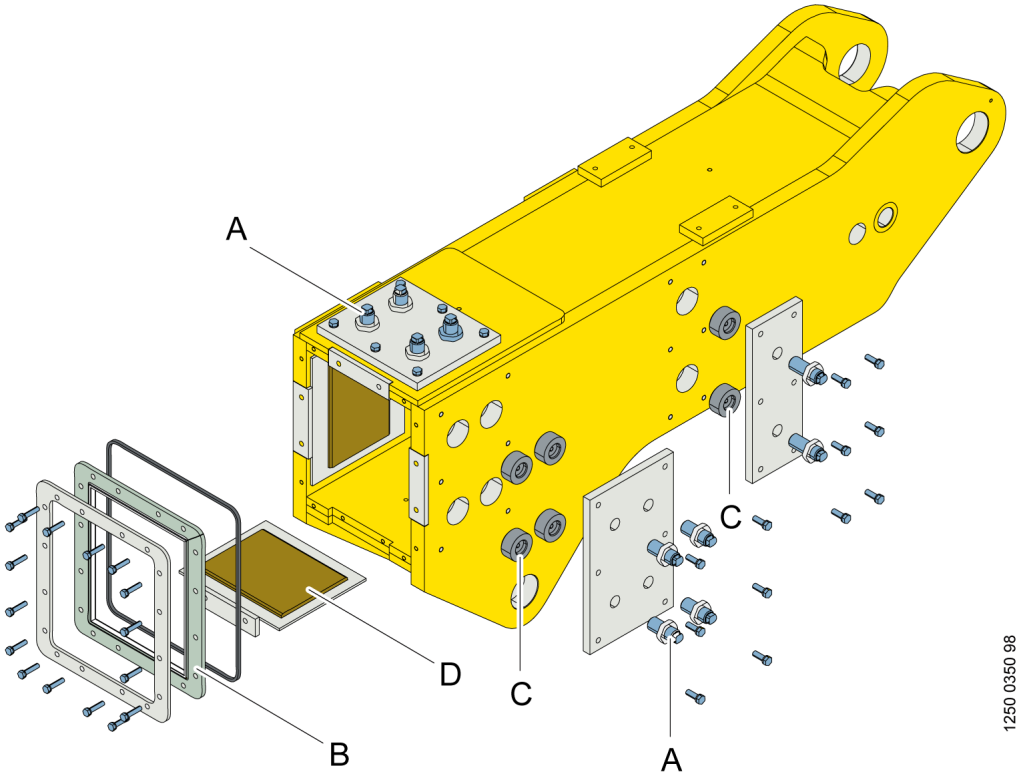


Figure 59 Checking the shims

1 Run the boom to horizontal position.

2 Detach all the mounting bolts (A) on the cover plates around the outer boom.

3 Remove the cover plates from the outer boom.

4 Take out the shims (C) using suitable tools.

5 Check the condition of the shims, replace them with new ones if necessary.

6 Reinstall the cover plates and mounting bolts in reverse order of the removal steps.

7.7 Replacing the wear pad of telescopic boom

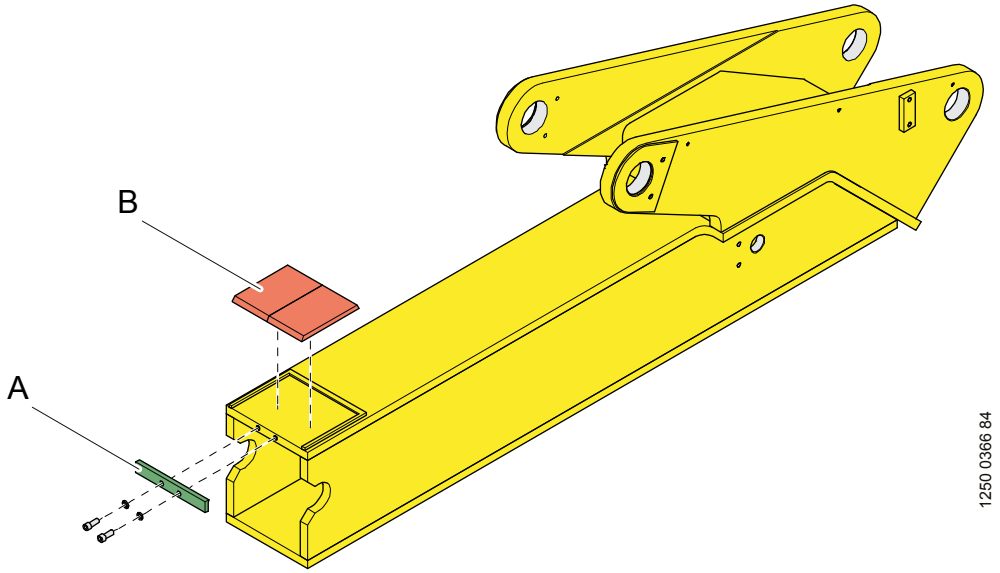


Figure 60 Replacing the wear pad of telescopic boom

1 Run the boom to horizontal position, the feeder to vertical position to support the extended boom.

2 Detach all the mounting bolts, seal and plates from the outer boom head.

3 Detach the mounting bolts from the outer boom and remove the cover plates.

4 Undo the screw to disassemble the stop plate (A).

5 Check the thickness of the wear pads (B), replace the wear pads with new ones while the thickness is less than 6 mm.

6 Reinstall the mounting nuts and plates. Replace the old seal with new one if necessary.

8 Track frames

8.1 Tensioning the crawler tracks

Track tension is checked between the front wheel (3) and support roller (1) when the drill rig is parked on a level surface with the tracks are under normal load.

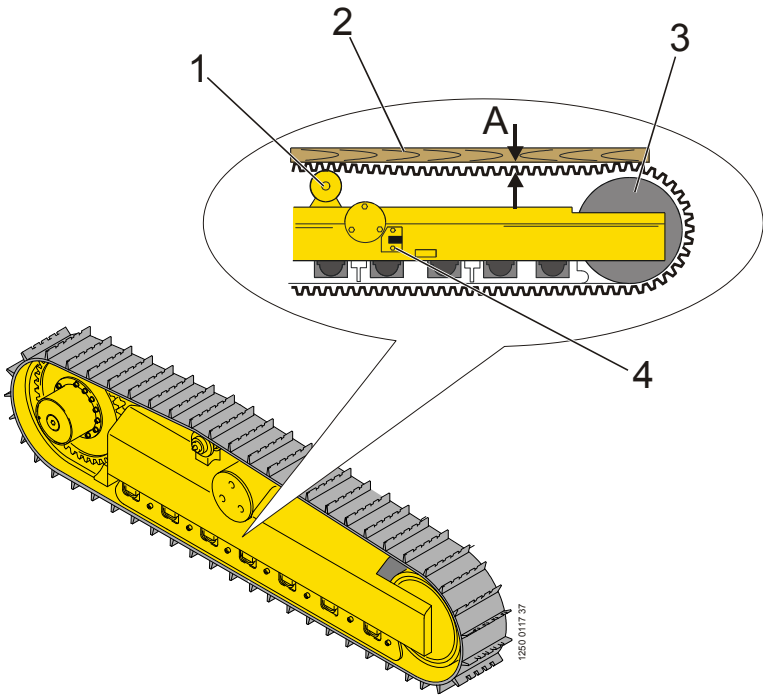


Figure 61 Crawler track

Note

The clearance (A) between the wooden plank and the crawler track should be between 5 to 15 mm (0.2 to 0.6 inch).

Note

The grease nipple should not be filled with grease during normal inspection.

---

1 Place a wooden plank (2) on top of each track.

2 Pack with grease via the nipple (4) to tension the track.

3 If necessary, grease can be removed from the tension cylinder by unscrewing the nipple (4).

9 Dust collector (DCT)

9.1 Checking the dust collector

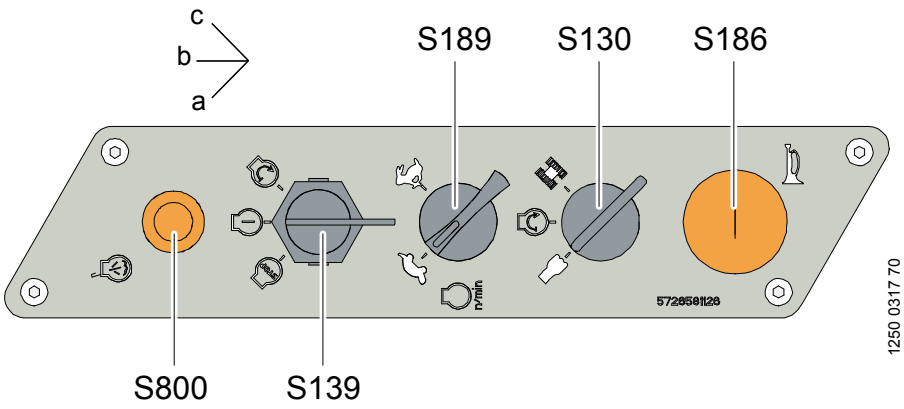


Figure 62 Engine control panel

1 Turn the ignition key (S139) to IGNITION position (b).

2 Turn the switch (S130) to DRILLING position (a).

Note

A timer starts as soon as drilling is terminated while activating DCT.

