Original Instructions

QJ341

Operator's Manual

SANDVIK

QJ341

Document number: ID: QJ341-en-01/07/2011

Issue: 01/07/2011

Version: 1

Sandvik
Hearthcote Road, Swadlincote, Derbyshire, DE11 9DU, United Kingdom
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www.sandvik.com

Machine Information:

Serial Number.....

Engine Serial No.....

Date of Build.....

Declaration of Conformity:

SANDVIK

Declaration of Conformity

CE

We hereby declare that the machinery

Machine Nomination, Type of machine:

QJ341

is in conformity with the following Directives, Standards and Codes
2006/42/EC Machinery Directive
2004/108/EC Electro-Magnetic Compatibility (EMC)
2006/95/EC Low Voltage Directive (LVD)

EC Type-examination and Certificates
ISO21873-2:2009

Technical file
We assure that documentation have been compiled in accordance with 2006/42/EC Annex VII

Phil Coleman, PDC Group Engineering Manager , Swadlincote
is authorized to make the technical file available on request by competent authority of the EC Member States in accordance with 2006/42/EC. The documents will be delivered as electronic files.

Paul Colton, Operations Director, Swadlincote
confirms the manufacturing process to ensure compliance of the manufactured machinery with the technical file.

This declaration remains valid as long as no modification is carried out without the manufacturer's written agreement.

Date: 01 / 01 / 2010

Phil Coleman
PDC Group Engineering Manager

Paul Colton
Operations Director

Manufacturer:
COMPANY, ADDRESS

Sandvik Mining and Construction,
Hearthcote Road,
Swadlincote
DE11 9DU

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1. Safety Section

1.1.Safety Essentials

SANDVIK put safety first.

This is to ensure maximum safety measures are taken, *ALWAYS* read this section carefully *BEFORE* carrying out any work on the equipment or making any adjustments.

Note: ***This equipment is manufactured in accordance with the Machinery Directive 2006/42/EC of 01.01.2010. The customer should make sure that this equipment is in conformance with local and national legislation if used outside of the EU.***

DANGER	
 	**INHALATION, BREATHING HAZARD!** **Breathing or inhaling silica dust particles will cause death or serious injury. ALWAYS work with a respirator approved by the respirator manufacturer for the job you are doing.** **Ensure suitable breathing equipment is used throughout any procedures carried out. ALL necessary precautions MUST be taken to reduce the risk of breathing dust or particles.**

Read this manual and familiarize yourself with any associated documentation. If in ANY doubt ask. Do not take ANY personal risk.

Only trained competent persons should be allowed to install, set, operate, maintain, and decomposing this equipment. Make sure that a copy of this manual is available for any persons installing, using, maintaining or repairing this equipment.

Training should be provided to make sure that safe working practices are followed. Initial commissioning and starting must only be undertaken by a authorised person who has read and fully understands the information provided in the manual pack. ALWAYS follow the procedures outlined in the operating and maintenance instructions.

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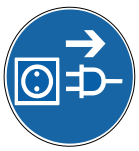


To avoid the risk of electric shock, ALWAYS isolate this equipment from the supply source before removing any guards or covers or performing any maintenance or adjustment to the equipment.

Note: ***The equipment manufacturer declines all responsibility for injury or damage if the instructions and precautions in this manual are not followed.***

1.1.1.Safety Labels and Signals

This section includes explanations of safety symbols, signs, signals and labels used on the product and information for use.

1.1.2.Signal Words

The following signal words and symbols are used to identify safety messages throughout these instructions:

DANGER

The signal word **DANGER** indicates a hazardous situation which, if not avoided, will result in serious injury or death.

WARNING

The signal word **WARNING** indicates a hazardous situation which, if not avoided, could result in serious injury or death.

NOTICE

The signal word **NOTICE** indicates a situation which, if not avoided, could result in damage to property or environment.

When you see **ANY** of the signal words in this manual, be alert; your safety is involved. Carefully read and understand the message that follows, and inform other users.

1.1.3.General Hazard Symbol

This general HAZARD symbol identifies important safety messages in this manual.

When you see **ANY** of the hazard symbols in this manual, be alert; your safety is involved. Carefully read and understand the message that follows, and inform other users.

1.1.4.Safety Hazards Pertaining to the Equipment

The following safety symbols may be posted on the equipment and contained in the manuals. You MUST observe all safety symbols, labels, and instructions at ALL times.

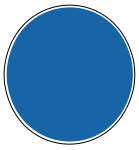
- ***ENSURE*** safety instructions and safety labels attached to the equipment are ***ALWAYS*** complete and legible.
- Keep safety instructions and safety labels clean and visible at all times.
- Replace any illegible or missing safety instructions and safety labels before operating the equipment.

- Ensure replacement parts include safety instructions and labels.

1.1.5.Colour Coded Safety Signs

Signs located on the machine and used throughout this manual are colour coded relating to the information they convey, as follows:

- PROHIBITED YOU CAN NOT DO.



- MANDATORY YOU MUST DO.

- HAZARD YOU MUST BE AWARE OF.

1.1.6.Symbols for Prohibited Actions

Prohibited actions used throughout this manual are indicated by a red circle with a red diagonal line across the circle. The action which is prohibited will always be in black as follows:

No Climbing

No Smoking

Do Not Touch

No Open Flames

Limited or Restricted Access

Do Not Weld

Do Not Remove Safety Guard

1.1.7.Symbols for Mandatory Actions

Mandatory actions used throughout this manual are indicated by white symbols on a blue background as follows:

Wear Safety Gloves

Wear Eye Protection

Wear Safety Helmet

Wear Safety Harness

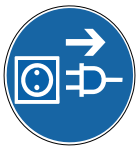
Wear Ear Protection

Wear Safety Boots

Wear Close Fitting Overalls

Wear Respirator

Wear High Visibility Vest



Disconnect Power Source from Supply

Switch Off and Lockout Equipment

Read the Manual

1.1.8.Symbols for Hazards

Hazard symbols used throughout this manual are indicated by a yellow triangle with black symbols and black frames as follows:

Crushing Hazard - Hands

Crushing Hazard - Feet

Chemical Burn Hazard

Electrical Hazard

Electrical Shock/ Electrocution Hazard

Entanglement Hazard

Entanglement Hazard

Falling Hazard

Falling Load Hazard

Ignition Hazard

Flying Material Hazard

Lifting Hazard

Skin Injection Hazard

Silica or Other Dust Hazard

Tripping Hazard

Magnet Hazard

Falling Material hazard

Impact Hazard

Hanging Load Hazard

Tipping Hazard

General Hazard

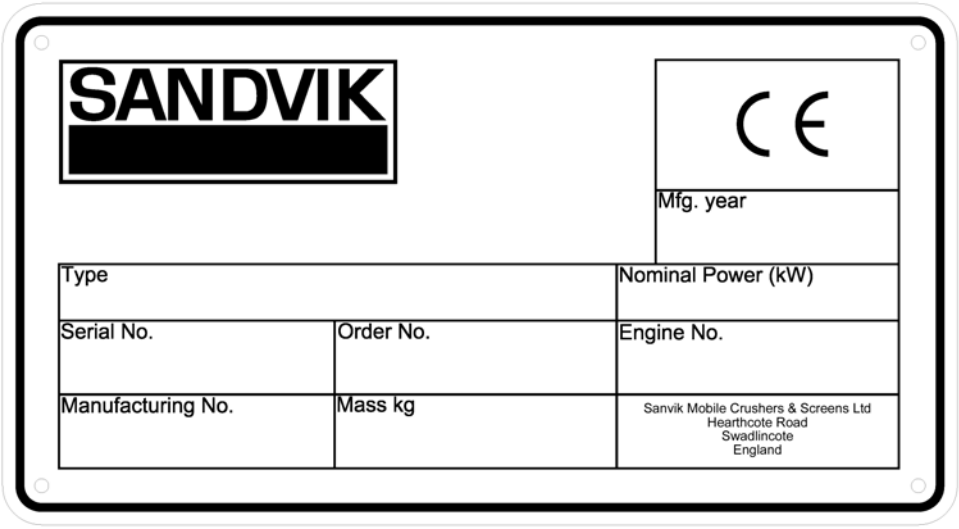
Explosion Hazard

High Pressure Hazard

Drill Entanglement Hazard

Hot Surface Hazard

1.1.9.Machine Serial Number Plate



1.2.Component Safety Features

DO NOT use this equipment if any safety guards or devices have been removed or NOT installed properly.

DO NOT use this equipment if any safety guards or devices have been removed or NOT installed properly.

1.3.Features for Operator Safety

Note: ***Safety features associated with this equipment have been assessed in accordance with ISO21873-2.***

Emergency stop buttons have been installed to prevent death or serious injury. Ensure Emergency stop buttons are visible and not obstructed in any way. Ensure all personnel are trained in the operation and location of emergency stops.

Emergency stop circuit is up to 30 V DC series circuit and hard wired to remove power from the Electronic Control Unit (ECU) Engine management system and stop the engine. To avoid electric shock or cutting injury, you MUST wait at least ten full seconds after activating an emergency stop to allow the system to release its residual charge.

You MUST read and fully understand the Hydraulic/Electrical circuit diagrams, Refer to *Electrical and Hydraulics, page 201*.

Safety guards have been installed to prevent death or serious injury. DO NOT remove, modify, or alter any safety guard. Make sure that all safety guards are secured in their correct positions.

Steps, handrails, tread plates, and fixed guards are provided where persons are required to climb on the machine. For maintenance access ONLY.

If for any reason other areas of the machine need to be accessed, DO a full recorded risk assessment and take the appropriate safety measures.

1.4.Environmental Safety

To avoid unnecessary engine emissions, you ***MUST*** regularly service the machine as specified in the machine maintenance sections contained in this manual.

1.4.1.Hazardous Materials

⚠ WARNING	
	**POSION and CONTAMINATION HAZARD!** **Drinking from storage containers that have held equipment fluids or other harmful substances could cause serious injury or death. Disposing of fluids or other waste products in an irresponsible manner could cause serious environmental damage.** **Fuels, fluids and other materials used in the operation of this machine may contain chemicals which could cause serious injury or death and or environmental damage if disposed of in an irresponsible manner.** **DO NOT store fuels, fluids and other materials used in the operation of this machine in food or beverage containers.** **Use leak proof containers when draining fluids.** **DO NOT pour waste onto the ground, down a drain or into any water source.** **Observe COSSH data information source locally and OEM data information detailed in the appendix of this manual when working with components or substance that may contain chemicals.** **ALWAYS dispose of fuels, fluids or other materials used in the operation of this machine in accordance with local and national legal regulations.**

Diesel spillage MUST be cleaned up immediately due to fire hazard. Follow local and national regulations.

ONLY use lubricating oils recommended in the maintenance schedule or OEM manuals.

OBSERVE COSHH / MSDS information contained in the appendix to this manual.

1.4.2.Machine Disposal

This equipment ***MUST ONLY*** be disposed of at a specialist machine breaker.

1.5.Personal Protective Equipment (PPE)

1.5.1.Entanglement Hazards

DANGER	
  	**ENTANGLEMENT HAZARD!** **Working in close proximity to running machinery could cause serious injury or death.** **DO NOT work close to machinery unless it is completely stopped.** **DO NOT wear, loose clothing or jewellery of ANY kind.** **Long hair MUST BE tied back.** **ALWAYS wear (CE approved) minimum Personal Protective Equipment (PPE), Refer to *Minimum Required Personal Protective Equipment (PPE), page 20*.**

1.5.2.Minimum Required Personal Protective Equipment (PPE)

The following (CE approved) PPE **MUST BE WORN** by everyone, as a minimum requirement when working on or around the machinery, within 20 metres (approximately 66 feet): Additional PPE may be required for specific tasks, which will be detailed in the relevant section throughout the manual.

Safety Gloves

Eye Protection

Safety Helmet

Respirator

Ear Protection

Safety Boots

Close Fitting Overalls

High Visibility Vest

1.6.Hazard Zones

Limit access to equipment and surroundings, erect barriers 20 metres around the perimeter of the machine.

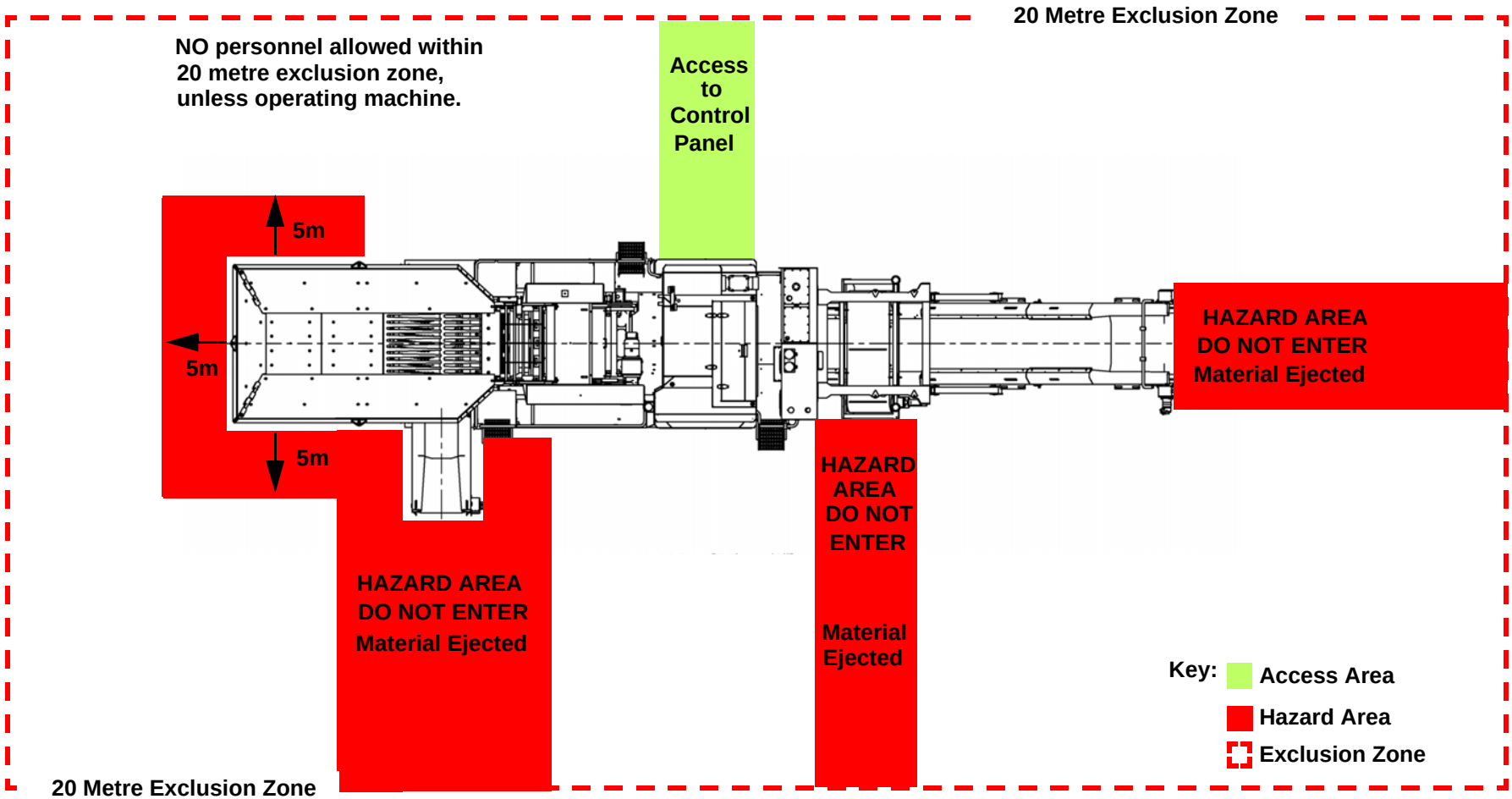


Figure 1-1: Hazard Exclusion Zone

1.7.Measured Noise Levels

Ear protection MUST be worn if you are within 20 metres (approximately 66 feet) of the machine when the engine and other parts of the machine are running.

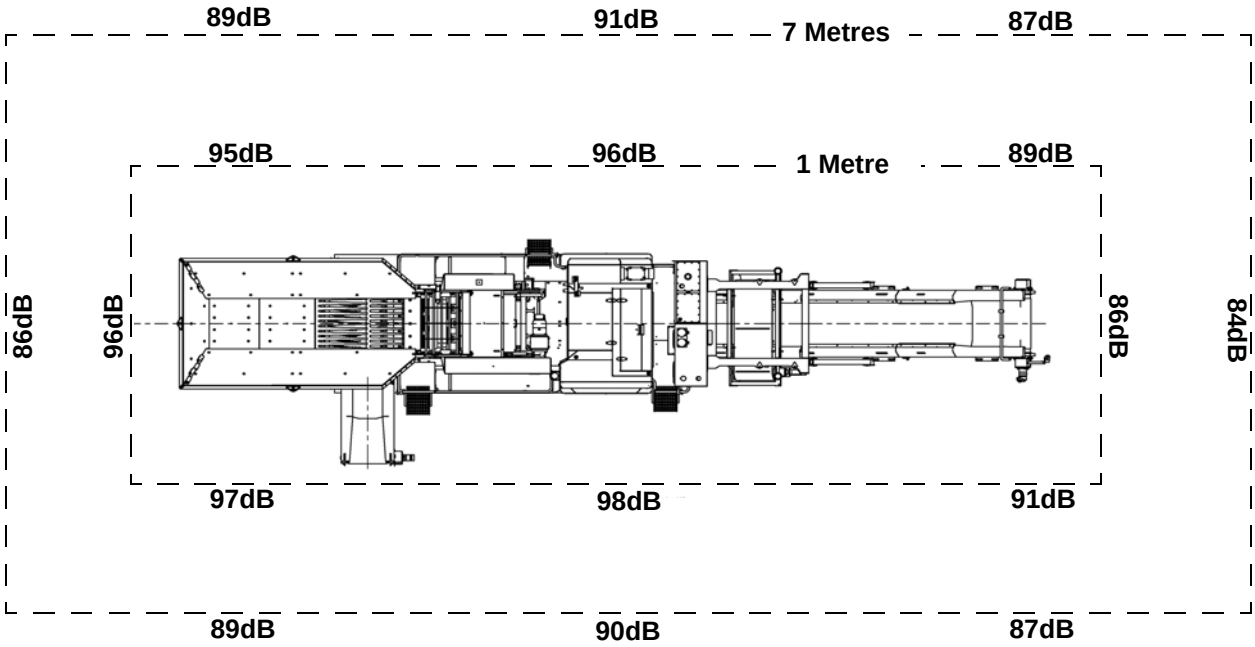


Figure 1-2: Measured Noise Levels

Refer to ***Figure 1-2:Measured Noise Levels*** the diagram indicates measured noise levels at 1 metre and 7 metres using a Castle GA101/701 meter with an empty machine all systems running situated on the factory assembly line. Product and local conditions will have an affect on the noise levels experienced.

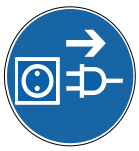
1.8.Vibration Levels

There are **NO** circumstances where an operator should need to be on or touching the machine when it is running.

1.9.Organizational Safety Measures

The following safety measures **MUST** be observed at all times:

Understand the service procedure before commencing work.
Keep area clean and dry.
NEVER lubricate, clean, service, or adjust machinery while it is moving.
Allow machinery to cool before performing any maintenance or adjustments.
ENSURE all parts are properly installed and are in good condition.
Replace worn and broken parts IMMEDIATELY.
Remove any build up of grease, oil and debris from equipment.
During maintenance, use ONLY the correct tool for the job.
NEVER make any modifications, additions, or conversions which may affect safety.



Disconnect battery ground cable before making adjustments on electrical systems or welding on the equipment.

If clothing, tools, or any body parts become entangled in machinery, IMMEDIATELY disengage all power and operate controls to relieve pressure. Stop engine and implement lockout procedures.

If equipment exhibits any unusual movement or sound, stop equipment, lock out IMMEDIATELY, and report the malfunction to your supervisor.

1.10.Personnel Qualifications, Requirements and Responsibilities

ONLY trained, competent, reliable and authorized personnel should operate or maintain this machine.
Statutory minimum age limits must be observed.

Work on electrical system and its equipment MUST ONLY be carried out by a skilled electrician or by personnel under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.

Work on the hydraulic system MUST ONLY be carried out by persons with training and authorisation to maintain the hydraulic equipment.

1.11.Safety Advice Regarding Specific Operational Phases

1.11.1.Standard Operation

Take the necessary steps to ensure the equipment is ONLY used when it is in a safe and reliable state.

Operate the equipment ONLY for its designed purpose, and only if all guarding, protective, and safety devices, emergency shut-off equipment, sound proofing elements and exhausts, are in place and fully functional.

ENSURE local barriers are erected to stop unauthorized entry to the equipment or work area.

Attach a hazard sign(s) to the equipment in appropriate positions to alert all persons of potential hazards.
BEFORE starting the engine ensure it is safe to do so.

1.11.2.Blockage or Malfunction

In the event of material blockage, any malfunction or operational difficulty, stop equipment and lockout immediately. Rectify problem immediately, Refer to *Stalled or Blocked Crusher, page 122* section or contact your nearest dealer.

1.11.3.Unguarded Areas

Limit access to the equipment and its surroundings by erecting barrier guards (min. distance 1.5 meters away) to reduce the risk of other mechanical hazards, falling loads and ejected materials.

Switch off and lockout equipment before removing any safety devices or guarding. Ensure safety devices and guards are all installed correctly before lock out is removed.

DANGER	
 	**ENTANGLEMENT HAZARD!** **Working in close proximity to running machinery could cause serious injury or death.** **DO NOT work close to machinery unless it is completely stopped.** **DO NOT wear, loose clothing or jewellery of ANY kind.** **Long hair MUST BE tied back.** **DO NOT reach in to unguarded machinery.** **ALWAYS wear (CE approved) minimum Personal Protective Equipment (PPE), Refer to *Minimum Required Personal Protective Equipment (PPE) on page 20*.**

1.12.Special Work, Including Equipment Maintenance, Disposal of Parts, and Hazardous Materials

Observe adjustment, maintenance, and service intervals detailed throughout this manual, except where:
- Failure of warning lights, horns, gauges, or indicators calls for immediate action.
- Adverse conditions require more frequent servicing.
- USE ONLY Original Equipment Manufacturer's (OEM) recommended replacement parts and equipment.
- Enure only properly trained personnel undertake these tasks.

1.12.1.Securing Equipment Before Performing Maintenance

When undertaking maintenance and repair work, equipment must first be made safe.

Switch off engine using ignition key.

Switch off at isolation point and remove ignition key.

Implement lockout procedures.

Attach hazard sign(s) to equipment in appropriate positions to alert all personnel of potential hazards.

1.12.2.Maintenance Site Conditions

Prior to starting any maintenance work, ENSURE equipment is positioned on stable and level ground and has been secured against inadvertent movement and buckling.

1.12.3.Replacement & Removal of Components

ALWAYS observe handling instructions detailed throughout this manual, OEM manuals, or spare parts suppliers' instructions.

Do a full risk assessment and take all necessary safety measures.

NEVER allow untrained staff to attempt to remove or replace any part of the equipment.

The removal of large or heavy components without adequate lifting equipment is PROHIBITED, this could cause serious injury or death.

To avoid the risk of accidents, individual parts and large assemblies being moved for replacement purposes should be carefully attached to lifting equipment and secured. ONLY use suitable lifting equipment supplied or approved by OEM.

NEVER work or stand under suspended loads.

KEEP AWAY from the feeder hopper and product conveyor discharge, where there is risk of serious injury or death from contact with ejected debris.

LIMIT ACCESS to the equipment and its surroundings by erecting barrier guards to reduce the risk of residual mechanical hazards, falling lifted loads, and ejected materials.

1.12.4.Climbing and Falling

Falling from and/or onto this equipment could result in serious injury or death.

NEVER climb on the equipment while it is in operation or use equipment parts as a climbing aid.

ALWAYS keep the area around the equipment clear of debris and trip hazards.

Beware of moving haulage and loading equipment in the vicinity of the equipment.

When carrying out overhead assembly work, ALWAYS use specially designed or otherwise safety-oriented ladders and maintenance platforms.

ONLY use Maintenance Platforms provided on the equipment. ALWAYS perform work from an approved, safe and secure platform.

When reaching any points 2m (approximately 6 feet) or more above ground level, ALWAYS use CE certified safety harness.

Keep all handles, steps, handrails, platforms, landing areas, and ladders free from dirt, oil, snow and ice.

1.12.5.Safety Considerations During Maintenance

It is essential that you take the following steps to ENSURE you and others are safe. DO full risk assessments and take all necessary safety measures.

During maintenance, RESTRICT ACCESS to essential staff only. Where appropriate, erect barrier guards and post warnings.

The fastening of loads and instructing or guiding of crane operators should be entrusted to qualified persons only.

The observer providing instructions must be within sight or sound of the operator and positioned to have an all around view of the operation.

ALWAYS ensure any safety device such as locking wedges, securing chains, bars, or struts are utilized as indicated in throughout this manual.

Ensure that any part of the equipment raised for any reason is prevented from falling by securing it in a safe reliable manner.

Never work alone.

NEVER work or stand under suspended loads.

1.12.6.Safety Considerations During Cleaning

This equipment MUST be isolated prior to cleaning.

After cleaning, examine all fuel, lubricant, and hydraulic fluid lines for leaks, loose connections, chafe marks and damage. Any defects found MUST be repaired immediately.

DO NOT direct power washers near to or into control boxes and electrical devices.

1.12.7.Removal of Safety Devices, Guards and Decals

Prior to operation, all safety devices, control devices, decals and guards, temporarily removed for set-up, maintenance or repair purposes MUST be refitted and checked immediately upon completion of the maintenance or repair work.

To avoid serious personal injury or death, NEVER operate the equipment with safety devices, decal or guards removed or unsecured.

ALWAYS report any defects regarding guards, safety devices, decals or control devices.

1.12.8.Surrounding Structures

This equipment MUST ONLY be operated in a position away from buildings, permanent structures or high ground to eliminate the risk of persons falling onto the equipment or its surrounds.

All temporary maintenance platforms erected around the equipment MUST be removed prior to operation.

b.

1.12.9.Safety when Refuelling

⚠ WARNING	
  	**FIRE HAZARD!** **Smoking and or using other naked flames in the vicinity of flammable materials and or fuels, could cause serious injury or death.** **ONLY refuel with diesel from approved storage and supply equipment.** **NEVER remove the filler cap or refuel with the engine running.** **NEVER add gasoline or any other fuels mixed to diesel due to increased fire or explosion risks and damage to the engine.** **Smoking is PROHIBITED when refuelling or handling diesel fuel.** **DO NOT carry out maintenance on the fuel system near naked lights or sources of sparks, such as welding equipment.** **IMMEDIATELY clean up spilt fuel and dispose of correctly to minimize any environmental impact.** **To avoid spillage use drip trays.**

1.13.Specific Hazards

1.13.1.Electrical Energy

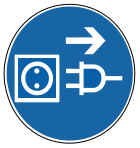
External Considerations and Hazards

When working with the equipment, maintain a safe distance from overhead electric lines. If overhead cables are in the vicinity, a risk assessment **MUST** be completed prior to operating the equipment. Ensure you follow local and national regulations.

⚠ DANGER	
 	**ELECTROCUTION HAZARD!** **Contact with overhead electric lines will cause serious injury or death.** **If your equipment comes into contact with a live wire, you MUST:** **- vacate the area.** **- Warn others against approaching and touching the equipment;** **- Report the incident and have the live wire shut off.**

Machine - Electrical

Work on electrical system and its equipment MUST ONLY be carried out by a skilled electrician or by personnel under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.



Before starting any maintenance or repair work, the power supply to the equipment MUST be isolated. Check the de-energized parts to ensure they do not have any power. In addition to insulating any adjacent parts or elements, ground or short circuit them to avoid the risk of electrical shock.

The electrical equipment is to be inspected and checked at regular intervals. Defects such as loose connections, scorched or otherwise damaged cables MUST be repaired, or replaced immediately. A trained competent person must do this.

Use ONLY original fuses with the specified current rating. Switch off the equipment IMMEDIATELY if trouble occurs in the electrical system.

This equipment is wired on a negative earth. ALWAYS observe correct polarity.

1.13.2.Battery

AVOID contact with the skin, eyes or clothing.
ALWAYS wear appropriate PPE, Refer to *Personal Protective Equipment (PPE), page 19*.

ALWAYS Isolate and disconnect the battery leads before carrying out any maintenance to the electrical system.
Recharge the battery in a well ventilated area.

The battery contains sulphuric acid, an electrolyte which can cause severe burns and produce explosive gases.

Smoking is PROHIBITED when maintaining the battery.

1.13.3.Gas, Dust, Steam, Smoke and Noise

DANGER	
	**INHALATION, BREATHING HAZARD!** **Breathing or inhaling silica dust particles will cause death or serious injury. ALWAYS work with a respirator approved by the respirator manufacturer for the job you are doing.** **Ensure suitable breathing equipment is used throughout any procedures carried out. ALL necessary precautions MUST be taken to reduce the risk of breathing dust or particles.**
	**Dust found on the equipment or produced during work on the equipment MUST NOT be removed with compressed air.** **Dust waste MUST ONLY be handled by authorized personnel. When disposing of dust waste, the material must be dampened, placed in a sealed container and marked to ensure proper disposal.**

	**ALWAYS operate internal combustion engines outside or in a well ventilated area.** **If, during maintenance, the equipment must be operated in an enclosed area, ENSURE there is sufficient ventilation or provide forced ventilation.**
	**Observe ALL local and national safety regulations. Contact your local authority for additional information.**

1.13.4.Welding or Naked Flames

WARNING	
	**FIRE HAZARD!** **Welding or using other naked flames in the vicinity of the equipment creates the risk of an explosion or fire, which could result in serious injury or death from fire or explosion.**
	**AVOID all naked flames in the vicinity of this equipment.** **Welding, flame cutting and grinding work on the equipment MUST ONLY be carried out if this has been expressly authorized.** **Before carrying out welding, flame cutting and grinding operations, clean equipment and its surroundings from dust and debris and other flammable substances and ensure the premises are adequately ventilated.** **The battery MUST BE isolated and disconnected.**
	

1.13.5.Hydraulic Equipment

DANGER	
	**SKIN PENETRATION HAZARD!** **Hydraulic fluid under pressure can penetrate the skin, which will result in serious injury or death.** **If fluid is injected under the skin, it must be surgically removed or gangrene will result. GET MEDICAL HELP IMMEDIATELY.** **ALWAYS use a piece of cardboard to check for leaks. DO NOT USE YOUR HAND.**

WARNING	
	**FIRE HAZARD!** **Splashed or spilled oil creates the risk of a fire, which could result in serious injury or death.** **Check all lines, hoses and screwed connections regularly for leaks or other damage.** **Repair damaged lines, hoses, or screwed connections IMMEDIATELY.**

Work on hydraulic equipment must be carried out by persons with training and authorisation to maintain the hydraulic equipment. Do a full risk assessment and take all necessary safety measures.

ALWAYS relieve pressure from the hydraulic system before carrying out any kind of maintenance or adjustment.

BEFORE carrying out any repair work, depressurize all system sections and pressure hoses (hydraulic and compressed air system) requiring removal, in accordance with the specific instructions for the unit concerned.

Hydraulic and compressed air lines MUST be laid and fitted properly. Ensure no connections are interchanged. The fittings, lengths and quality of the hoses MUST comply with the technical requirements.

ONLY fit replacement components of a type recommended by the manufacturer.

ALWAYS practice extreme cleanliness when servicing hydraulic components. Ensure all measures are taken to avoid spillage and leaks.

1.13.6.Hazardous Substances

ENSURE that correct procedures are formulated to safely handle hazardous materials in strict accordance with the manufacturer's instructions and all applicable regulations by correctly identifying, labelling, storing, using and disposing of the materials.

A full list of Hazardous Substances associated with this equipment can be found in the appendix of this document.

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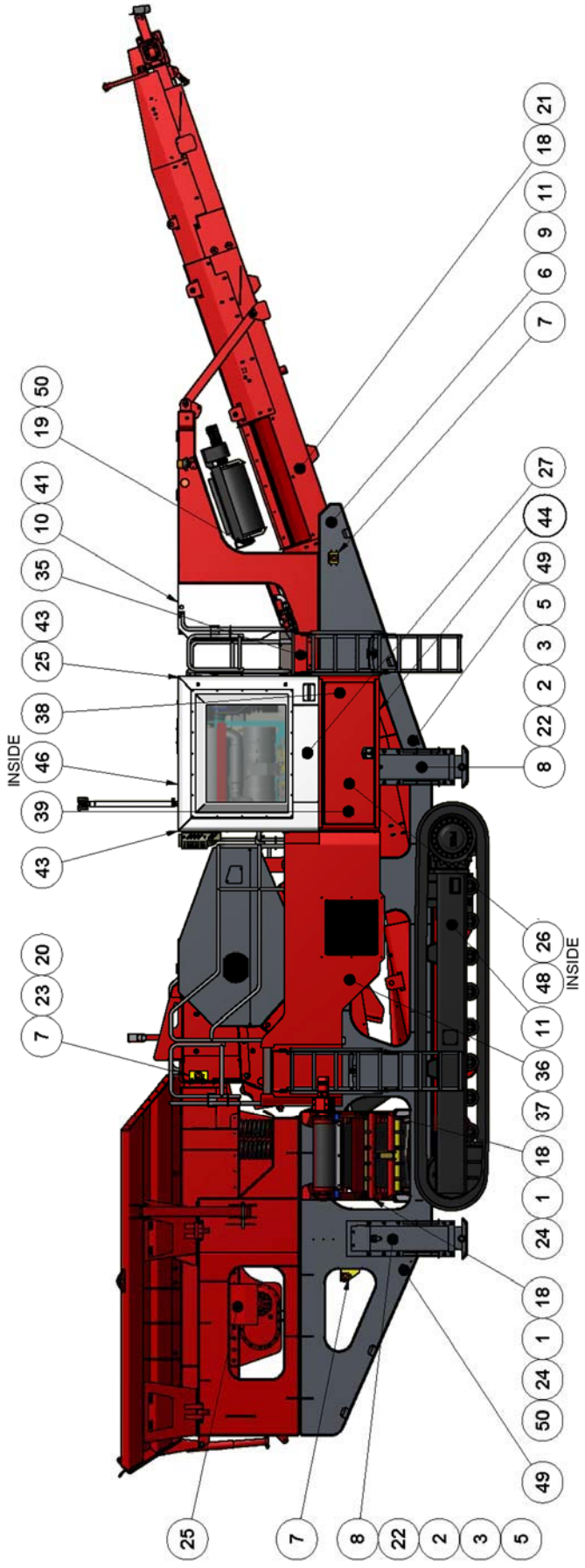
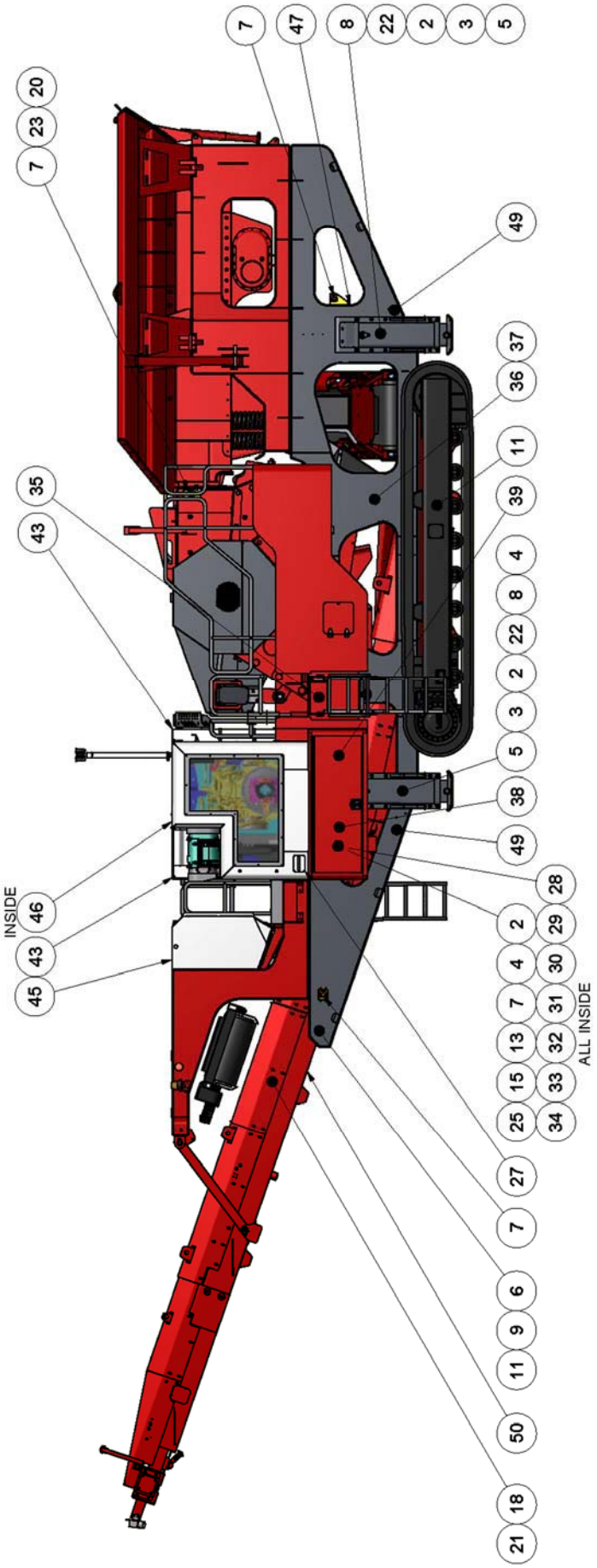
1.14.Safety Decals - Locations



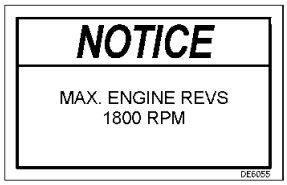


For safety decal locations, Refer to ***Safety Decals - Locations, page 35***.

1:DE0021

2:DE0022

3:DE0023



4:DE6055

5:DE0025

6:

7:DE0027

8:DE0039

9:DE0051

10:DE0053

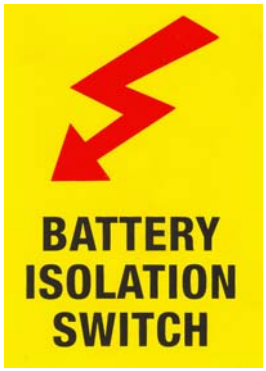
11:DE1007

12:

13:DE1014

14:

15:



16:DE1043

17:

18:DE5001

19:DE5003

20:DE5006

21:DE5007

22:DE5008

23:DE5009

24:DE5010

25:DE5011

26:DE5012

27:DE5013

28:DE5014

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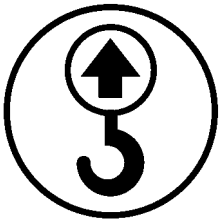

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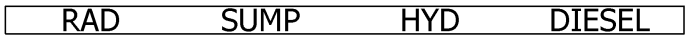

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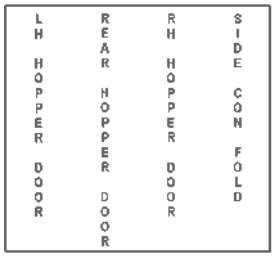

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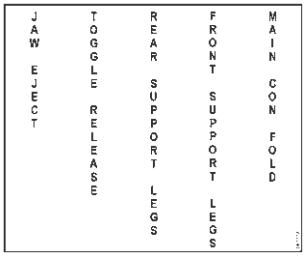

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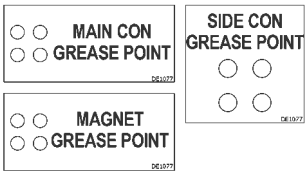

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2. Transport and Technical Data

2.1.Special Considerations for Transport

ALWAYS observe local and national regulations concerning the transportation of heavy equipment. Ensure all appropriate permits, licenses and endorsements are obtained and maintained before transporting.

NOTICE

DO NOT transport the machine utilizing a vehicle not capable of hauling at least the listed gross weight of the machine, Refer to *Technical Information, page 51*. Failure may result in damage to the machine, haulage vehicle, and may result in serious personal injury or death.

2.1.1.Machine Preparation for Transport

⚠ WARNING

PERSONNEL HAZARD!

Lack of knowledge or understanding could cause serious injury, death or damage to the machine.

DO NOT prepare machine for transportation until you have READ and FULLY understood this manual. If necessary seek clarification from your supervisor and or a Sandvik representative, before continuing. Failure to do so may also invalidate the manufacturers warranties.

⚠ WARNING

PERSONNEL HAZARD!

Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.

Stop machine, isolate, remove ignition key and tag out, before continuing. Refer to *Lock and Tag-out Procedure, page 105*.

⚠ WARNING

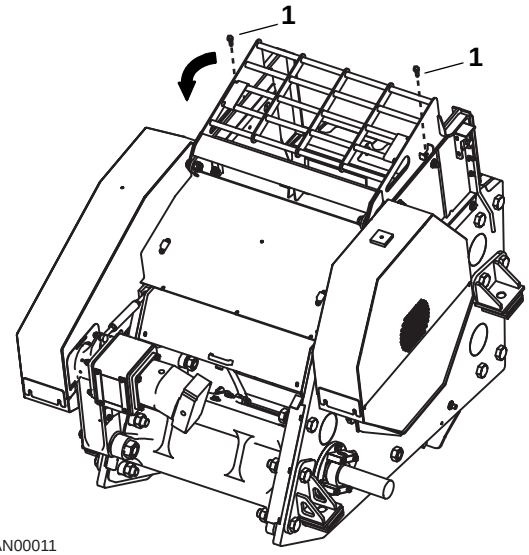
FALLING HAZARD!

Falling from heights could cause serious injury or death.

Some of the steps in this procedure requires working at height, ensure the following applies when working off the ground:
- **Maintenance platforms are in place.**
- **All hand rails are fixed in position.**
- **All ladders are lowered and fixed in position.**
- **A safety harness is worn.**

Hopper Lid

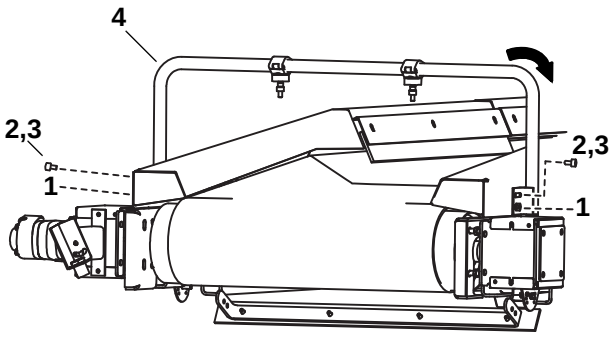
1. Shut down machine, Refer to ***Machine Shut Down, page 101***.
2. Remove two bolts (1) and fold back hopper lid.
3. Install and tighten bolt (1) back into threaded holes (to prevent loss) on both sides.



SAN00011

Main Conveyor Spray Bar

4. Remove upper bolt (2) and washer (3) on both sides.
5. Slacken lower bolt (1) on both sides.
6. Fold main spray bar (4) back into the transport position.
7. Tighten bolt (1) on both sides.
8. Install and tighten bolt (2) back into threaded holes (to prevent loss) on both sides.



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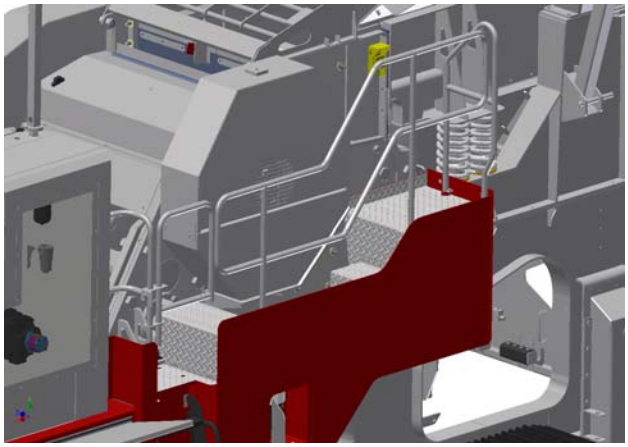
9. Loosen safety rails and reposition for transport on both maintenance platforms.



10. Start engine, Refer to ***Engine - Starting Procedure, page 69***.

11. From ‘Main Menu’ press ‘Auxiliary Functions’ (button 4), which activates the auxiliary levers.

Note: ***Main conveyor rises automatically.***

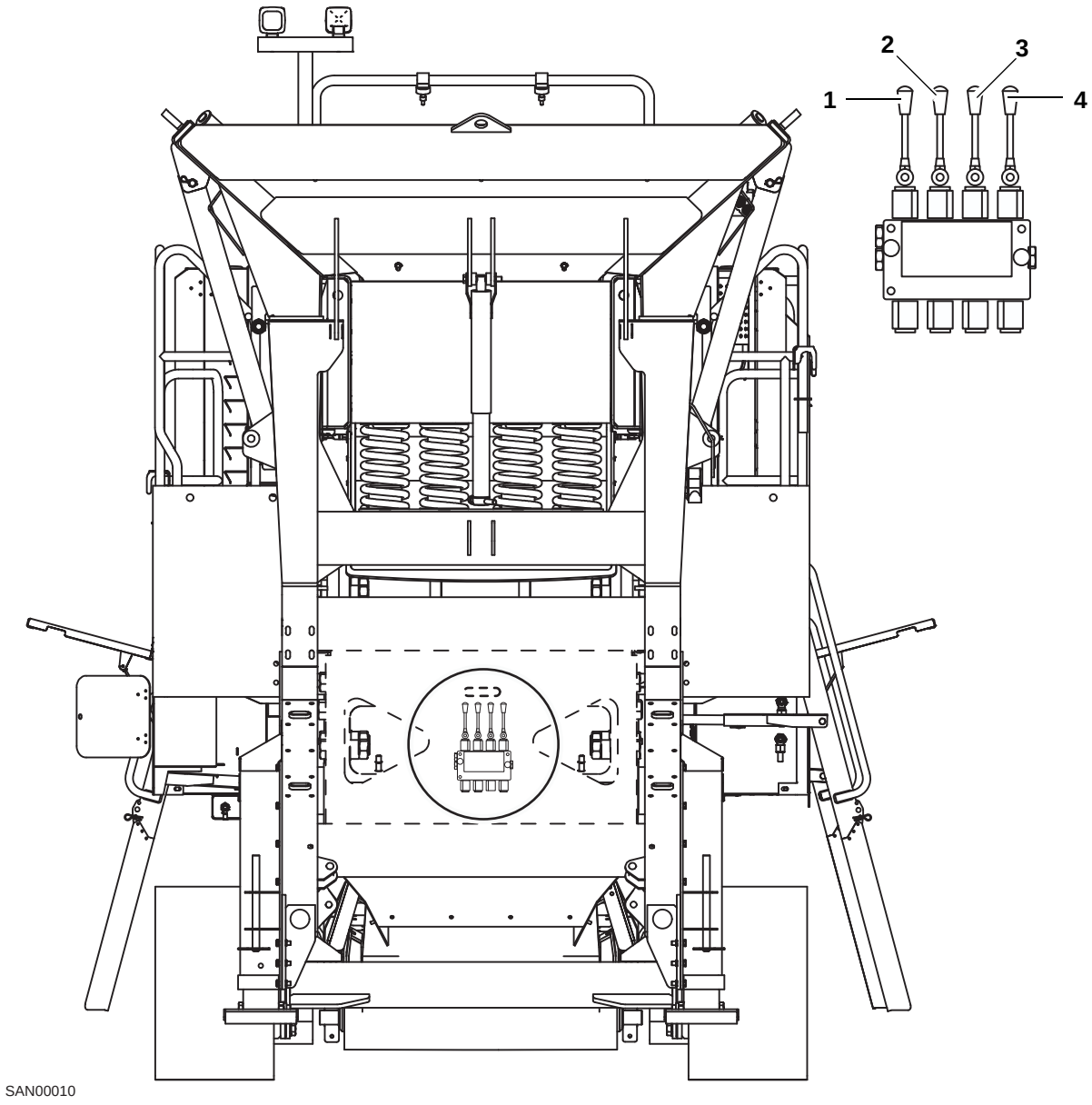


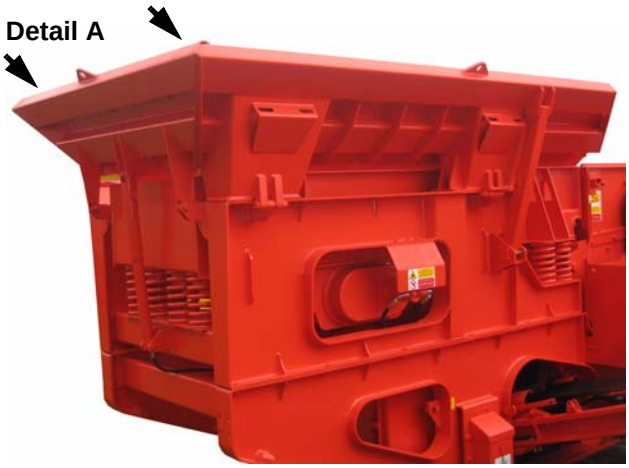
Figure 2-1: Auxiliary Levers - Location

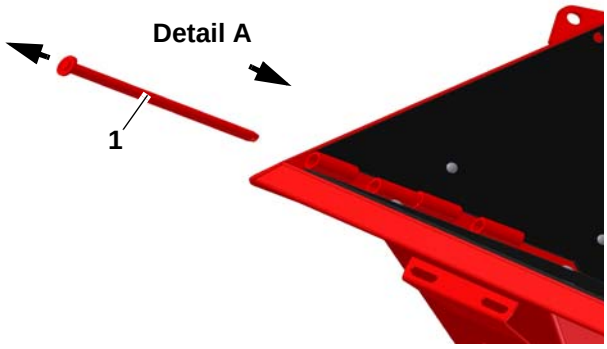
1. Side Door (Left)
2. Rear Door
3. Side Door (Right)
4. Natural Fines Conveyor

12.Refer to ***Figure 2-1:Auxiliary Levers - Location***, for natural fines conveyor, operate auxiliary lever (4).

⚠ WARNING	
	**PERSONNEL HAZARD!** **Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.** **Stop machine, isolate, remove ignition key and tag out, before continuing. Refer to *Lock and Tag-out Procedure, page 105*.**

13. Prepare rear hopper door, remove locating pins (1) one on each side.

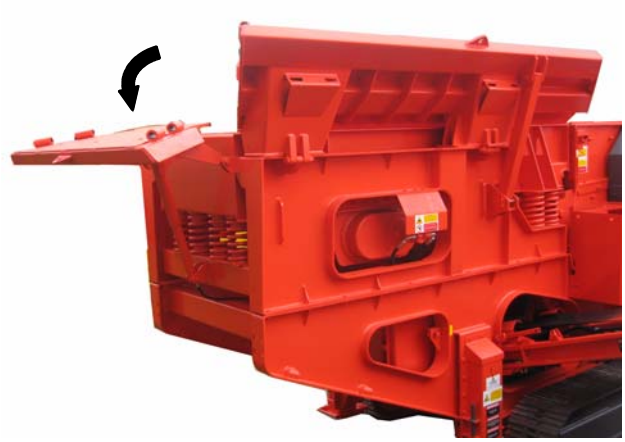




14. Start engine, Refer to ***Engine - Starting Procedure, page 69***.

15. From ‘Main Menu’ press ‘Auxiliary Functions’ (button 4), which activates the auxiliary levers.

16. Refer to ***Figure 2-1:Auxiliary Levers - Location***, fold down rear hopper door by operating auxiliary lever (2).



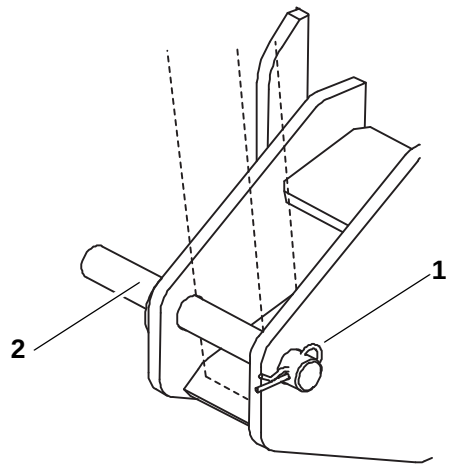
⚠ WARNING

PERSONNEL HAZARD!

Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.

Stop machine, isolate, remove ignition key and tag out, before continuing. Refer to *Lock and Tag-out Procedure, page 105*.

17. Prepare right hand and left hand hopper doors, remove 'R' clip (1) from retaining pin (2) (one on each side).
18. Remove retaining pin (2) from pin props (one on each side).
19. Re-insert transport pins to Natural Fines Conveyor (transport position).
20. Start engine, Refer to ***Engine - Starting Procedure, page 69***.
21. From 'Main Menu' press 'Auxiliary Functions' (button 4), which activates the auxiliary levers.



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22. Refer to ***Figure 2-1:Auxiliary Levers - Location***, fold down side hopper doors by operating auxiliary levers (1, Left) and (3, Right).
23. Turn 'OFF' the 'AUX' switch (4) on main control panel to 'OFF' position.
24. Place all tools and manuals into tool box and control panels.
25. Visually check machine to ensure no component damage.

2.1.2.Tracking Machine onto/off Transport Vehicle

DANGER	
	**CRUSHING HAZARD!** **Personnel or objects on machine or in exclusion zones when machine is operational, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES operate machine when ANY personnel or objects are on the machine or in the exclusion zones, 20 metres (approximately 66 ft).** **Carry out a thorough site inspection prior to commencing ANY tracking operations.**

1. Follow start up and tracking procedure, Refer to ***Tracking Machine, page 71***, machine can be tracked onto or off the transport vehicle at the pre-set tracking speed.
2. Before tracking machine off transport vehicle ensure all temporary sealing and transport straps and chains are removed.
3. After tracking machine onto transport vehicle ensure all temporary sealing, transport straps and chains are installed. DO NOT secure by tying down over the tracks.

   Note: ***Tying down is the responsibility of the driver of the transport vehicle.***
4. Lower all four jacking legs sufficiently to support the weight of the machine and spread the load, Refer to ***Jacking Legs - Lower, page 81***.

2.2.Transport and Working Dimensions

Note: ***Before transporting this machinery all measurements should be checked to ensure they conform to local and national regulations for transportation of vehicles.***

For information on the machine's transport dimensions, refer to ***Machine Working Dimensions on page 54***.

Note: For information on the machine's working dimensions, refer to ***Machine Transport Dimensions on page 55***.

2.3.Application and Limitations

This machine has been designed and constructed to reduce minerals such as stone and concrete including steel reinforced concrete to a predetermined size. It must not be used for any other purpose without first contacting Sandvik Mining and Construction technical department. DO NOT operate until the manual and all instructions supplied with the machine are read and fully understood.

2.3.1.Common Applications

This list is by no means exhaustive. Please contact Sandvik Mining and Construction for further information on any materials not indicated below.

- Granite.
- Slate.
- Bricks.
- Limestone.
- Reinforced Concrete.
- Recycling/ Demolition.
- Asphalt.

2.4.Description

This QJ341 is a self contained tracked machine built to withstand the rigours and conditions of operating in quarries and within the construction industry. It utilises a diesel engine to provide the power to the hydraulic power pack and to generate electricity for the electrical systems of the machine.The tracks, feeders, jaws, conveyors and all other working parts of the machine are hydraulically driven. Where possible all of the moving parts of this machine are guarded, where not, warnings are provided. The Safety Section of this manual must be read and fully understood. Any residual organisational, personal and environmental issues must be fully addressed as detailed in the safety section.This equipment has been manufactured and assessed to be in accordance with Machinery Directive 2006/42/EC.

2.5.Operation Description

Material is loaded normally by excavator into the hopper where the vibratory feeder transfers the material towards the crushing jaws.The material passes over the grizzly bars where smaller material will fall through the bars and is transferred either to the main conveyor or directed onto the natural fines conveyor. The larger material that has stayed on the grizzly bars is fed to the crusher box and into the jaws where it is crushed between the wear plates and falls onto the main conveyor.The material is transferred up and along the main conveyor passing underneath the magnet. At this point any ferrous material mixed in with the material will be discharged. The material continues along the main conveyor where it is unloaded to a stock pile or to waiting transport.

2.6.Key Features

- Diesel hydraulic power via a Caterpillar engine providing hydraulic transmission without clutches.

- Vibratory feeder with automatic control to regulate the feed into the crusher. The hydraulic system automatically coordinates the flow of material from the vibrating feeder over the grizzly bars to the jaw.
- Hydraulic adjustment system to regulate the product size to be crushed.
- Jaw size 1200 x 750 mm encompassing unique high speed and Geo-crush technology to give very high production while reducing wear.
- Operation of jaw can be reversed to clear any blockage.
- High crushing speed.
- Over band magnet removes all of the reinforcing bar when concrete is crushed.
- Spray mounted dust suppression.
- Maintenance platforms.
- Complete machine rises on its hydraulic legs to facilitate cleaning and servicing of tracks and to provides a stable base.
- Machine is self propelled by Remote Control or Umbilical Control Hand Set.
- Optional bogie system eliminating the need for low loader transport.

2.7.Identification of Main Units

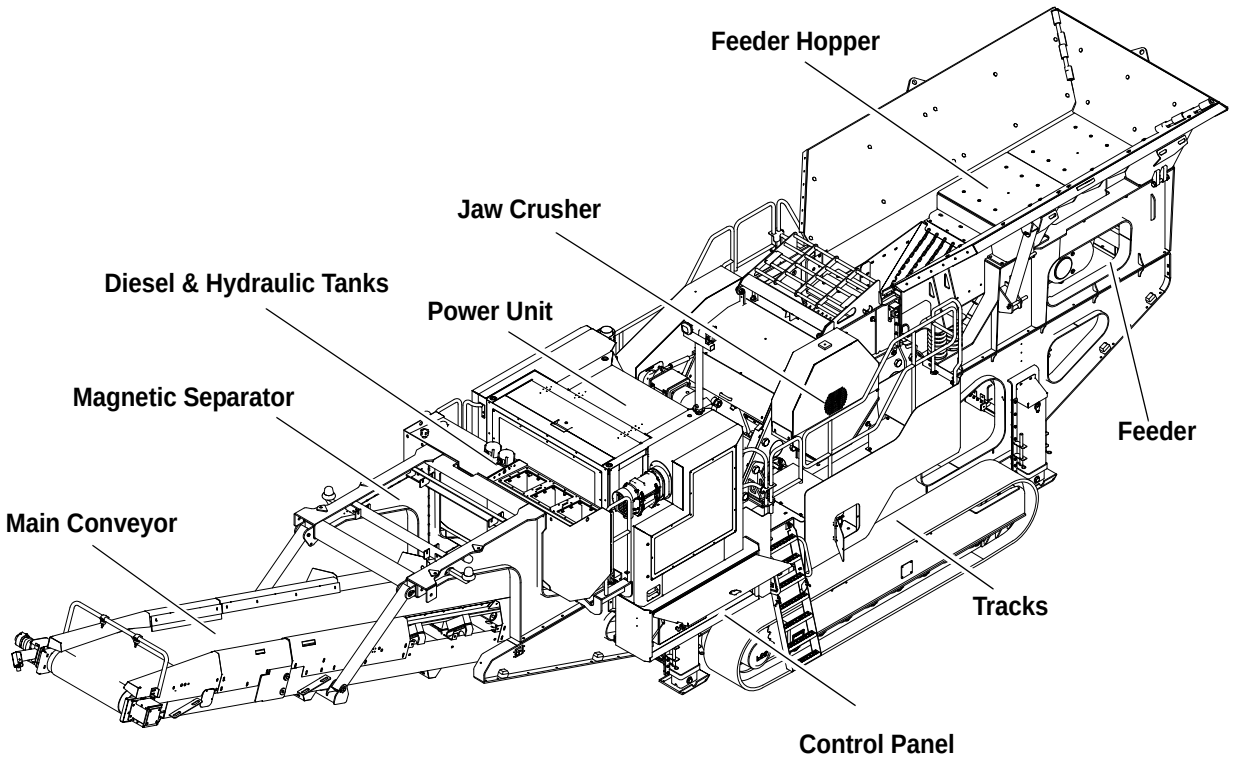
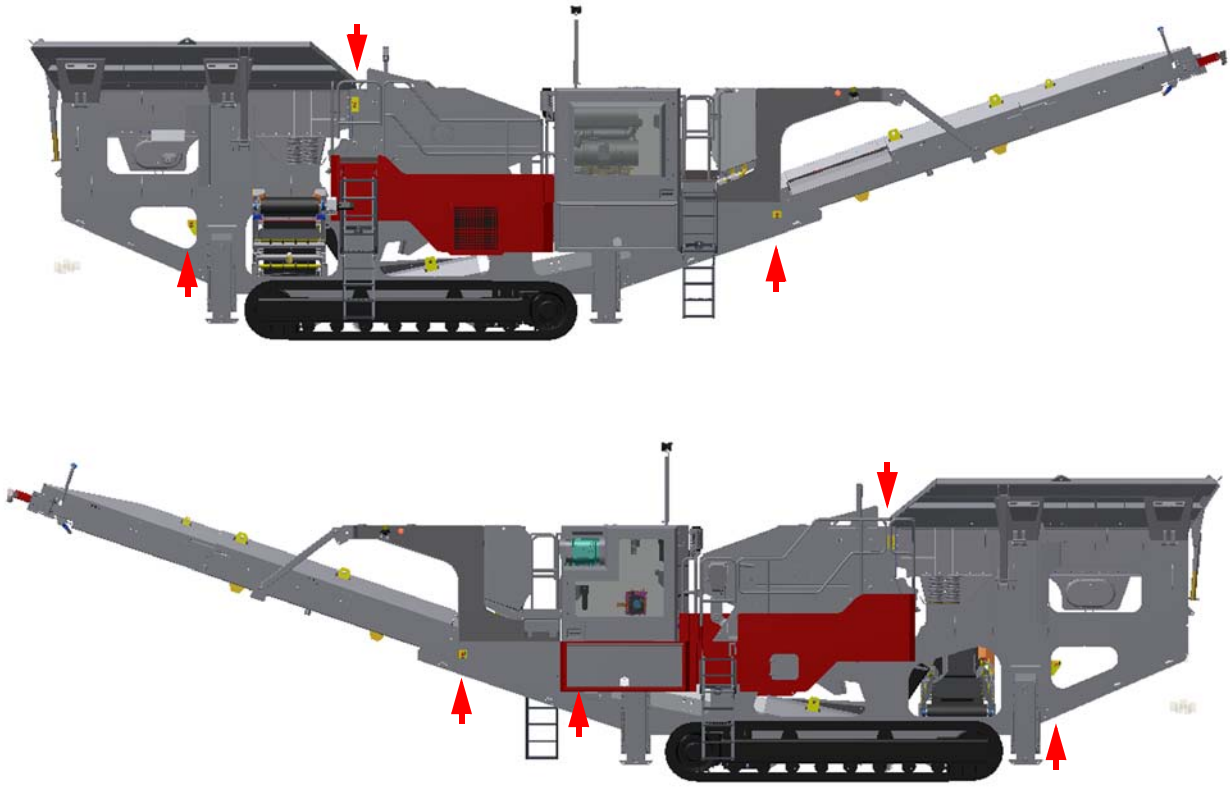


Figure 2-2: Main Components

2.8.Identification of Emergency Stop Positions



2.9.Technical Information

- Machine: Single Toggle Mobile Jaw Crushing Unit.
- Jaw Crusher - 1200 mm (3.93 ft) x 750 mm (2.46 ft).
- Total weight: 48.4 Tonne

2.9.1.Machine dimensions

- For working dimensions, refer to ***Machine Working Dimensions on page 54***.
- For transport dimensions, refer to ***Machine Transport Dimensions on page 55***.

2.9.2.Standard Features

Primary 1200mm (3.93 ft) x 750mm (2.46 ft) Single Toggle Jaw Crusher, designed by Sandvik, utilizing the very latest in finite crushing analysis with rigid one piece welded Crusher Frame, which has been heat-treated after welding for internal stress relief.

2.9.3.Options

- Dirt Conveyor.
- Magnetic Separator.
- Radio Controlled Tracks.

2.10.Specification of Main Units

2.10.1.Feeder

- Hopper Width - 2751 mm (9.02 ft).
- Feeder Width - 1100 mm (3.61 ft).
- Feeder Length - 4000 mm (13.12 ft).
- Hopper Capacity - 5.3 cubic meters.

2.10.2.Crusher

- Feed Opening- 1200 mm (3.94 ft) x 750 mm (2.46 ft).
- Crusher Speed - 300 RPM.
- Drive - Hydraulic.

2.10.3. Main Conveyor

- Belt Width - 814mm (2.67 ft).
- Conveyor Length - 11756mm (38.53 ft).
- Conveyor Width - 1 Hydraulic Motor 2028mm (6.65 ft) / 2 Hydraulic Motors 2330mm (7.64 ft).

2.10.4.Natural Fines Conveyor

- Belt - 650 (2.13 ft) x 3100 mm (10.17 ft).
- Belt Extended - 650 (2.13 ft) x 5100mm (16.73 ft).

2.10.5.Tracks

- Track Type - Low Ground Pressure Twin Track Undercarriage.
- Normal Ground Pressure approximately 126.5 kPa (without options).
- Gradient Max 20°.
- Approximate Speed - 1.1 km/h.
- Centre - 3715 mm (12.18 ft).
- Width - 500 mm (1.64 ft).
- Drive - Hydraulic Integral Motors.
- Control - Remote Handset.
- Cable Control - Remote Handset Optional Radio remote.

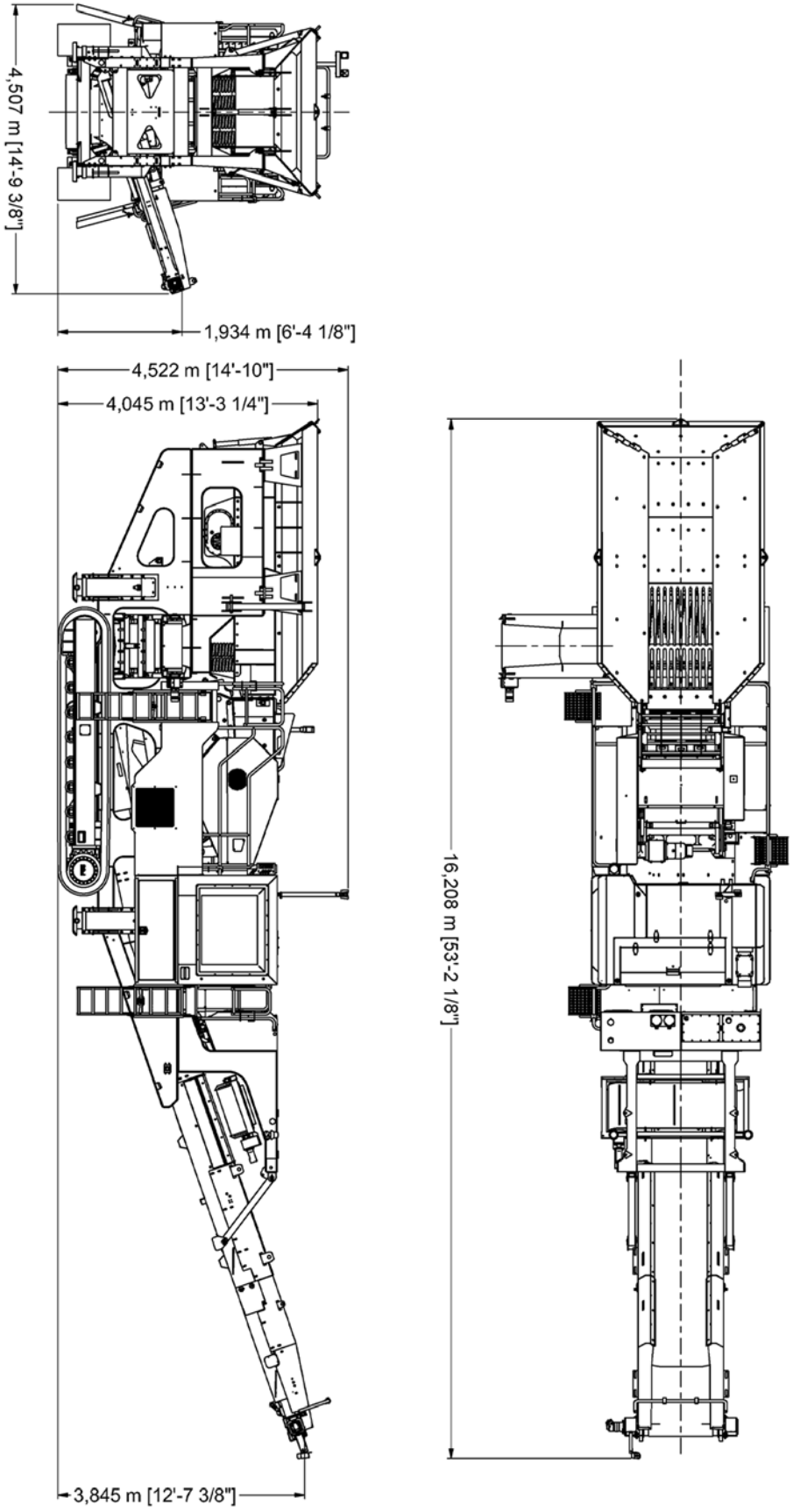
2.10.6.Power Unit

- Caterpillar C9 - 262Kw (350Hp).
- Volvo D7 (Optional).
- Refer to relevant engine manual for further information.
- Diesel Tank - 500 litres.
- Hydraulic Tank - 500 litres.

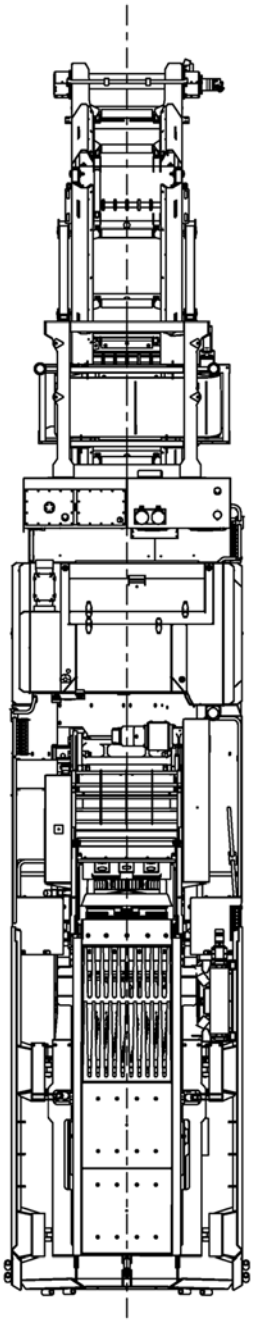
2.10.7.Magnetic Separator

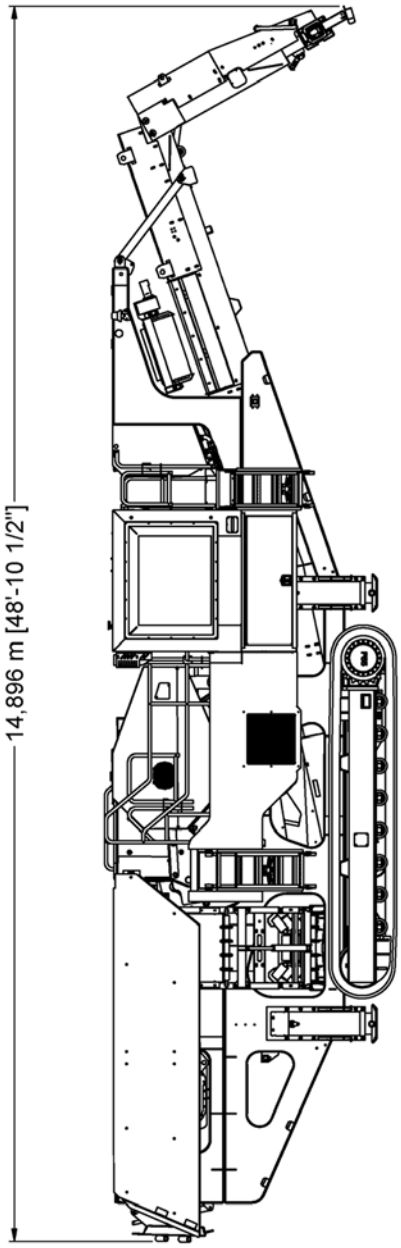
- Self Cleaning Suspended.
- Belt Width - 800mm (2.62 ft).
- Drive Hydraulic Motor.
- Control Fixed Speed.
- Weight - 1300Kg (2,900lbs approximately).
- Refer to relevant magnetic separator manual for further information.

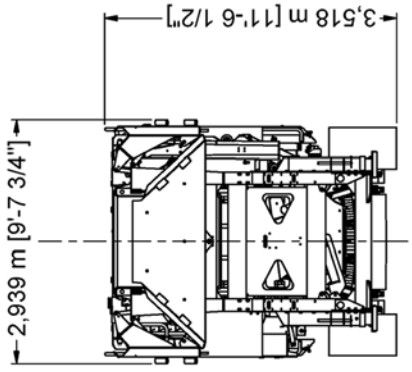
2.11.Machine Working Dimensions



2.12.Machine Transport Dimensions







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3. Product Overview

3.1.Product Overview

3.1.1.Main Components:

- Main Output Conveyor.
- Natural Fines Side Conveyor.
- Vibrating Feeder.
- Magnetic Overhead Conveyor.
- Jaw Crusher.
- Engine and Hydraulic Power Pack.
- Controls in Cabinets.
- Tracks.

3.1.2.Optional Extras:

- Hopper Extensions.
- Low Ambient Arctic Temperature Pack.
- High Ambient Temperature Pack.
- Output Stockpile Level Sensor.
- Hardox Liners.
- Dust Suppression System.