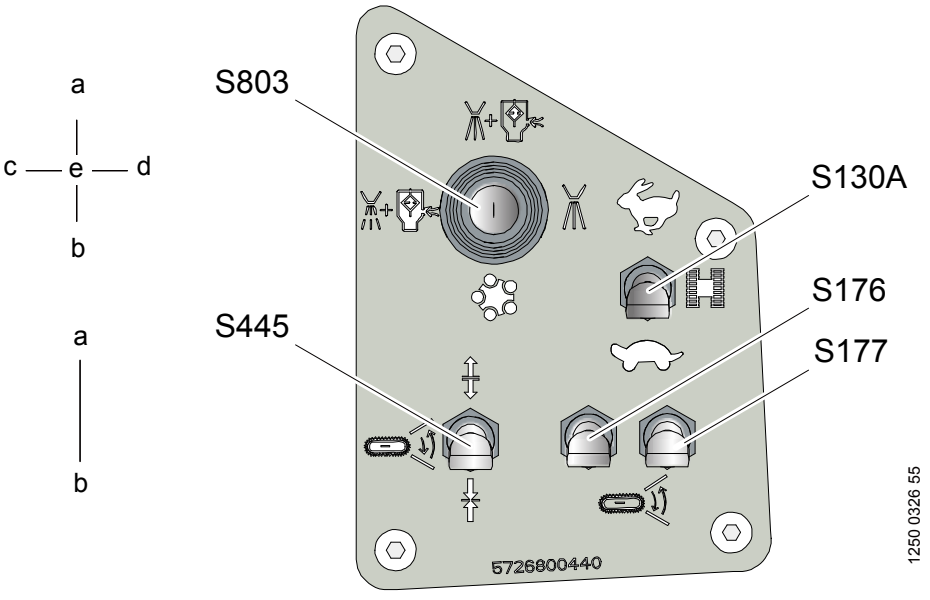


Figure 63 Tramming control panel

3 Operate the DCT/RHS control lever (S803) to REDUCED AIR, DCT ON position (c).

4 The LEDs on the air valves (A, B, C and D) flash at intervals.

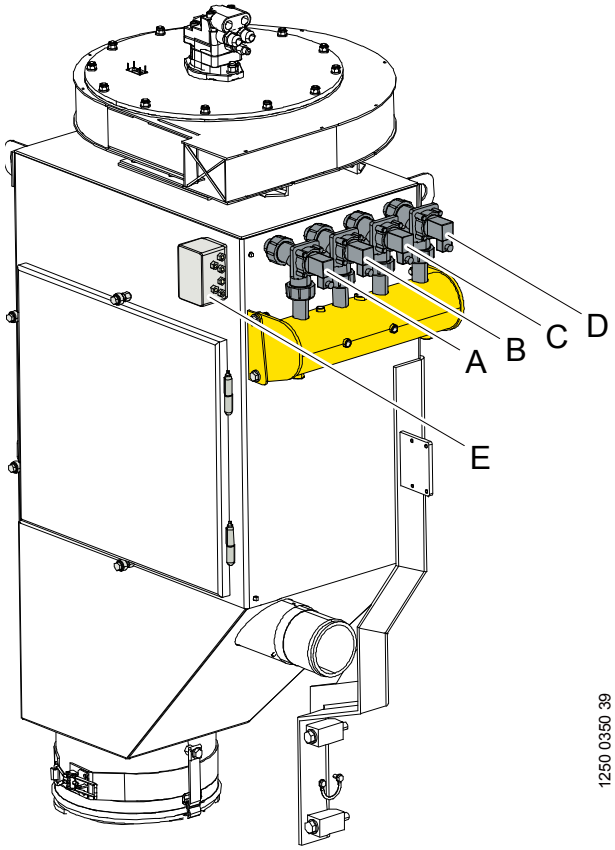


Figure 64 Dust collector (DCT)

5 Measure the pulse duration of one of the air valves (A, B, C or D). Adjust the time to 260 ms in the DCT control unit (E).

6 Measure the time between the pulse by air valve (A) and air valve (B). Adjust the pause time to 5 seconds in the DCT control unit (E).

- Extension of cleaning time.
  - All indicator flash at the same time. Count the number of pulses. Factory setting is 10 pulses/minute during the cleaning time.
- Cease drilling with reduced percussion activated, all the indicator diodes on the cleaning valve will flash at the same time.

9.2 Filter test, dust collector

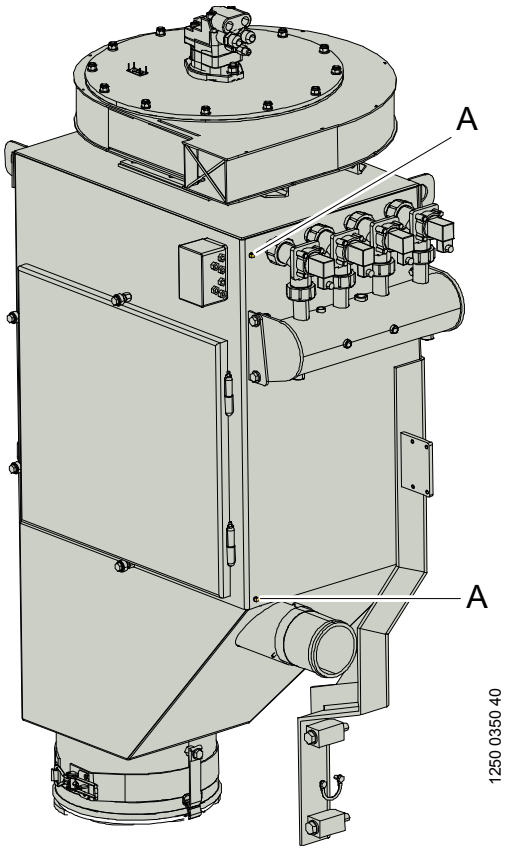


Figure 65 Measurement points for dust collector filter

For checking filters in dust collector. Unscrew plugs (A) and apply a differential pressure gauge to the two holes.

Measure the pressure drop while air flushing is activated. If the drop is greater than an 800 mm (wg) column of water, all the filters should be changed.

Note

If pump 3 does not maintain preset pressure it may be due to the dust collector filter being clogged.

If the dust collector is operated with a deficient filter then the fan wings are worn.

9.3 Adjust the suction capacity

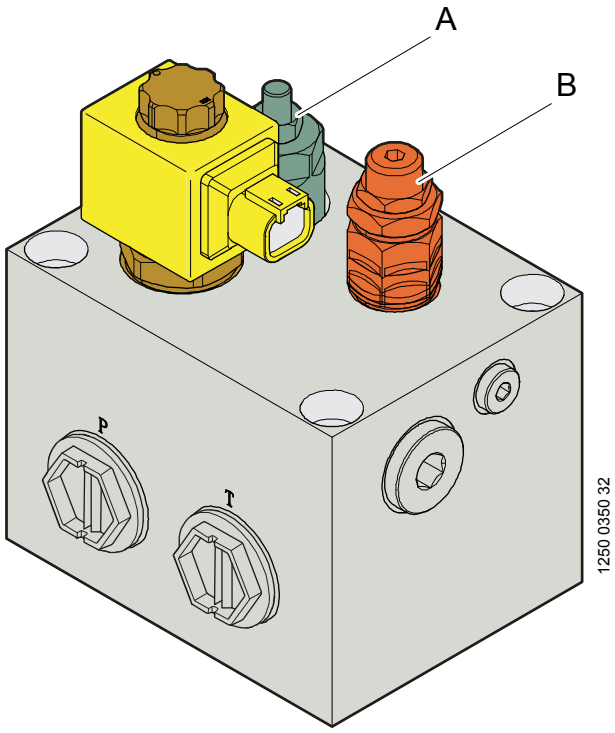


Figure 66 Valve block

The DCT's fan wheel is driven by pump 3.

Sometimes it is necessary to adjust the DCT's suction capacity. This is performed by adjusting the pressure for pump 3 on the valve block. The valve block is fitted on the DCT.

The pressure is adjusted with set screw (A) and the fan wheel's brake time is adjusted with screw (B).

You should aim for a distribution of 70% (preseparator) - 30% (DCT). Brake time should be 8 - 10 seconds. Factory setting 150 bar.

9.4 Dust collector filter change

The dust collector filters are located in the dust collector. Unscrew the nuts (A) to open the hatch and change all the filters.

Use a ring spanner to unscrew the filters. Screw the nuts on the bottom of the filters counterclockwise.

Recommended tightening torque when fitting the new filters is 12-15 Nm.

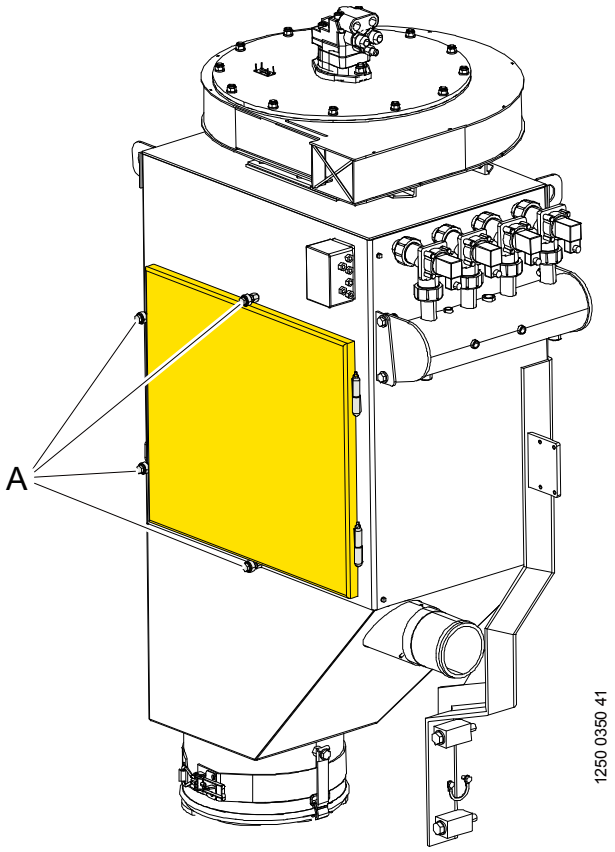


Figure 67 Dust collector

10 Radiator

10.1 Environmental issues when handling coolant

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Chemicals, e.g. flushing additives, other additives and coolants, can be environmentally hazardous.**
- **Treat in accordance with local regulations in force for both handling and waste disposal.**

10.2 Coolant

WARNING

- **Danger of scalding and pressure!**
- **Can cause serious personal injury.**
- **Release the pressure in the radiator before removing the radiator cap.**

10.2.1 General

The drill rig has two radiators. The right-hand radiator is for the compressor oil and hydraulic oil. The left-hand radiator is for the engine's coolant.

Checking and filling coolant takes place in a separate expansion tank. For the coolant used, refer to “Fluids and Lubricating Greases (SDE Nanjing)”.

Note

See separate instruction manual for details of diesel engine maintenance.

10.2.2 Check coolant level

Note

Never check the coolant level when the machine is running or hot.

Check the coolant level through sight glass (B), standing by the right side of DCT.

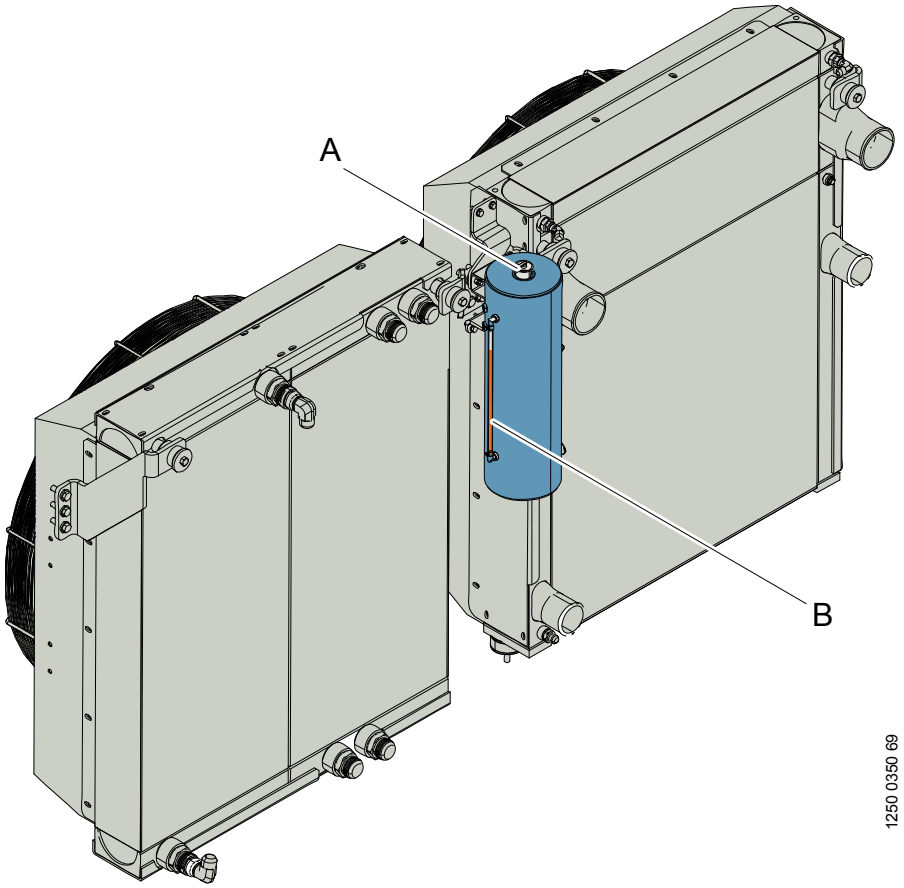


Figure 68 Radiator expansion tank

10.2.3 Adding coolant

1 Open the hatch on the canopy above the coolant tank.

2 Remove the cap (A) and then add coolant.

11 Diesel engine

11.1 Safety

WARNING

- **Danger of rotating parts!**
- **Hot engine and components.**
- **Can cause serious personal injury**
- **Maintenance work on the drill rig must only be carried out when the engine is switched off.**