3.1.3.Machine Layout Indicating Main Components

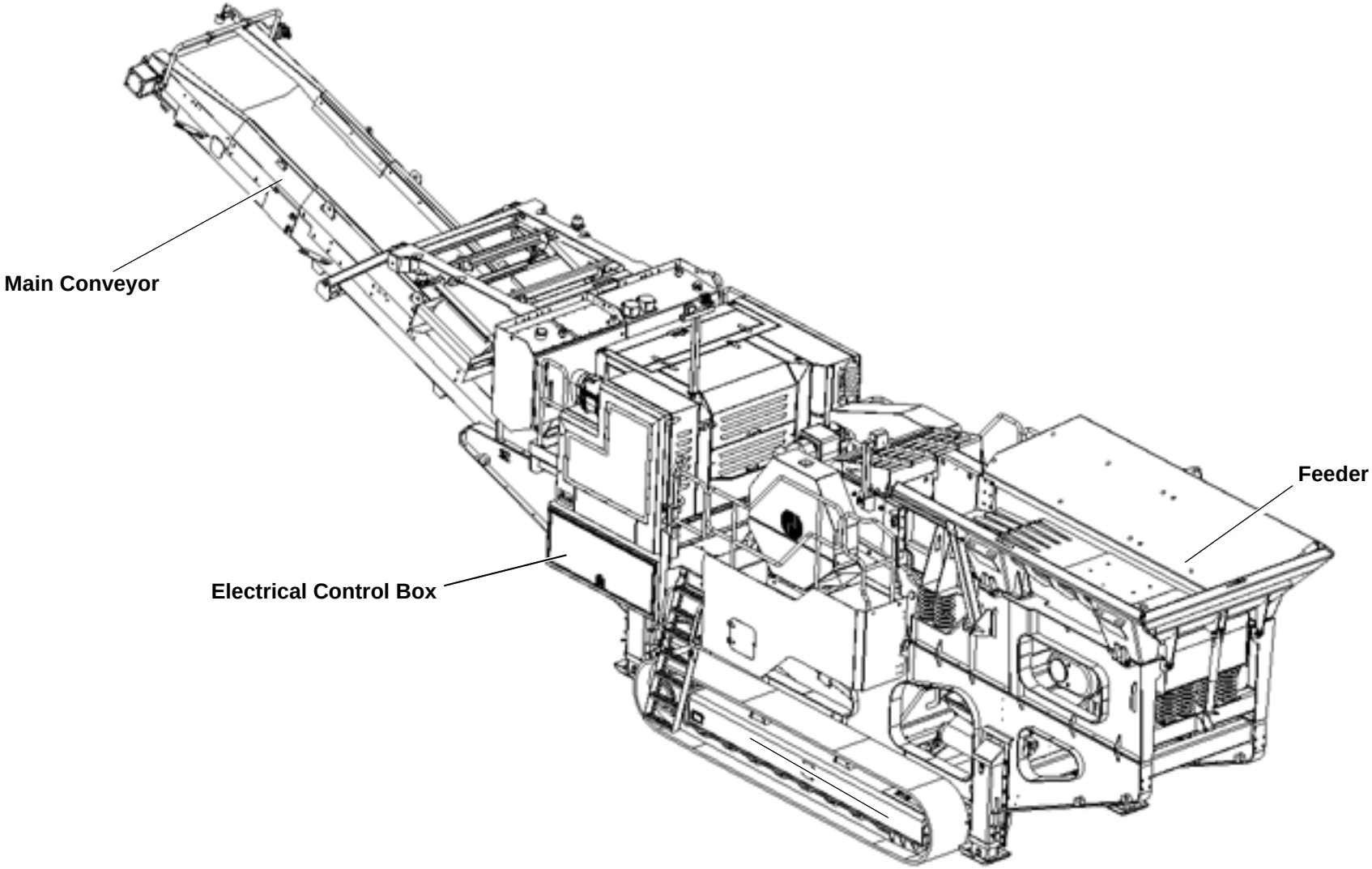


Figure 3-1: Main Components

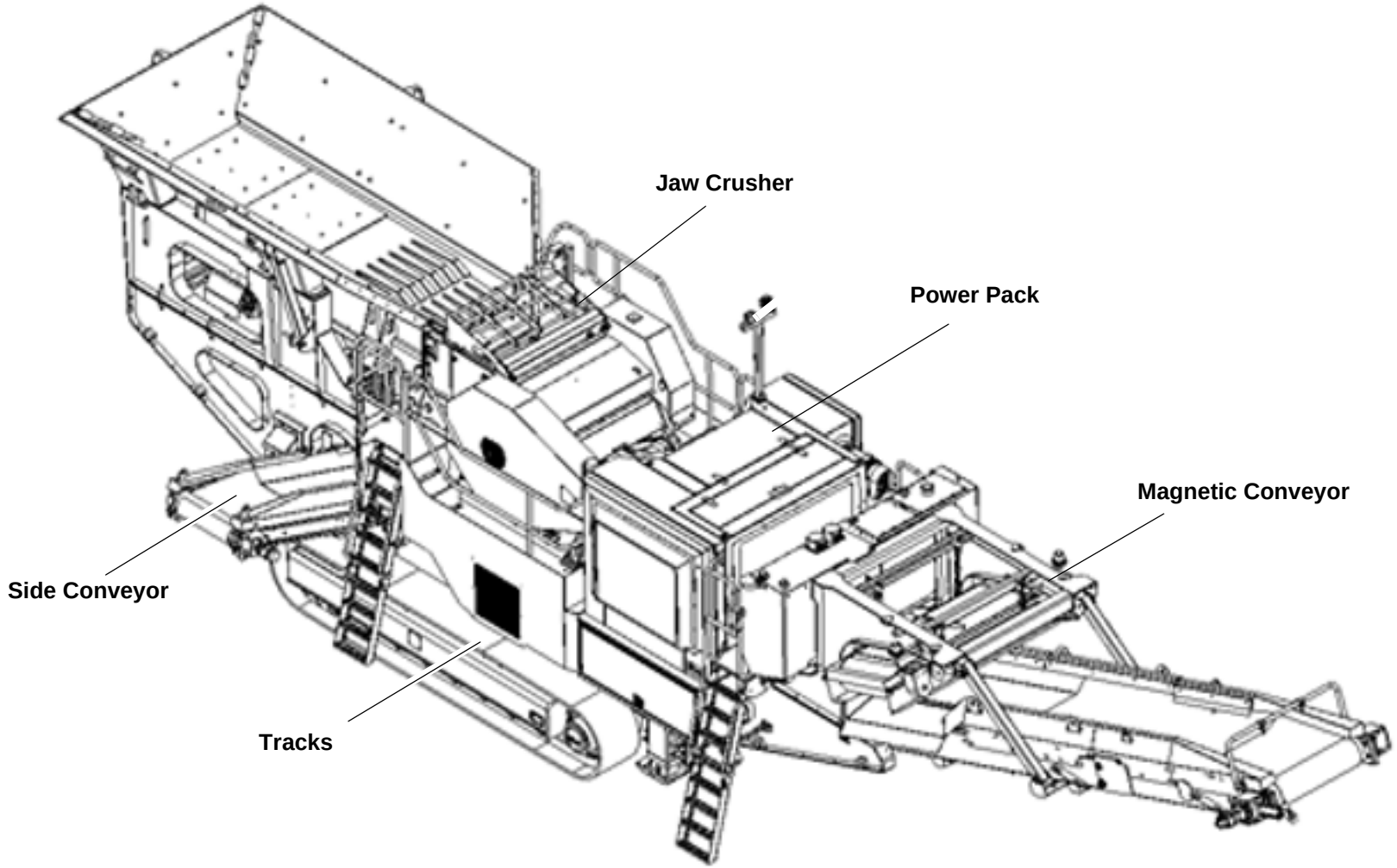


Figure 3-2: Main Components

4. Commissioning and Shut Down

4.2.Commissioning and Shutdown - Safety

The following safety instructions apply throughout the commissioning and shutdown section, additional and or variations in safety measures that are specific to their relevant sub sections will be detailed in the body of the text.

⚠ WARNING	
 	**PERSONNEL HAZARD!** **Lack of knowledge or understanding could cause serious injury, death or damage to the machine.** **DO NOT START COMMISSIONING! Until you have READ and FULLY understood this manual. If necessary seek clarification from your supervisor and or a Sandvik representative, before attempting ANY operations or maintenance. Failure to do so may also invalidate the manufacturers warranties.**

⚠ WARNING	
	**PERSONNEL HAZARD!** **Not using the minimum Personal Protective Equipment (PPE) could cause serious injury or death.** **Make sure that the minimum PPE is used when working on or within 20 metres (approximately 66 feet) of the machine, Refer to *Personal Protective Equipment (PPE), page 19*.**

4.3.Commissioning

4.3.1.Preliminary Operations

Machine Preliminaries

Make sure that commissioning and shutdown safety, Refer to ***Commissioning and Shutdown - Safety, page 62*** is followed throughout the pre commissioning instructions in addition to the following safety measures.

⚠ WARNING

PERSONNEL HAZARD!

Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.

Stop machine, isolate, remove ignition key and tag out, before carrying out these pre-start instructions. Refer to *Lock and Tag-out Procedure, page 105*.

⚠ WARNING

FALLING HAZARD!

Falling from heights could cause serious injury or death.

Some of the steps in this procedure require working at height, if this is the case, ensure the following:
- Maintenance platforms are in place.
- All hand rails are fixed in position.
- All ladders are lowered and fixed in position.
- A safety harness is worn.

NOTICE

It is recommended that set up of this machine be carried out by a representative of Sandvik Mobile Screening and Crushing Ltd. or by a qualified representative of the dealer.

NOTICE

The following instructions assume transportation of this machine using a low loader type vehicle, delivered in close proximity to the job site. If machine Is transported in any other way, contact the manufacturer for additional set up instructions.

Note: ***A minimum of two persons are required to carry out the following procedures, one to carry out the operations (operator) and one to observe for any potential hazards or dangers (observer).***

1. Remove all loose items from machine and store safely.
2. DONOT attempt to start this machine until you are aware of all aspects of its operation.
3. Remove any temporary sealing and transport straps.
4. Visually inspect machine for the following:
   - There are no signs of impact damage.
   - All safety guards / safety devices are in place and secure.
   - All machine components are in place and secure.
   - There are no signs of ANY fluid or oil leaks including hydraulic hoses.
5. Make sure that the crusher, feeder and conveyor belts are free from any materials, remove if necessary.
6. Remove all tools and equipment from the operational area.
7. Carry out a full daily maintenance routine, Refer to ***Maintenance on page 129***.
8. Carry out all engine pre start checks, Refer to ***Information and Data Sheets, page 207***.
9. Make sure that all visible drums and rollers turn freely.
10. Make sure that the skirting rubbers and scrapers are in place and secure.
11. The machine is transported with inlet chute top cover in the open position. Close inlet chute cover and tighten in position.

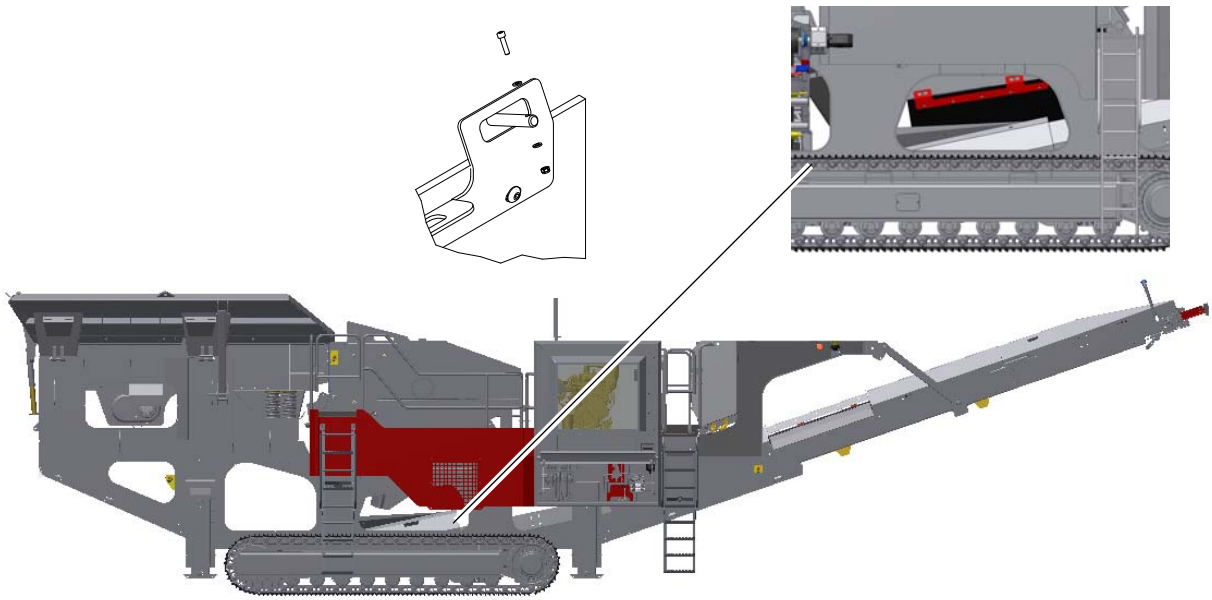


Figure 4-3: Main Conveyor Jaw Crusher Box - Rubbers

Side Jaw Rubbers

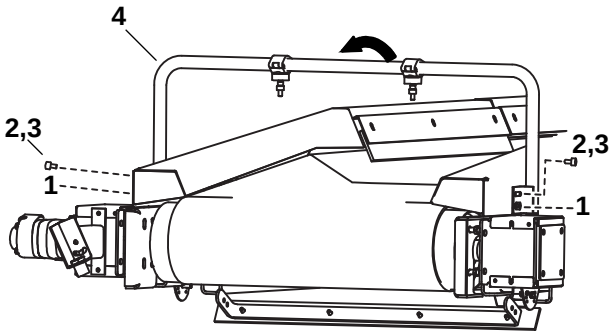
12. Refer to ***Figure 4-3:Main Conveyor Jaw Crusher Box - Rubbers***, install jaw side rubbers as follows:
    - Make sure that the nuts, bolts and washers are removed.
    - Position side rubbers, install bolts, washers, nuts and tighten.

⚠ WARNING	
	**LIFTING HAZARD!** **Lifting heavy objects could cause serious injury.** **Use correct lifting technique and get assistance when lifting heavy objects.**

Main Conveyor Spray Bar - Install

Note: ***Spray bar is folded back for transportation.***

13. Remove bolt (2) and washer (3) from upper threaded hole.
14. Slacken bolt (1) on both sides and position spray bar (4) upright, in its normal working position.
15. Install washers (3), bolts (2) on both sides and tighten.
16. Tighten bolt (1) on both sides.



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Ground Surface Preliminaries

NOTICE

This machine is designed to operate on a solid level surface capable of carrying the weight of the machine.

It is important that the machine is placed on level solid ground, capable of carrying the weight of the machine Refer to ***Identification of Emergency Stop Positions, page 51*** or damage could occur. The ground surface should be level. An appropriate site must be identified prior to delivery and unloading of the machine.

4.4.Main Control Devices

4.4.1.Electrical Control Box

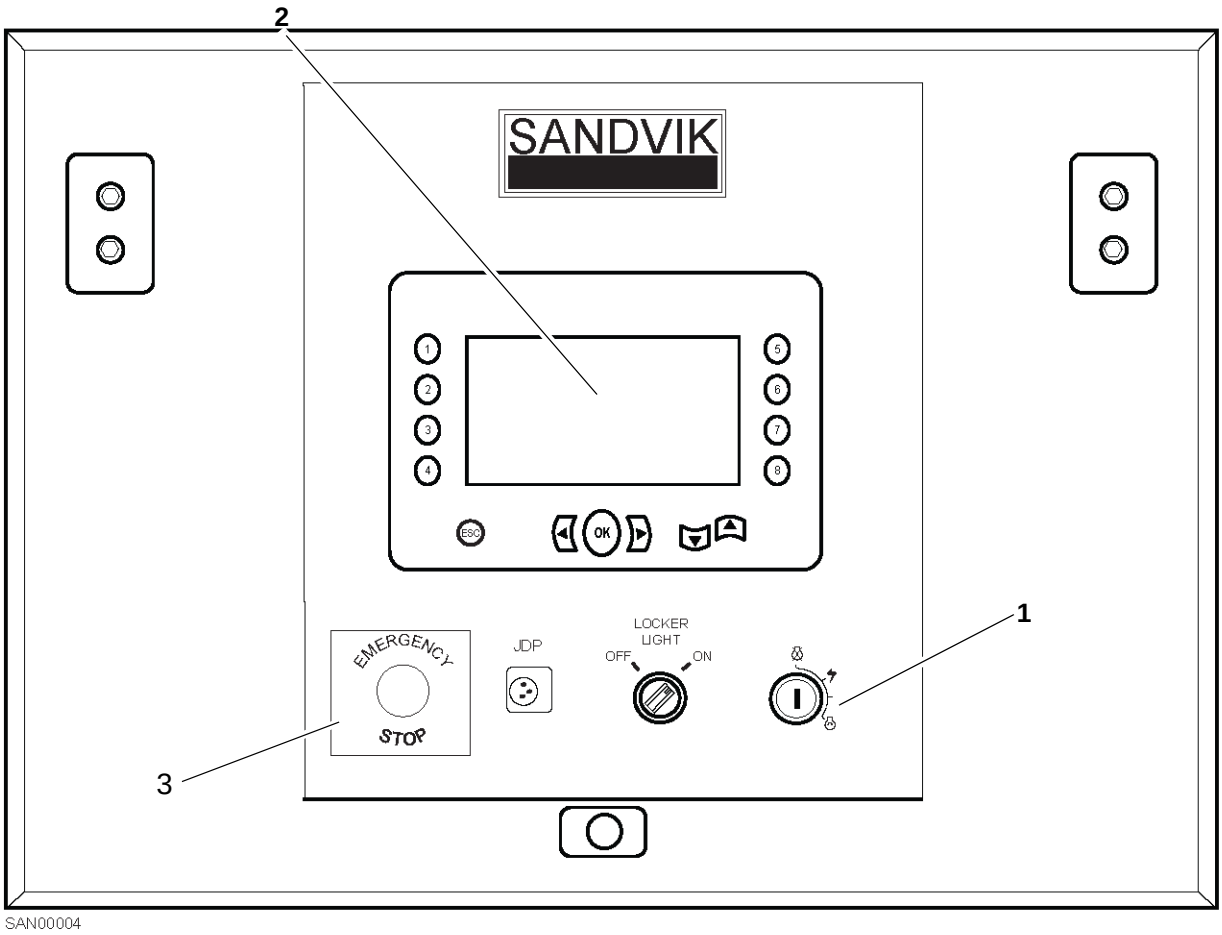


Figure 4-4: Electrical Control Box

1. Ignition Key
2. Display Panel
3. E-Stop Reset

4.4.2.Display Panel

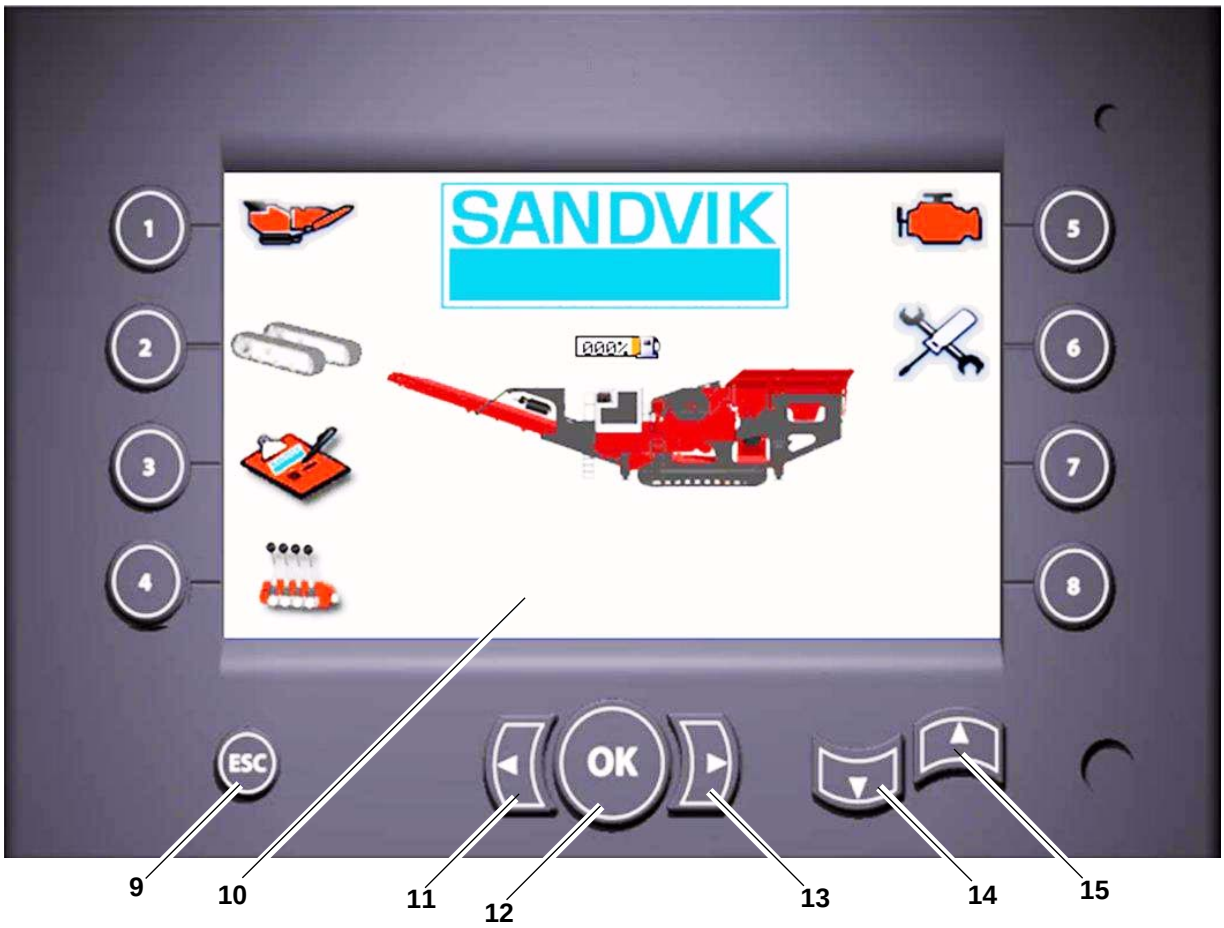


Figure 4-5: Display Panel - Main Menu

1. Plant Run
2. Track Select
3. Machine Log
4. Auxiliary Functions
5. Engine Information
6. Maintenance
7. Not used
8. Not used
9. Escape Function
10. Control Panel Display
11. Sub Menu Selections
12. Acknowledge Button
13. Sub Menu Selections
14. Sub Menu Adjust Down
15. Sub Menu Adjust Up

Note: ***Screen images throughout may not reflect that portrayed on the machine display, due to software revisions. Images are for illustrative purposes only.***

4.4.3.Setting Time and Date

1. Refer to ***Figure 4-5:Display Panel - Main Menu***, to change the time and date press and hold ‘ESC’ button (9) for 3 seconds to access the ‘Information Menu’.
2. Time and date fields appear, press and hold button (4) for 3 seconds.
3. Press right arrow button (13) ‘Years’ is highlighted and starts to flash.
4. Press ‘Up’ or ‘Down’ arrow buttons (14), (15) to change ‘Year’.
5. Press right arrow button (13) ‘Months’ is highlighted and starts to flash.
6. Press ‘Up’ or ‘Down’ arrow buttons (14), (15) to change ‘Month’.
7. Press right arrow button (13) ‘Days’ is highlighted and starts to flash.
8. Press ‘Up’ or ‘Down’ arrow buttons (14), (15) to change ‘Day’.
9. Press right arrow button (13) ‘Hours’ is highlighted and starts to flash.
10. Press ‘Up’ or ‘Down’ arrow buttons (14), (15) to change ‘Hour’.
11. Press right arrow button (13) ‘Minutes’ is highlighted and starts to flash.
12. Press ‘Up’ or ‘Down’ arrow buttons (14), (15) to change ‘Minutes’.
13. Press right arrow button (13) ‘Seconds’ is highlighted and starts to flash.
14. Press ‘Up’ or ‘Down’ arrow buttons (14), (15) to change ‘Seconds’.
15. Press and hold button (4) for 3 seconds to save changes.
16. Press ESC button (9) to return to Main Menu.

4.4.4.Setting the Language

1. Refer to ***Figure 4-5:Display Panel - Main Menu***, to change the time and date press and hold ‘ESC’ button (9) for 10 to 15 seconds to access the ‘Information Menu’.
2. Button 3 toggles between languages (the country flag or a greeting will appear).

4.5.Engine - Starting Procedure

4.5.1.Engine Starting Procedure - Safety

DANGER

PERSONNEL HAZARD!

Persons on machine or in exclusion zones when starting machine, may cause serious injury or death.

DO NOT UNDER ANY CIRCUMSTANCES start the machine when ANY persons are standing on the machine or in the exclusion zones, 20 metres (approximately 66 ft).

WARNING

TIPPING HAZARD!

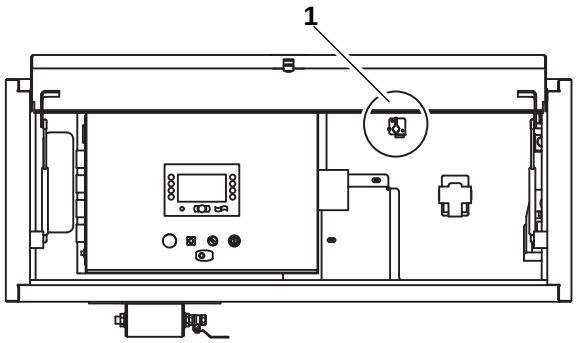
Operating machine on unsuitable ground could cause serious injury or death.

Machine MUST NEVER be tracked on gradients more than: 10° left to right or 20° front to back. Both tracks MUST BE in contact with firm level ground, suitable for carrying the machines weight.

NOTICE

COLD START: When starting machine in temperatures of 0°C (32°F) or below, run all systems at idle for 15 minutes to allow hydraulic oil to reach working temperature (DO NOT feed material into machine during this time). DO NOT change the engine speed while any systems are running. DO NOT operate systems contrary to these instructions.

1. Make sure that the preliminary procedures are carried out prior to starting machine, Refer to ***Preliminary Operations, page 63***.
2. Turn battery isolation switch (1) 'ON' located inside electrical cabinet.
3. Make sure that all emergency stops are released, and the switch on the remote control is turned off.
4. Press the E-Stop reset button, refer to *Figure 4-4: Electrical Control Box on page 66* (item 3).
5. Turn ignition key to 'ON' position, display panel 'Main Menu' is displayed, Refer to ***Figure 4-5: Display Panel - Main Menu, page 67***.



SAN00013

6. Turn ignition key to 'CRANK' position and hold until engine starts.

Note: ***Siren will sound & beacon will flash for 7 seconds before engine starts. If engine fails to start wait a few seconds before attempting again.***

7. Release ignition key slowly, which returns to the 'ON' position. Engine is now running at idling speed.

Note: ***To shut-down machine, Refer to Machine Shut Down, page 101.***

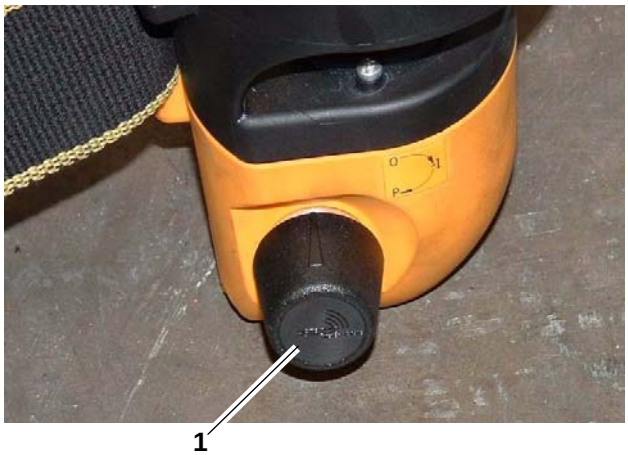
4.5.2.Tracking Machine

DANGER	
	**CRUSHING HAZARD!** **Personnel or objects on machine or in exclusion zones when starting and tracking machine, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES start or track the machine when ANY personnel or objects are on the machine or in the exclusion zones, 20 metres (approximately 66 ft).** **Carry out a thorough site inspection prior to commencing ANY operations.**

Note: ***A minimum of two persons are required to carry out the following procedures, one to carry out the operations (operator) and one to observe for any potential hazards or dangers (observer).***

1. Start engine, Refer to ***Engine - Starting Procedure, page 69***.
2. From ‘Main Menu’ press ‘Track Select’ button 2.

3. On the remote control handset, turn transmitter to the ‘On’ position (1).



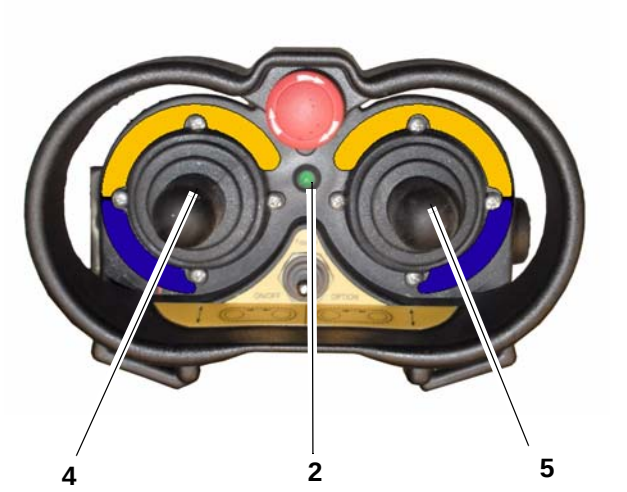
4. From ‘Track Select Menu’ press radio receiver ‘Remote Track’ button 2.

Note: ***In areas where interference is a particular problem, track by pressing button ‘1’ and use an umbilical cord, hard wired to the machine.***

Refer to xxxxx for further details.

Note: ***Additional selections available from this menu are ‘Auxiliary Functions’ (5) and ‘Track Diagnostics’ (6), Refer to relevant sections for more information.***

5. On the remote control handset, wait a few seconds for the green light (2) to start flashing.



6. Activate radio transmitter, press green button (3).

Note: ***Siren will sound and beacon will flash and it takes approximately 7 seconds for the radio transmitter to become operational.***

7. Tracking is now possible using the two joysticks (4) and (5), together to move in a straight line and or individually to turn.

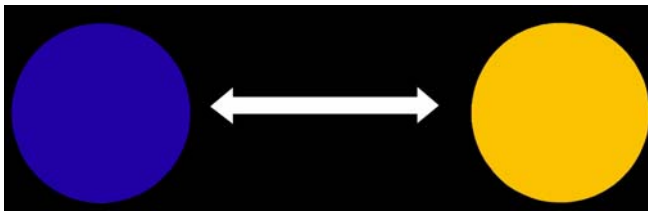
Note: The tail section of the main conveyor will lift prior to the tracks engaging.

8. If necessary engine Revs Per Minute (RPM) can be adjusted up (faster) or down (slower) to aid tracking using buttons as shown.

Note: ***If main conveyor is not raised it will raise automatically.***

4.5.3.Direction indicators

When operating the Remote Handset, the yellow buttons are for forward movement and the blue ones for reverse. (These correspond to direction indicator stickers on the machine and the remote handset.)



When operating the Hard Wire Handset, the yellow buttons are for forward movement and the blue ones for reverse. (These correspond to direction indicator stickers on the machine.)

4.5.4.Wired umbilical track control

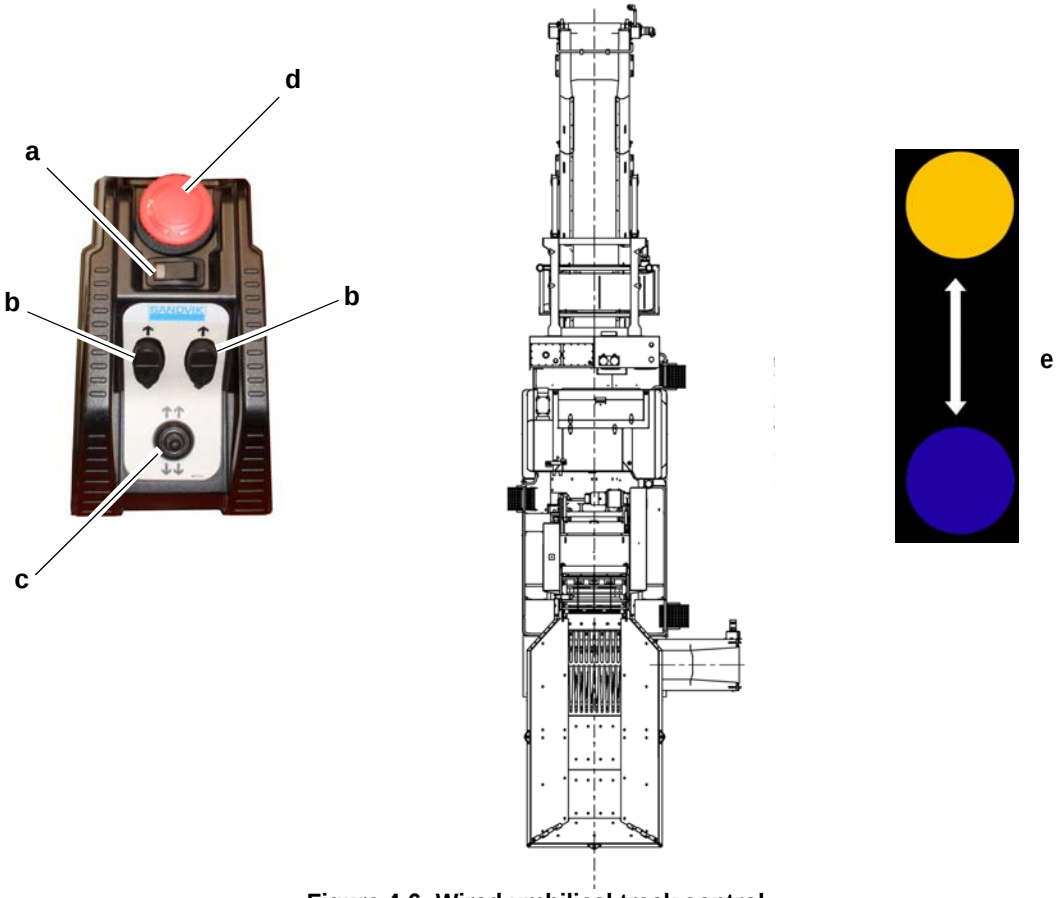


Figure 4-6: Wired umbilical track control

a. Umbilical control ON/OFF switch

b. Individual track control

c. Double track control for moving in straight line

d. Emergency stop button

e. Yellow and blue direction markers.

4.5.5.Main Conveyor - Manual Raise

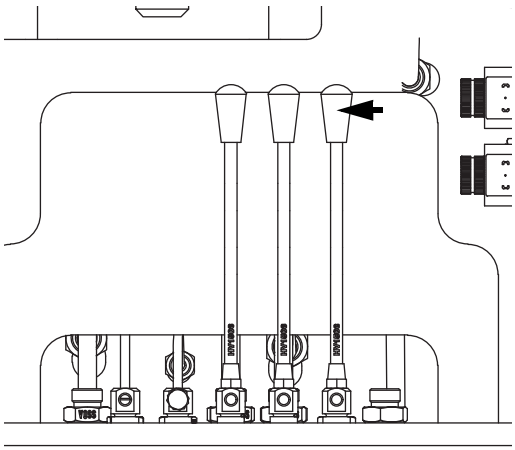
DANGER	
	**CRUSHING HAZARD!** **Personnel or objects on machine or in exclusion zones when starting or operating main conveyor, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES start or operate main conveyor when ANY personnel or objects are on the machine or in the exclusion zones, 20 metres (approximately 66 ft).** **Carry out a thorough site inspection prior to commencing ANY operations.**

Note: ***A minimum of two persons are required to carry out the following procedure, one to carry out the operation (operator) and one to observe for any potential hazards or dangers (observer).***

9. Start engine, Refer to ***Engine - Starting Procedure, page 69***.

10. From ‘Main Menu’ press ‘Auxiliary Functions’ button 4, which activates the auxiliary levers.

11. Raise main conveyor by pulling auxiliary lever, located in hydraulic cabinet.



SAN00007

4.5.6.Machine Set-up for Operation

It is assumed the pre-commissioning instructions have been completed prior to commencing with machine set-up for operation, Refer to ***Preliminary Operations, page 63*** if necessary.

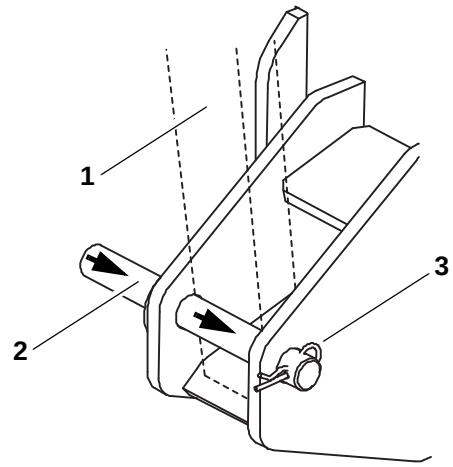
⚠ WARNING	
 	**PERSONNEL HAZARD!** **Lack of knowledge or understanding could cause serious injury, death or damage to the machine.** **DO NOT Set-up machine until you have READ and FULLY understood this manual. If necessary seek clarification from your supervisor and or a Sandvik representative, before attempting to set-up machine. Failure to do so may also invalidate the manufacturers warranties.**

⚠ WARNING	
 	**FALLING HAZARD!** **Falling from heights could cause serious injury or death.** **Some of the steps in this procedure requires working at height, ensure the following applies when working off the ground:** **- Maintenance platforms are in place.** **- All hand rails are fixed in position.** **- All ladders are lowered and fixed in position.** **- A safety harness is worn.**

1. Start engine, Refer to ***Engine - Starting Procedure, page 69***.
2. From ‘Main Menu’ press ‘Auxiliary Functions’ (button 4), which activates the auxiliary levers.
3. Refer to ***Figure 2-1: Auxiliary Levers - Location, page 45***, fold up side hopper doors by operating auxiliary levers (1, Left) and (3, Right).

⚠ WARNING	
	**PERSONNEL HAZARD!** **Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.** **Stop machine, isolate, remove ignition key and tag out, before continuing with these instructions. Refer to *Lock and Tag-out Procedure, page 105*.**

4. Secure props (1) (one on each side) securely, install retaining pin (2) and secure with ‘R’ clips (3).

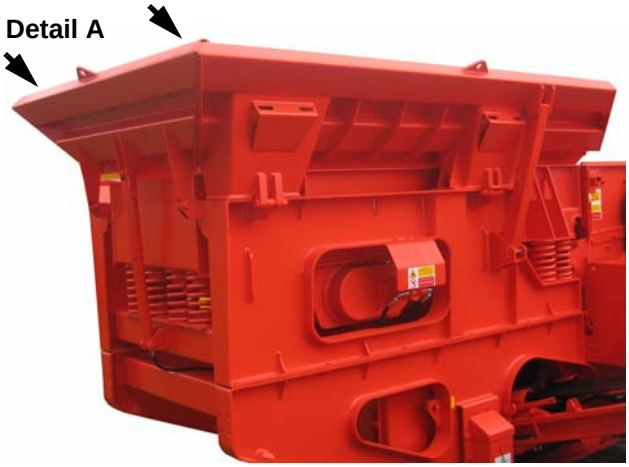


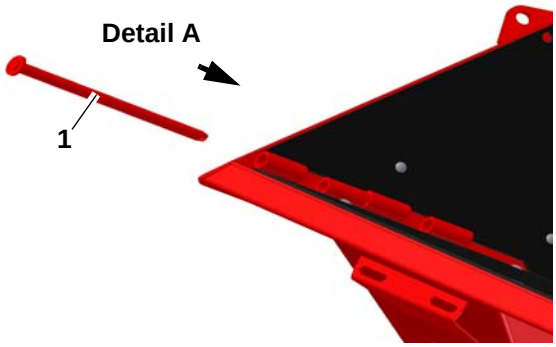
SAN00014

5. Start engine, Refer to ***Engine - Starting Procedure, page 69***.
6. From ‘Main Menu’ press ‘Auxiliary Functions’ (button 4), which activates the auxiliary levers.
7. Refer to ***Figure 2-1: Auxiliary Levers - Location, page 45***, fold up rear hopper door by operating auxiliary lever (2).

⚠ WARNING	
	**PERSONNEL HAZARD!** **Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.** **Stop machine, isolate, remove ignition key and tag out, before continuing with these instructions. Refer to *Lock and Tag-out Procedure, page 105*.**

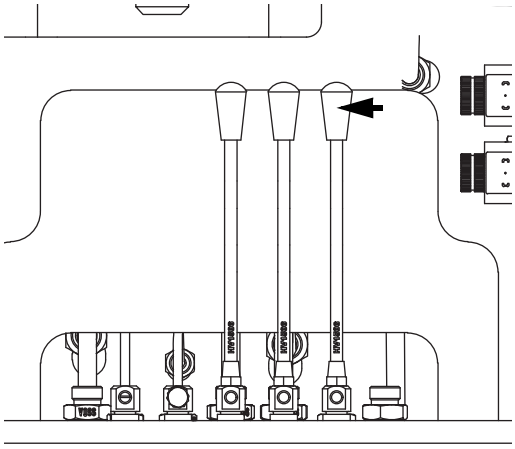
8. Secure hopper rear door in place with locating pins (1) one on each side.





9. Start engine, Refer to ***Engine - Starting Procedure, page 69***.
10. From ‘Main Menu’ press ‘Auxiliary Functions’ (button 4), which activates the auxiliary levers.
11. Refer to ***Figure 2-1: Auxiliary Levers - Location, page 45***, unfold the Natural Fines Conveyor by operating auxiliary lever (4).

12.Lower main conveyor by pushing auxiliary lever, located in hydraulic cabinet.



SAN00007

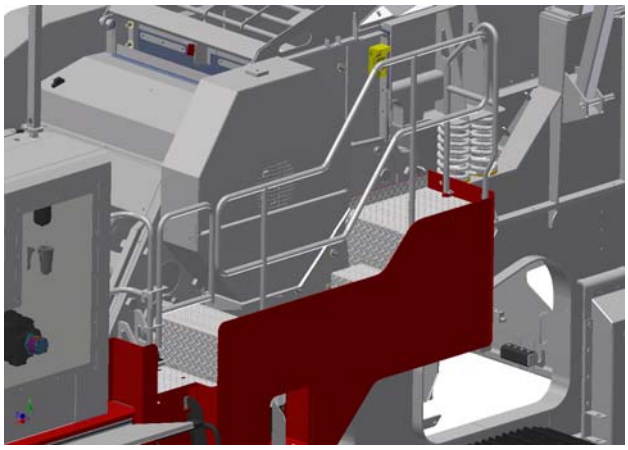
⚠ WARNING

PERSONNEL HAZARD!

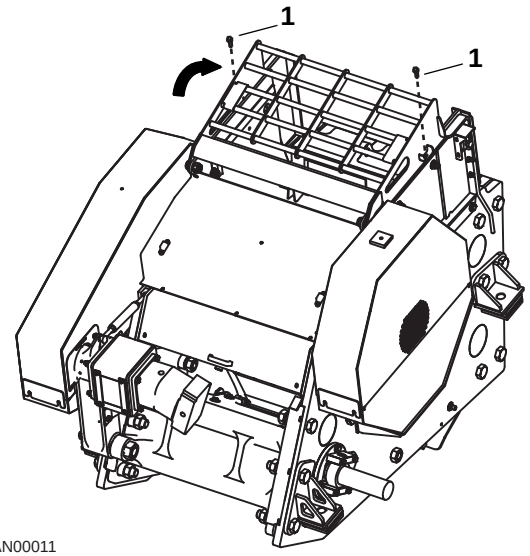
Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.

Stop machine, isolate, remove ignition key and tag out, before continuing with these instructions. Refer to *Lock and Tag-out Procedure, page 105*.

13.Install safety rail to maintenance platforms and tighten securely.



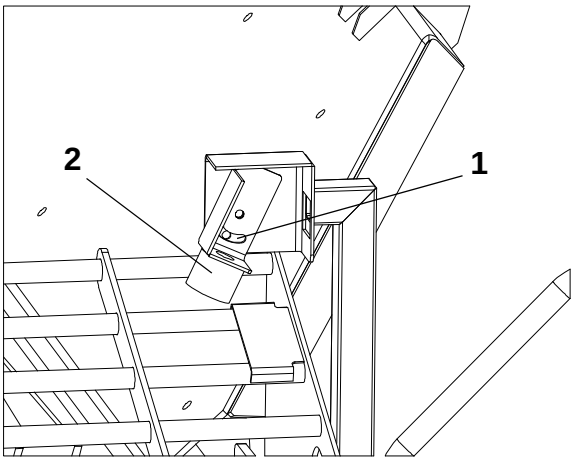
14.Lower hopper lid, install and tighten two bolts (1) each side.



SAN00011

15.At the top of the inlet chute cover, set the sonar to its working position:

- Loosen the lower bolt (1)
- Pivot the sonar (2) in position
- Tighten the lower bolt.



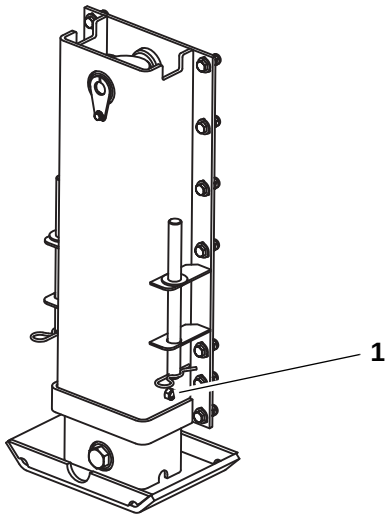
4.5.7.Jacking Legs - Lower

⚠ WARNING	
	**CRUSHING HAZARD!** **Personnel near or on machine whilst lowering jacking legs, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES operate jacking legs when ANY personnel or objects are on or near the machine.** **Carry out a thorough site inspection prior to commencing ANY work operations.**

Note: ***A minimum of two persons are required to carry out the following procedures, one to carry out the operations (operator) and one to observe for any potential hazards or dangers, along with aligning retaining pin holes (observer).***

Note: ***Front jacking leg shown, rear leg similar.***

16.If fitted, loosen the M16 securing bolt (1).



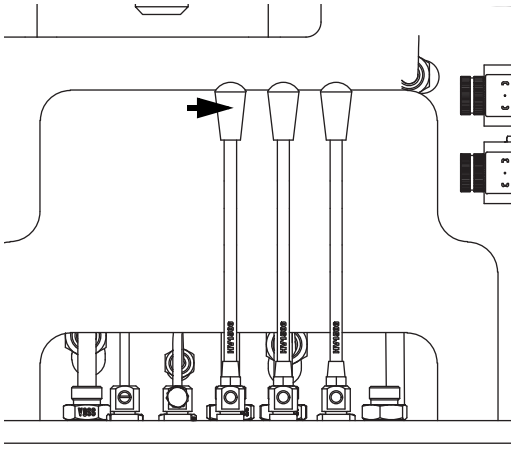
SAN00003

17.Start engine, Refer to ***Engine - Starting Procedure, page 69***.

18.From ‘Main Menu’ press ‘Auxiliary Functions’ button 4, which activates the auxiliary levers.

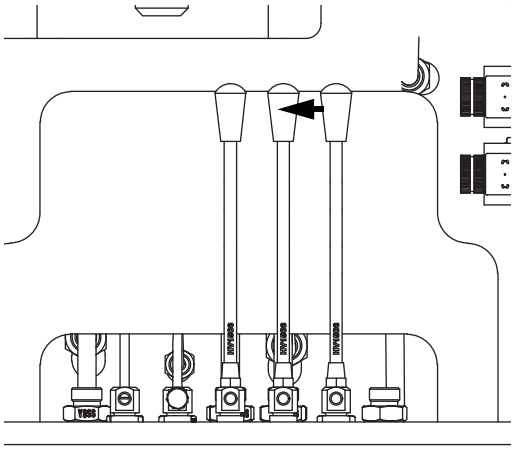
Note: ***The purpose of lowering the jacking legs is to support the vehicle weight and distribute the load evenly. Some adjustments may be required depending on the site area.***

19.Lower rear jacking legs by pushing left auxiliary lever, located in hydraulic cabinet.



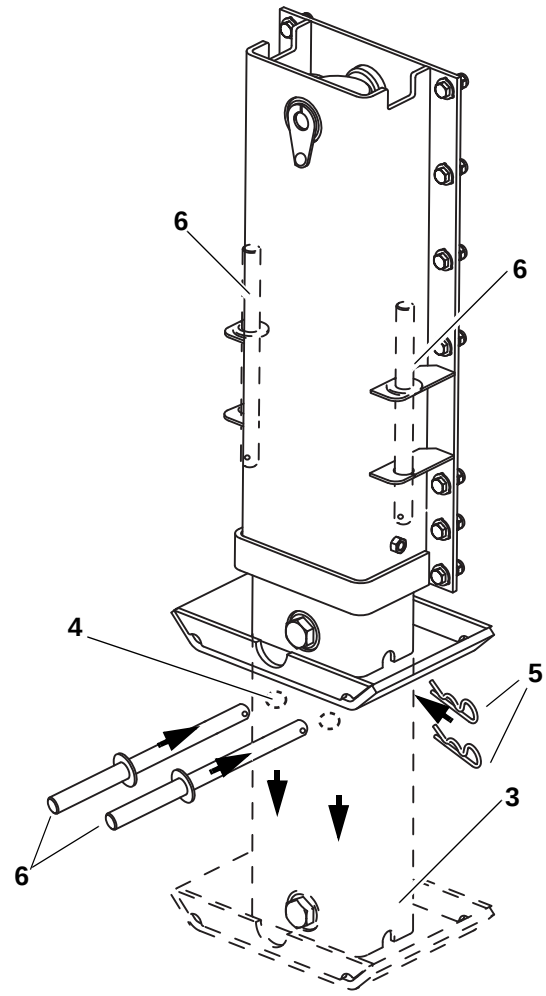
SAN00007

20.Lower front jacking legs by pushing centre auxiliary lever, located in hydraulic cabinet.



SAN00007

21. As jacking legs (3) lower, the observer should indicate to the operator when a suitable pair of retaining pin, holes (4) are aligned and the weight of the vehicle is supported.
22. Shutdown machine, remove ignition key and lock and tag-out before the next step, Refer to ***Machine Shut Down, page 101***.
23. Remove 'R' clips (5) from retaining pins (6) and install two retaining pins (6) into suitable retaining pin holes (4).
24. Install 'R' clips (5) into retaining pins (6).
25. Repeat process for remaining jacking legs.



SAN00006

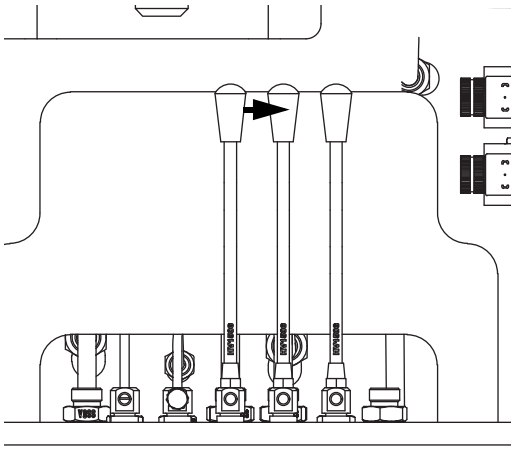
4.5.8.Jacking Legs - Raise

⚠ WARNING	
	**CRUSHING HAZARD!** **Personnel near or on machine whilst raising jacking legs, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES operate jacking legs when ANY personnel or objects are on or near the machine.** **Carry out a thorough site inspection prior to commencing ANY work operations.**

Note: ***A minimum of two persons are required to carry out the following procedures, one to carry out the operations (operator) and one to observe for any potential hazards or dangers.***

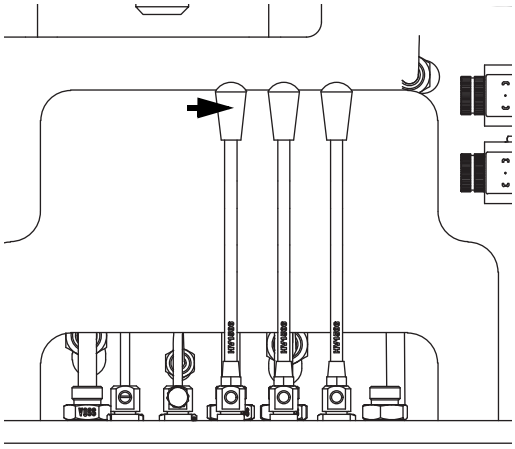
1. Start engine, Refer to ***Engine - Starting Procedure, page 69***.
2. From ‘Main Menu’ press ‘Auxiliary Functions’ button 4, which activates the auxiliary levers.

3. Lower front jacking legs slightly by pushing centre auxiliary lever, located in hydraulic cabinet, this releases the weight from the retaining pins.



SAN00007

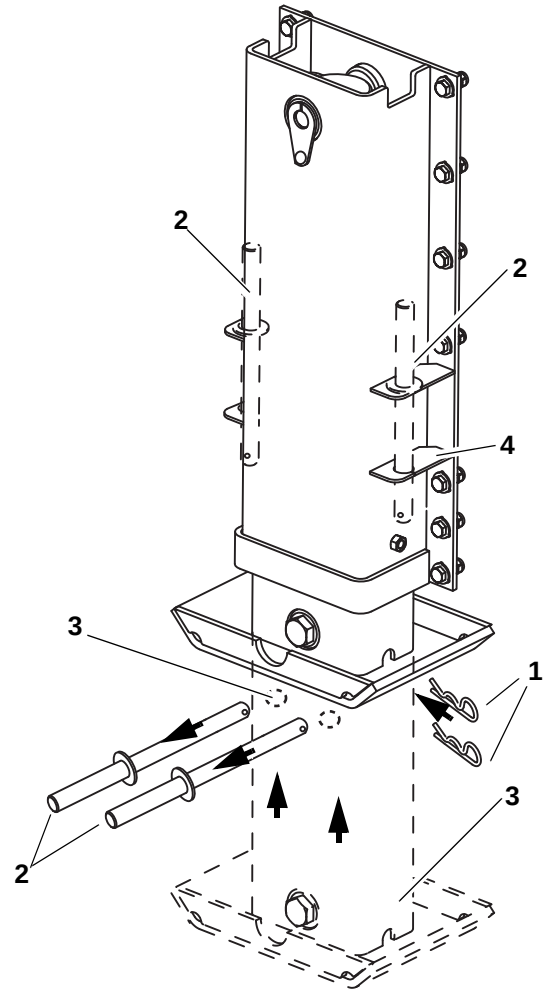
4. Lower rear jacking legs slightly by pushing left auxiliary lever, located in hydraulic cabinet, this releases the weight from the retaining pins.



SAN00007

Note: ***Front jacking leg shown, rear leg similar.***

5. Shutdown machine, remove ignition key and lock out before the next step, Refer to ***Machine Shut Down, page 101***.
6. Remove ‘R’ clips (1) from retaining pins (2).
7. Remove two retaining pins (2) from retaining pin holes (3).
8. Return retaining pins (2) to retaining pin holders (4).
9. Install ‘R’ clips (1) onto retaining pins (2).
10. Repeat process for remaining jacking legs.

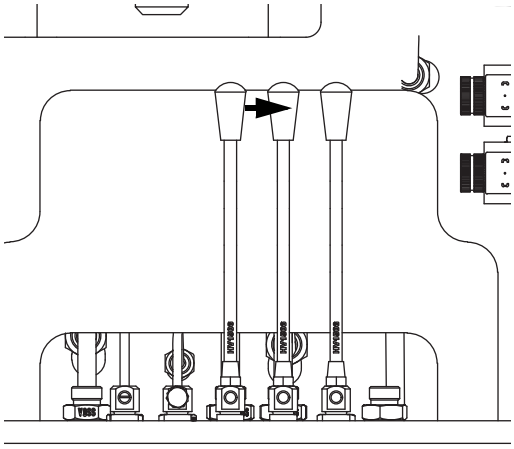


SAN00006

11. Start engine, Refer to ***Engine - Starting Procedure, page 69***.

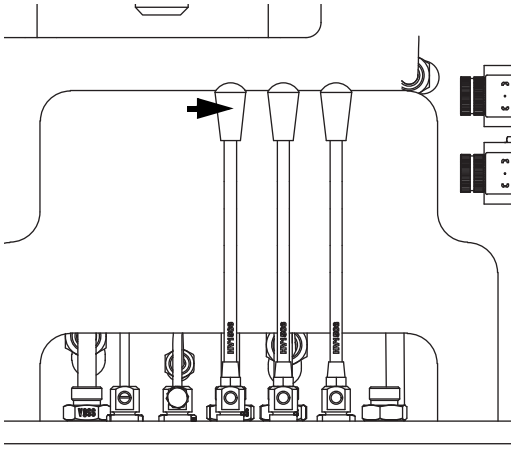
12. From ‘Main Menu’ press ‘Auxiliary Functions’ button 4, which activates the auxiliary levers.

13. Raise front jacking legs by pulling centre auxiliary lever, located in hydraulic cabinet.



SAN00007

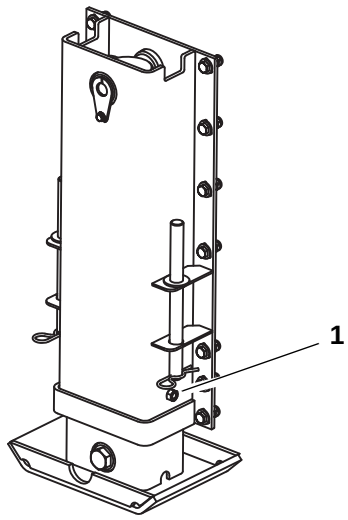
14. Raise rear jacking legs by pulling left auxiliary lever, located in hydraulic cabinet.



SAN00007

15.If fitted, tighten the M16 securing bolt (1).

16.Repeat process for remaining jacking legs.



SAN00003

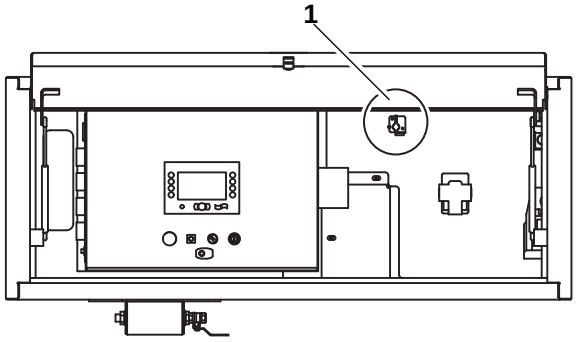
4.6.Operating the Machine

Before commencing general operation make sure that all preliminary operations are carried out, this applies during the commissioning process and or general usage, Refer to ***Preliminary Operations, page 63***.

DANGER	
	**CRUSHING HAZARD!** **Personnel or objects on machine or in exclusion zones when starting or operating machine, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES start or operate machine when ANY personnel or objects are on the machine or in the exclusion zones, 20 metres (approximately 66 ft).** **Carry out a thorough site inspection prior to commencing ANY operations.**

4.6.1.Start-up Sequence - Running the Crusher

1. Make sure that all preliminary procedures are carried out prior to starting machine, Refer to ***Preliminary Operations, page 63***.
2. Turn battery isolation switch (1) ‘ON’ located inside electrical cabinet.
3. Make sure that all emergency stops are released, and switch on remote control is turned off.
4. Press the E-Stop reset button, refer to *Figure 4-4: Electrical Control Box on page 66* (item 3).
5. Turn ignition key to ‘ON’ position, display panel ‘Main Menu’ is displayed, Refer to ***Figure 4-5: Display Panel - Main Menu, page 67***.



SAN00013

6. Access crusher control sub menu by pressing button 1.
7. Select relevant run mode, ‘Manual’ or ‘Automatic’ Refer to ***Manual Run Mode, page 89*** or ***Auto Run Mode, page 94***.

4.6.2.Manual Run Mode

Note: ***Selecting this option allows the operator to select particular functions and start each operation in turn.***

1. Access crusher control menu, Refer to ***Start-up Sequence - Running the Crusher, page 88***.
2. Select ‘Manual Run’ mode, press button 1 to access ‘Manual Run’ mode options.

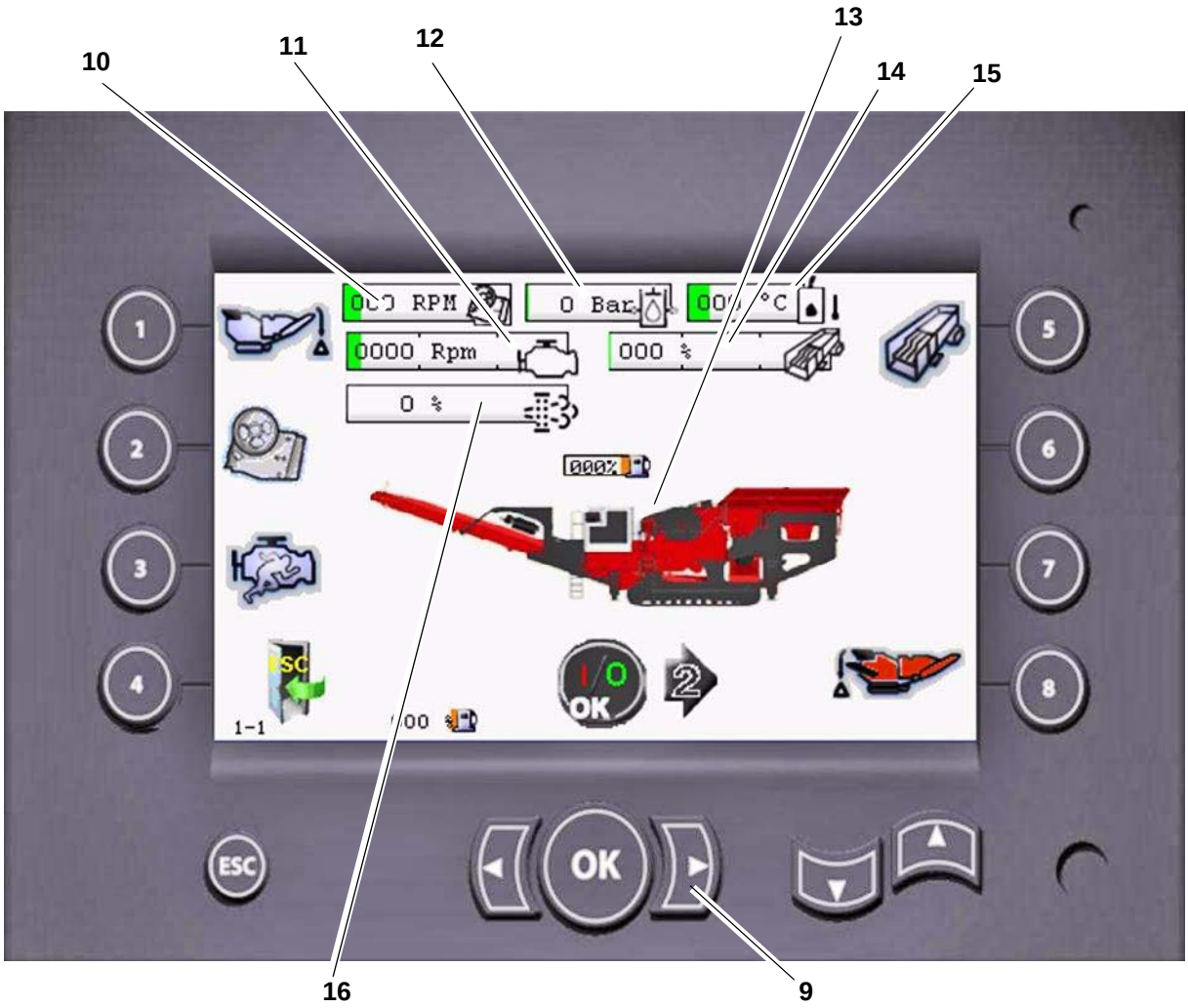


Figure 4-7: Manual Run Mode - Page 1 Options

1. Main Conveyor Start / Stop
2. Crusher Start / Stop
3. Engine Adjust Speed
4. Return to Main Menu
5. Feed Conveyor Start / Stop
6. Not Used
7. Not Used
8. Natural Fines Conveyor Start / Stop
9. Next Page
10. Crusher Speed (RPM)
11. Engine Speed (RPM)
12. Crusher Drive Pressure
13. Display Screen Options
14. Feeder Conveyor Speed % Value
15. Hydraulic Oil Temperature (°C)
16. Engine Soot Level % Value (3b engine only)

When ‘Manual Run’ mode has been selected each of the operations can be started up individually, however they can only be started up in following sequence, ‘Main Conveyor’, ‘Crusher’ and ‘Feeder’.

Note: ***The Natural Fines Conveyor can be turned on at any point during the sequence.***

4.6.3.Manual Run Page 1 Options - Functionality

Refer to ***Figure 4-7: Manual Run Mode - Page 1 Options, page 90***.

Button 1 - Main Conveyor Start / Stop

Operates main conveyor, which will automatically lower, a siren sounds and beacon flashes for 10 seconds before conveyor starts.

Note: ***Main conveyor cannot be stopped until the crusher as been switched off.***

Button 2 - Crusher Start / Stop

Operates the crusher which, can only be started after the main conveyor has been started, a siren sounds and beacon flashes for 10 seconds before crusher starts.

Note: ***Crusher can only be stopped if the feed conveyor is stopped first.***

Button 3 - Engine Adjust Speed

Allows the operator to control engine speed. When this function is selected the option to start and stop the Natural Fines Conveyor will disappear and engine ramp up/down buttons will appear enabling the operator to increase or decrease engine speed.

Button 4 - Return to Main Menu

Returns the user to the main menu.

Button 5 - Feed Conveyor Start / Stop

Operates feed conveyor which, can only be started after the crusher has reached a preset operating speed, a siren sounds and beacon flashes for 10 seconds before the crusher starts.

Button 6 - Not Used

Button 7 - Not Used

Button 8 - Natural Fines Conveyor Start / Stop

Operates Natural Fines Conveyor which, can be started any time after the crusher is started, a siren sounds and beacon flashes for 10 seconds before Natural Fines Conveyor starts.

Item 9 - Next Page

Takes the user to the next menu page.

Item 10 - Crusher Speed (RPM)

Indicates the current crusher speed displayed in Revolutions Per Minute (RPM).

Item 11 - Engine Speed (RPM)

Indicates the current engine speed displayed in RPM.

Item 12 - Crusher Drive Pressure

Indicates the current crusher drive pressure displayed in bar.

Item 13 - Display Screen Options

Available display screen options are shown.

Item 14 - Feeder Conveyor Speed % Value

Indicates the current feeder conveyor speed as a percentage value.

Item 15 - Hydraulic Oil Temperature

Indicates the current hydraulic oil temperature displayed in degrees centigrade.

Item 16 - Engine Soot Level % Value (3b engine only)

Indicates the current engine soot levels displayed as a percentage value.

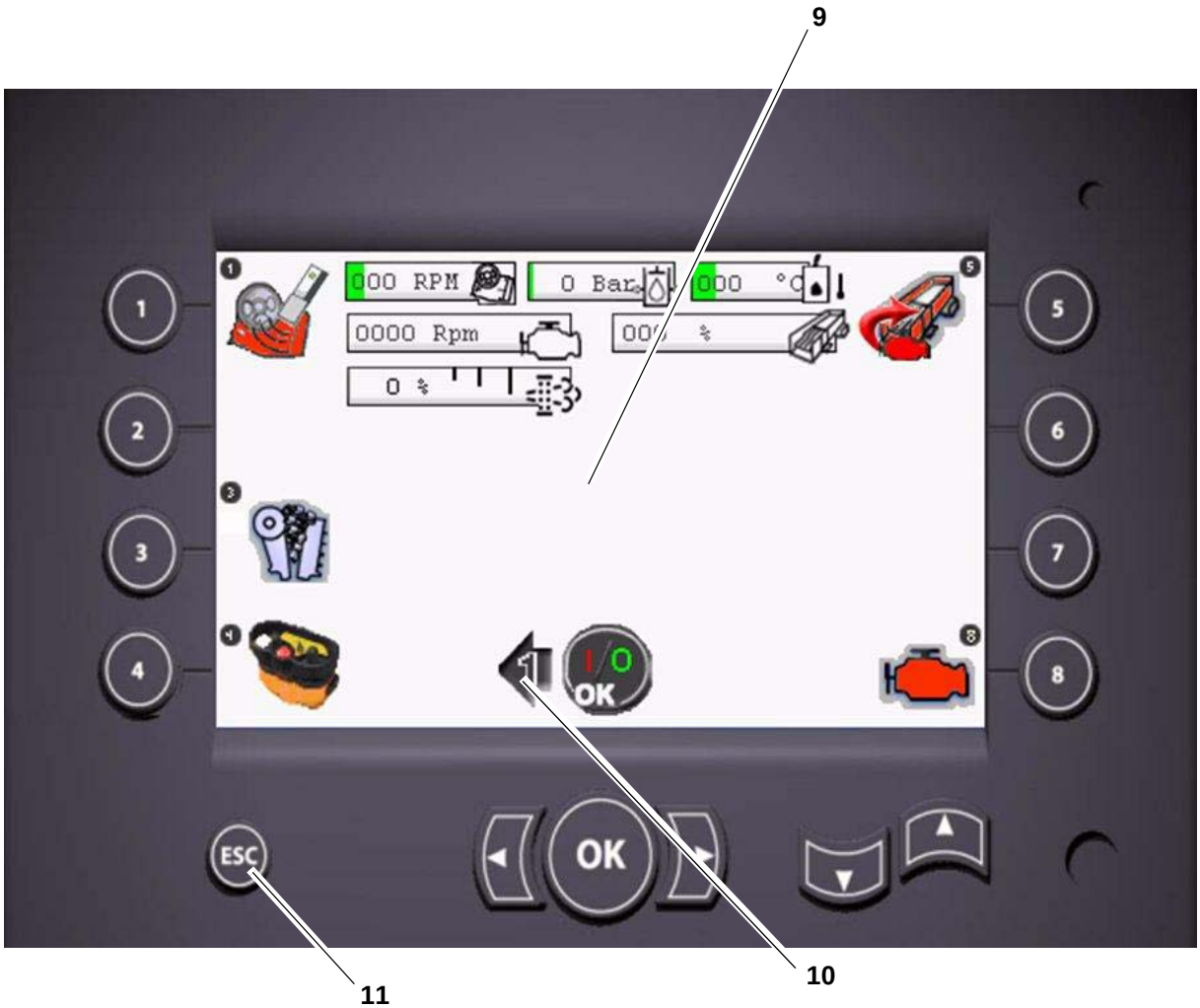


Figure 4-8: Manual Run Mode - Page 2 Options

1. Hopper Level Control Enable
2. Not Used
3. Crusher Jog
4. Radio Select
5. Crusher Level Control Enable
6. Not Used
7. Not Used
8. Engine Information
9. Display Screen Options
10. Previous Page
11. Escape Function

4.6.4.Manual Run Page 2 Options - Functionality

Refer to ***Figure 4-8: Manual Run Mode - Page 2 Options, page 92***.

Button 1 - Hopper Level Control Enable

Enables hopper level control, the level sensor in the crushing chamber controls the feeder speed in relation to the level of material in the chamber. Desired control levels can be adjusted.

Hopper Level Control - Sub Menu

Refer to ***Figure 4-9:Hopper Level Control - Sub Menu***.

- Button 2 / 3 increase / decrease level.

- Button 6 / 7 increase / decrease sensor sensitivity.

Refer to ***Figure 4-8: Manual Run Mode - Page 2 Options, page 92***.

Figure 4-9: Hopper Level Control - Sub Menu

Button 2 - Not Used

Button 3 - Crusher Jog

Allows the operator to jog crusher in forward and reverse.

Button 4 - Radio Select

Allows the operator to control functions of the machine via remote control - Jog forward/reverse, feeder speed and feeder on/off.

Button 5 - Crusher Level Control Enable

Enables crusher load control. Desired control levels can be adjusted.

Crusher Level Control - Sub Menu

Refer to ***Figure 4-10:Crusher Level Control - Sub Menu***.

- Buttons 2/3 adjusts feeder start up pressure.

- Buttons 6/7 adjusts feeder stop pressure.

- Press back button to return to previous menu.

Refer to ***Figure 4-8: Manual Run Mode - Page 2 Options, page 92***.

Figure 4-10: Crusher Level Control - Sub Menu

Button 6 - Not Used

Button 7 - Not Used

Button 8 - Engine Information

Displays engine information.

Item 9 - Display Screen Options

Displays all the current available options.

Item 10 - Previous Page

Displays previous page options, Refer to ***Figure 4-7:Manual Run Mode - Page 1 Options***.

Item 11 - Escape Function

Returns the user to the main menu.

4.6.5.Auto Run Mode

Note: ***Selecting this option operates the crusher in automatic mode.***

1. Access crusher control menu, Refer to ***Start-up Sequence - Running the Crusher, page 88***.
2. Select ‘Auto Run’ mode, press button 2 to access ‘Auto Run’ mode options.

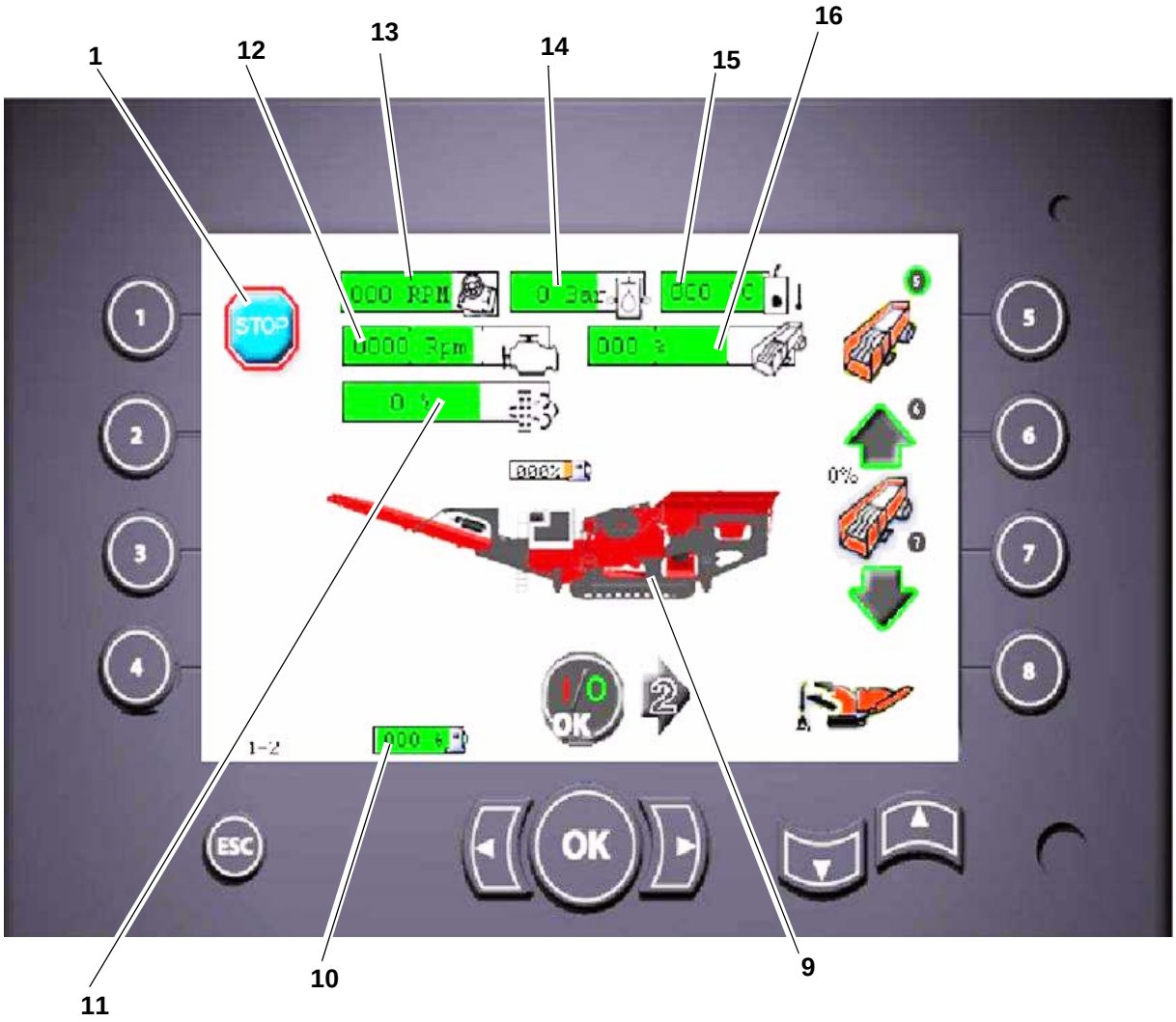


Figure 4-11: Auto Mode - Display

1. Stop Button
2. Not Used
3. Not Used
4. Not Used
5. Crusher Load Enable
6. Feeder Speed Control
7. Feeder Speed Control
8. Natural Fines Conveyor Start / Stop
9. Visual Representation
10. Fuel Gauge
11. Engine Soot Level % Value (3b engine only)
12. Engine Speed (RPM)
13. Crusher Speed (RPM)
14. Engine Load (Bar)
15. Hydraulic Oil Temperature (°C)
16. Feeder Conveyor Speed % Value

Operating machine in auto mode will start each function automatically, sounding the siren and flashing the beacon for 10 seconds prior to each function commencing. As follows:

A. Main conveyor lowers.

B. Main conveyor starts.

C. Ramp crusher and engine to full speed.

Note: ***When crusher reaches its preset speed and no feeder inhibit faults are active the feeder can be started manually by pressing button 5.***

4.6.6.Auto Mode Display - Functionality

Refer to ***Figure 4-11: Auto Mode - Display, page 95***.

Button 1 - Stop Button

Stops the ‘Auto Mode’ process.

Button 2 - Not Used

Button 3 - Not Used

Button 4 - Not Used

Button 5 - Crusher Level Control Enable

Enables crusher load control. Desired control levels can be adjusted.

Buttons 6 and 7

Adjusts the feeder speed.

Button 8 - Natural Fines Conveyor Start / Stop

Operates Natural Fines Conveyor which, can be started any time after the crusher is started, a siren sounds and beacon flashes for 10 seconds before Natural Fines Conveyor starts.

Item 9 - Visual representation

A visual representation is displayed on the screen.

Item 10 - Fuel Gauge

Indicates the current amount of fuel in the tank.

Item 11 - Engine Soot Level % Value (3b engine only)

Indicates the current engine soot levels displayed as a percentage value.

Item 12 - Engine Speed

Indicates the current engine speed displayed in RPM.

Item 13 - Crusher Speed

Indicates the current crusher speed displayed in RPM.

Item 14 - Engine Load

Indicates the current engine load displayed in bar.

Item 15 - Hydraulic Oil Temperature

Indicates the current hydraulic oil temperature displayed in degrees centigrade.

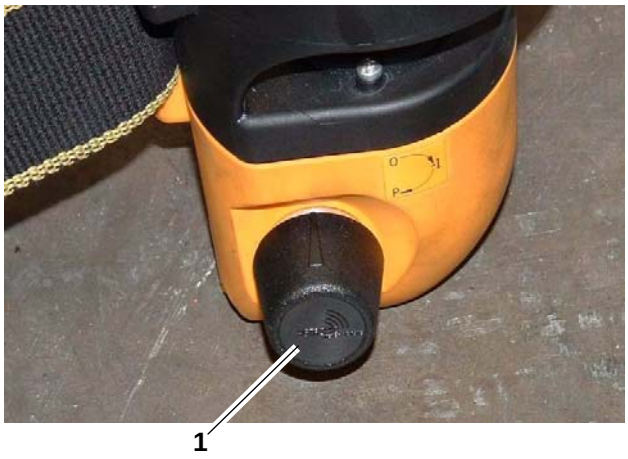
Item 16 - Feeder Conveyor Speed % Value

Indicates the current feeder conveyor speed as a percentage value.

4.6.7.Feed Conveyor - Remote Adjustment

Machine must be operational and in ‘Manual Mode’ or ‘Auto Mode’ to adjust feed conveyor, Refer to ***Engine - Starting Procedure, page 69***.