11.2 Environmental issues when handling oil

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Leaking hydraulic connections and lubrication grease are environmentally hazardous.**
- **Changing oils, replacing hydraulic hoses and different types of filter can be environmentally hazardous.**
- **Always collect oil residue, oil spillage, waste with oil content, and lubrication grease residue and spillage. Treat in accordance with local regulations in force.**
- **Use biodegradable hydraulic fluids and lubrication oils for Atlas Copco products wherever possible. Contact your local Atlas Copco office for further information.**

11.3 Oil for the diesel motor

Note

See also the separate instruction manual for the diesel engine, for details of diesel engine maintenance.

Note

Top up if the oil level is below or level with the lower mark on the dipstick (see the "Fluids and Lubricating Greases (SDE Nanjing)").

1 Check that the oil level is between the upper and lower marks on the dipstick (A).

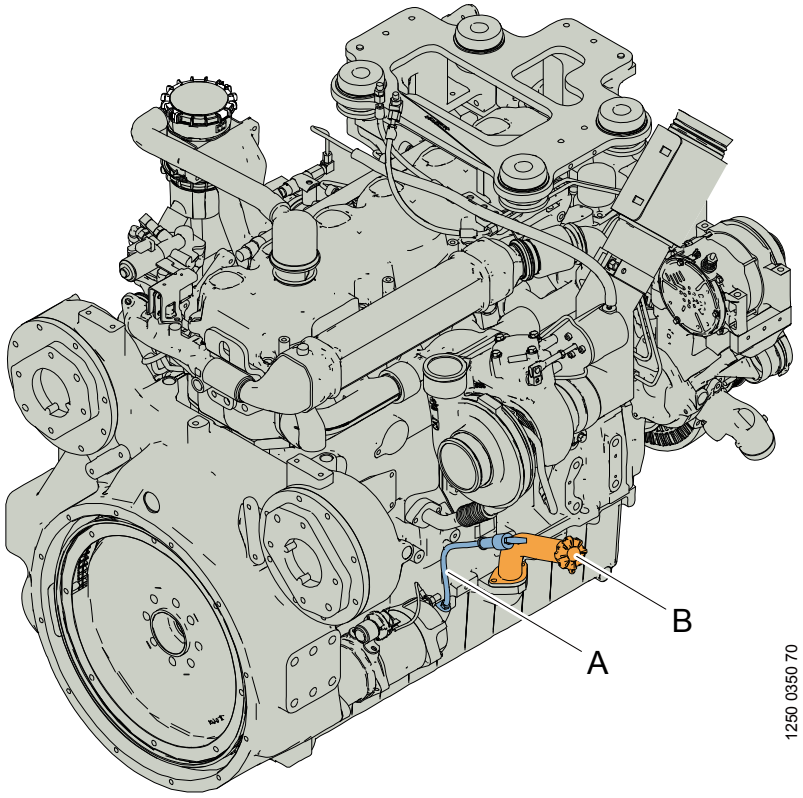


Figure 69 Diesel engine

2 Top up (B) if the oil level is below or level with the lower mark. (Refer to the diesel engine's maintenance manual for oil specifications.)

11.4 Maintenance of components

11.4.1 Air filter for engine and compressor, service intervals

The air filters consist of filter housing with cover, filter cartridge, safety cartridge, indicator and evacuation valve. Cleaning is carried out in two stages. The first stage comprises a cyclone and the second stage a normal filter. Both cleaning stages take place in the filter housing.

A filter's performance will improve right up until it becomes clogged. For this reason the filter cartridge should not be replaced at regular intervals, but only when it is clogged. The filter cartridges must never be cleaned as this impairs filtration and also risks damaging the filter element.

There is an indicator (15) fitted onto the pressure gauge panel to advise when the filter cartridge is clogged. The alarm lamp comes on if a filter starts clogging. The indicator must be checked every 1000th engine hour.

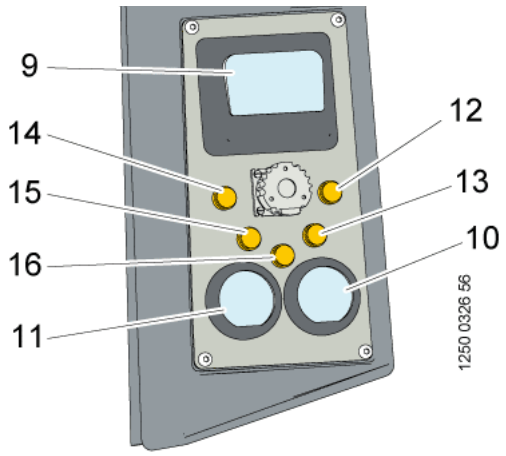


Figure 70 Pressure gauge panel

The discharge from the first stage of the cleaning flows through a single evacuation valve. This should preferably be checked once each shift.

The filter housing also contains a safety cartridge which must be replaced every third time the filter cartridge is replaced.

If maintenance and replacement at fixed intervals is necessary for any reason, which is not normally recommended, then the following guidelines apply.

Table 7 Intervals for filter maintenance

Hours	0	500	1000	1500	2000
Replacing filter cartridge and cleaning the filter housing	New	X	X	X	X
Replacing the safety cartridge	New	-	-	X	-
Indicator test	-		X		X

11.4.2 Air filter for engine and compressor, maintenance

Note

Never clean the filter cartridges.

When an evacuation valve is damaged, replace it. If the indicator for clogged air filter is still on, the safety cartridge must also be replaced.

Replacing the filter cartridge

1 Undo clamps (1) and remove the cover (2).

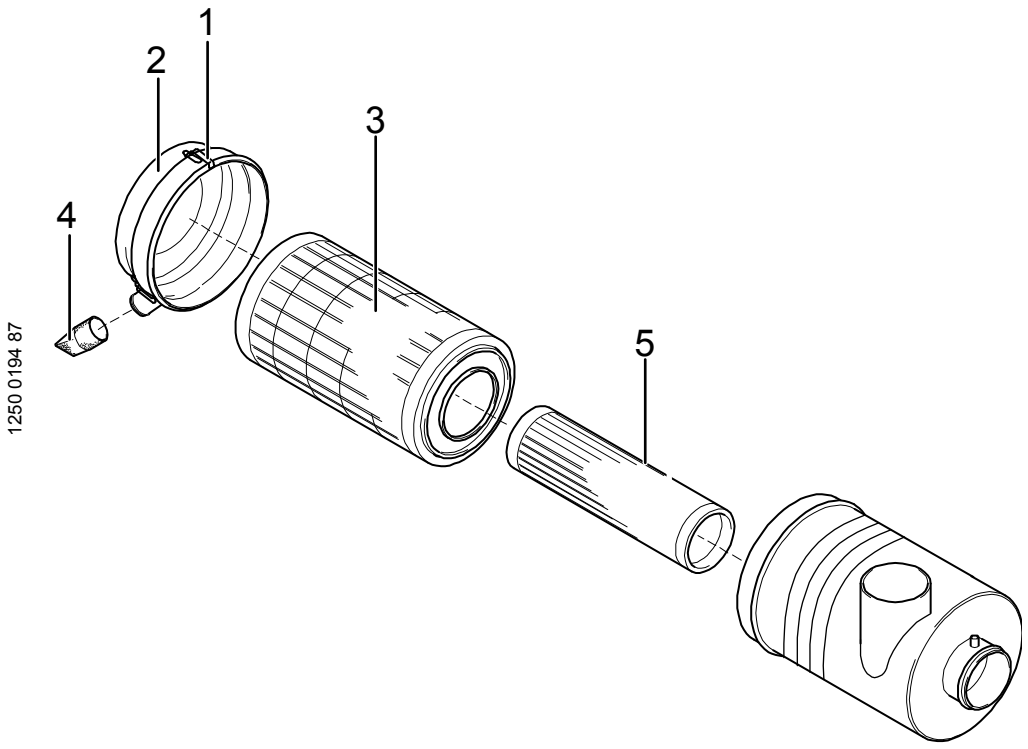


Figure 71 Air filter

2 Remove the main cartridge (3).

3 Clean inside the filter housing and lid with a clean, dry rag.

Note

If the safety cartridge has also been removed for changing, the filter housing air outlet must be completely covered with adhesive tape before cleaning the filter housing.

---

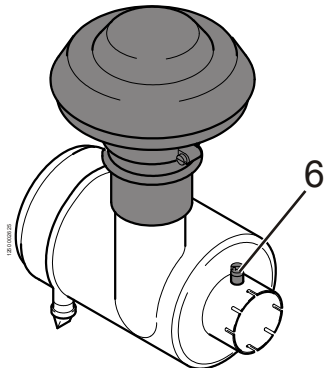
4 Check that the evacuation valve (4) is not damaged. Change it if necessary.

5 Remove any adhesive tape there may be on filter housing air outlet.

6 Install a new main cartridge and a new safety cartridge if required.

7 Refit the cover and fasten the clamps.

Checking the indicator



To ensure filter clogging is detected, the function of the indicator (6) must be checked regularly. This is done by gradually blocking the air intake with a piece of wood or similar. The indicator should then signal and the warning symbol should be visible, or the warning light should illuminate. If the warning does not indicate, start by checking the cable connections. If there are no problems with the connections, then the indicator is faulty and must be replaced.

Note

The indicator is not included in the filter housing, but is ordered separately.

Take care to use a whole and clean piece of wood so that dirt or other particles do not enter the filter housing.

11.4.3 Fuel system

Filter

There are three fuel filters for the diesel engine. A prefilter and two fine filters are located on the left of the engine. The prefilter has a loose insert that must be cleaned once a month. Change the filter insert if it is damaged.

The diesel engine fine filter must be changed and not cleaned.

Prefilter

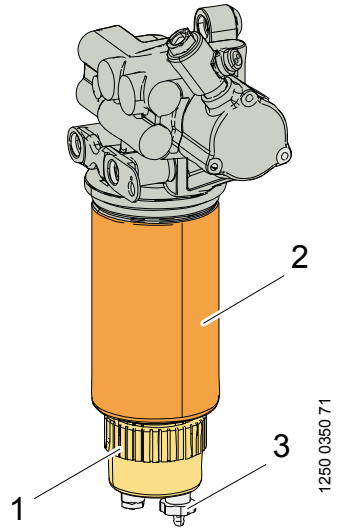


Figure 72 Prefilter

Draining

Drain the water from the prefilter container daily by opening the drain cock (3).

Changing fuel filter:

1 Remove the filter bowl (1) and clean with pure diesel fuel.

2 Remove the fuel filter (2) and clean the sealing surface on the base of the filter. Make sure all the remnants of the gasket have been removed.

3 Lubricate the new fuel filter gasket.

4 Screw on the new fuel filter on the base of the filter until the gasket makes contact with the filter base. Use the twist marks to aid tightening. Tighten the filter a further three quarters of a turn by hand. Do not tighten the filter too hard.

5 Screw the clean filter bowl (1) back in place.

Fine filter

1 Relieve residual fuel pressure from the fuel system before removing the filters.

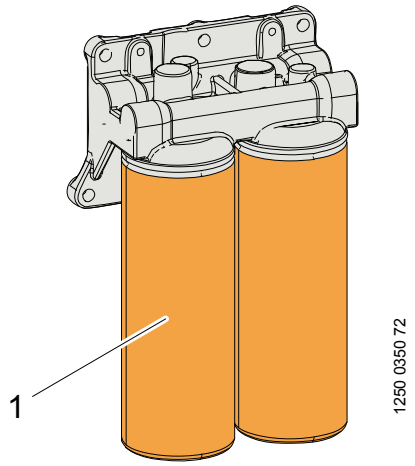


Figure 73 Fine filter

2 Unscrew the fuel filter (1) with a suitable tool and detach it.

3 Collect any residual fuel with a suitable container.

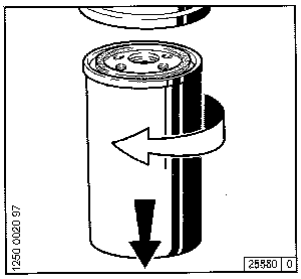


Figure 74 Changing fuel filter

4 Clean the filter holder sealing surface.

5 Lubricate the rubber seal of the new fuel filter.

6 Screw in the filter by hand until the gasket is home.

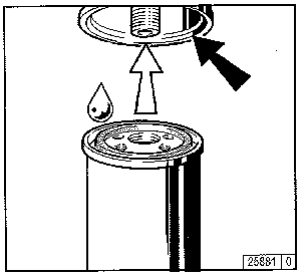


Figure 75 Changing fuel filter

7 Tighten the filter an additional half turn.

8 Check that the fuel filter does not leak.

11.4.4 Environmental issues when handling fuel

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Fuel spillage is environmentally hazardous and a fire risk.**
- **Always collect fuel residue and spillage. Treat in accordance with local regulations in force.**

11.4.5 Draining the fuel tank

WARNING

- **When performing maintenance on a rig, be aware that you will be working under a suspended load. Before starting work, the machine must be supported with appropriate jack stands.**

Always fill the fuel tank with fuel of the correct grade for the temperature.

1 Undo the front protective plate on the underside of the drill rig.

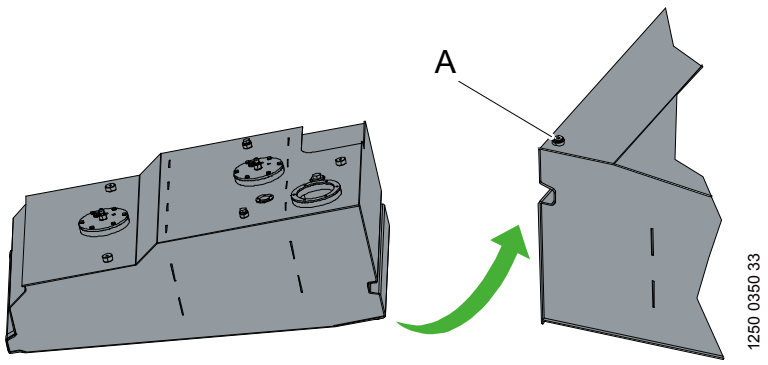


Figure 76 Drainage of diesel tank

2 Undo the bottom plug (A) by holding the nut with a ring spanner and unscrewing with an 8 mm Allen key. Allow the water to drain.

3 Use track oscillation to tilt the drill rig so that the tank drains completely.

4 Tighten the plug so the diesel oil cannot leak out.

11.4.6 Belts

Replacing the multi-belt

Make sure the engine is switched off.

1 Remove the belt cover.

2 Ease up on the belt tension by turning the tensioning wheel (A).

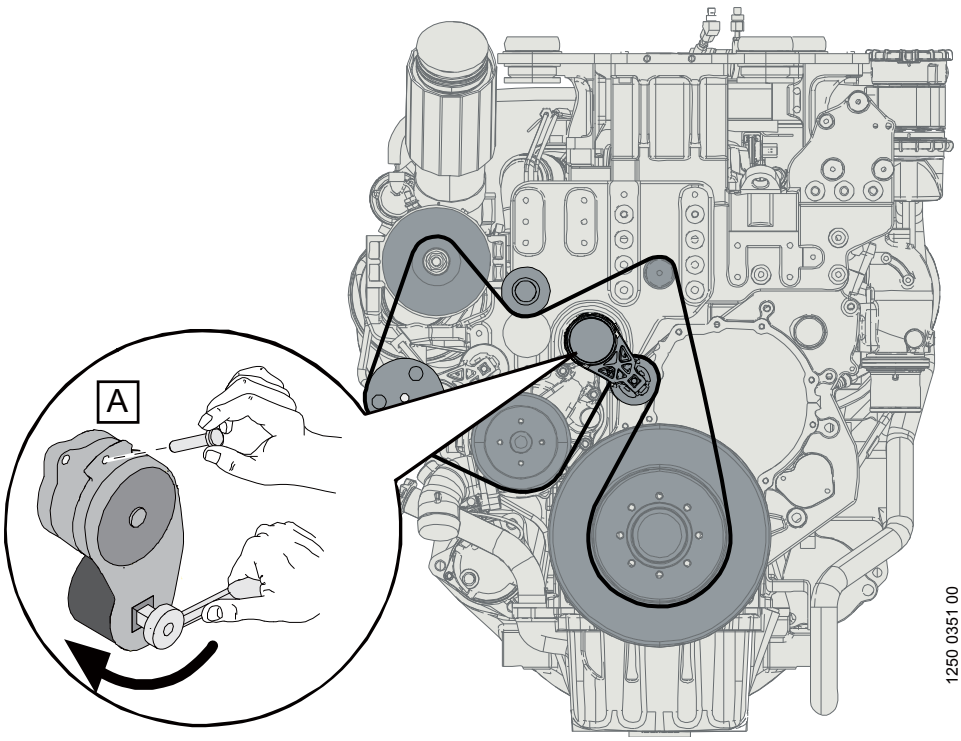


Figure 77 Belt tension C9.3

3 Lock the tensioning wheel in the position where the belt is slack using a pin.

4 Undo and pull out the four bolts (4) in the shaft coupling until there is play.

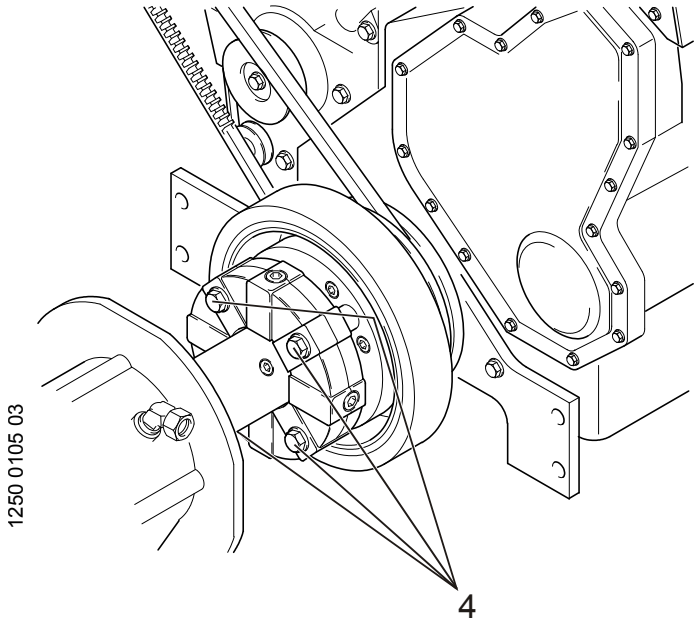


Figure 78 Undo the bolts

5 Replace the belt by inserting it through the clearance between the coupling rubber and the shaft flange.

6 Screw back the coupling rubber and tighten the bolts (185Nm).

7 The belt is tensioned automatically when the lock-out assembly is removed from the tensioning wheel.

8 Refit the belt cover.

11.4.7 For further instructions, see separate instructions for the diesel engine.

12 Compressor and air system

12.1 Safety

WARNING

- **High system pressure.**
- **Can cause personal injury.**
- **Never perform maintenance work while the drill rig is operating.**
- **Make sure that the hydraulic, water and air systems are depressurized and that the electrical system is de-energized before starting work on the rig.**
- **The use of incorrect or used oil may involve a risk of fire or explosion in the compressor system.**

The compressor may emit pressure up to 17 bar. The compressor oil must cool down before work on the compressor is started. The oil can reach temperatures of 120 °C during operation. When replacing air hoses, use only Atlas Copco original hoses, or consult Atlas Copco. In the event of a suspected leakage you must absolutely not use your hands to detect/search for the leakage. Such a procedure could lead to immediate fatality.

Hoses must be considered as consumable items. For this reason, all hoses between compressor and pressure tank must be replaced at a maximum interval of 5 years.

12.2 Compressor description

The rig is equipped with a single-stage screw compressor which is driven by the diesel engine. The compressed air from the compressor flows to an air receiver which also functions as an oil separator. The majority of the oil is removed in the air tank by means of centrifugal force. The remainder is separated in an oil separator element in the air receiver. The separated oil is collected in the lower section of the air receiver, which functions as an oil tank.