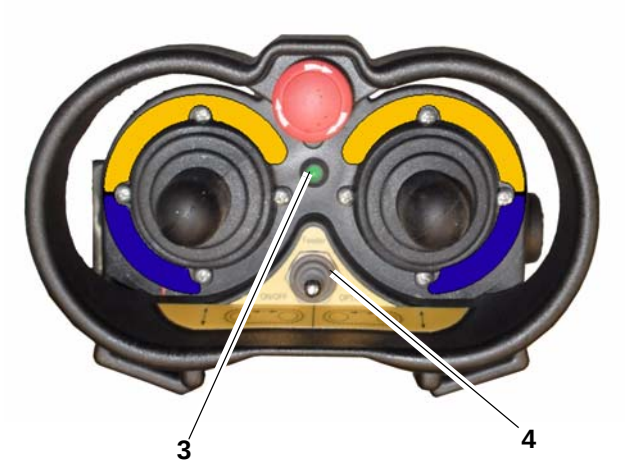
1. Turn transmitter to the ‘On’ position (1).



2. Activate radio transmitter, press green button (2).

   Note: ***Siren will sound and beacon will flash and it takes approximately 7 seconds for the radio transmitter to become operational.***

3. Wait a few seconds for the green light (3) to start flashing.
4. Toggle switch (4) to switch the feeder on and off as required.



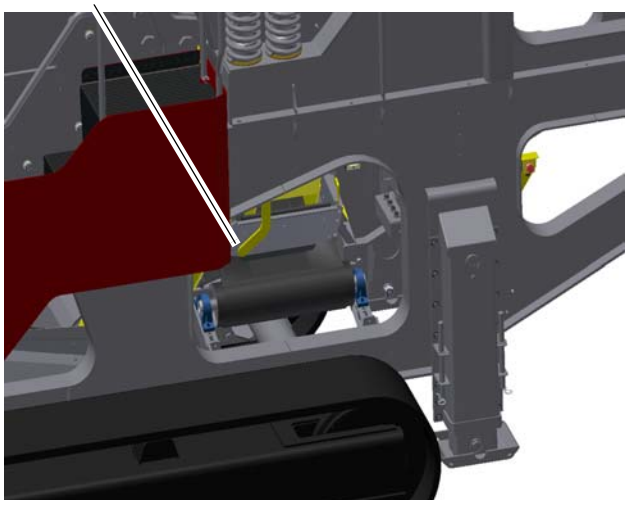
4.6.8.Feeder Transfer Chute

⚠ WARNING	
 	**PERSONNEL HAZARD!** **Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.** **Stop machine, isolate, remove ignition key and tag out, before changing the position of the feeder transfer chute. Refer to *Lock and Tag-out Procedure, page 105*.** **Make sure that the feeder transfer chute handle is fully engaged.**

The feeder section separates smaller sized material away from the material to be crushed. The operator has a choice as to how to stockpile this graded material with the use of the feeder transfer chute and side conveyor. For further information refer to

1. Locate feeder transfer chute handle (1).

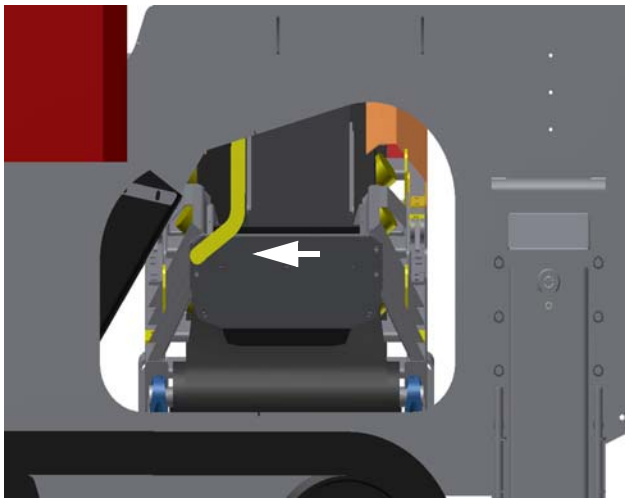
1



Option 1

Graded material mixed with crushed material - stock piled together.

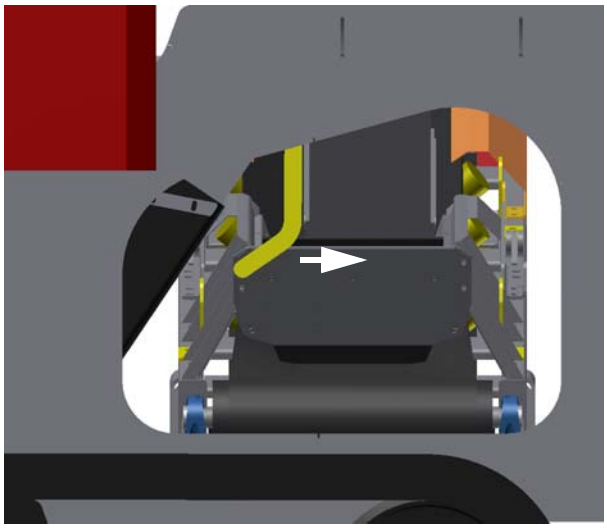
2. Move the feeder transfer chute handle to the left, make sure that the handle is fully engaged.



Option 2

Graded material is directed onto the Natural Fines Conveyor to be stock piled separately away from main conveyor stock pile.

3. Move the feeder transfer chute handle to the right, make sure that the handle is fully engaged.



4.7.Fault Events

The system stores the last 27 recorded historical fault events, which can be accessed via the display screen.

For a full list of fault codes, refer to ***Machine Fault Codes and Maintenance Screens on page 191***.

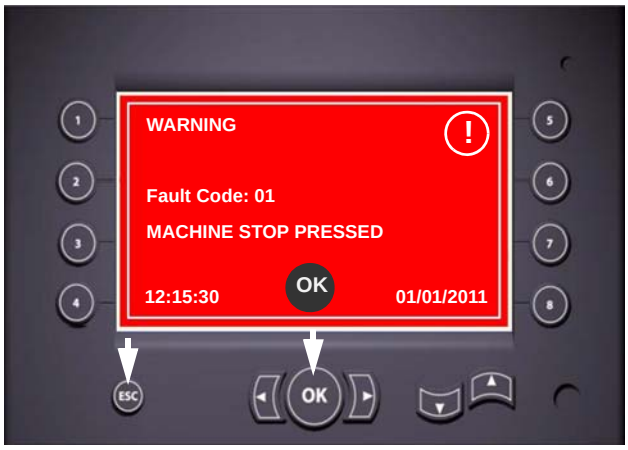
1. To access ‘Fault Events’ log, select ‘Fault Events’ button 3 from ‘Main Menu’.

   Note: ***To navigate to ‘Main Menu’ press ‘ESC’ button from any other menu screen.***

Note: ***Historical fault events are shown in order of their time stamps, up to a maximum of 27 events. Any subsequent events over-write the oldest event.***

2. Use ‘Scroll Buttons’ to highlight next or previous ‘Fault Event’
3. When ‘Fault Event’ has been removed or cleared from the machine Press ‘OK’ to acknowledge removal.

4. A pop-up ‘WARNING’ window identifying the fault opens.
5. If you want to permanently remove it from memory press ‘OK’.
6. If you made a mistake or don’t want to remove it from memory press ‘ESC’ to return to previous menus.



4.8.Machine Shut Down

4.8.1.Machine Shut Down Safety

Ensure commissioning and shutdown safety, Refer to ***Commissioning and Shutdown - Safety, page 62*** is followed throughout machine shut down in addition to the following safety measures.

DANGER	
	**CRUSHING HAZARD!** **Personnel or objects on machine or in exclusion zones when shutting down machine, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES shutdown machine when ANY personnel or objects are on the machine or in the exclusion zones, 20 metres (approximately 66 ft).** **Carry out a thorough site inspection prior to commencing ANY operations.**

DANGER	
 	**FLYING MATERIAL HAZARD!** **Personnel or objects on machine or in exclusion zones when shutting down machine, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES start or operate machine when ANY personnel or objects are on the machine or in the exclusion zones, 20 metres (approximately 66 ft).** **Carry out a thorough site inspection prior to commencing ANY operations.** **Ensure all material has been removed from the feeder and crusher chamber and that the conveyors are not producing a stock pile, prior to shutdown.**

4.8.2.Manual Stop Sequence

Ensure commissioning and shutdown safety, Refer to ***Commissioning and Shutdown - Safety, page 62*** and ***Machine Shut Down Safety, page 101*** is followed throughout machine shut down.

Note: ***When stopping machine manually, you MUST follow the correct shut down operational sequence!***

Figure 4-12: Manual Run Mode

1. Allow machine to continue to run until there is no more material on or in the machine.
2. Refer to ***Figure 4-12:Manual Run Mode***, from 'Manual Run' mode shut down feeder, press button 5.
3. Allow the feeder to completely stop.
4. Shut down crusher, press button 2.
5. Allow the crusher to completely stop (when crusher drive pressure falls below a set value).
6. Ramp engine RPM down, press button 3 followed by the down button.
7. Shut down main conveyor, press button 1.
8. Shut down Natural Fines Conveyor at any point during this procedure, press button 8.
9. Lock out and tag machine, Refer to ***Lock and Tag-out Procedure, page 105***.

4.8.3.Auto Stop Sequence

Ensure commissioning and shutdown safety, Refer to ***Commissioning and Shutdown - Safety, page 62*** and ***Machine Shut Down Safety, page 101*** is followed throughout machine shut down.

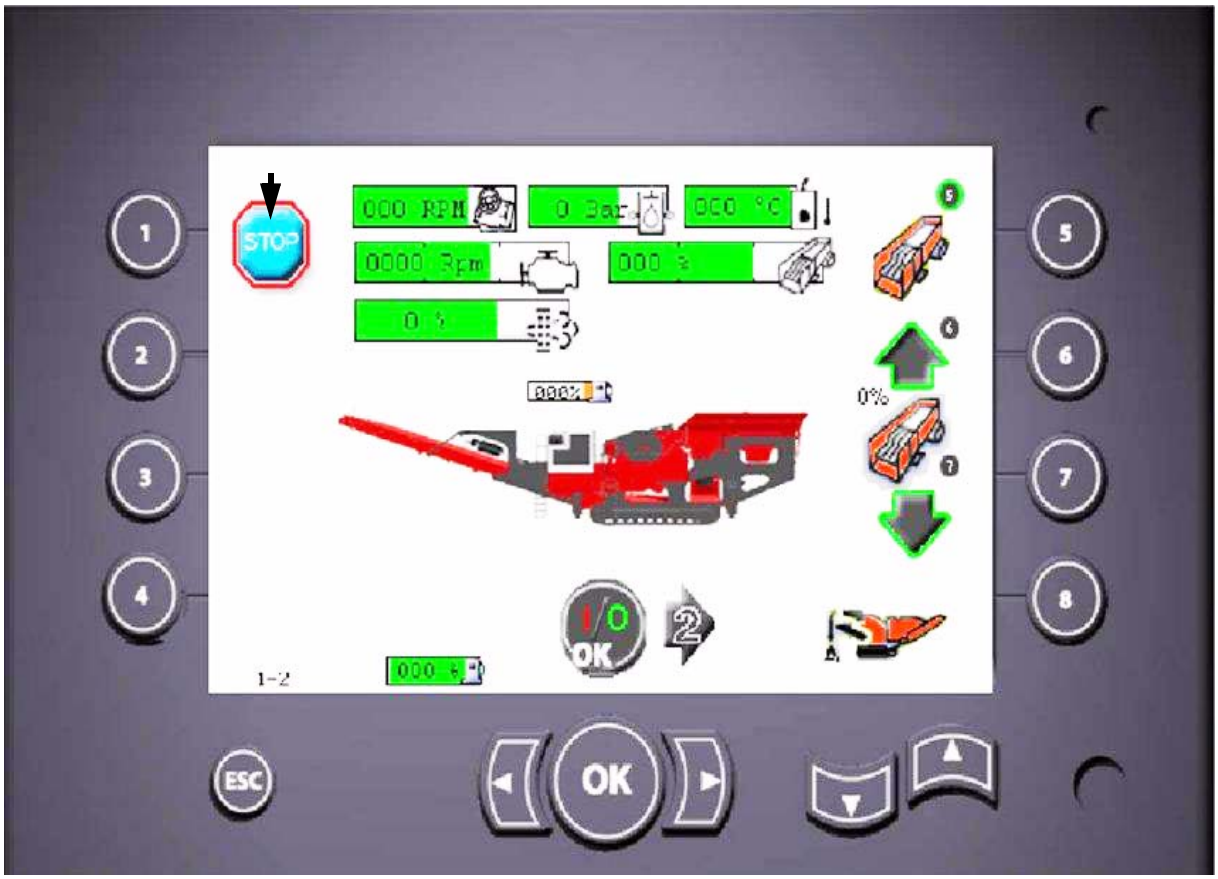


Figure 4-13: Auto Mode

1. Allow machine to continue to run until there is no more material on or in the machine.
1. Refer to ***Figure 4-13:Auto Mode***, from ‘Auto Run’ mode press the ‘STOP’ button.
1. ‘STOP’ button will flash red and the ‘Auto Stop Sequence’ will commence.
2. During shut down a visual representation will be displayed.
3. Feeder will shutdown.
4. After a short delay the crusher will shut down.
5. When crusher drive pressure falls below a set value it will completely stop and the engine will commence ramp down.
6. Main conveyor will then shut down.
7. Lock out and tag machine, Refer to ***Lock and Tag-out Procedure, page 105***.

4.8.4.Emergency Stop - Operation

NOTICE

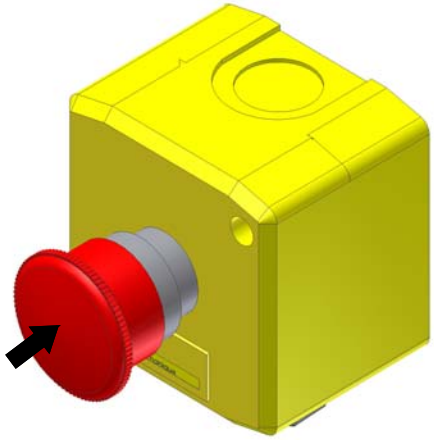
Use emergency stop buttons in an emergency situation not normal stopping - frequent use causes damage to hydraulic components.

Emergency stop buttons must be reset before machine re-start.

Ensure ANY emergency has been cleared before the emergency stop is reset.

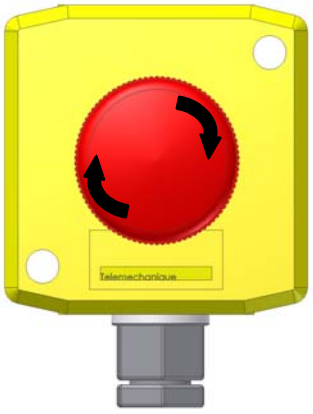
In the event of a malfunction, operational difficulty or other emergency, firmly press the nearest emergency stop button and lockout immediately, Refer to ***Lock and Tag-out Procedure, page 105***.

1. Push emergency stop button to stop the machine.



4.8.5.Emergency Stop - Reset

1. Ensure malfunction, operational difficulty or other emergency has been rectified.
2. Ensure preliminary operations are carried out prior to reset, Refer to ***Preliminary Operations, page 63***.
3. Reset all emergency stops. Turn emergency stop clockwise and release.
4. Restart as necessary, Refer to ***Start-up Sequence - Running the Crusher, page 88***.

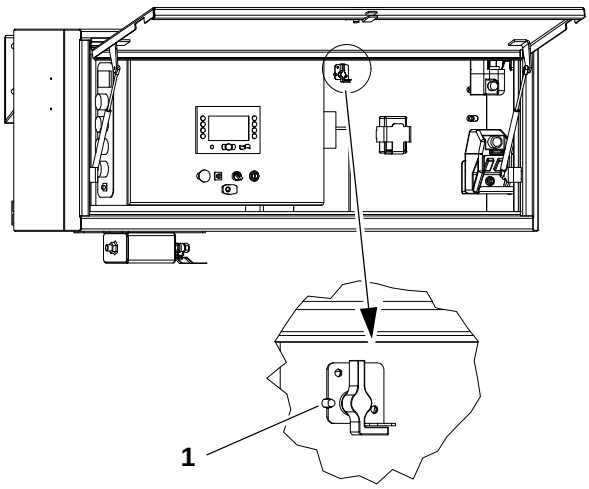


4.9.Lock and Tag-out Procedure

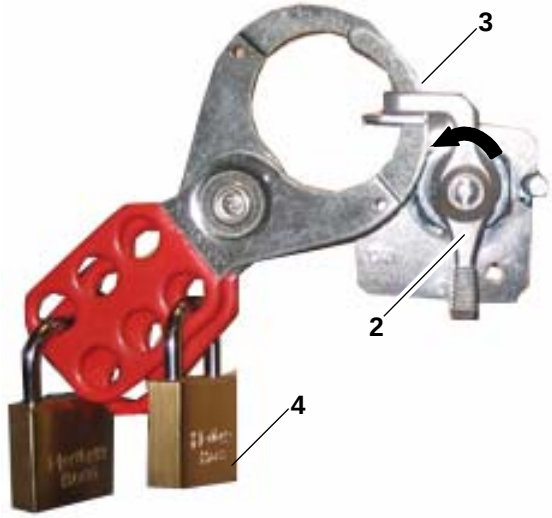
When carrying out any maintenance or working on or around the machine it must be switched off, the isolator moved to the off position and a lock attached to prevent any accidental attempts to start the machine.

Lockout and tag machine whenever it is operated under alternate power, or under ANY condition which shutting off the engine and removing the ignition key does not completely cut the power, to ensure proper immobilization. Failure to follow this procedure could result in damage to the machine, serious injury or death.

1. Position all hydraulic controls in the neutral position.
2. Ensure all supports and slide stops are securely fixed in position.
3. Shut down machine and remove ignition key, Refer to ***Machine Shut Down, page 101***.
4. Locate isolator, inside electrical cabinet area (1).



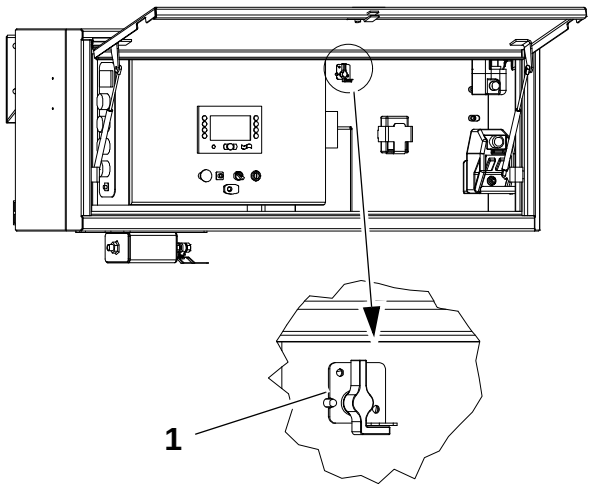
5. Move isolator (2) to the off position to align lock holes (as shown).
6. Install isolator device (3) through lock holes.
7. Attach individual lock/s (4) and keep individual keys on your person.
8. If necessary, when safe to do so start machine, Refer to ***Start-up Sequence - Running the Crusher, page 88***.



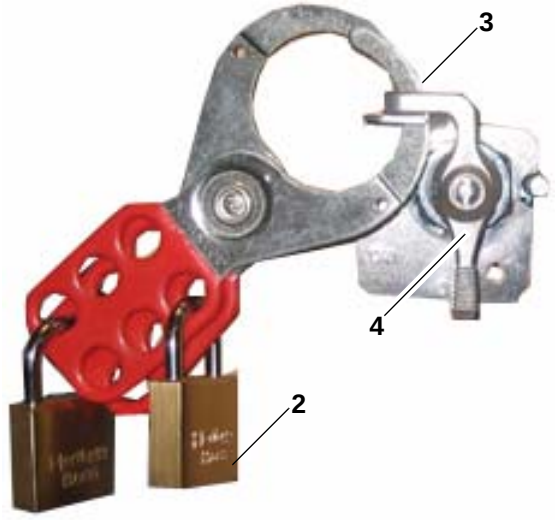
4.9.1.Tag Removal Procedure

Make sure that there are NO persons on the machine or in the danger zone before tag removal as this may result in serious injury or death.

1. Make sure that all maintenance has been completed and no persons are on or near the machine.
2. Locate isolator, inside electrical cabinet area (1).



3. Remove ONLY your lock (2).
4. If yours is the last lock, remove isolator device (3).
5. Move isolator (2) to the on position, rotate clockwise.
6. If necessary when safe to do so start machine, Refer to ***Start-up Sequence - Running the Crusher, page 88***.



5. Operation

Do not start operating this machine until you have read and fully understood this manual.

5.1.Before Starting Up the Machine for Operation

Before commencing general operation ensure all preliminary operations are carried out, this applies during the commissioning process and or general usage, Refer to ***Preliminary Operations, page 63***.

DANGER	
	**CRUSHING HAZARD!** **Personnel or objects on machine or in exclusion zones when starting or operating machine, may cause serious injury or death.** **DO NOT UNDER ANY CIRCUMSTANCES start or operate machine when ANY personnel or objects are on the machine or in the exclusion zones, 20 metres (approximately 66 ft).** **Carry out a thorough site inspection prior to commencing ANY operations.**

Make sure the machine is set for operation refer to ***Machine Set-up for Operation, page 76*** and the scheduled maintenance checks are done refer to ***Maintenance, page 129***.

1. Make sure the material size is set as necessary. Refer to ***Using Radio Remote for Machine Adjustments, page 118***.
2. Set the feeder transfer chute output (main conveyor or side conveyor) refer to ***Feeder Transfer Chute Setup, page 127***.
3. Set up the exclusion zones with safety barriers and appropriate signs from the following conveyors:

	DANGER
 	**Material will exit from a height from all conveyors and ferrous metal will exit from the magnet chute, which may cause injury or death** **STRONG magnet field on the magnet conveyor, do not go near it if you have a pacemaker, as this may cause death**

- The main product output conveyor
- The side conveyor
- The magnet conveyor chute

5.2.Machine Crushing Mode

1. Start engine, Refer to ***Engine - Starting Procedure, page 69***. The initial control screen P1000 will be displayed.

Figure 5-1: Initial Control Screen

2. At the initial control screen, select machine, button 1.

5.3.Methods of Operation

The crusher start up has an automatic mode which should normally be used.

The manual crusher start up mode may be used if desired but components of the machine must be started and stopped in the correct sequence. The machine controls will only allow the correct sequence by highlighting the next step when available.

DO not start the machine if it is full of material. Clear any material away before starting.

Select the automatic or manual method of operation as follows:

5.4.Automatic Mode

1. At the crushing screen, select the automatic start up of the crusher, press button 2.

2. Each sequence of the operation will be highlighted as it starts. A warning is activated prior to each function starting in the following sequence:
   - Main conveyor lowers.
   - Main conveyor starts.
   - Crusher starts, increasing to preset speed.

3. The automatic screen 1 will be displayed

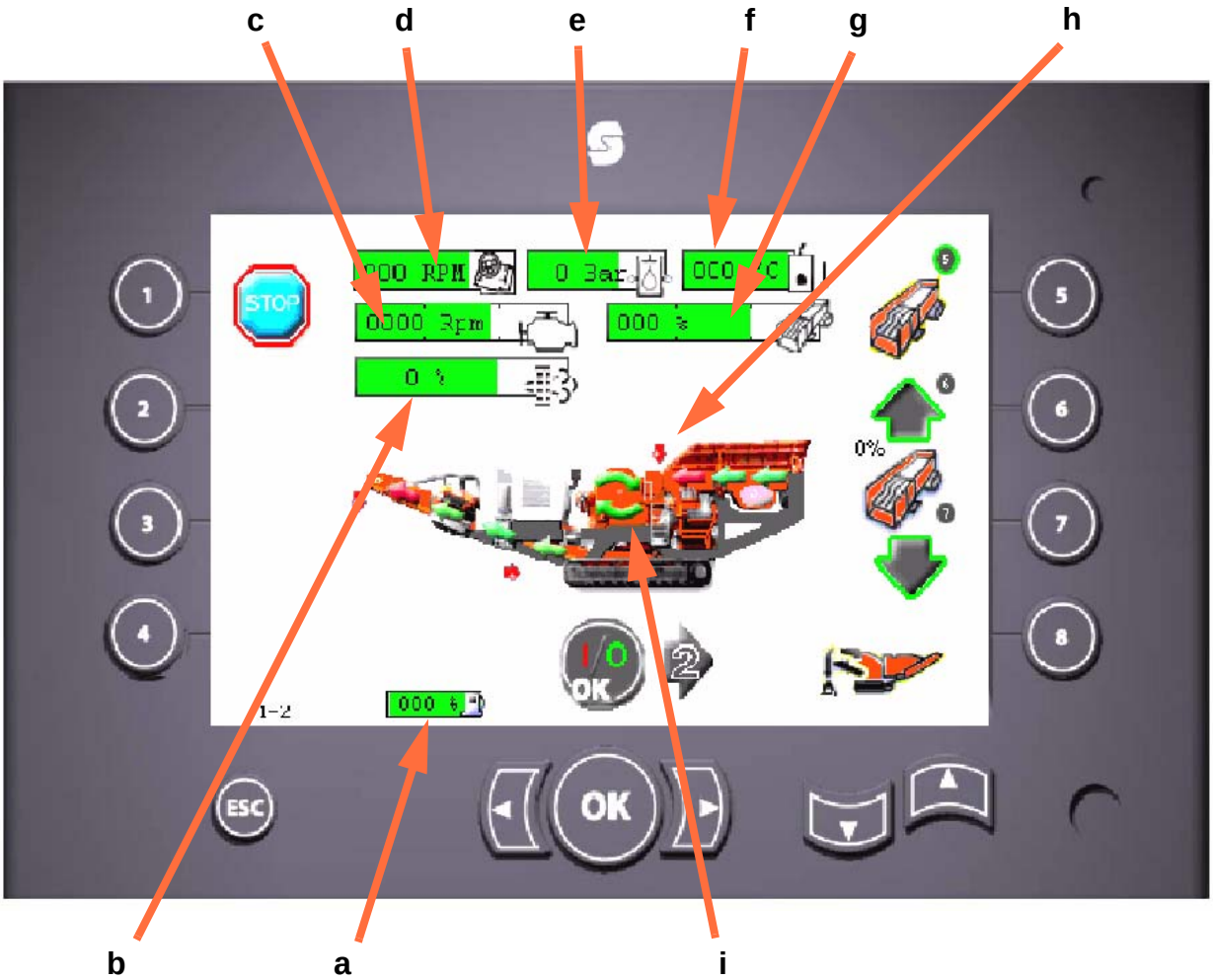


Figure 5-2: Automatic Operation Information Screen 1

a. Fuel tank level gauge.
b. Engine soot level as a % value.
c. Engine speed rpm.
d. Crusher speed rpm.
e. Engine load as a % value.
f. Hydraulic oil temperature.

g. Current feeder speed as a % value.

h. Red arrow indicates position of sensor that has stopped the feeder.

i. Green arrow indicates material flow through crusher.

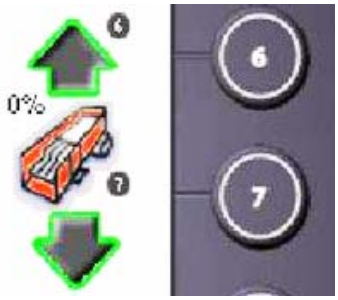
5.4.1.Feeder Start and Stop

1. When the crusher is at operating speed, the feeder icon will flash, press start button 5. A warning is activated prior to starting.
2. Press button 5 again to stop.

5.4.2.Feeder Speed Adjustment

1. To increase the feed rate speed, press button 6.
2. To decrease the speed, press button 7.

Speed is shown as a % of maximum.

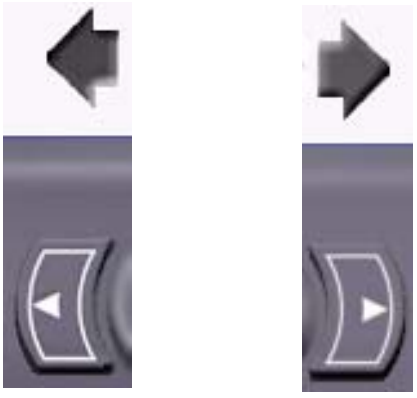


5.4.3.Natural Fines Conveyor Start and Stop

1. When the crusher is at operating speed, the fines conveyor icon will flash, press start button 8. A warning is activated prior to starting.
2. Press button 8 again to stop.

5.4.4.Automatic Operation - Additional Control Screen

1. Press right arrow to view next screen.
2. Press left arrow to return to previous screen.



5.4.5.To Stop the Crusher in Auto Mode

1. Allow all material to clear from the feeder.
2. Return to auto screen 1 If necessary, press left arrow.

3. On screen 1 of the auto mode screen, press button 1.
4. The machine will stop components in sequence with a delay between each section, to ensure all material has been cleared.

5.4.6.Return to Initial Control Display

1. When escape icon is visible, press button 4 to return to previous control display.

or

2. Press ESC to return to previous control display.

5.5.Manual Mode

1. At the crushing screen, select the manual start up of the crusher, press button 1.

The manual screen 1 will be displayed.

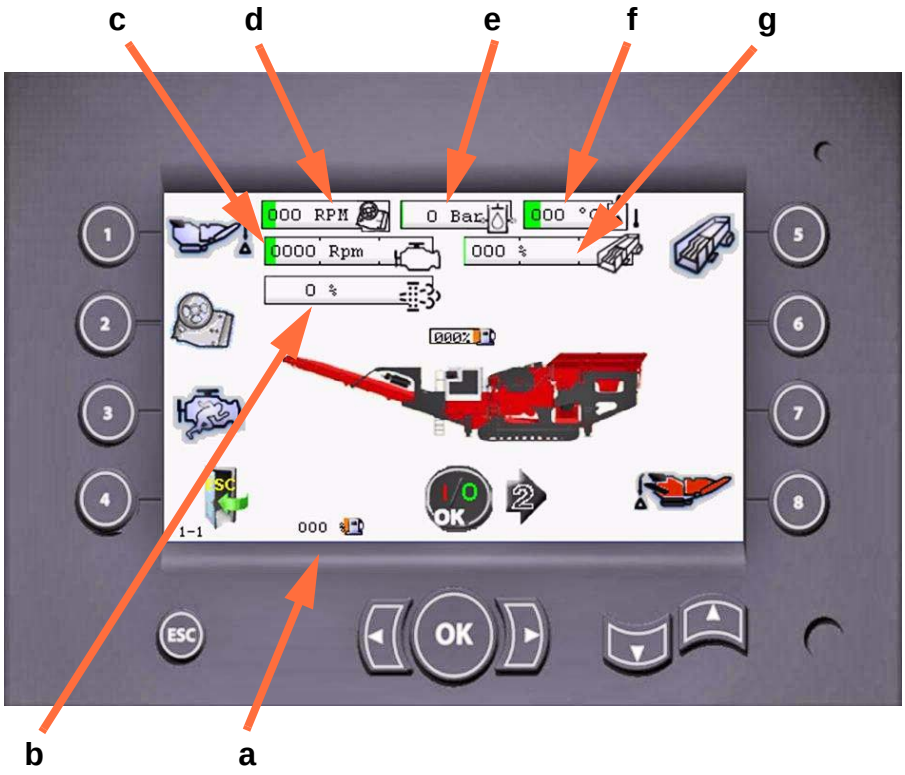


Figure 5-3: Manual Operation Screen 1

a. Fuel tank level gauge.

b. Engine soot level as a % value.

c. Engine speed rpm.

d. Crusher speed rpm.

e. Engine load as a % value.

f. Hydraulic oil temperature.

g. Current feeder speed as a % value.

5.5.1.Starting the machine

There is a delay before each component starts and a warning is activated prior to each function starting.

The machine components can only be started in the following sequence:

1. Start the main product output conveyor, press button 1.

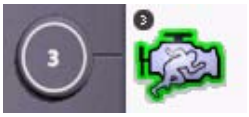
2. Start the crusher, press button 2.
3. When the crusher is running at a pre-set speed, other components can be started

5.5.2.Engine Speed Adjustment

1. When the crusher is running the engine speed can be adjusted, press button 3 and the engine icon is highlighted for speed adjustment.

2. To increase the engine speed, press the up button.
3. To decrease the engine speed, press the down button.

4. When the required engine and crusher speed are shown, set the speed by pressing button 3 again.



5.5.3.Feeder Start and Speed Control

A warning is activated prior to the feeder starting.

1. Start the feeder, press button 5. The feeder icon will become lit.

2. To adjust the speed of the feeder, press button 6 to increase and button 7 to decrease.

5.5.4.Natural Fines Conveyor Start and Stop

A warning is activated prior to the conveyor starting.

1. When the crusher is running the fines conveyor can be started, press button 8. The icon will become lit.
2. To stop the natural fines conveyor, press button 8.

5.5.5.Manual Operation Screen Display 2

Control functions available from this display screen:

Figure 5-4:

a. Crushing chamber level monitor.

b. Adjust high and low levels of chamber monitor.

c. Joggle the crusher.

d. Use radio remote for machine adjustments.

e. Control feeder by engine and crusher load.

f. Adjust load settings for feeder.

g. Output level monitor (if fitted).

h. View engine parameters.

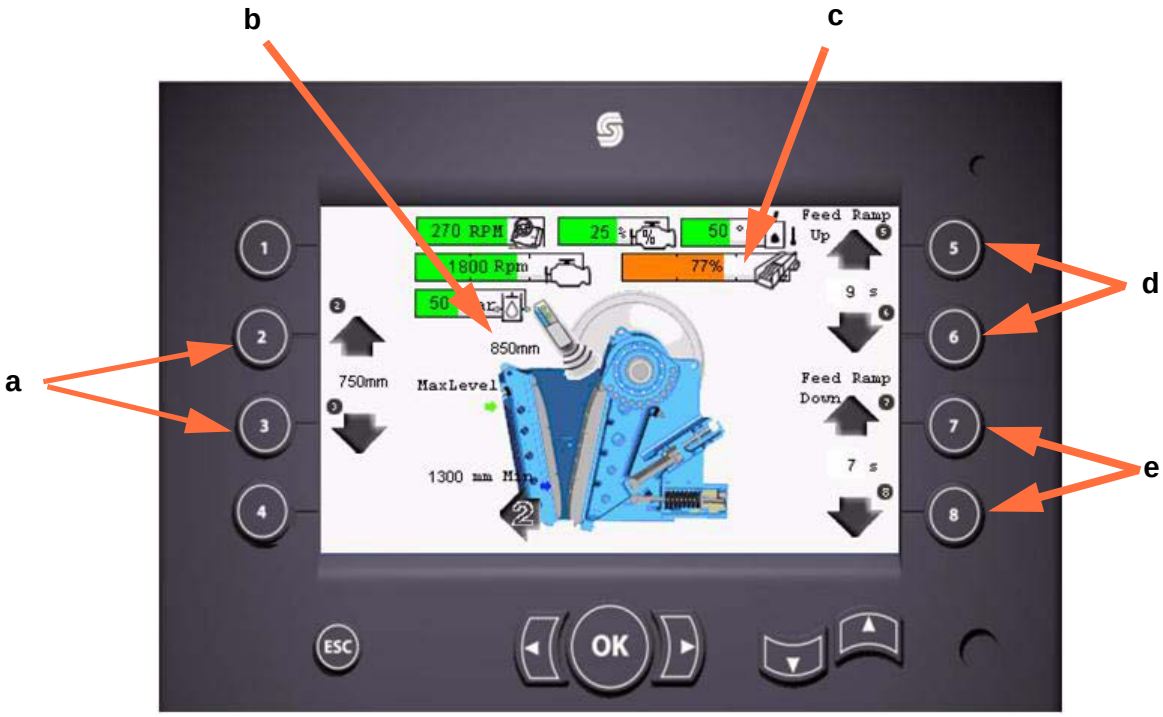
5.5.6.Crusher Chamber Level Monitor

1. To switch on the crusher chamber monitor, press button 1

The icon will be highlighted when on.

2. Once active, the height of the sensor can be adjusted by pressing button 2.

3. On the crusher chamber level adjustment screen, the following adjustments can be made and viewed:



a. The desired height level setting can be adjusted by pressing buttons 2 and 3.

b. The current level detected by the sensor is displayed in mm.

c. The feeder indicator bar will turn orange when the feeder is being controlled by the level sensor.

d. The time taken for the feeder to increase to full speed can be adjusted by buttons 5 & 6.

e. The time taken for the feeder to reach minimum speed can be adjusted by buttons 7 & 8.

5.5.7.Joggle the Crusher

If the crusher has stalled, the Closed Size Setting (CSS) is to be opened to the maximum setting before attempting to clear the blockage. Refer to ***Adjust the Jaw Closed Size Setting (CSS), page 123***.

1. If the machine is not running, select manual mode by pressing button 1. Start the main conveyor and increase the engine speed to 1800 rpm.

2. Select the options screen by pressing the right arrow.

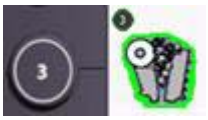
3. Select crusher joggle, button 3.

Note:

If the feeder is running it will stop.

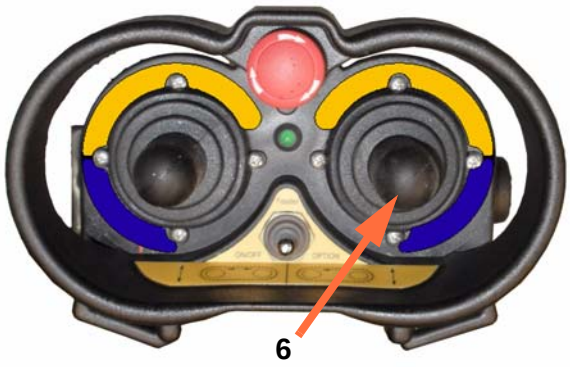
If the crusher is running it will stop.

Once complete the icon will highlight green.

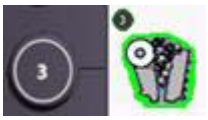


4. Press left or right arrow buttons to joggle the jaw in each direction as required.

5. If the radio remote control is to be used with the jogging function. Set up the radio remote control. Refer to ***Using Radio Remote for Machine Adjustments, page 118.***
6. The jaw can now be jogged using the right hand remote lever.



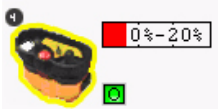
7. Once complete de-select 'jog' mode by pressing button 3, the crusher will return to normal operating speed.