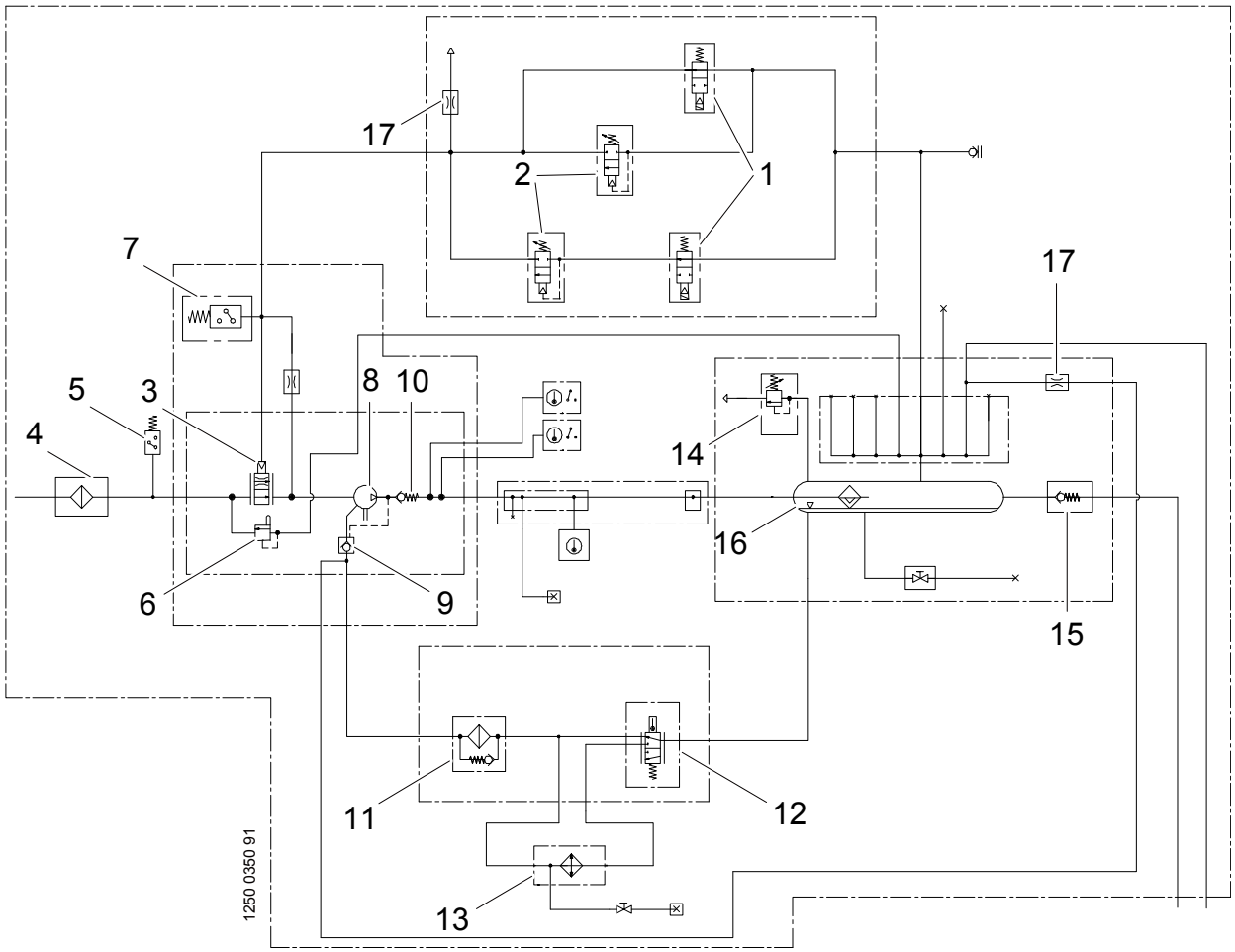


Figure 79 Compressor system diagram

1 Loading valves Y210A and Y210B
2 Control valves
3 Intake valve
4 Air filter
5 Air filter switch
6 outlet valve
7 Air pressure switch
8 Compressor
9 Oil stop valve
10 Check valve
11 Oil filter
12 Thermostat
13 Radiator
14 Safety valve
15 Minimum pressure valve
16 Pressure tank
17 Restriction

12.3 Maintenance

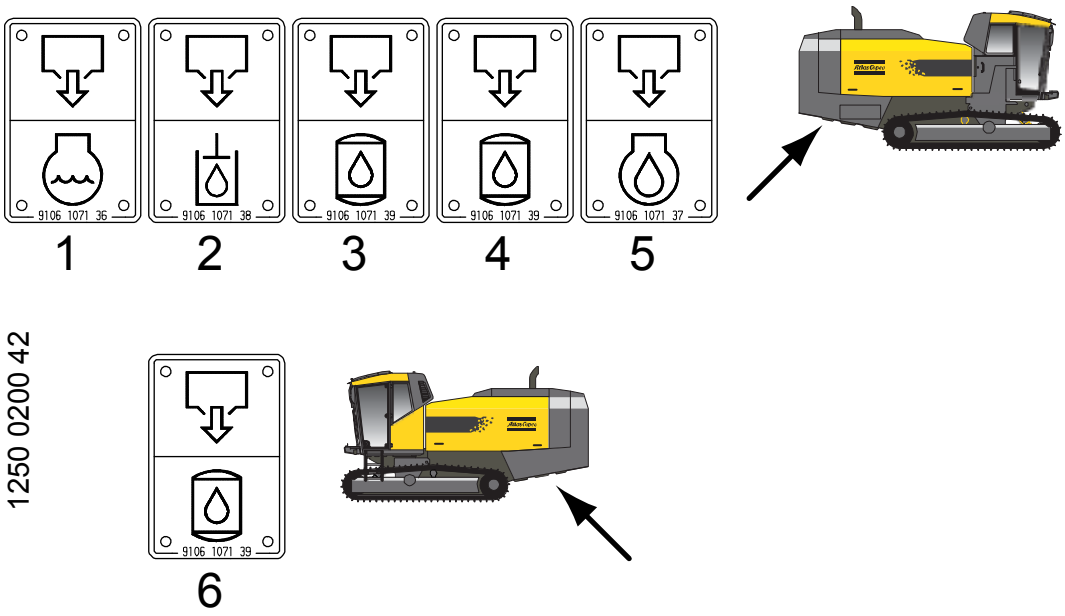


Figure 80 Right and left-hand draining points

1 Engine radiator
2 Hydraulic oil cooler
3 Compressor cooler
4 Compressor element
5 Engine oil
6 Compressor tank
7 Oils and fuel

12.3.1 Draining the condensate in the pressure tank

The pressure tank must be drained of condensate daily, preferably before the start of the work shift. The rig must have been switched off for at least 1 hour. Draining is performed from plug 4 at the draining point on the left-hand side of the rig.

12.3.2 Checking the oil level

Check the oil level daily.

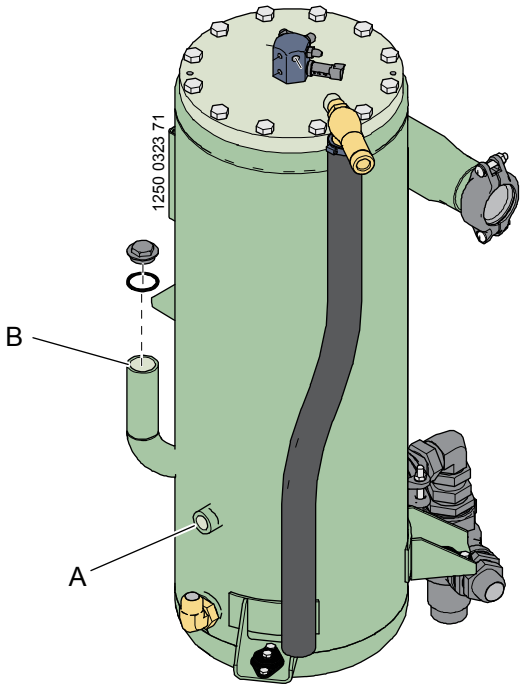


Figure 81 Pressure tank

1 Make sure the rig is standing level.

2 Switch off the rig and allow the oil level to settle for at least 5 minutes.

3 Check the compressor oil level. The indicator on the gauge (A) must be in the green zone.

4 Fill with oil at (B), if required.

Note

Never fill with too much oil. Overfilling results in high oil consumption. Take care to use the correct oil grade. See "Fluids and Lubricating Greases (SDE Nanjing)".

12.3.3 Changing oil and oil filter

The intervals for oil change are determined by oil grade and operating temperature. The prescribed interval (see maintenance schedules) is based on an oil temperature of up to 120 °C and normal operating conditions. Oil should be changed more frequently when working in high ambient temperatures or very dusty or damp conditions.

1 Run the compressor to operating temperature. Confirm that the pressure is zero by reading the pressure in the control system, or by reading the pressure gauge (10).

2 Drain the oil through the removed drain plugs for compressor tank, compressor cooler and compressor element. Collect the oil in a receptacle. Screw out the filter plug to speed up the draining. Tighten the plugs after draining.

3 Remove the oil filters, for example by means of a special tool. Collect the oil in a receptacle.

4 Clean the filter seat on the manifold using oil, and make sure that no dirt falls down into the system. Lubricate the gasket on the new filters. Screw the filters in place until the gasket makes contact with the seat. Then screw a further half turn.

5 Fill the air receiver until the oil level reaches the filler pipe. The indicator on the gauge (A) must be in the upper section of the green zone. Make sure that no dirt falls down into the system. Fit and tighten the filler plug once again.

6 Operate the unit without any load for several minutes in order to circulate the oil and force out any air in the oil system.

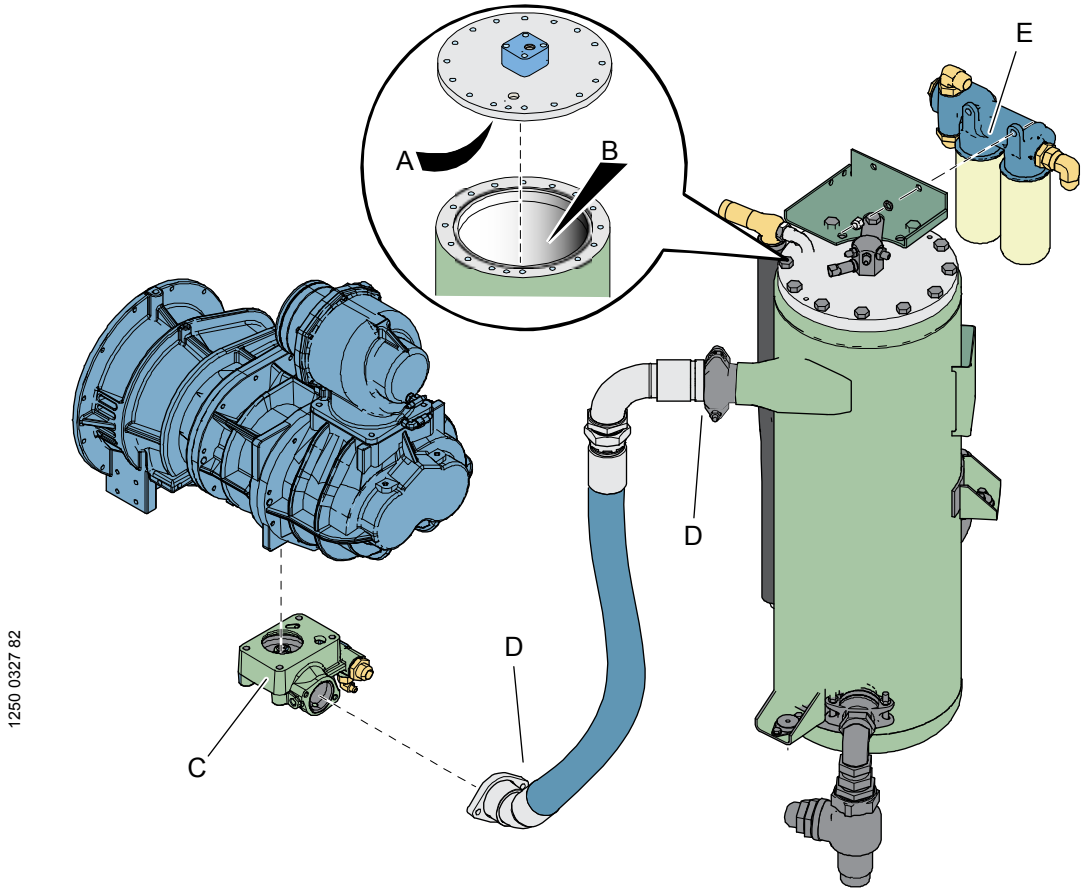
7 Stop the compressor. Allow the oil to settle for several minutes. Check that the system is depressurized. Unscrew the filler plug (B) and fill with oil until the indicator on the oil level gauge (A) is once again in the green zone. Fit and tighten the filler plug once again.