5.5.8.Using Radio Remote for Machine Adjustments

1. Select radio remote, press button 4.

2. The icon is highlighted when on and shows the signal strength.



3. Set radio remote switch option to plant.

4. Switch the radio remote control to 1 and wait until the green light flashes consistently.

5. Synchronise the radio control to the machine, press green button.

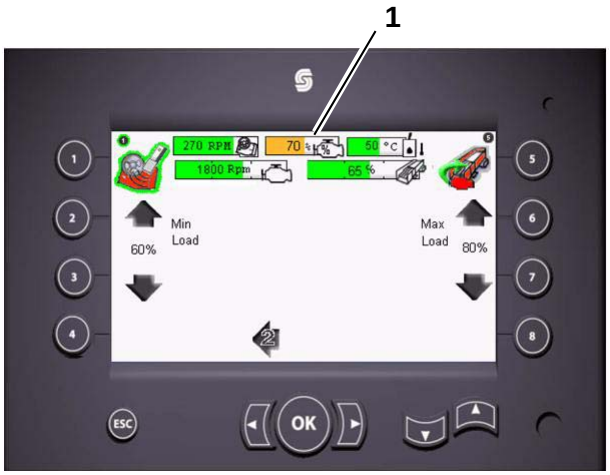
5.5.9.Control Feeder by Engine and Crusher Load

Feeder load control settings:

1. The feeder load control is activated by pressing button 5 (1).
2. Once activated, the feeder load control can be adjusted using button 6 (2).

Feeder load control adjustment:

3. The maximum load can be set by pressing buttons 6 and 7.
4. The minimum engine load can be set by pressing buttons 2 and 3.
5. If the engine load is controlling the feeder, the engine power indicator will turn orange (1).



5.5.10.View Engine parameters

1. To view engine parameters during operation, press the right arrow to access the options screen (shown).
2. Press button 8.

1. When the machine is idle press button 5.

There are two engine parameter screens

- Screen 1 as shown:

To access screen 2 of the engine parameters, press the right arrow button.

- Screen 2 shown:

5.5.11.Manual Operation Screen Display 3

Control functions available from this display screen:

- Operator Tech mode (button 5)
- Sandvik maintenance mode (button 1)

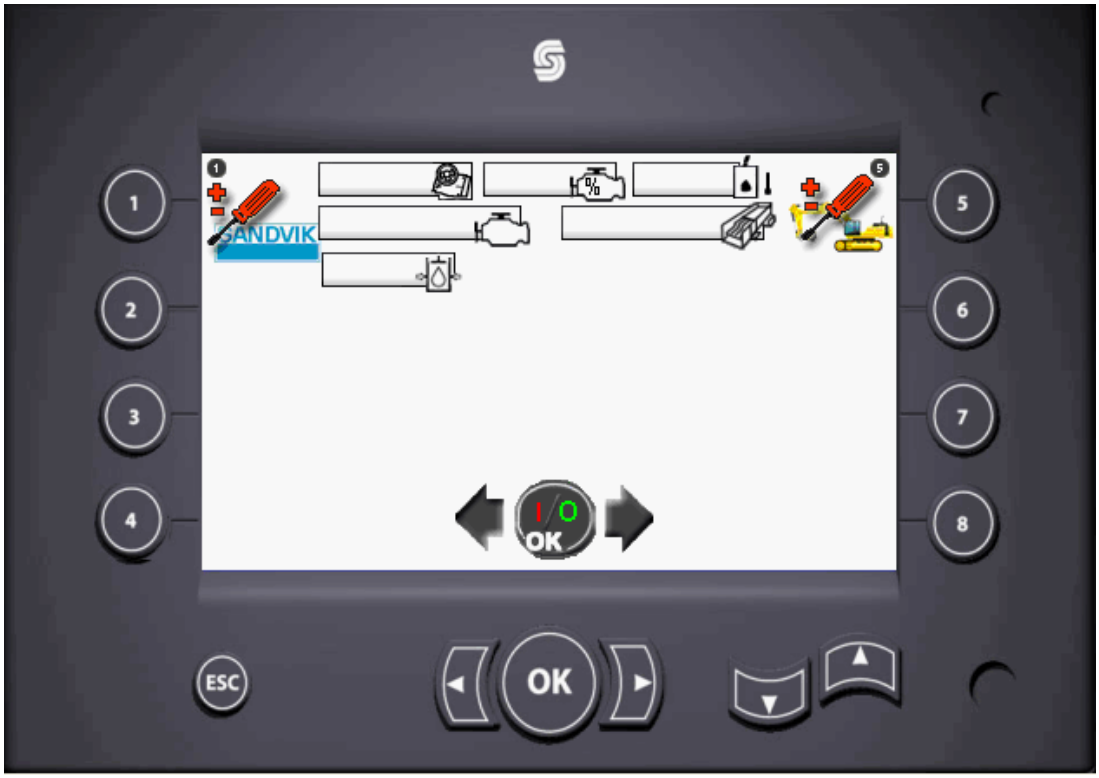


Figure 5-4: Manual Operation Screen 3

5.6.Stalled or Blocked Crusher

DANGER
Make sure NO persons are on the machine when it is ON, as this may cause injury or death.
When the material is removed from the jaw, the jaws may move together because of the stored pressure. Make sure that you are NOT between the jaw plates as this may cause injury or death.

If the jaw stalls or is blocked with material:,

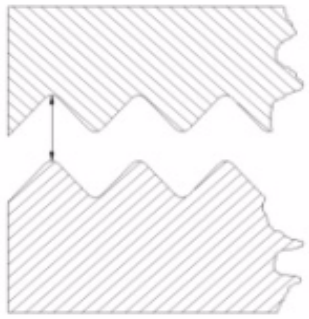
- Make sure the feeder is OFF and has stopped.
- Make sure the crusher is OFF and has stopped.
- Make sure the main conveyor is OFF and has no material on it.
- If necessary reverse or joggle the jaw crusher, refer to ***Joggle the Crusher, page 117***, or
- Make sure that the machine is locked and tagged-out. Remove the material with a suitable tool or tools.

- Start machine again only when the material is removed and it is safe to do so.

5.7.Adjust the Jaw Closed Size Setting (CSS)

The crusher must not be operated at Closed Size Settings (CSS) of less than 75mm (3") without prior approval in writing from Sandvik Mining and Construction

The jaw CSS is the distance shown between the jaw plates at the minimum jaw opening.

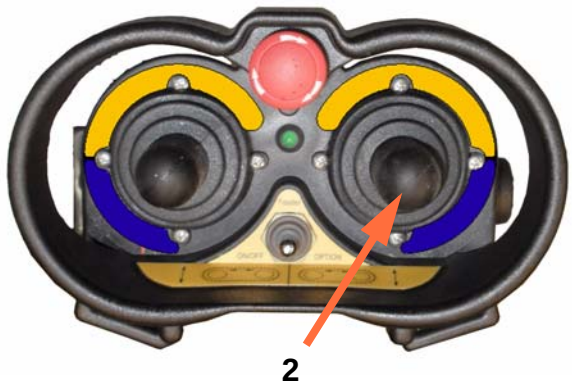


1. On the display screen, from the manual/auto run select screen. Select the right arrow to close the jaw and reduce the CSS.
2. To increase the CSS select the left arrow.

Note: A visual check of the material output size is to be made to determine if further adjustment is required.

5.7.1 Using Radio Remote to Adjust the Jaw CSS

1. If the radio remote control is to be used to set the CSS. Set up the radio remote control. Refer to ***Using Radio Remote for Machine Adjustments, page 118***.
2. The jaw can now be adjusted using the right hand remote lever.



3. To cancel the radio remote, press button 6 again.

5.8.Operating The Machine (Crushing)

Do not start crushing until you have read and fully understood this manual.

To operate machine, start the systems in the sequence that follows:

1. If fitted, start the water pump and dust suppression system.
2. Before loading material into the machine, make sure that the machine is not vibrating excessively. Shut down the machine refer to ***Machine Shut Down, page 101***.

5.8.1.Loading Material Into Machine:

NO persons are allowed ON the machine or in the hazard zones when the machine is ON, also while the machine is loaded as this may cause serious injury or death.

Make sure ALL necessary precaution are taken to reduce the risk of breathing in dust or particles, as this may cause serious injury or death

NOTICE

RISK OF EQUIPMENT DAMAGE. Do not start these systems if they are full of material. Clear any material away before starting.

1. The feeder *MUST* be on and running *BEFORE* material is put on it. *DO NOT* start the feeder if it is full of material.
2. Material which is larger than 80% of the crusher box input should not be presented to the feeder. *STOP, ISOLATE AND TAG THE MACHINE* and remove any large pieces of material with the appropriate equipment. *DO NOT* use excavators to force any material into feeder as any damage occurred from this action will invalidate any Sandvik Mining and Construction warranty.
3. Material should be fed carefully, (not dropped onto feeder) from about 300mm above feeder. Make sure that feeder is evenly loaded over its entire length - excluding grizzly. This is to help with screening fines material and to maximise production.
4. It is recommended that an excavator is used to load material into hopper. *DO NOT OVER FILL HOPPER.*
5. For maximum output and minimum wear, it is recommended that the crusher chamber is fed consistently with the supply of material being steady and constant. STOP/ START OPERATION OF THE FEEDER SHOULD BE AVOIDED.
6. Sensors are fitted to the crusher box side plate and should the crusher chamber become overfilled the feeder will STOP until the material is reduced to an acceptable level. For setting the crusher chamber level monitor, refer to ***Crusher Chamber Level Monitor, page 116***.
7. See ***Feeder Speed Adjustment, page 111*** for adjusting feeder control speed.

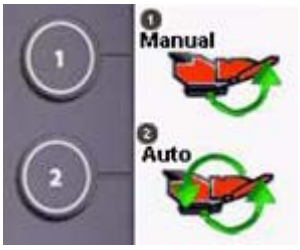
When the machine is set up as described in the previous pages, it is now ready to be used to crush the desired material.

5.9.Reverse Jaw Operation

When crushing, the jaw of the machine may become jammed with material. If this happens, the direction of crushing can be reversed in order to free the material. To do this, proceed as follows:

1. Make sure that the crusher has stopped.
2. On the display screen, press button 5 for crusher reverse.

3. Select button 1 for manual start up of the crusher or button 2 for automatic start up.



The crusher will run in reverse.

4. The crusher can be stopped by either, crusher reverse, press button 5 to set to off. Or cycle the ignition.

The procedure may be repeated as often as necessary to try to release any blockages in the crusher box. If the machine is unable to crush material that has become stuck in the jaw after the crusher reverse function has been activated, the crusher may need to be cleared manually refer to ***Stalled or Blocked Crusher, page 122***.

5.10.Feeder Transfer Chute Setup

⚠ WARNING	
 	**PERSONNEL HAZARD!** **Stop the machine, isolate, remove ignition key and tag-out before setting up the feeder transfer chute. Refer to *Lock and Tag-out Procedure, page 91*.** **The feeder transfer chute lever may move suddenly due to the momentum of the deflector plate. Care is to be taken when moving the lever into position.**

The feeder transfer chute separates smaller sized material away from the material to be crushed. The deflector plate (1) is adjusted using the handle (3). All the material put into the hopper can be directed onto the main conveyor through the chute (4). If the smaller sized material is required to be separated, the material is directed through the chute (2) to the side conveyor. The operator has a choice as to how to stockpile this graded material with the use of the feeder transfer chute and side conveyor'.

For further information on the feeder transfer chute, refer to ***Feeder Transfer Chute, page 98***

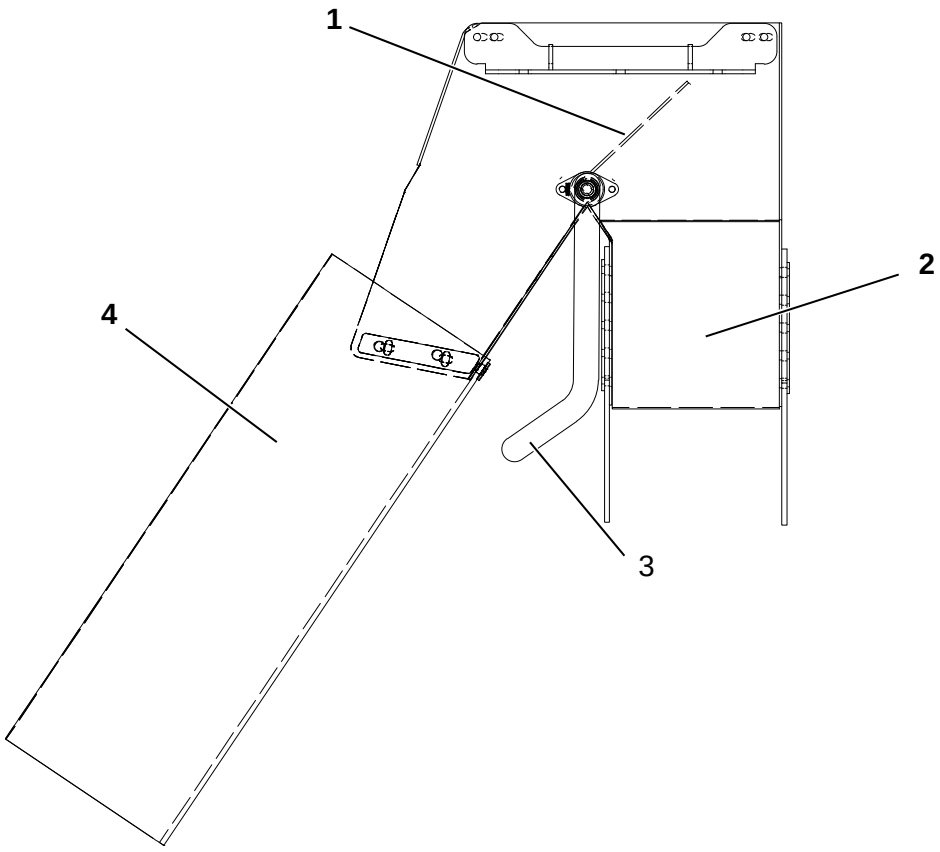


Figure 5-5: Feeder transfer chute

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6. Maintenance

6.1. Maintenance - Safety Requirements

The safety instructions that follow apply throughout the maintenance section. Additional and or variations in safety measures that are specific to the relevant maintenance procedure will be detailed in the body of the text.

Maintenance is essential for safety and to ensure the best possible performance from the machine by reducing the chances of breakdowns.

For maintenance schedules and procedures relating to Original Equipment Manufacturers, refer to ***Information and Data Sheets on page 207***.

⚠ WARNING	
 	**PERSONNEL HAZARD!** **Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.** **Do not stand on the machine whilst it is operation.** **Stop the machine, isolate, remove ignition key and tag-out before carrying out any maintenance procedures. Refer to *Lock and Tag-out Procedure on page 105*.**

⚠ WARNING	
 	**FALLING HAZARD!** **Some maintenance requires working from height. Falling from heights could cause serious injury or death.** **When working at height, obey the precautions that follow:** **• Maintenance platforms are in place** **• All hand rails are fixed in position** **• All ladders are lowered and fixed in position** **• A safety harness is worn.**

WARNING	
	**HOT SURFACE HAZARD!** **The engine could still be hot after operation and cause severe burns if touched.** **Make sure that the engine is cool before maintenance is started.**

NOTICE

RISK OF EQUIPMENT DAMAGE. Do all maintenance procedures as a minimum requirement.

Machines that operate in severe site or environmental conditions may require more frequent maintenance routines.

Only use lubricants, fluids, filters and parts recommended by the Original Equipment Manufacturer (OEM) or accelerated wear or damage could result. Never use grease containing Molybdenum.

Do not start any maintenance until you have read and fully understood this manual. Particular attention must be paid to the *Safety Section on page 11*. If there is a maintenance procedure that is not fully understood contact Sandvik before commencing with the maintenance.

Any adjustments must only be carried out by trained personnel. Any adjustments to the hydraulic system must only be carried out by trained Sandvik service engineers.

Make sure that oils and fluids are cleaned and disposed of correctly in a way that meets the local and national environmental regulations.

6.2. Daily Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that these checks are carried out before the machine is started each day.

Daily Maintenance Schedule (minimum requirements)	
1.	Do the daily engine maintenance schedule. Refer to C9 Operation & Maintenance Manual.
2.	Air cleaner rubber seals - inspect for wear.
3.	Air pre-cleaner - inspect and clean as necessary.
4.	Diesel tank - check top up level. Refer to ***Diesel Fuel - Check Level and Top Up on page 141***.
5.	Engine Oil - check top up level. Refer to ***Engine Oil - Check Level and Top Up on page 140***.
6.	Engine Coolant - check top up level. Refer to ***Engine Coolant - Check Level and Top Up on page 143***.
7.	Water tank (if fitted) - check level.
8.	Hydraulic oil tank - check top up level. Refer to ***Hydraulic Fluid - Check Level and Top Up on page 142***.
9.	Hydraulic, water and diesel hoses - check for signs of damage or leaks.
10.	Diesel water trap feeder - check and drain as necessary. Refer to ***Diesel Water Trap - Drain on page 142***.
11.	Track gearbox - check oil level. Refer to ***Track Gearbox Oil - Change on page 155***.
12.	Feeder Gearbox - check level. Refer to ***Feeder Gearbox - Check Oil Level and Top Up on page 147***.
13.	Rollers and Drums - inspect condition and make sure that they move freely.
14.	All Safety guards - make sure they are present and attached.
15.	Grizzly bars - make sure they are free from obstructions.
16.	Crusher chamber - make sure it is free from obstructions.
17.	Crusher lubrication system - Inspect hoses for signs of damage or leaks.
18.	Emergency stops - operate and reset all. Refer to ***Emergency Stop - Operation on page 104***.
19.	Walk around inspection.
20.	Track machine 10 meters in both directions to prevent chain seizure. Refer to ***Tracking Machine on page 71***.

6.3. Weekly Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that these checks are carried out on a weekly basis

Weekly Maintenance Schedule (minimum requirements)	
Preliminaries.	
1.	Do the daily maintenance schedule. Refer to ***Daily Maintenance Schedule on page 132***.
2.	Do the weekly engine maintenance schedule. Refer to C9 Operation & Maintenance Manual.
3.	Panels and bolts - check that all are in place and secure.
4.	Oil cooler and radiator - clear any build up of dust.
5.	Jaw plates - check for wear. Turn around or replace as necessary. Refer to ***Jaw Plates - Turning and changing on page 160***.
6.	Toggle plate - inspect to make sure that it is free from cracks or other defects. Replace as necessary.
7.	Toggle assembly - inspect for damage. Clear all debris to make sure that there is free movement of the hydraulic cylinders.
8.	Toggle clamping ram - inspect for damage or wear, replace as necessary.
9.	Link arm ram bearings - inspect for damage or wear, replace as necessary.
10.	Crusher chamber liner plates - inspect for wear, replace as necessary.
11.	Crusher box front and rear beam fixing bolts - check and tighten as necessary.
12.	Jaw brake pressure - check and adjust as necessary.
13.	Bearings - Grease. Refer to ***Bearings - Grease on page 148***.
14.	Belt scraper - check and adjust as necessary.
15.	Belt sealing rubbers - check and check and adjust as necessary.
16.	Main/side conveyor bearings - check and apply grease as necessary.
17.	Jaw plates - perform full movement of the plates, make sure that the adjustment wedge and clamping system are free moving and clear from any obstruction.

6.4. 50-80 Hours Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that the following is carried out after 50-80 hours running of the machine.

50-80 Hours Maintenance Schedule	
1.	Replace the following filter elements. Refer to ***Hydraulic Filters - Replace on page 153*** for filter locations:
	• Series 45 (130cc) filter element
	• Series 90 (130cc) filter element
	• Jaw circuit high pressure filter element
	• Return filter elements (2 off).

6.5. 250 Hours Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that these checks are carried out every 250 hours.

250 Hours Maintenance Schedule (minimum requirements)	
Preliminaries.	
1.	Do the weekly maintenance schedule. Refer to ***Weekly Maintenance Schedule on page 133***.
2.	Do the engine 250 hour maintenance schedule. Refer to C9 Operation and Maintenance manual.
3.	Hydraulic hoses - check for signs of damage or leaks.
4.	Conveyor belts and tracking - Inspect condition, align head drums as necessary.
5.	Toggle clamping ram bearings - inspect (note! these bearings must be thoroughly inspected with a view to change at the next 250 hours service.
6.	Link arm ram bearings - inspect (note! these bearings must be thoroughly inspected with a view to change at the next 250 hours service.
7.	Drive belts - check for wear, swelling, softening and tension, replace as necessary. Note! Tautness should remain constant during the belts working life.

6.6. 500 Hours Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that these checks are carried out every 500 hours.

500 Hours Maintenance Schedule (minimum requirements)	
Preliminaries.	
1.	Do the 250 hours maintenance schedule. Refer to ***250 Hours Maintenance Schedule on page 135***.
2.	Do the engine 500 hour maintenance schedule. Refer to C9 Operation and Maintenance manual.
3.	Diesel filter EN1014 - replace. (check part numbers)
4.	Diesel filter EN1015 - replace. (check part numbers)
5.	Engine oil filter - replace. Refer to C9 Operation and Maintenance manual.

6.7. 750 Hours Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that these checks are carried out every 750 hours.

750 Hours Maintenance Schedule (minimum requirements)	
Preliminaries.	
1.	Do the 250 hours maintenance schedule. Refer to ***250 Hours Maintenance Schedule on page 135***.

6.8. 1000 Hours Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that these checks are carried out every 1000 hours.

1000 Hours Maintenance Schedule (minimum requirements)	
Preliminaries.	
1.	Do the 500 hours maintenance schedule. Refer to ***500 Hours Maintenance Schedule on page 136.***
2.	Vibrating feeder - change oil. Refer to ***Oils and Fluids on page 189*** for the recommended oil***.***
3.	Toggle clamping ram bearings - replace.
4.	Link arm ram bearings - replace.
5.	Hydraulic system - change oil. Refer to ***Oils and Fluids on page 189*** for the recommended hydraulic fluid.
6.	Track gearboxes - change oil. Refer to ***Track Gearbox Oil - Change on page 155***.

6.9. 2000 Hours Maintenance Schedule

Maintenance - Safety Requirements on page 130 must be followed before this maintenance is started.

Make sure that these checks are carried out every 2000 hours.

2000 Hours Maintenance Schedule (minimum requirements)	
Preliminaries.	
1.	Do the 1000 hours maintenance schedule. Refer to ***1000 Hours Maintenance Schedule on page 137***.
2.	Replace the following strainers. Refer to ***Hydraulic Filters - Replace on page 153*** for strainer locations:
• 2 1/2” suction filters/strainers	
• Filter suction strainer.	
3.	Replace the following filter elements. Refer to ***Hydraulic Filters - Replace on page 153*** for filter locations:
• Series 45 (130cc) filter element	
• Series 90 (130cc) filter element	
• Jaw circuit high pressure filter element	
• Return filter elements (2 off).	
4.	Flush the hydraulic system.
5.	Hydraulic system - change oil. Refer to ***Oils and Fluids on page 189*** for the recommended hydraulic fluid.

6.10. Maintenance Procedures

The engine and hydraulic compartment locations are shown at *Figure 6-1:* to aid maintenance procedures.

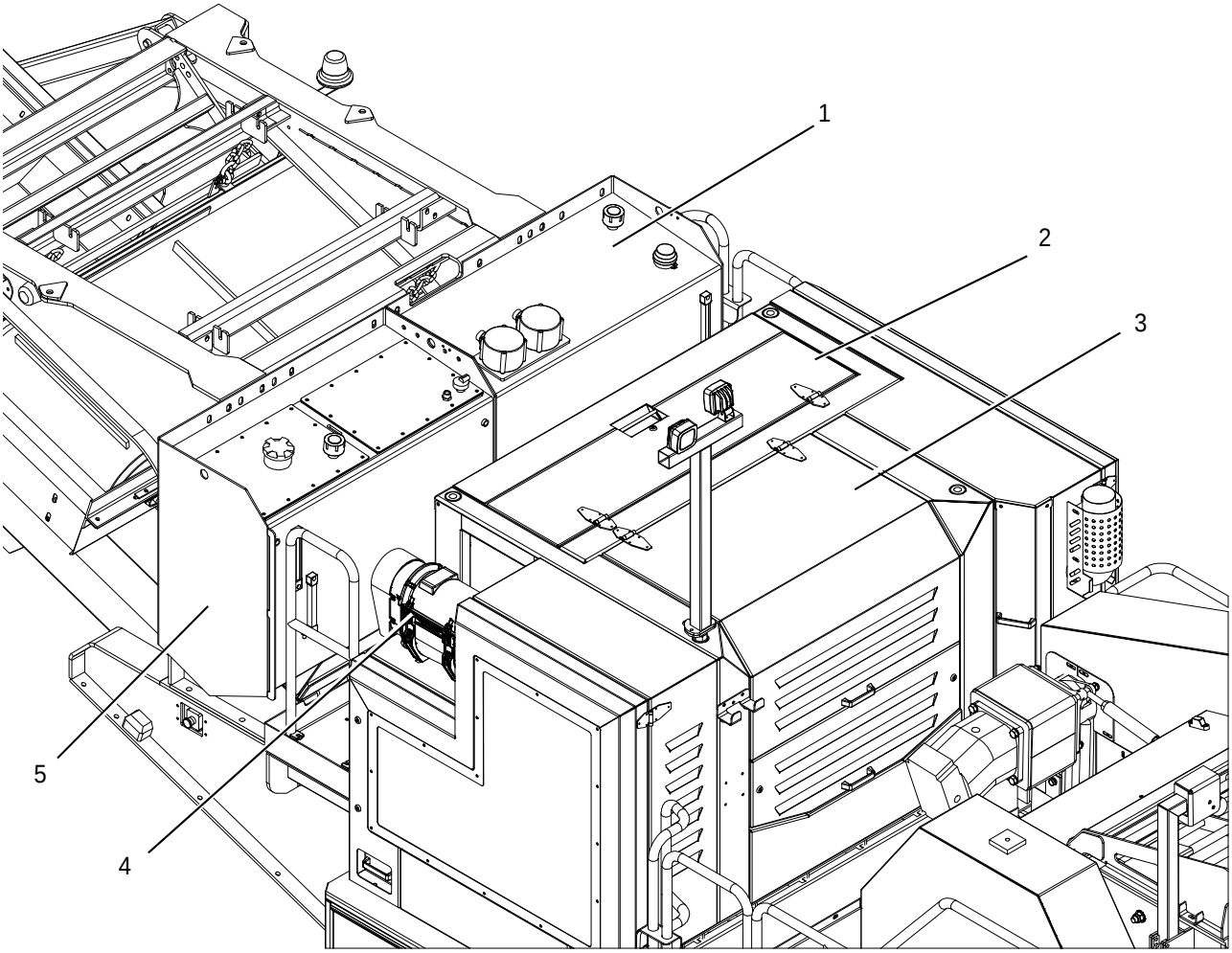


Figure 6-1: Engine/hydraulic compartment locations

Key to *Figure 6-1:*

1	Hydraulic tank	4	Air cleaner
2	Radiator compartment	5	Fuel tank
3	Engine compartment		

6.10.1. Fluid Drain Points

The fluid drain points are located below the hydraulic cabinet.

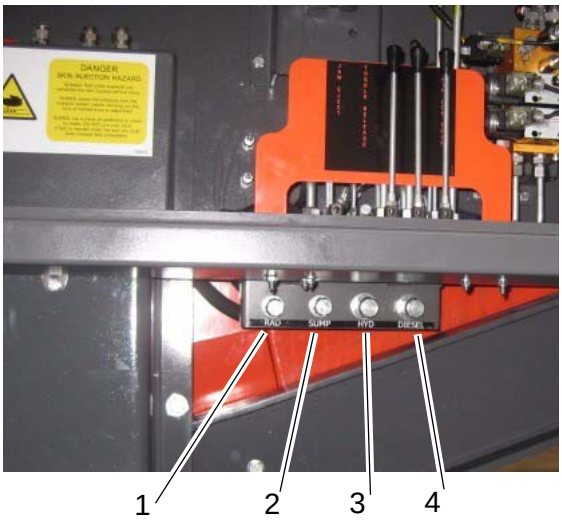


Figure 6-2: Fluid drain points

Key to *Figure 6-2:*.

1 Radiator drain
2 Sump drain
3 Hydraulic drain
4 Diesel drain

6.10.2. Engine Oil - Check Level and Top Up

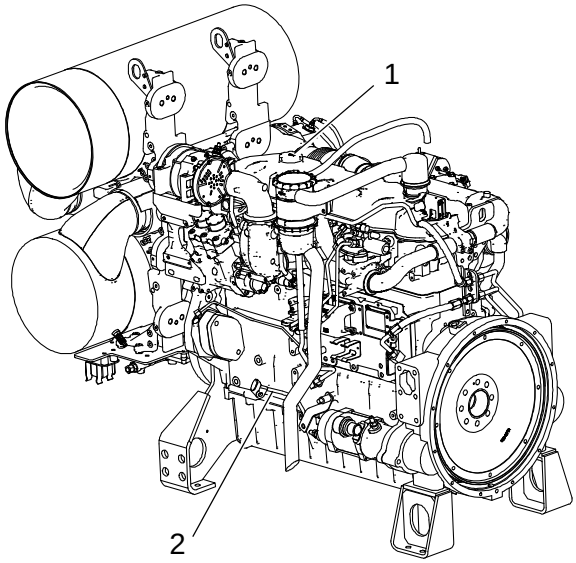
The safety requirements in Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

WARNING	
	**HOT SURFACE HAZARD!** **The engine could still be hot after operation and cause severe burns if touched.** **Make sure that the engine is cool before maintenance is started.**

NOTICE

RISK OF EQUIPMENT DAMAGE. Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the oil is filled correctly.

1. Open the engine compartment cover. For location refer to ***Figure 6-1: Engine/ hydraulic compartment locations, page 139*** (item 3).
2. At the engine compartment, check the engine oil level through the dipstick (2).
3. If necessary, refill the oil. Clean the area around the filler cap (2) before opening to prevent contamination.
4. Refer to ***Oils and Fluids on page 189*** for the recommended oil or refer to Caterpillar C9 Operation and Maintenance manual.



6.10.3. Diesel Fuel - Check Level and Top Up

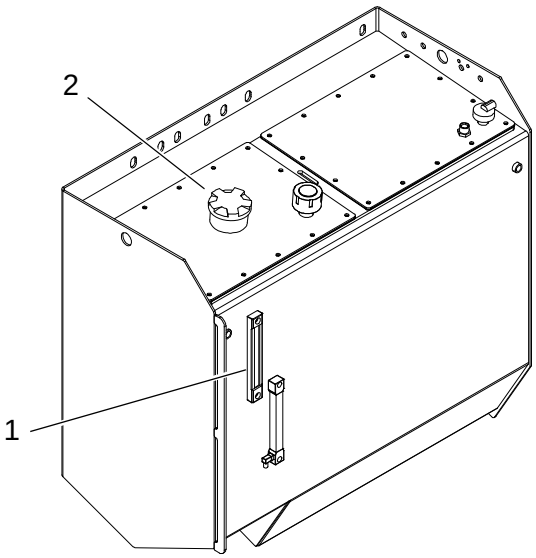
The safety requirements in Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

NOTICE

RISK OF EQUIPMENT DAMAGE. Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the oil is filled correctly.

All fault will show on the display screen when the fuel level is low. A visual check can also be made.

1. At the fuel tank, visually check the fuel level (1).
2. If necessary refill fuel tank. Clean the area around the filler cap (2) before opening to prevent contamination.
3. Refer to ***Oils and Fluids on page 189*** for the recommended fuel.



6.10.4. Diesel Water Trap - Drain

The safety requirements in Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

1. Open the engine compartment cover. For location refer to ***Figure 6-1: Engine/ hydraulic compartment locations, page 139*** (item 3).
2. Visually check the diesel water trap, drain if necessary.

6.10.5. Hydraulic Fluid - Check Level and Top Up

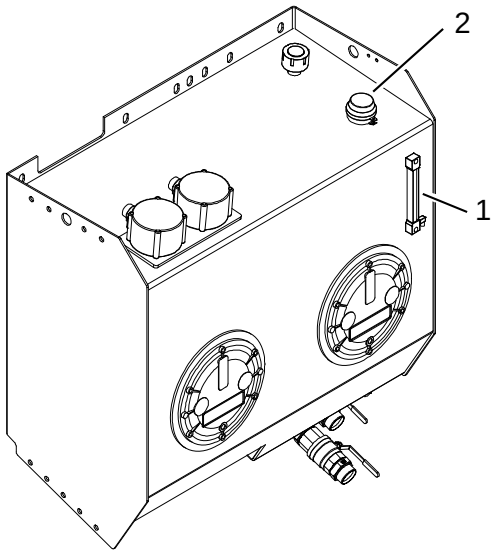
The safety requirements in Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

NOTICE

RISK OF EQUIPMENT DAMAGE. Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the oil is filled correctly.

All fault will show on the display screen when the hydraulic fluid level is low. A visual check can also be made.

1. Visually check the hydraulic fluid level (1). If necessary fill the hydraulic tank. Clean the area around the filler cap (2) before opening to prevent contamination.
2. Refer to ***Oils and Fluids on page 189*** for the recommended hydraulic fluid.



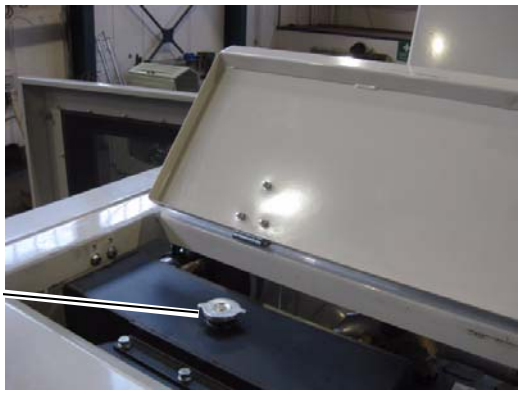
6.10.6. Engine Coolant - Check Level and Top Up

The safety requirements in Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

NOTICE

RISK OF EQUIPMENT DAMAGE. Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the oil is filled correctly.

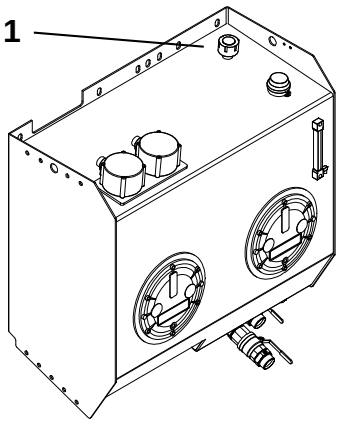
1. Open the radiator compartment cover. For location refer to ***Figure 6-1: Engine/ hydraulic compartment locations, page 139*** (item 2).
2. Check radiator water level & refill if necessary (1).
3. Refer to ***Oils and Fluids on page 189*** for the recommended anti-freeze fluid.
4. Use a 50/50 mixture of anti-freeze and water.



6.10.7. Checking/ Changing Hydraulic Tank Air Breather

The safety requirements in Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

1. At the top of the hydraulic tank, clean the area around the air breather (1).
2. Replace the tank air breather.



6.10.8. Air Cleaner - Servicing

The safety requirements in Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

⚠ WARNING

INHALATION, DUST HAZARD!

Breathing or inhaling dust particles could cause serious injury or death.

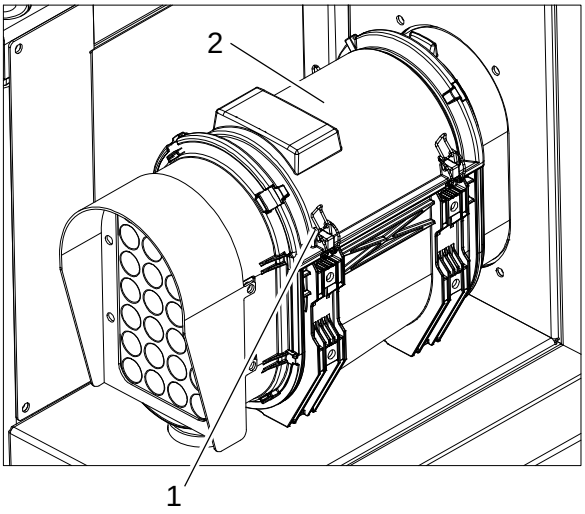
Make sure all necessary precautions are taken to reduce the risk of breathing in dust particles.

Note: When the engine has operated in environments that are dusty or dirty, the air cleaner elements may require more frequent service, than what is stated in the maintenance schedules.

Note: A fault will display on screen if there is an air filter blockage.

Replace the air cleaner filters as follows:

1. Locate the air cleaner, refer to *Figure 6-1:* (item 4).
1. Release the four clips (1) that attach the air cleaner cover (2).
2. Remove the air cleaner cover.



3. Replace the primary air filter (1).
4. To gain access to the secondary air filter (2) (not shown) the primary air filter must be removed.
5. Replace the secondary air filter (2) (not shown).
6. Install the air cleaner cover.
7. If an air filter blockage has occurred, the air filter blockage switch is to be reset. Refer to *Figure 6-4:* for switch location.

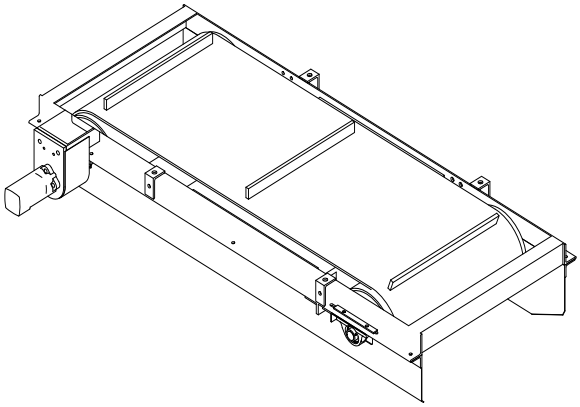
6.10.9. Magnet Conveyor - Maintenance

DANGER	
	**MAGNET HAZARD!** **The magnet conveyor has a strong magnetic field. Do not approach the magnetic conveyor if fitted with a pacemaker as this can cause injury or death.**

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

Refer to the manufacturers handbook for maintenance information. ***Information and Data Sheets on page 207***.

1. Remove pieces of metal from the magnet conveyor to prevent jamming of rotating parts.



6.10.10. To Adjust the Magnet Conveyor Belt Tension

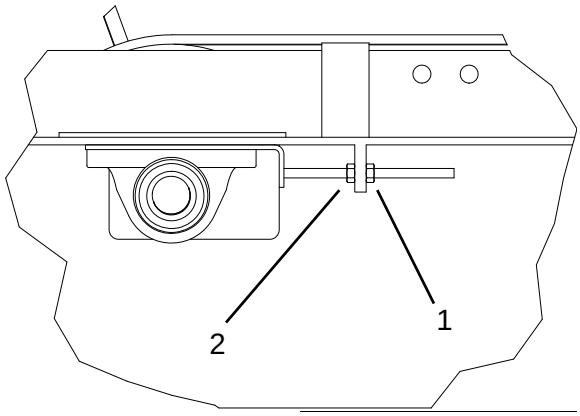
DANGER	
	**MAGNET HAZARD!** **The magnet conveyor has a strong magnetic field. Do not approach the magnetic conveyor if fitted with a pacemaker as this can cause injury or death.**

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

1. To adjust the magnet conveyor belt tension, the tail drum is to be moved in/out as necessary:
2. Loosen the bolt (1) and tighten the bolt (2) as necessary.

Note! The belt has to operate loose so ferrous metal does not get trapped.

3. Make sure that both sides are adjusted equally and the tail conveyor is aligned correctly.
4. Make sure that the conveyor belt is in the centre
5. Tighten bolt (1) when the belt is tightened to the correct level. Adjust the magnet conveyor belt tension



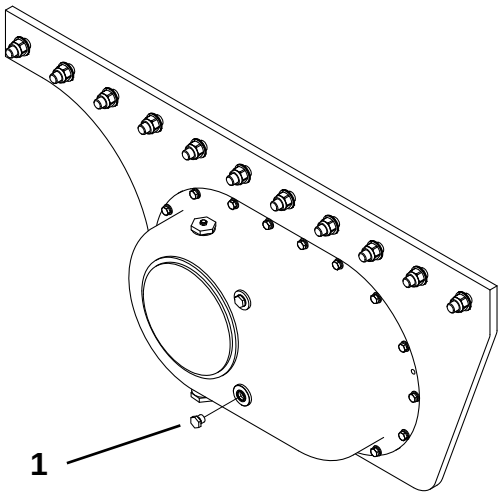
6.10.11. Feeder Gearbox - Check Oil Level and Top Up

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

NOTICE

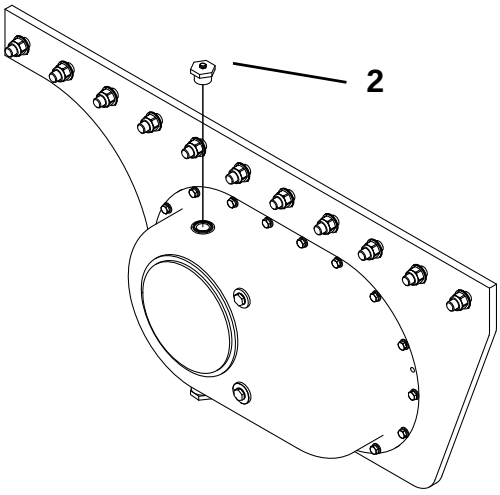
RISK OF EQUIPMENT DAMAGE. Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the oil is filled correctly.

1. Clean the area around the plug (1) before removal to prevent contamination.
2. To check the oil level in the feeder, remove the level plug (1). If oil comes out the level is acceptable.



To top up the oil level:

3. Clean the area around the filler plug before removal to prevent contamination.
4. Remove the filler plug.
5. Fill until oil comes out of the level hole. Refer to ***Oils and Fluids on page 189***, for recommended oil for the feeder gearbox.
6. Install the level plug (1) and the filler plug (2).
7. Repeat for the feeder gearbox on the opposite side.



6.10.12. Bearings - Grease

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

NOTICE

RISK OF EQUIPMENT DAMAGE. Do not use grease containing molybdenum. Doing so could cause damage to parts and invalidate any warranty. Only use grease specified in *Oils and Fluids on page 189.*

Only apply grease where indicated, refer to *Figure 6-3:* for the grease point locations.

For information on filling the auto-lubrication system, refer to Grease Pump Unit (Auto-lubrication system)- Fill with Grease on page 149.

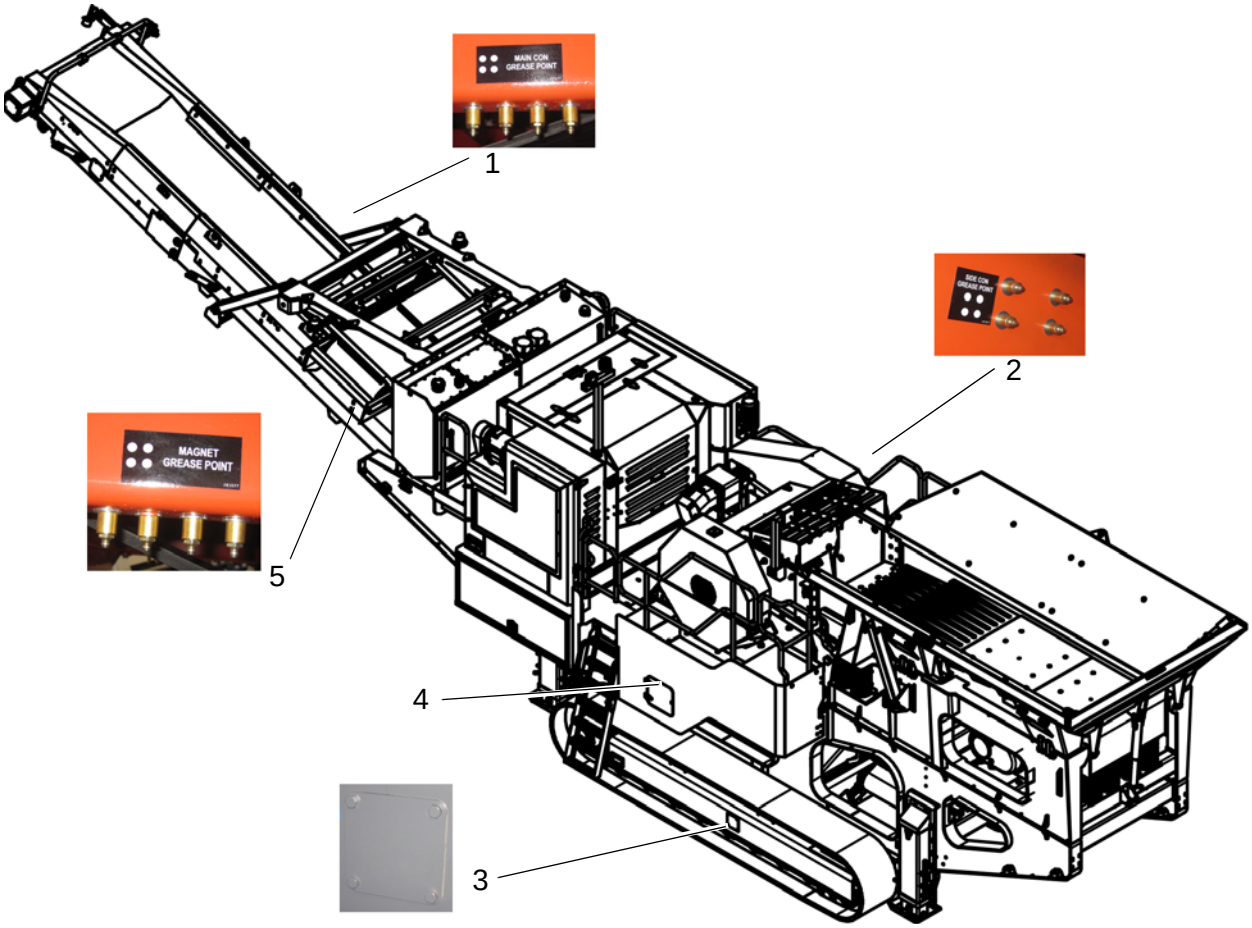


Figure 6-3: Grease points

Key to *Figure 6-3:*

1	Main conveyor grease points	4	Auto-lubrication filling point
2	Side conveyor grease points	5	magnetic conveyor grease points
3	Track grease panel		

6.10.13. Grease Pump Unit (Auto-lubrication system)- Fill with Grease

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

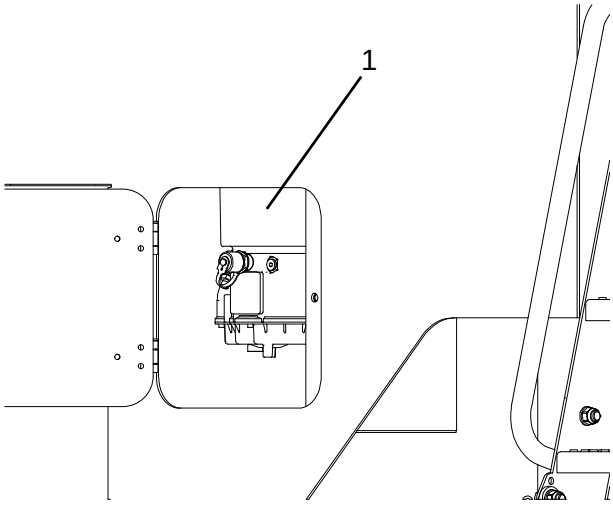
NOTICE

RISK OF EQUIPMENT DAMAGE. The greasing system MUST only be filled with the recommended grease listed within *Oils and Fluids on page 189*.

The greasing system automatically applies grease to the frame, jaw stock and frame bearings. The grease pump unit (1) that feeds the system is to be re-filled when required.

1. The grease pump warning light on the display panel will become lit when the unit is empty of grease. Refer to
2. Follow the maintenance and filling instructions in the manufacturer's handbook. Refer to ***Information and Data Sheets on page 207***.

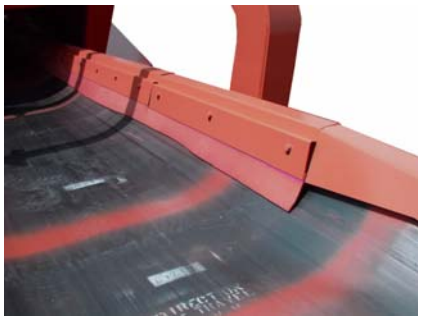
Note! The Grease Pump Unit is factory preset and should not need adjustment. The recommended setting is 6 min./ hour.



6.10.14. Inspecting/ Adjusting Belt Sealing Rubbers

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

1. Sealing rubber in correct position & condition.



2. Adjust as required.

3. Refit clamp fixing screws.

6.10.15. Belt Scraper - Adjust

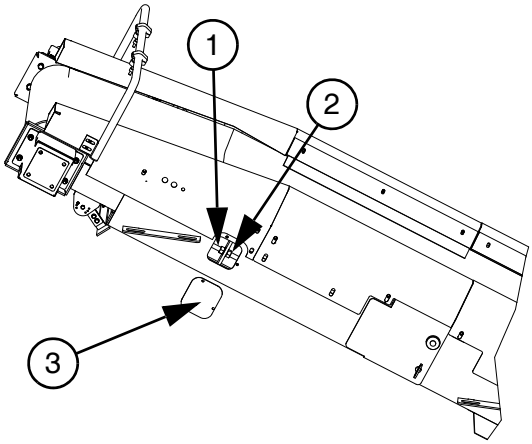
Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

1. If necessary, adjust the head drum scraper by loosening bolts in the springs, adjusting scraper and re-tightening bolts.

6.10.16. Conveyor Belts - Adjust

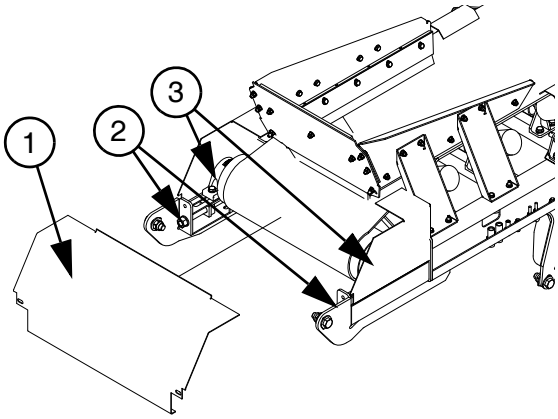
Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

A belt will need adjustment when it has become slack and starts to slip on the rollers.



Main Conveyor:
Adjust the drive drum out as necessary:

1. Remove the cover plate (3).
2. Loosen the bolt (2) and tighten the bolt (1) as necessary.
3. Make sure that both sides are adjusted equally and the tail conveyor is aligned correctly.
4. Make sure that the conveyor belt is in the centre.
5. Tighten bolt (2) when the belt is tightened to the correct level.



Side Conveyor:
Adjust the Tail drum out as necessary.

1. Remove the cover (1) and loosen the bearing bolts (3). Tighten the bolts (2) as necessary.
2. Make sure that both sides are adjusted equally and the tail drum is aligned correctly.
3. Make sure that the conveyor belt is in the central to the drum.
4. Install the cover (1) when the belt is tightened to the correct level.

6.10.17. Hydraulic Filters - Replace

Figure 6-4: and *Figure 6-5:* indicate filter locations on the machine.

Make sure that filters are disposed of correctly in a way that meets the local and national environmental regulations.

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

NOTICE

CLEAN UP ANY OIL SPILLS AFTER PERFORMING THESE OPERATIONS, WITH A SPILL KIT THAT MEETS YOUR LOCAL AND NATIONAL REGULATIONS.

Figure 6-4: Engine Compartment - Filter element locations (for replacement)

Key to *Figure 6-4:*

1 Series 45 (130cc) filter element
2 Jaw circuit high pressure filter element
3 Series 90 (130cc) filter element
4 Air filter blockage reset switch

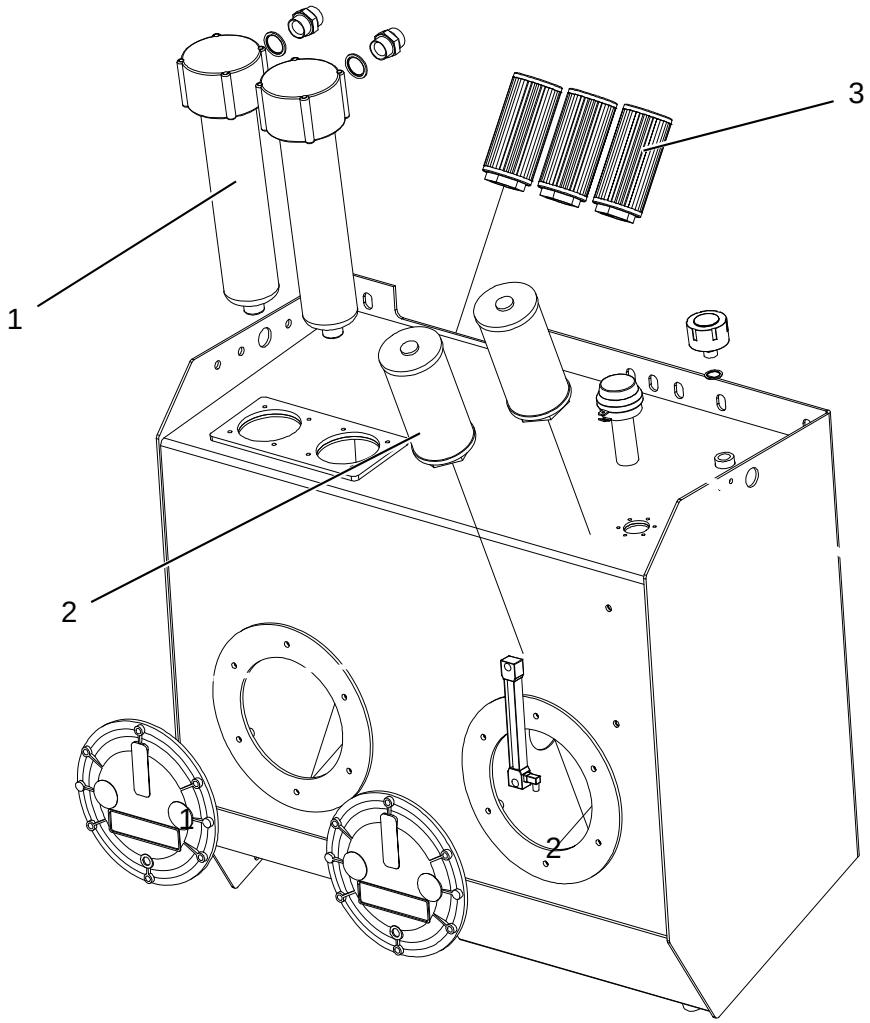


Figure 6-5: Hydraulic tank - filter element locations (for replacement)

Key to *Figure 6-5:*

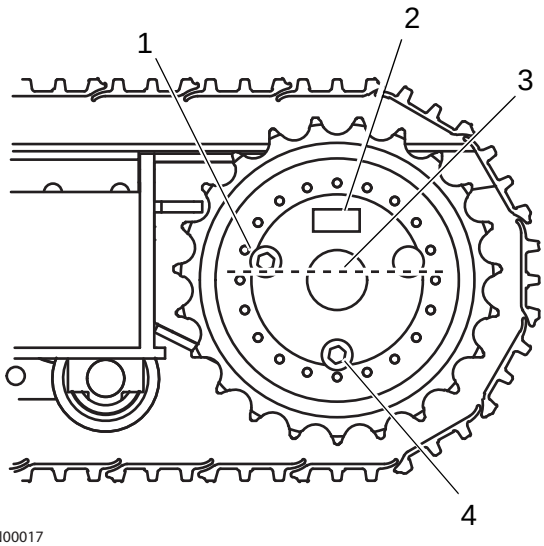
1 Return filter element (2 off)
2 2 1/2” Suction filters/strainers (90 micron) (3 off)
3 Filter suction strainer

6.10.18. Track Gearbox Oil - Change

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

Make sure that oils and fluids are cleaned and disposed of correctly in a way that meets local and national environmental regulations.

1. Track the machine, refer to ***Tracking Machine on page 71*** until the gearbox (2) is in the upright position. The top up plug (1) should be positioned to the left. The drain plug (4) is to be positioned at the bottom of the gearbox.
2. Clean the area around the drain plug before removal to prevent contamination.
3. Place a suitable container under the drain plug. Using an M10 socket wrench, remove the drain plug to drain the oil.
4. Clean the area around the drain plug and re-install the drain plug.
5. Clean the area around the top up plug before removal to prevent contamination.
6. Using an M10 socket wrench, remove the top up plug.
7. Fill the oil to the correct level (3), the oil level should be level with the bottom of the top up plug threaded hole. Refer to ***Oils and Fluids on page 189*** for recommended oil.
8. Allow any surplus oil to drain before installing top up plug.
9. Clean any residue from the gearbox.



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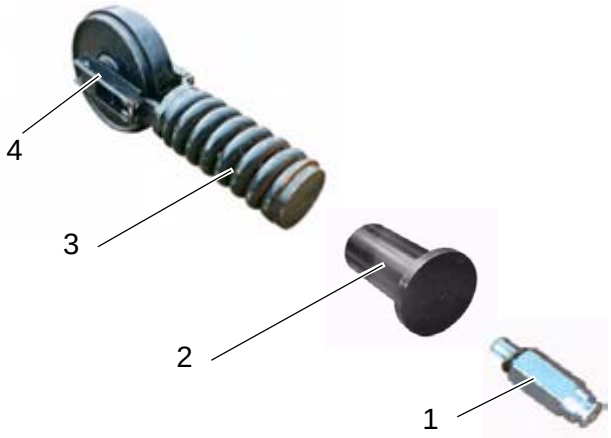
6.10.19. Track Tension

Note: Track adjustment operates through a tensioning system. When the tensioning cylinder (2) is filled with grease it pushes the spring tension unit (3) and the idler (4) forward. Grease is filled through the track adjuster grease valve (1).



6.10.20. Track Tension - Check

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

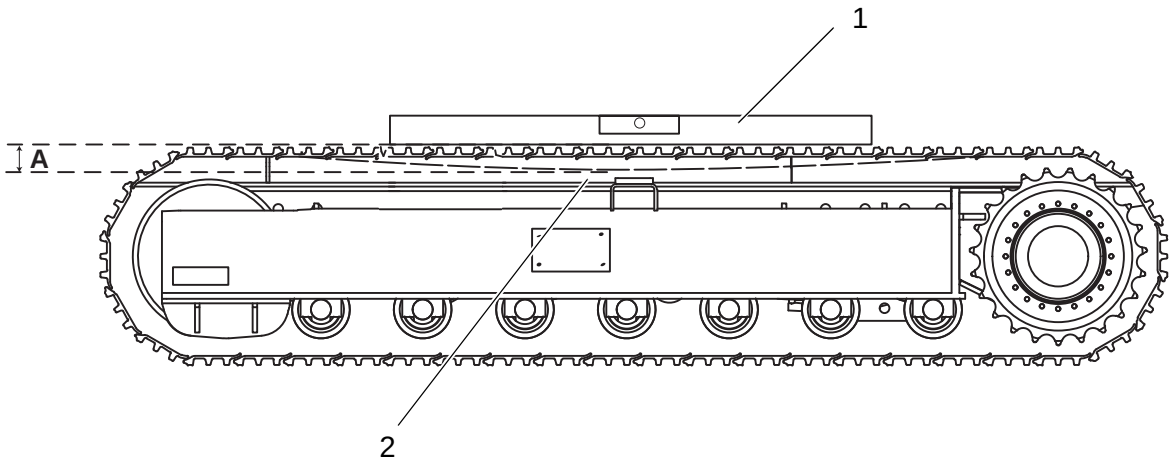


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Figure 6-6: Side view on track

1. Track the machine, refer to ***Tracking Machine on page 71*** a few metres forwards and backwards on level ground to allow the tracks to adopt their natural degree of tension. Do not slew the machine.
2. Stop the machine, refer to ***Machine Shut Down on page 101***.
3. Using a straight edge (1) and a measuring tape, measure the droop of the track (2) the droop (dimension A) should not exceed 30 mm.

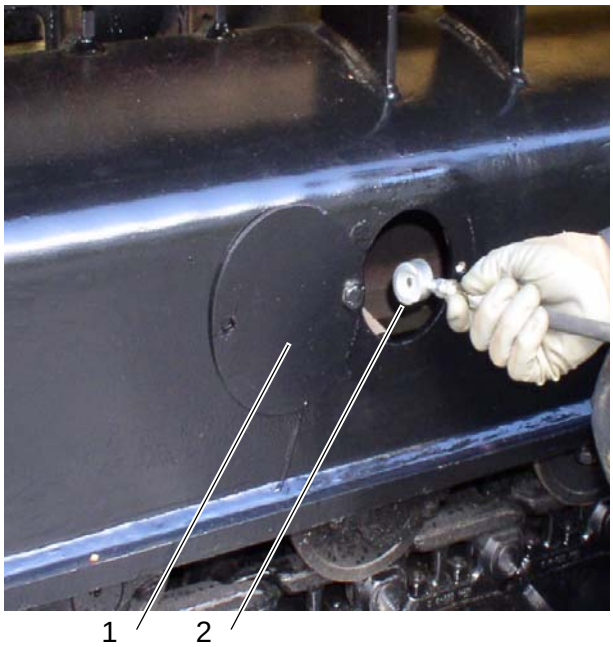
6.10.21. Track Tension - Increase

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

NOTICE

RISK OF EQUIPMENT DAMAGE. Do not over-tension the track as this places excessive loads on the gearbox and idler bearings. This will lead to accelerated wear and premature failures.

1. Remove the inspection cover (1) on the side of track frame.
2. Make sure that the track adjuster grease valve is secure.
3. Attach a grease gun connector (2), to a grease gun and install on to the track adjuster grease valve.
4. Pump grease into the tensioning system through the grease nipple until track droop is correct.
5. Recheck the track tension, refer to ***Track Tension - Check on page 157***.
6. Add additional grease if required and repeat check.
7. Clean off any escaped grease and install the inspection cover.

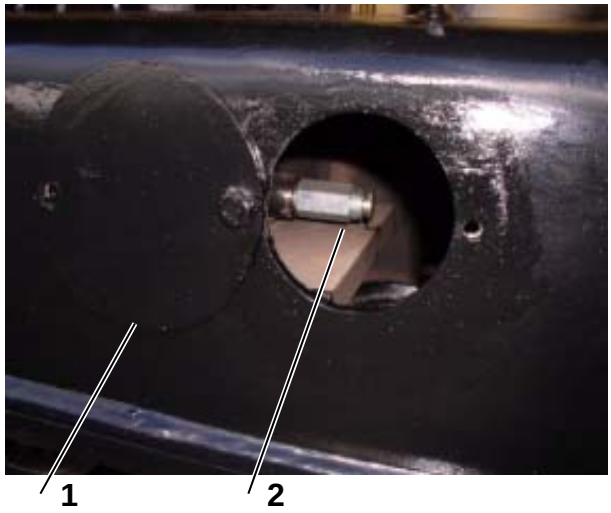


6.10.22. Track Tension - Reduce

WARNING	
	**SKIN INJECTION HAZARD!** **under high pressure could penetrate the skin causing serious injury or death.** **Never loosen a grease nipple by more than ½ turn when the track is under tension.**

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

1. Remove the inspection cover (1) on the side of the track frame.
2. Loosen the track adjuster grease valve (2), by turning it 1/2 turn anti-clockwise. As the grease escapes from the tensioning system the track will become slack.
3. Recheck the track tension, refer to ***Track Tension - Check on page 157***.
4. When correct tension has been achieved, tighten the track adjuster valve 1/2 turn clockwise.
5. Clean off any excess grease and install the inspection cover.



6.11. Jaw Plates - Turning and changing

When examining the jaw plates it is found that they are excessively worn they must be either turned or replaced. Jaw plates will wear more at the bottom of the crusher chamber, as this is where most of the crushing action takes place. The jaw plates can be turned around to maximise their useful life.

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

Do not start any jaw plate maintenance until you have read and fully understood the Safety Section on page 11.

⚠ WARNING

FALLING OBJECT HAZARD!

Do not allow personnel to work on or walk under loads supported by a crane or hoist.

Only use certified and approved lifting equipment. Make sure that the lifting equipment used meets the applicable regulations i.e. that lifting equipment is strong and stable enough for the intended use, is marked with a Safe Working Load (SWL), is suitably positioned and is operated in a planned manner by competent persons.

Make sure that all the loads are attached with their related supports / lift equipment before the installation or the removal.

RISK OF CRUSHING AND DEATH!
Be Careful of the component weights. NEVER get into the jaw box's crushing chamber while the jaw plates or the jaw bolts are loose and/or the machine is NOT locked and tagged out. If you are not sure do NOT enter the crushing chamber.

Make sure that there are minimum of two persons to do the task.

Make sure that the lockout procedure is completed before the start of the maintenance procedures. NEVER work on the machine while it is in operation.

.

Only use Sandvik approved lifting devices to secure the load to the crane. Refer to the following paragraphs for additional information.

- Inspect Sandvik supplied lifting equipment (as shown in image). Make sure that the lifting tools are undamaged.
- If any damage is found do not continue with the procedure and replace the damaged equipment immediately.

NOTICE

RISK OF EQUIPMENT DAMAGE. Do not allow the jaw plate to become excessively worn so that the seats for the crusher box jaw plate or jaw stock become worn.

This can result in the need for more extensive and costly repairs or even replacement.

6.11.1. Prepare to Remove the Jaw Plates

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

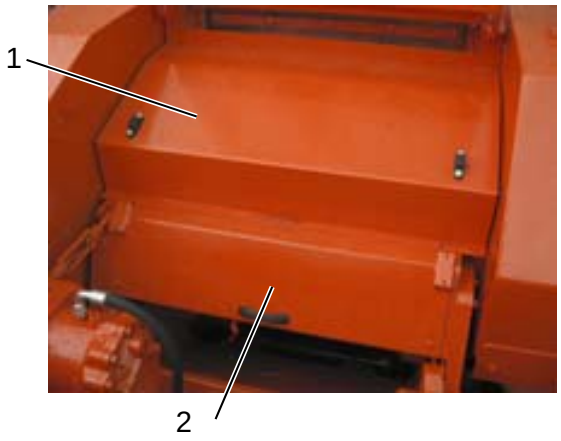
To prepare the machine to change or turn jaw plates, proceed as follows:

1. Open the jaw plates gap to the full position. Refer to setting material output size ***Adjust the Jaw Closed Size Setting (CSS) on page 123***.
2. Shut down the machine. Refer to the ***Commissioning and Shut Down on page 61***.
3. Lock and tag-out the machine. Refer to the ***Lock and Tag-out Procedure on page 105***.

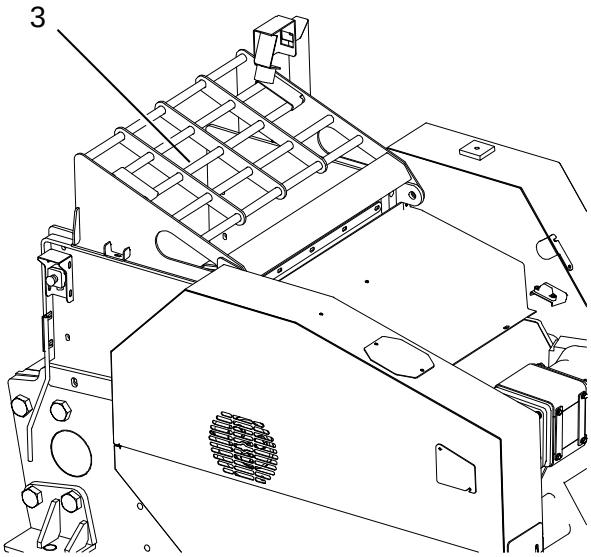
6.11.2. Jaw Guards - Remove

Maintenance - Safety Requirements on page 130 must be followed before this procedure is started.

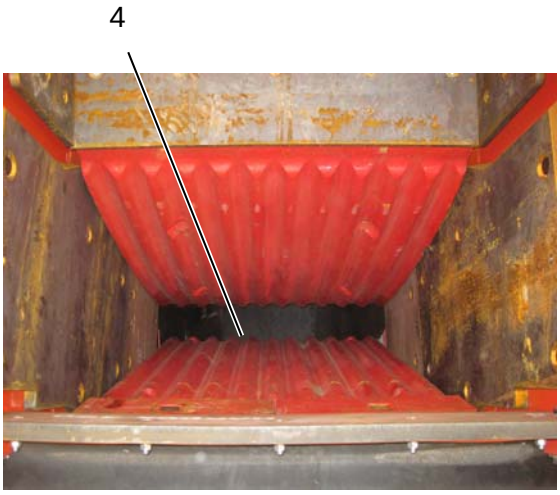
1. Remove the guard and toggle cover plate (1) and (2) above the jaw stock.



2. Remove the inlet chute cover (3).



3. Make sure that the jaw plate and the wedges (4) are clean, include all lift holes and clearances between the plates and the wedges.



4. If necessary remove the dirt from the main conveyor as follows:

Make sure that personnel are clear of the hazard exclusion zone before the machine is started. Refer to *Hazard Zones on page 21*.

5. Make sure the all personnel are off and away from the machine.
6. Un-tag the machine. Refer to the ***Tag Removal Procedure on page 106***.
7. Start the machine. Refer to ***Engine - Starting Procedure on page 69***.
8. Start the main conveyor to remove all dirt. Refer to ***Operating The Machine (Crushing) on page 125***.
9. When the material is removed from the main conveyor, shut down the machine. Refer to ***Machine Shut Down on page 101***.
10. Lock and tag-out the machine. Refer to the ***Lock and Tag-out Procedure on page 105***.

6.11.3. Swing Jaw Plate - Remove

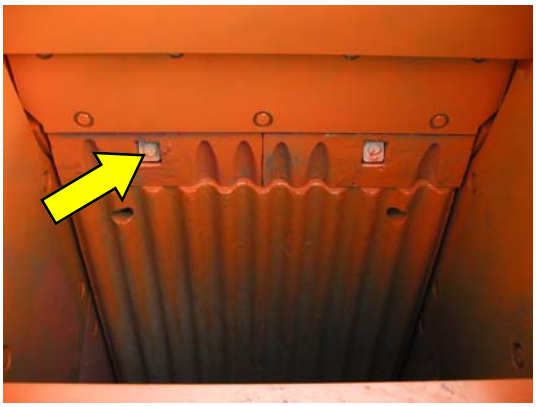
DANGER	
	**FALLING OBJECT HAZARD!** **The jaw plate becomes loose when the nuts are removed, it could fall and cause serious injury or death.** **Make sure that personnel are NEVER in the jaw box or between the jaw plates.**

WARNING	
	**FALLING OBJECT HAZARD!** **The wedges will become loose when the nuts are removed, they could fall and cause injury or damage the equipment. Make sure that the wedges are held in position and carefully removed from the back of the jaw plate.**

***Maintenance - Safety Requirements on page 130* must be followed before this procedure is started.**

11. Loosen and remove the wedge nuts.

12. Remove the wedge bolts and the wedges from swing jaw stock only.

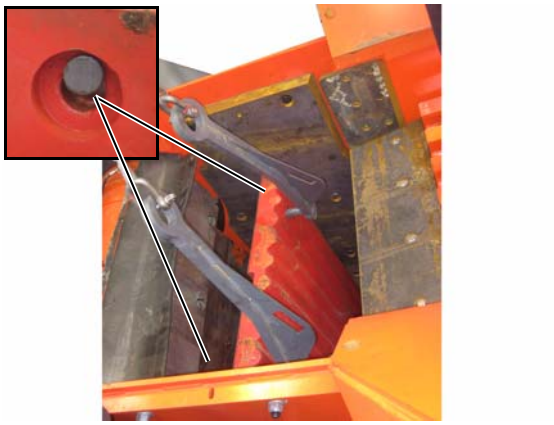


13. NOTE: Remove the wedge bolts as shown; pull out the wedge up the bolt. Remove the wedges and the bolt.

14. Attach a crane to the wear plate and support the weight with the chain/strap. Remove the nuts and the bolts. Remove the wear plate with a crane.

15. Attach the lifting hooks to a minimum of a 5 tonne (metric) or 6 ton (US) crane.

16. Put the lifting hooks in the correct position, in the lifting holes. Make sure they are central to the jaw plate and they are vertical to the point of lift. Make sure they are installed correctly into the lifting holes.



FALLING OBJECT HAZARD. Do not allow personnel to work or stand below a suspended load. If necessary put safety barriers in position.

17. Lift the jaw plate up and out with the crane. When the jaw plate is clear of the machine move it out and away from the machine.

18. When the jaw plate is away from the machine move it down.

6.11.4. Fixed Jaw Plate - Remove

Maintenance - Safety Requirements on page 130 **must be followed before this procedure is started.**

DANGER	
	**FALLING OBJECT HAZARD!** **The fixed jaw plate is loose when the nuts are not installed and tightened and the jaw plate could fall and cause serious injury, death or damage the equipment. Make sure it is held in position when the lifting tools are removed.** **Make sure persons are NEVER in the jaw box or between the jaw plates.**

NOTICE

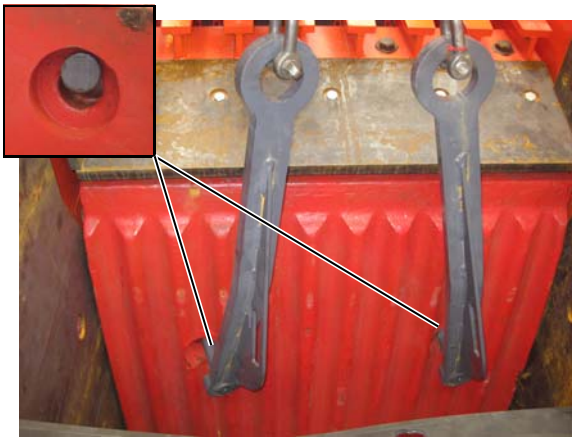
RISK OF EQUIPMENT DAMAGE. Install and tighten the control valve lever into the position as shown below. Remove again after use. Improper use could result in damage to the jaw plates.

1. Loosen and remove locking nuts from the bolts.

2. Carefully remove the bolts. DO NOT enter the crusher box. NOTE: Push the bolt from back of the fixed jaw plate.

3. Attach the lifting hooks to a minimum of a 5 tonne (Metric) or 6 ton (US) crane.

4. Install the Lifting hooks into the lifting eyes correctly. Tighten the chain/ropes with the crane.



Make sure that personnel are clear of the hazard exclusion zone before the machine is started. Refer to *Hazard Zones on page 21*.

5. Make sure the all personnel are off and away from the machine.
6. Un-tag the machine. Refer to the ***Tag Removal Procedure on page 106***.
7. Start the machine. Refer to ***Engine - Starting Procedure on page 69***.
8. Install and pull back the jaw plate release lever (1) (lever not shown). to bring the fixed jaw plate forward.
9. Refer to ***Machine Shut Down on page 101***.
10. Refer to ***Lock and Tag-out Procedure on page 105***.

11. Use the crane and remove jaw plate, Remove the wedge.

12. The hydraulic ram release with the fixed jaw plate removed, looks as shown.

Make sure that personnel are clear of the hazard exclusion zone before the machine is started. Refer to *Hazard Zones on page 21*.

13. Make sure the all personnel are off and away from the machine.
14. Un-tag the machine. Refer to the ***Tag Removal Procedure on page 106***.
15. Start the machine. Refer to ***Engine - Starting Procedure on page 69***.
16. Push forward the jaw plate release lever (1) (lever not shown). The hydraulic ram is retracted.
17. Refer to ***Machine Shut Down on page 101***.
18. Refer to ***Lock and Tag-out Procedure on page 105***.

6.11.5. Crusher Box Liner Plates - Replace

Maintenance - Safety Requirements on page 130 **must be followed before this procedure is started.**

Do not attempt to remove liner plate by hand

FALLING OBJECT HAZARD. Do not allow personnel to work or stand below a suspended load. If necessary put safety barriers in position.

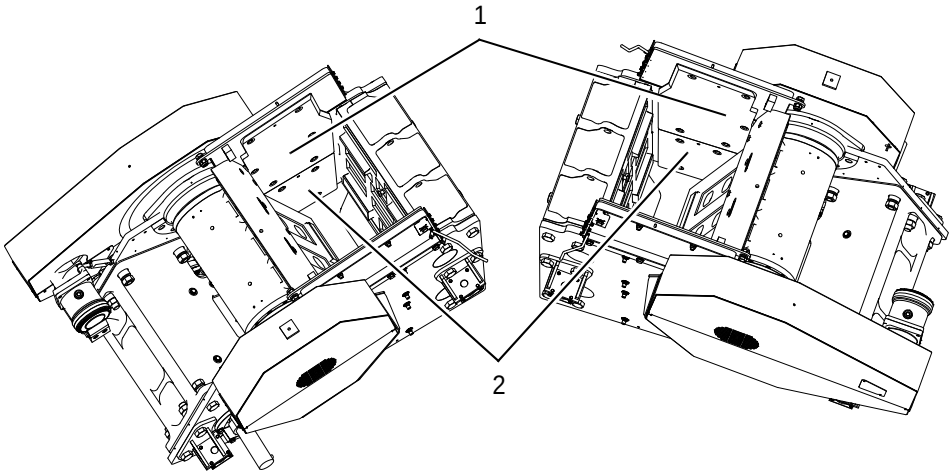
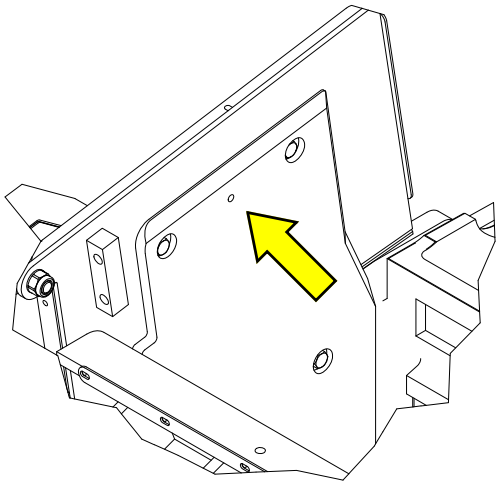


Figure 6-7: Location of crusher box liner plates

Note! The removal procedure for the all crusher box liner plates is identical. The top plates (1) are to be removed first followed by the bottom plates (2). To install the crusher box liner plates, the bottom plates are to be install first followed by the top plates.