Note

If the oil has been destroyed due to the use of incorrect oil or excessive temperature, or overextended operating time following the latest change, then the system must be flushed clean before new oil is filled. This is carried out by changing the oil and oil filter, then allowing the compressor to be loaded for about half an hour, and then changing the oil and oil filter once again. The oil stop valve must also be inspected and cleaned.

Never fill with too much oil. Overfilling results in high oil consumption.Take care to use the correct oil grade. See “Fluids and Lubricating Greases (SDE Nanjing)”.

12.3.4 Compressor flushing



1 A = Underside of reservoir cover plate
2 B = Inside of reservoir
3 C = Oil stop valve
4 D = Hose connections
5 E = Oil filter

1 First of all, the system must be drained thoroughly when the oil is hot so that as little oil as possible is left in the system, especially in inaccessible areas. If possible the oil system must also be pressure washed so that the remaining oil will be blown out. See step 1 and 2 under the heading "*See 12.3.3 Changing oil and oil filter*" for detailed description.

2 Remove the oil filters (E).

3 Open the cover plate on the air reservoir and remove the oil separator element.

4 Check the inside of the oil reservoir. If sediments are detected, the parts (A-D) must be thoroughly cleaned before the procedure is completed. Contact Atlas Copco's service department.

5 Insert a new oil separator element, screw on the new oil filter and close the valve in accordance with the instructions under heading "*See 12.3.3 Changing oil and oil filter*".

6 Fill the oil reservoir with the minimum amount of oil permissible and run the compressor unloaded in light mode for 30 minutes.

7 Drain the system thoroughly when the oil is hot so that as little oil as possible is left in the system, especially in inaccessible areas. If possible the oil system must also be pressure washed so that the remaining oil will be blown out.

8 Fill the system to full level.

9 Run the compressor unloaded in light mode for 15 minutes and check for leaks.

10 Check the oil level and fill if necessary.

11 Collect all surplus lubricant and discard it in accordance with regulations for handling waste lubricants. See the chapter "*See 13 Oil and fuel*" in the maintenance instructions.

12.3.5 Cleaning the oil cooler

Keep the compressor oil cooler clean using compressed air in order to maintain efficient cooling.

12.3.6 Test pressurizing the safety valve

1 Load the compressor by operating switch S130 in DRILLING position.

2 Note the current pressure on the pressure gauge.

3 Adjust the regulator until the safety valve is triggered. The pressure must then not have exceeded 17 bar.

4 Adjust the regulator so that the pressure returns to the previous value.

Note

The regulator must not be adjusted during drilling.

Under no circumstances may the set pressure of the safety valve be changed to a pressure other than that stamped on the valve.

12.3.7 Disassembling the compressor

1 Disconnect the hoses between the pressure tank and pumps.

2 Detach the pressure tank set from the chassis.

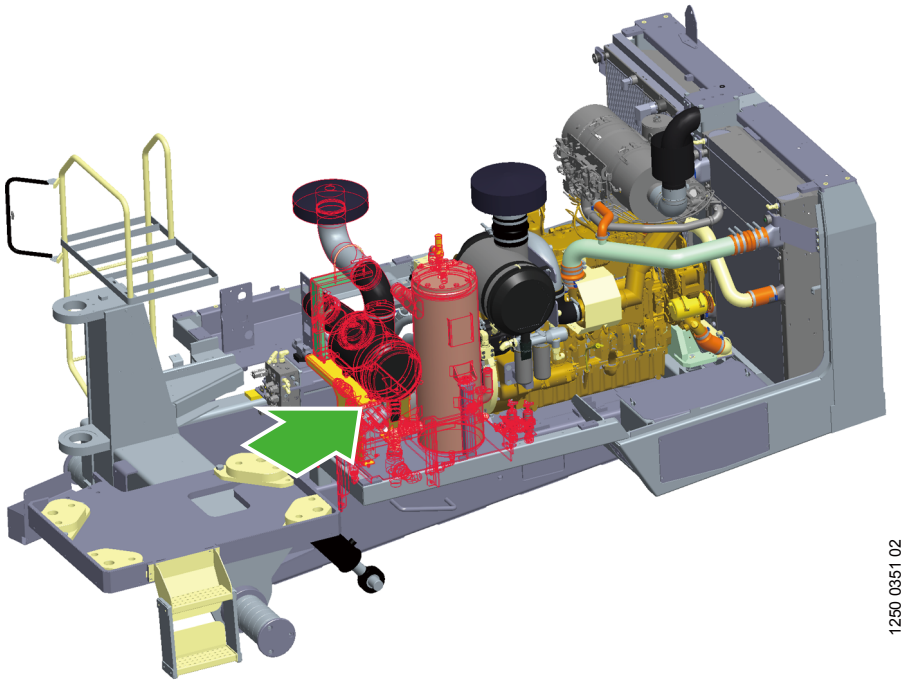


Figure 82 Disassembling the pressure tank set

3 Put a support under the flywheel housing before detaching the compressor.

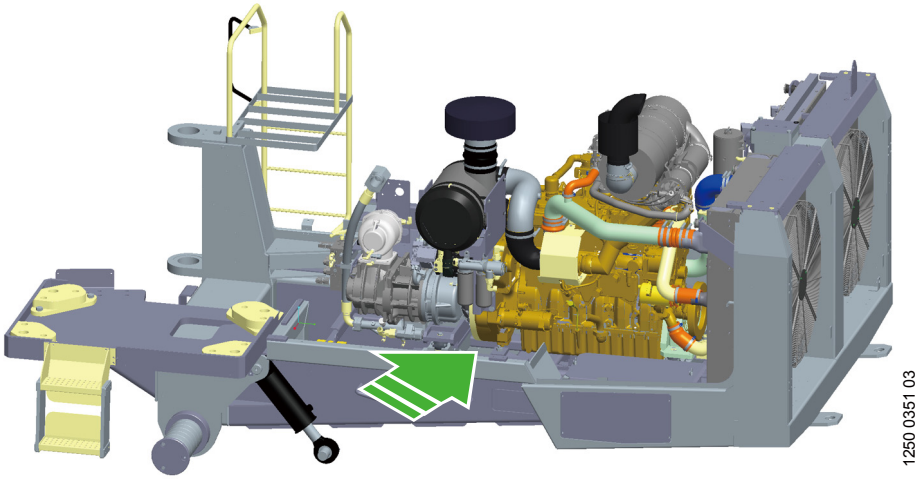


Figure 83 Putting support under flywheel housing

4 If there’s no proper support can be used, adjust the bolt to support the flywheel housing.

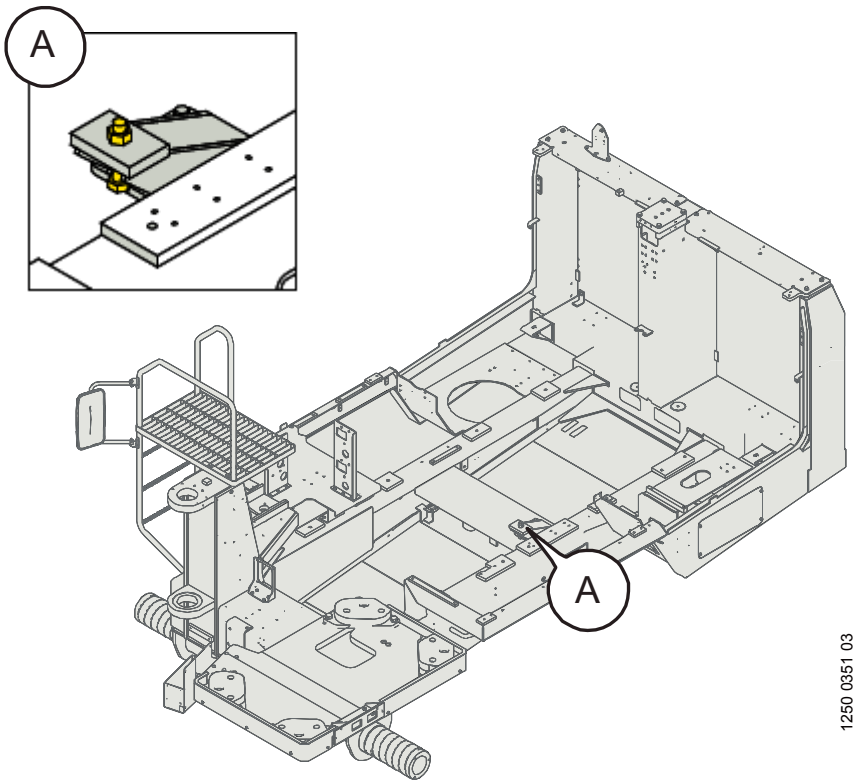


Figure 84 Adjusting bolt

5 Undo the bolt (B) from the both sides of compressor.

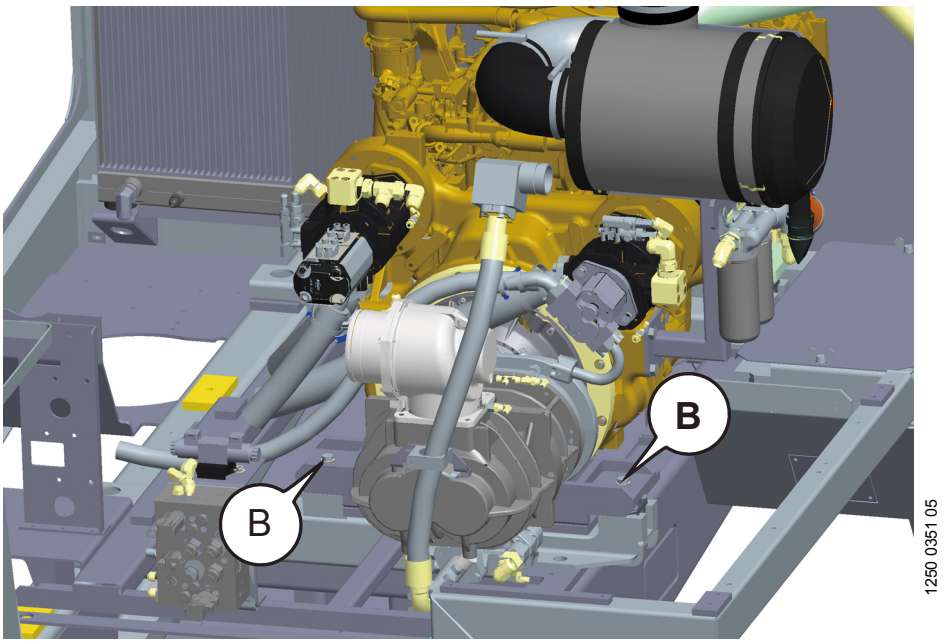


Figure 85 Bolts for mounting the support

6 Remove the hoses that connect to the compressor.

7 Undo the bolts (C) from the air end.

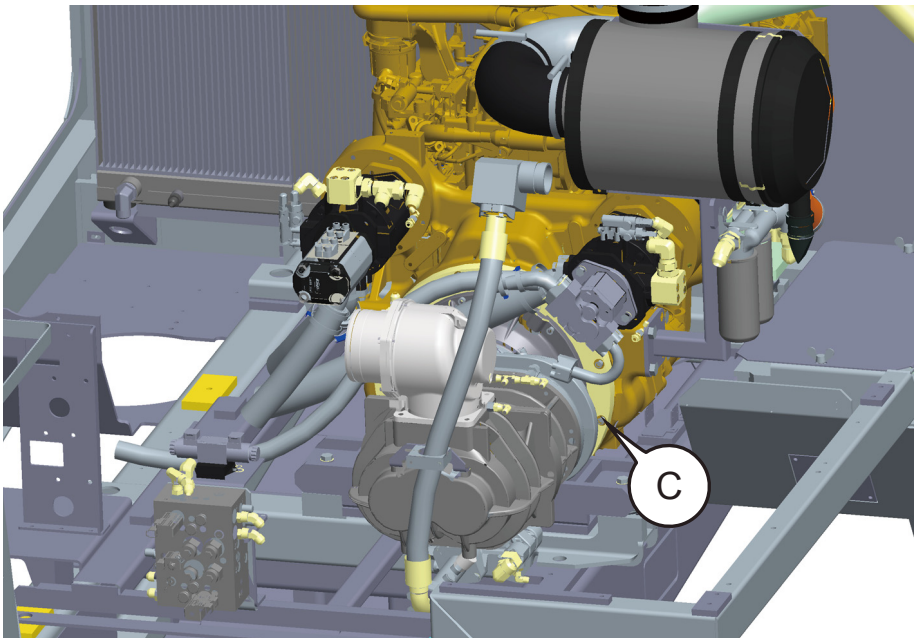


Figure 86 Mounting bolts

8 Pull out the compressor for approximately 150 mm.

9 Lift the compressor using crane or other proper tools.

12.4 Control system

12.4.1 System description

The control system consists of:

- Regulator valves
- Loading valves (solenoid valve) Y210A and Y210B
- Flushing air valve Y115
- Flushing air valve Y116

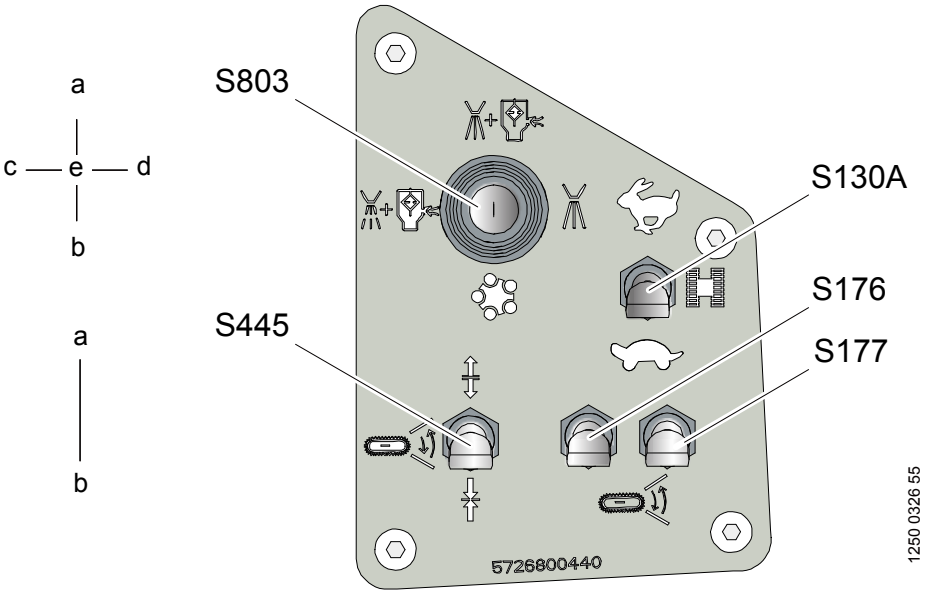


Figure 87 Tramming control panel

When the compressor is unloaded the loading valve (Y210A) is unactivated. When the compressor is loaded (S130 in the cabin) solenoid valve Y210A will be activated and direct the air over the regulator.

In drilling mode, when reduced air is activated (S803 in position c), the solenoid valves Y210B and Y115 are not activated and air flows via the solenoid valve Y116 and can be regulated with a control valve.

In drilling mode, when full air flushing is activated (S803 in position a), the solenoid valves Y210B and Y115, Y116 are activated and the air flows via Y115 and Y116 and can then be regulated with a control valve. The factory setting for the full air pressure is 10±0.5 bar.

12.4.2 Problem solving

The table for fault finding assists in solving mechanical problems.

It is assumed that the diesel engine is in good condition.

	Problem		Possible faults		Steps to Take
1	The compressor is loaded automatically to full capacity after starting.	a	The loading valves (1) have jammed in load position.	a	Remove and check the loading valves. Replace the valves if necessary.
		b	The intake valve (3) has jammed in open position.	b	Remove the air filters, air intake manifold and the intake valve's spring housing. Pull out and insect the intake valve. Replace parts if necessary.
		c	Air is leaking in the control system.	c	Check hoses and connections. Stop the leakage, replace leaking hoses.
		d	Freezing problems in the control circuit	d	Check the magnet and valve. Rectify or replace if necessary.
2	Compressor does not provide air when the loading valve has been activated.	a	Control valve diaphragm is cracked.	a	If the ventilation unit blows air, remove and fit the control valve. Replace the diaphragm.
		b	The intake valve (3) has jammed in closed position.	b	See adjustment procedure 1b.
		c	The loading valves are faulty.	c	Check the loading valves. Rectify or replace if required.
3	Excessive oil consumption. Oil mist emerges from the drill bit. Compressor oil in the DCT filter and cleaning valves.	a	Oil level too high.	a	Ease the pressure, wait for approximately 10 minutes and drain the oil to the correct level.
		b	The restriction (17) in the oil flushing line (AP8) is blocked.	b	Remove the hoses and clean the restriction.
		c	Oil separator filter faulty.	c	Allow a service technician from Atlas Copco to remove and inspect the oil filter.

	Problem		Possible faults		Steps to Take
4	Compressor capacity or pressure below normal	a	The air consumption exceeds compressor capacity.	a	Check the connected equipment with regard to leakage.
		b	Blocked air filter element.	b	Remove and inspect the air filter elements. Replace if necessary.
		c	The control valves (2) are opened too early or is faulty.	c	Adjust the control valve. Remove and inspect parts if the valve does not respond. Replace where required.
		d	The diesel engine does not reach maximum engine speed.	d	Check and rectify the diesel engine if necessary.
		e	The loading valve is leaking.	e	Disconnect the hose to the ventilation unit from the valve while the compressor is operating at maximum load speed. If air is leaking, remove and inspect the valve. Replace damaged or worn O-rings.
		f	Oil separator filter blocked.	f	Change filter.
		g	The intake valve (3) for the air intake is still partially closed.	g	Remove the air filters, air intake manifold and the intake valve's spring housing. Pull out and inspect the intake valve. Replace parts if necessary.
		h	The safety valve (14) is leaking.	h	Remove and inspect the safety valve. Replace if the valve is not air tight after re-installation.
		i	The outlet valve (6) is leaking.	i	Remove and inspect the outlet valve. Replace the valve if necessary.

	Problem		Possible faults		Steps to Take
5	Air and oil mist is escaping from the air filters (4).	a	If it is mainly air: check the check valve (10) for excessive leakage or faults.	a	Remove the valve and inspect. Replace the valve if necessary. Replace the air filter element and safety cassettes. Check the oil level and fill with oil if required. Operate the unit for several minutes, stop and check the oil level again.
		b	If it is mainly oil: the oil stop piston is jammed or the oil stop valve (9) is jammed in open position.	b	See adjustment procedure 6a.
6	The compressor is overheated.	a	Insufficient compressor cooling.	a	Check the fan speed.
		b	The radiator (13) is blocked externally.	b	Clean the oil cooler.
		c	The radiator (13) is blocked internally.	c	Contact Atlas Copco.
		d	Oil level too low.	d	Before checking the oil level, wait for about 10 minutes after the unit has stopped. Fill with oil if required.
		e	The thermostatic pressure relief valve (12) stalls in closed position.	e	Remove and check the thermostatic pressure relief valve for correct opening and closing temperature. Replace the valve in the event of incorrect function.
		f	Faulty cooling fan.	f	Replace the fan.
		g	The oil stop valve (9) is closed.	g	Remove and inspect the oil stop valve. Replace if necessary.
		h	The check valve (10) is leaking.	h	Remove and inspect the drain valve. Replace if necessary.
		i	Faulty temperature sensor.	i	Replace the temperature sensor.
	(Air emission temperature above normal value)	j	Compressor element (8) not in order	j	Consult with Atlas Copco.

13 Oil and fuel

13.1 Environmental issues when handling fuel

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Fuel spillage is environmentally hazardous and a health risk.**
- **Always collect fuel residue and spillage. Treat in accordance with local regulations in force.**

13.2 Filling fuel

Turn off the engine before topping up the fuel. Do not handle fuel in the vicinity of hot surfaces, sparks or naked flames.

Cleanliness is important when filling with fuel. Ensure that the tank and tank cover are clean. Fuel should not be added if there is a risk that it is contaminated, for example in windy or wet weather, or when there is dust in the air.

Fuel which is stored must not have contact with the air, but should be stored in a closed vessel. The vessel must be approved for its purpose and shall be clean.

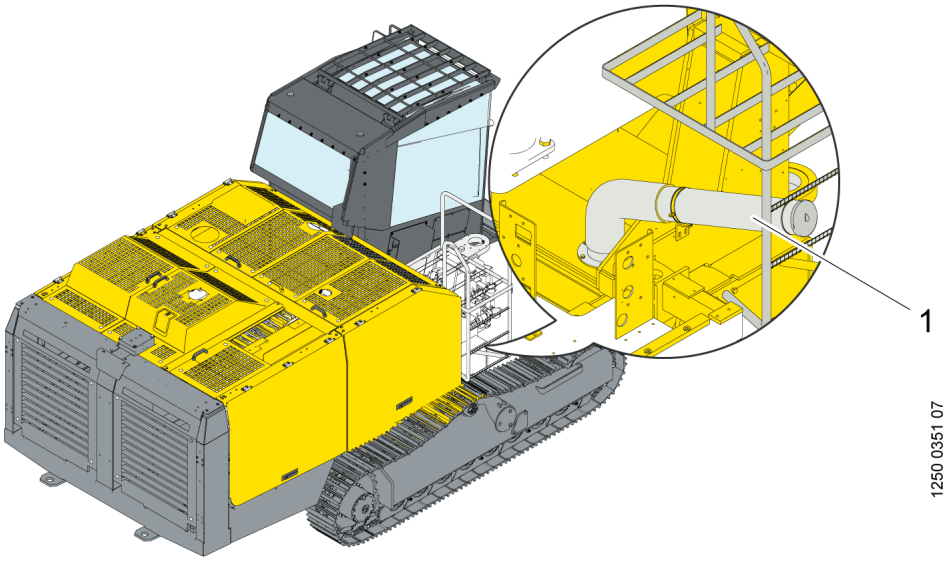


Figure 88 Filling fuel

1 Location of fuel filler orifice

Note

Use fuel with specifications complying with the engine manufacturer's recommendations.

13.3 Environmental considerations when handling oil

ENVIRONMENTAL DIRECTIONS

- **Think of the environment!**
- **Leaking hydraulic connections and lubrication grease are environmentally hazardous.**
- **Changing oils, replacing hydraulic hoses and different types of filter can be environmentally hazardous.**
- **Always collect oil residue, oil spillage, waste with oil content, and lubrication grease residue and spillage. Treat in accordance with local regulations in force.**
- **Always use biodegradable hydraulic fluids and lubrication oils for Atlas Copco products wherever possible. Contact your local Atlas Copco office for further information.**

13.4 Compressor oil

WARNING

- **Danger of rotating parts!**
- **Hot engine and components!**
- **Can cause serious personal injury.**
- **Maintenance work on the drill rig must only be carried out when the engine is not running.**

Check the oil level daily.

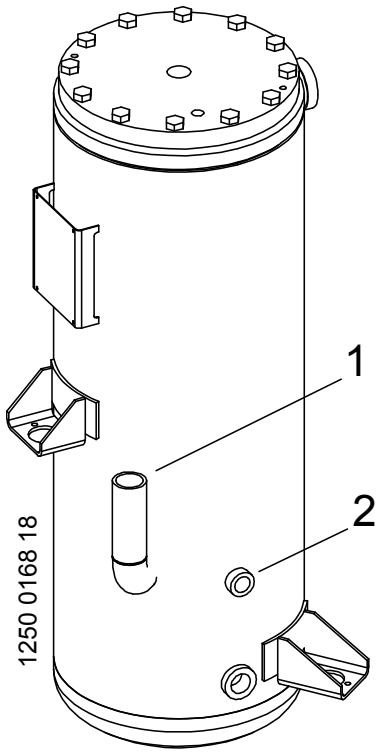


Figure 89 Compressor tank

1 Make sure the rig is standing level.

2 Switch off the rig and allow the oil level to settle for at least 5 minutes.

3 Check the compressor oil level. The indicator (2) on the gauge must be in the green zone.

4 Fill with oil through the filler (1) if required (refer to “Fluids and Lubricating Greases (SDE Nanjing)”).

Note

Never fill with too much oil. Overfilling results in high oil consumption.

13.5 Oil sampling

An oil sample gives a good indication of how well the hydraulic system has been maintained.

13.6 Hydraulic oil

13.6.1 Filling hydraulic oil manually

CAUTION

- **Protect your eyes from hydraulic oil**
- **Use protective goggles**

1 Check hydraulic oil filter restriction indicator to ensure the oil filter work normally.

2 Make sure all the couplings and hoses normally filled with oil are clean.

3 Pump manually with the hand pump (A).

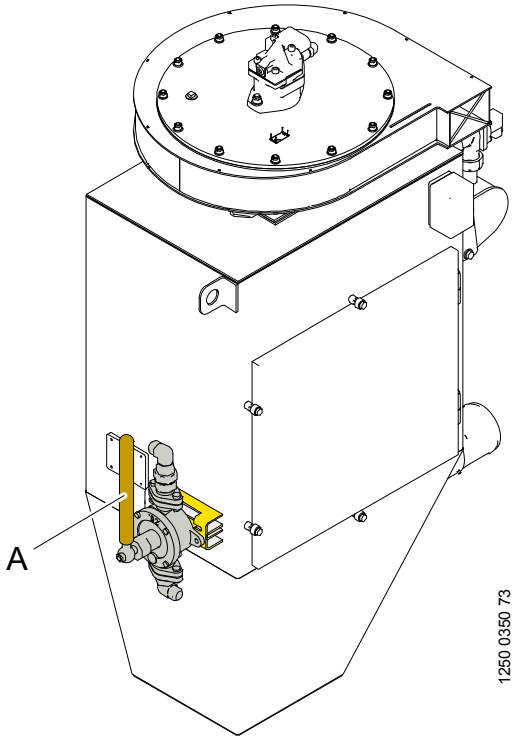


Figure 90 Hand pump

4 The hydraulic oil level can be read in the sight glass on the front of the hydraulic oil tank. The lower sight glass (1) should be full and the upper sight glass (2) should be half full.

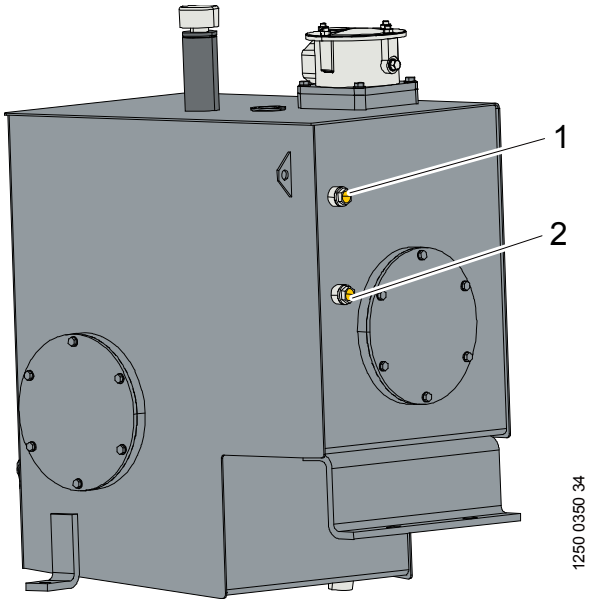


Figure 91 Hydraulic oil tank

Note

Do not fill too much hydraulic oil as it can clog the breather filter

13.7 Changing hydraulic oil

13.7.1 General

The hydraulic oil need not be changed as long as filter changes have been carried out as directed and oil cooling has been working satisfactorily. If oil samples show signs of oxidation or high water content, however, the oil must be changed.

13.7.2 Draining

1 Underneath the hydraulic oil tank is a ball valve (A). On the ball valve there is a steel cover. Remove the steel cover.

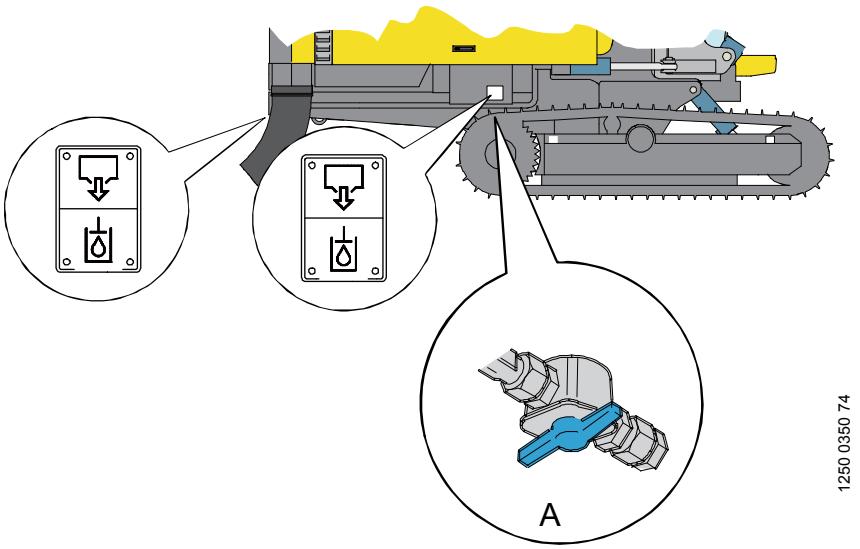


Figure 92 Ball valve underneath hydraulic oil tank

2 Screw a hose to the ball valve and place the other end of the hose into an empty oil drum.

3 Drain the oil from the tank by opening the ball valve.

4 Close the ball valve once the oil has stopped running out of the hose.

5 Unscrew the hose.

6 Screw back the steel cover to protect the ball valve.

13.8 Lubrication

The lubricating oil tank is mounted on the left of the vehicle frame.

Note

If the lubricating system oil is drained completely the system will have to be bled. So make sure that the tank is never emptied more than three-quarters, i.e. that it is always at least one-quarter full.

---

1 Make sure the level is always above the 2nd sight glass from the bottom.

2 Top up (A) if necessary (Refer to “Fluids and Lubricating Greases (SDE Nanjing)”).

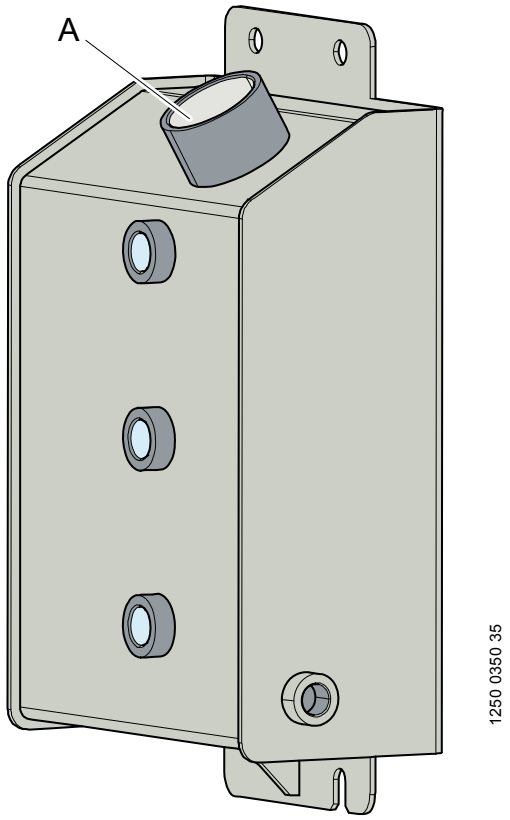


Figure 93 Lubricating oil tank

Note

Always use a funnel with strainer when refilling.


Atlas Copco