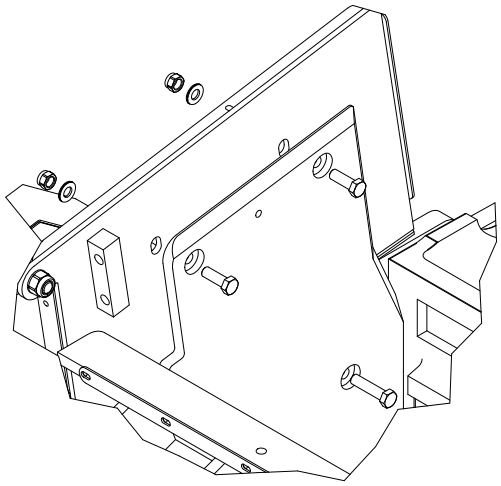
1. Make sure that the swing jaw plate is removed. Refer to ***Swing Jaw Plate - Remove on page 163***.
2. Make sure that the fixed jaw plate is removed. Refer to ***Fixed Jaw Plate - Remove on page 167***.

3. install and tighten a lifting eye. Attach a minimum of a 2 tonne (Metric) 3 ton (US) crane with a chain to the lifting eye. Make sure the chain is tight to support the weight of the wear plate.



4. Loosen and remove the bolts with the washers. Lift up the wear plate with the crane. To install lift the wear plate into position and hold it there with the crane. Install and tighten the bolts with the washers and nuts (TORQUE 711 Nm).

Note: The remove and install sequence given in step 1. And the remove and install procedure is the same for all the wear plates.

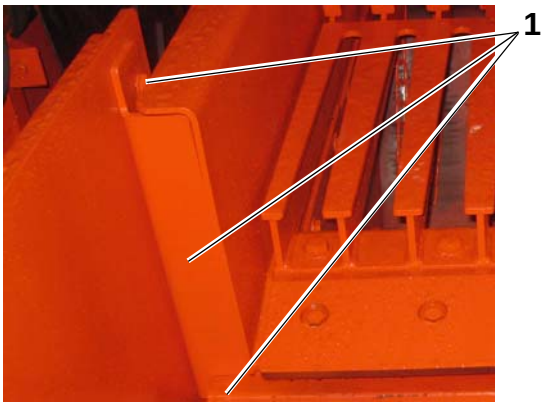


6.11.6. Fixed Jaw Plate - Install

Maintenance - Safety Requirements on page 130 **must be followed before this procedure is started.**

FALLING OBJECT HAZARD. Do not allow personnel to work or stand below a suspended load. If necessary put safety barriers in position.

1. Loosen the bolts (1) and push back both the sealing plates on each side.



2. Place the lifting tools in the jaw plate. Before lifting the plate make sure the back face and pockets are clean of debris.

3. Make sure the lifting tool is installed correctly in the hole. Lift the fixed jaw plate with a minimum of a 5 tonne (Metric) or 6 ton (US) crane.

4. Make sure the back of the plate is clean and smooth. Clean out any build up dirt or dust in the holes.

5. Install wedge in position as shown. The wedge should not rest on the lifting tool. See photos for approximate position. NOTE: Use grease to hold the wedge into position.

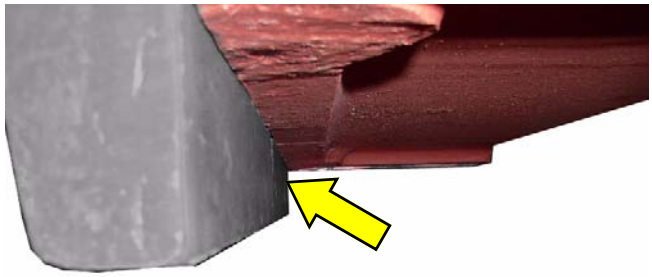
FALLING OBJECT HAZARD. Do not allow personnel to work or stand below a suspended load. If necessary put safety barriers in position.

6. Make sure the ram pin is in the full back position. Clean mounting plate.

7. Use the crane and lower the plate into position, SLOWLY into the crusher box. Make sure the a clearance of 10mm to 15mm is between both sides.

⚠ DANGER	
	**FALLING OBJECT HAZARD!** **The fixed jaw plate is loose when the nuts are not installed and tightened and the jaw plate could fall and cause serious injury, death or damage the equipment. Make sure it is held in position when the lifting tools are removed.** **Make sure persons are NEVER in the jaw box or between the jaw plates.**

8. Make sure the fixed jaw plate is installed correctly and that there is no clearance between the bottom of the jaw box and the fixed jaw plate.



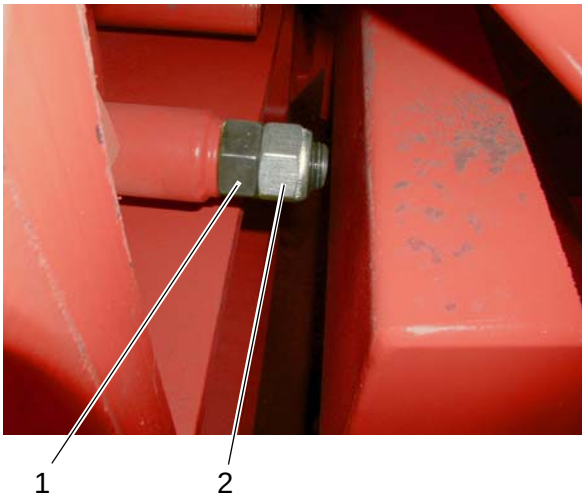
9. Carefully remove the lifting tools, and hold the plate into position, DO NOT ENTER THE JAW BOX.

10. Install the bolts and push them all the way through the hole.

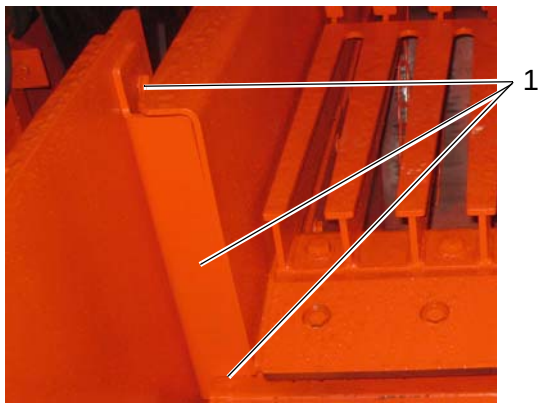
11. Install the nuts and lock nuts, but do not tighten.

12. Adjust the fixed jaw plate as necessary and make sure it is centred.

13. Tighten the nut (1) and lock nut (2).



14. Put the sealing plates (both sides) in the correct position against the fixed jaw plate. Install and tighten the bolts (1).

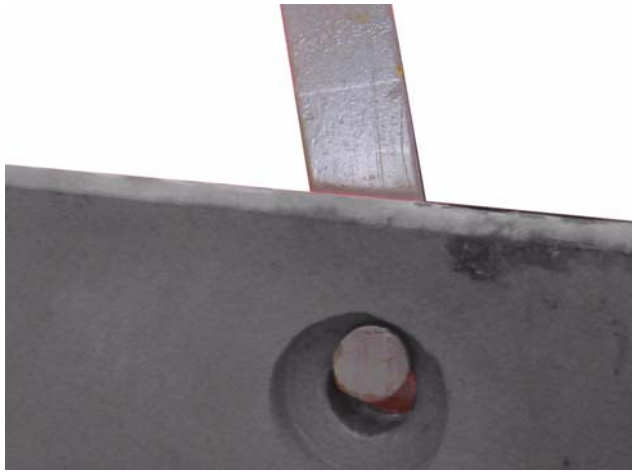


6.11.7. Swing Jaw Plate - Install

⚠ WARNING	
	**PERSONNEL HAZARD!** **Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.** **Stop machine, isolate, remove ignition key and tag-out, before carrying out these maintenance instructions.**

1. Make sure that the lock and tag-out procedure has been carried out on the machine.
2. Make sure the plate is free of dirt and dust. Use a minimum of a 5 ton (Metric) or 6 ton (US) crane and lift the swing jaw plate.

3. Make sure the lifting tools are in the correct position.



FALLING OBJECT HAZARD. Do not allow personnel to work or stand below a suspended load. If necessary put safety barriers in position.

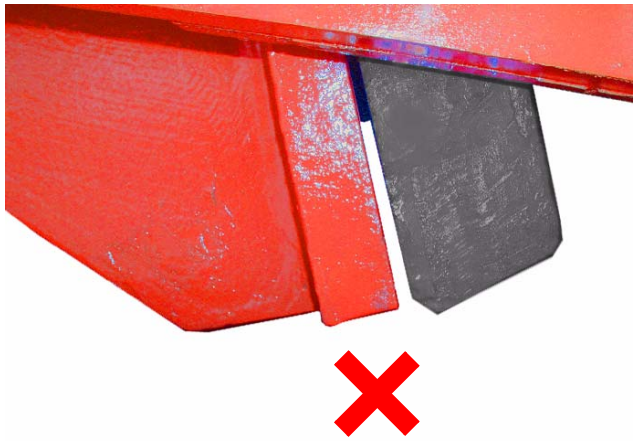
4. Lift the swing jaw plate slowly into position. Slowly lower jaw plate into position. DO NOT ENTER THE JAW BOX.

5. The jaw plate recesses will audibly drop onto the location point.

⚠ DANGER	
	**FALLING OBJECT HAZARD!** **The fixed jaw plate is loose when the nuts are not installed and tightened and the jaw plate could fall and cause serious injury, death or damage the equipment. Make sure it is held in position when the lifting tools are removed.** **Make sure persons are NEVER in the jaw box or between the jaw plates.**

6. Make sure a even clearance is on both sides. The swing jaw plate must have no clearance with the jaw face.

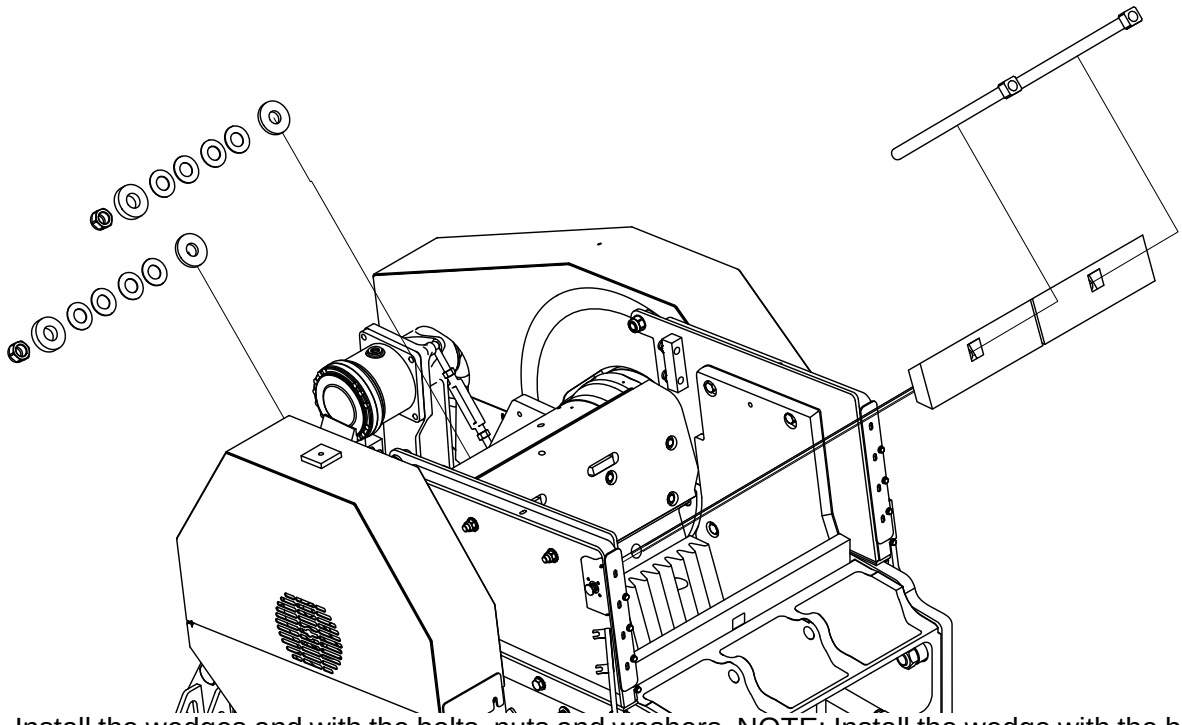
7. This is WRONG. The swing jaw must have no clearance with the jaw face. Adjust the swing jaw plate with the crane.



8. This is correct. The swing jaw plate has no clearance with the jaw face.

9. Remove the lifting tools and from the swing jaw plate

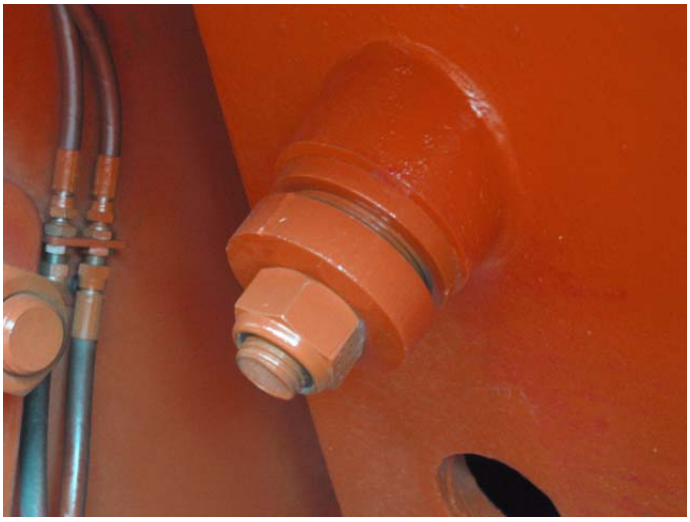
DANGER	
	**FALLING OBJECT HAZARD!** **The swing jaw plate is loose when the nuts are not installed and tightened and the jaw plate could fall and cause serious injury, death or damage the equipment. Make sure it is held in position when the lifting tools are removed.** **Make sure persons are NEVER in the jaw box or between the jaw plates.**



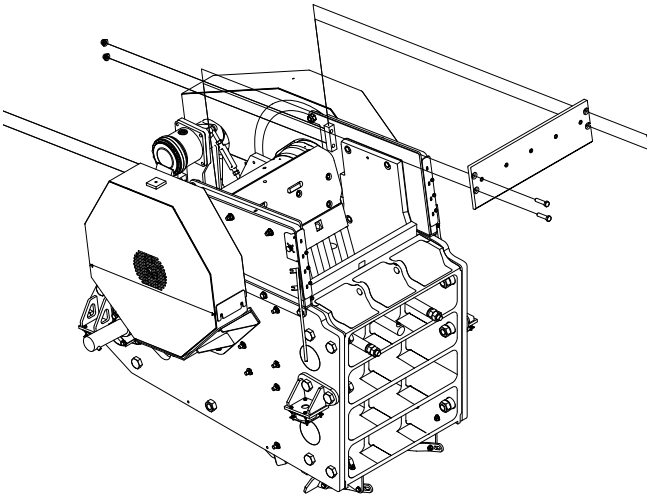
10. Install the wedges and with the bolts, nuts and washers. NOTE: Install the wedge with the bolt at the same time, position the bolt into the hole and install the wedge into position, use a hammer to make sure it is installed correctly. DO NOT ENTER THE JAW BOX.

FALLING OBJECT HAZARD. Do not allow personnel to work or stand below a suspended load. If necessary put safety barriers in position.

11. Make sure that the nuts are tightened correctly (TORQUE 5375Nm)



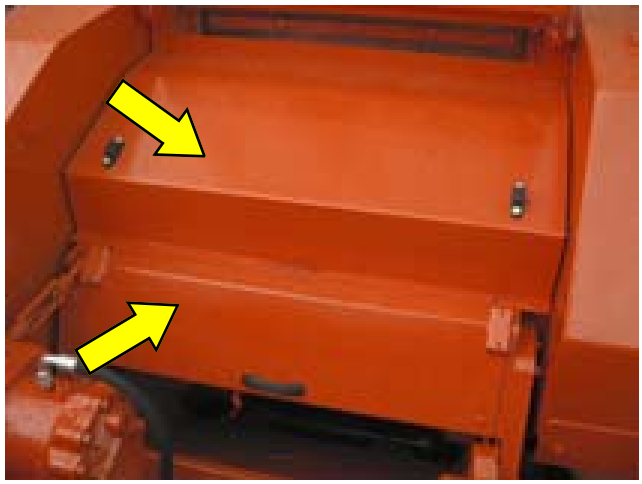
12. Use a crane with a strap/chain (lifting eye) to lift and hold the wear plate into position. Install and tighten the bolts with the nuts and washers.



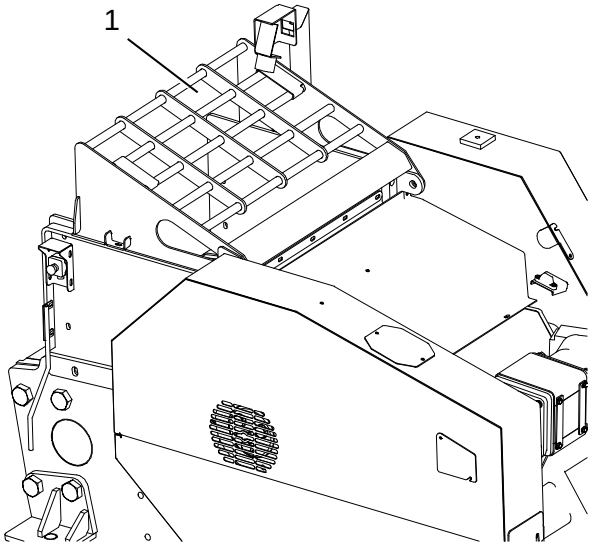
6.11.8. Jaw Guards - Install

Maintenance - Safety Requirements on page 130 **must be followed before this procedure is started.**

1. Install the toggle cover plate and the guard with the nuts and bolts



2. Install the inlet chute cover (1).



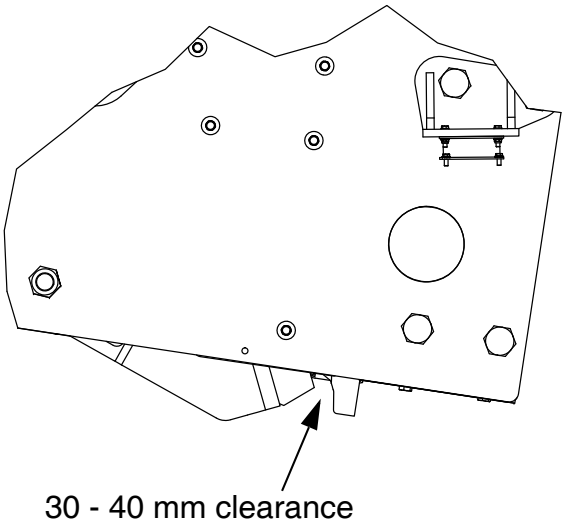
6.11.9. Toggle Plate - Remove/ Replace

To protect the crusher from the excessive loads generated by un-crushable objects, the jaw stock is fitted with an overload protection device - “Toggle Plate”. When the permissible loads are exceeded, the Toggle Plate will collapse from elastic buckling. The crusher will then automatically shut down, providing a degree of protection to valuable machine components. When this happens, clear any blockages from the machine and fit the replacement toggle in the following way.

Make sure the jaw guards are removed refer to ***Jaw Guards - Remove on page 162***.

***Maintenance - Safety Requirements on page 130* must be followed before this procedure is started.**

1. Reduce the Closed Size Setting (CSS) to 30 - 40 mm.
2. Stop the machine, refer to ***Machine Shut Down on page 101***.



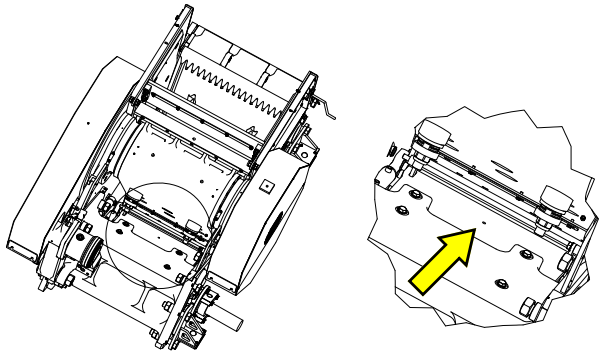
FALLING OBJECT HAZARD. Do not allow personnel to work or stand below a suspended load. If necessary put safety barriers in position.

Working on or in close proximity to the machine whilst it is on and or operating could cause serious injury or death.

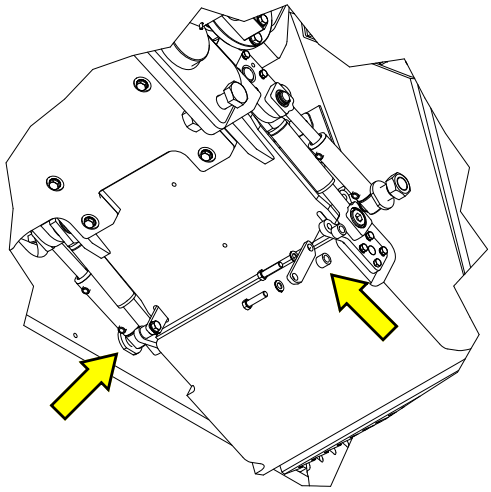
Do not stand on the machine whilst it is operation.

Stop the machine, isolate, remove ignition key and tag-out before carrying out any maintenance procedures. Refer to *Lock and Tag-out Procedure on page 105*.

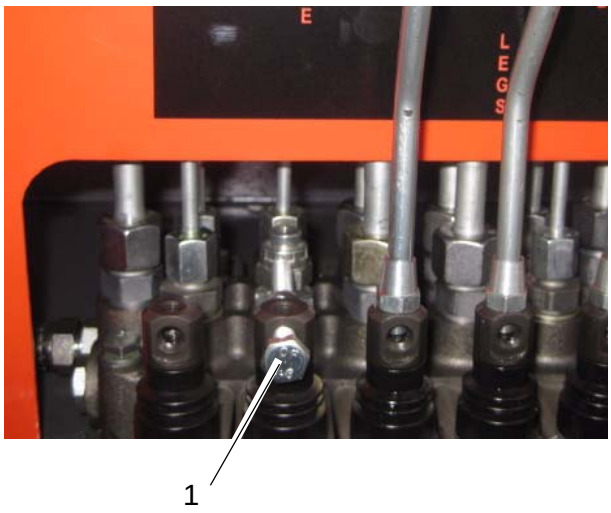
3. Make sure that the machine is locked and tagged-out.
4. Install and tighten a lifting eye. Attach a minimum of a 2 tonne crane with a chain to the lifting. Lift the crane to tighten the chain and support the weight of the Toggle plate.



5. Loosen and remove the bolts with the washers and bushes. Remove the tie bar. Do both tie bars.



6. Loosen and remove the nut with the bolt. and install and tighten the spare lever onto the toggle plate removal valve (1).
7. Start the machine. Make sure the Engine speed is set to position 1. DO NOT press clamp ON.

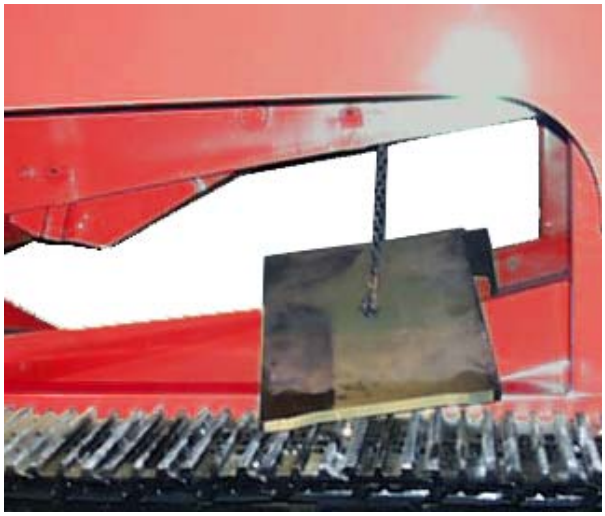


Make sure that all personnel are clear of the machine before the jaw stock is released.

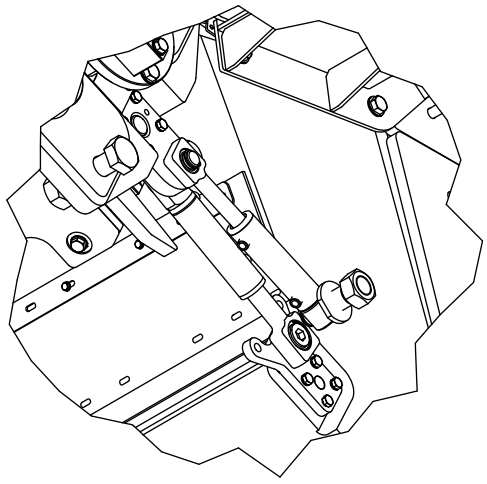
8. Using the attached lever, push the toggle plate removal valve (1) to release the toggle plate.
9. Stop the machine refer to ***Machine Shut Down on page 101***.

1

10. Lower the Toggle plate with the crane and remove through the clearance above the main conveyor.



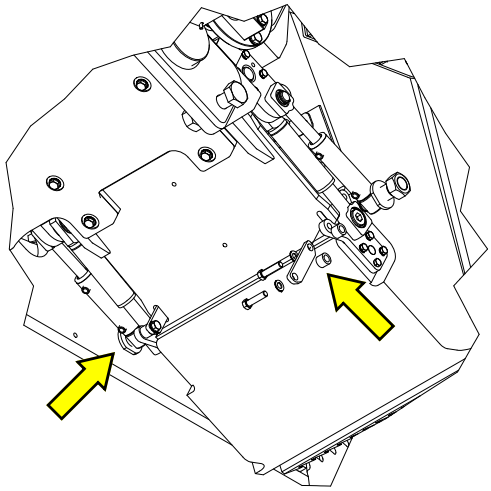
11. Check and Inspect the Toggle clamp and toggle ram bearings for cracks. Replace if necessary.



12. Use a minimum of a 2 tonne crane to lift and hold the Toggle plate into the correct position.

13. Install the tie bar. Install and tighten the bolts with the washers and bushes. Do both tie bars.

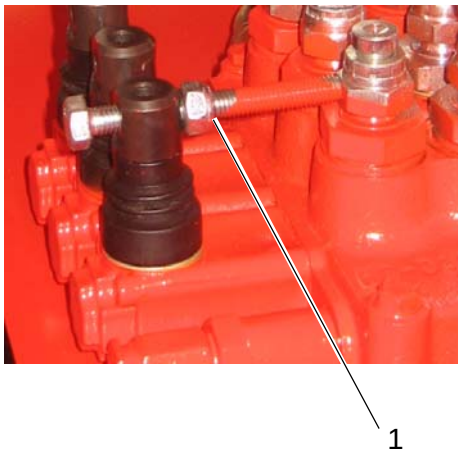
14. Start the machine refer to ***Engine - Starting Procedure on page 69***. Make sure the Engine speed is set to position 1. DO NOT press clamp ON.



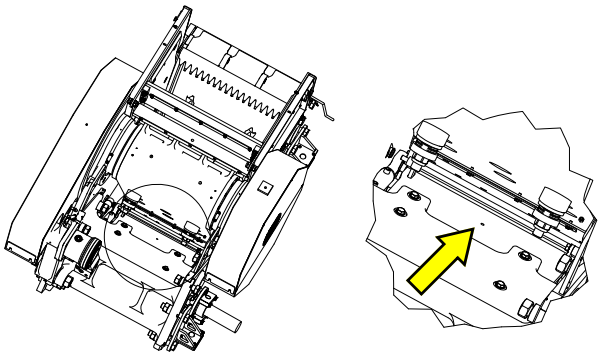
15. Pull the Toggle valve (1) to engage the Toggle plate.

16. Turn OFF the machine refer to ***Machine Shut Down on page 101***.

17. Loosen and remove the spare lever. Install and tighten the bolt with the nut (1).

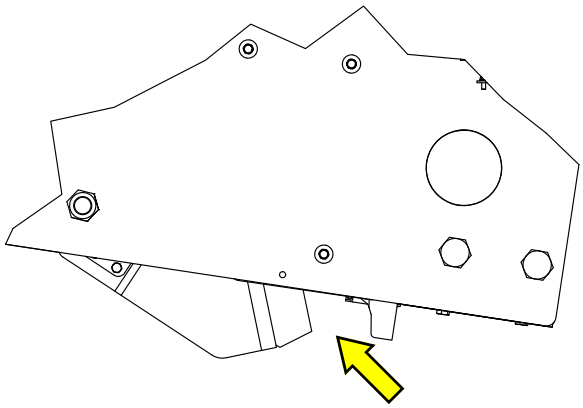


18. Remove the chain and loosen and remove the lifting eye.



19. Install the jaw guards refer to ***Jaw Guards - Install on page 183***.

20. Adjust the closed size setting (CSS) as necessary. Refer to ***Adjust the Jaw Closed Size Setting (CSS) on page 123***.



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Make sure that all guards are fitted and that the feeder, crusher and conveyor belts are empty before the machine is started.

21. Make sure the machine is un-tagged refer to ***Tag Removal Procedure on page 106***.

6.12. Oils and Fluids

NOTICE

RISK OF EQUIPMENT DAMAGE. Only use lubricants, fluids, filters and parts recommended by the Original Equipment Manufacturer (OEM) or accelerated wear or damage could result.

Never use grease containing Molybdenum. This may cause damage to the machine components and will invalidate the warranty.

Make sure that oils and fluids are cleaned and disposed of correctly in a way that meets the local and national environmental regulations.

Oils and fluids related to servicing:

Lub/ Oil and Points	Max. Vol.	Temperature	Viscosity	Manufacturers Equivalent Specifications	Sandvik Part Number
Anti-freeze				Shell Safe Anti Freeze Concentrate	CN6071
Diesel	420 Lt			Shell Agricultural Gas Oil	CN6004
Engine oil	30 Lt			Shell Rimula Signia 10W-40	CN6125
	30 Lt	Cold Weather		Shell Diesel Engine Oil Rimula 5W-30	CN5704
Engine oil - alternative	30 Lt			See Manufacturer's Handbook	
Feeder gearbox	6 Lt			Shell Omala 220 Gear Oil	CN6055
pump unit (Auto-lubrication system)	?Lt	-20°C to +150°C		SKF LGHB 2 (NLGI Grade 2)	CN6110 (400g tube) CN6109
pump unit (Auto-lubrication system)		Arctic		Shell Aeroshell 33	CN5702
Torque arm bearings	1 Lt	-20°C to +150°C		SKF LGHB 2 (NLGI Grade 2)	CN6110 (400g tube) CN6109
Hydraulic system	1400 Lt		ISO VG 32	Shell Tellus Arctic 32 (<0³C)	CN5700
	1400 Lt		ISO VG 46	Shell Tellus 46 (5³C - 35³C)	CN6070

Lub/ Oil and Points	Max. Vol.	Temperature	Viscosity	Manufacturers Equivalent Specifications	Sandvik Part Number
	1400 Lt		ISO VG 68	Shell Tellus Oil 68 (>35³C)	CN7739
	1400 Lt	Environmentally friendly		Shell Naturelle HF-E 46 (5³C - 35³C)	CN6106
Manual lubrication points and track tension	As req.			Shell Albida EP2	CN6073
Track gearbox	5Lt			Exol Ethena EP90 Gear Oil	
Tracks - alternative	5Lt			Shell SPIRAX GSX75W-80	CN6100

A full list of Substances Hazardous to Health associated with this equipment can be found in the appendix of this document.

6.13. Machine Fault Codes and Maintenance Screens

6.13.1. Maintenance screens

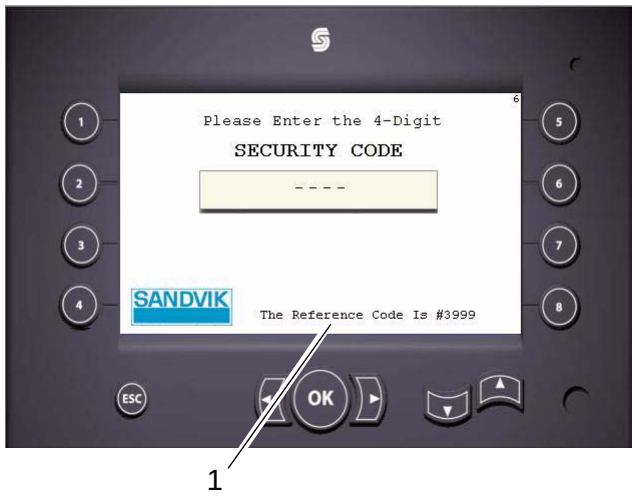
Maintenance screens are accessed by pressing Button-6 in the main menu screen and from the Services Menu page in Manual Operating Mode.

When in the maintenance mode the user can operate each function independent of other functions.

Upon entering the Parameter adjust pages for both Sandvik and Customer access; a security page will appear.

To gain access to the maintenance mode the operator must contact Sandvik and quote the reference code (1) displayed on the screen. The operator will be given a 4 digit number which should be entered using the screen Buttons 1-8.

Once entered press the OK-button to accept the code - if the correct code is entered then access will be granted. However if the incorrect code is entered the operator will have to wait sixty seconds before attempting to enter a new pin code.



6.13.2. Machine Fault Codes

All faults are reported on the display screen. Each fault is identified by a fault number (1) and a fault description (2).

There are three categories of faults:

- Red faults
- Blue faults
- Engine faults.

The tables that follow describe the faults in each category:

6.13.3. Red Faults

Fault Number	Red Faults Description
1	Machine Stops

Fault Number	Red Faults Description
2	Radio Stop Pressed
3	Low Hydraulic Oil Level
4	High Hydraulic Oil Temperature
9	Engine Speed Low Feeder Unavailable
11	Fuel Low Level Warning
13	Main Conveyor Speed Critical
19	Controller Unit2 Unavailable
26	Hydraulic Oil Temperature Sensor Unavailable
32	Manual Handset Stop Pressed

6.13.4. Blue Faults

Fault Number	Blue Faults Description
	Radio Track Joy stick Fault
	Radio Unavailable
	Hydraulic Oil Temperature Warning
	Manual Track Handset Fault
	Main Conveyor Pull Stop
	Left Track Valve Fault
	Right Track Valve Fault
	Feed Conveyor Valve Fault
	Hydraulic Temperature sensor Unviable
	Hydraulic Oil Cooler Output Unavailable
	Main Conveyor Output Unavailable
	Hydraulic Oil Temperature sensor Unavailable
	High Engine Load

6.13.5. Engine Faults

Fault Number	Engine Faults
	Fuel Temperature
	Fuel Rate
	Retarder Solenoid current
	Ether Injection Control Solenoid

Fault Number	Engine Faults
	8 Volt DC Supply
	5 Volt Sensor DC Power Supply
	Engine Oil Pressure
	Boost Pressure Sensor
	Atmospheric Pressure
	Engine Coolant Temperature
	Throttle Position
	Engine Speed
	Secondary Engine Speed
	Fuel Pressure
	Intake Manifold Air Temp
	Injector Actuation Pressure
	Engine Timing
	Air Inlet Heater Relay
	System Voltage
	Check Programmable Parameters
	J1939 Data Link communications
	Engine Coolant Level
	Inlet Air Temperature
	Fuel Temperature
	Auxiliary Temperature
	Auxiliary Temperature Sensor
	High Auxiliary Pressure
	Auxiliary Pressure Sensor
	Cylinder #1 Injector
	Cylinder #2 Injector
	Cylinder #3 Injector
	Cylinder #4 Injector
	Cylinder #5 Injector
	Cylinder #6 Injector

7. Trouble Shooting

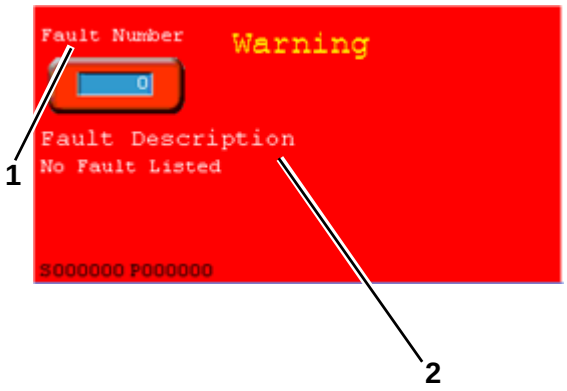
7.1. Trouble Shooting

The section that follows lists some of the common problems that can occur with the machine. If any of these occur, carry out the checks listed:

7.1.1. Machine faults displayed on screen

All faults are reported on the display screen. Each fault is identified by a fault number (1) and a fault description (2).

For a list of the faults refer to ***Machine Fault Codes and Maintenance Screens on page 191***.



Fault	Cause	Actions	State Sequence
Main conveyor speed wheel. Critical conveyor speed fault.	If the speed wheel on the main conveyor speed drops below 10 M/M default setting for a 2 seconds period.	Stop the feed conveyor and Main conveyor immediately. Intermittent bleeper will sound. Display Main conveyor low speed and fault Number...log fault.	Shutting down go to state 501.  Set desired shut down time intervals.
Main Hydraulic Failure	If the Hydraulic temperature sensor becomes unavailable when in plant run mode, hydraulic oil coolers will run continuous.	Stop the feeder immediately. Intermittent siren will sound. Display temperature sensor fault Number.... Log fault.	Shutting down go to state 501. Set desired shut down time intervals. Delay 5sec - stop re circulating / transfer conveyors Delay 15sec: State return to 200 Engine stop.

Fault	Cause	Actions	State Sequence
Main Hydraulic Failure	If the Hydraulic temperature sensor fails the hydraulic oil coolers will run continually for tracking mode this is only permitted for...? seconds.	Display temperature sensor fault Number 0...log fault.	State return to 200 Engine stop.
Main hydraulic oil level low	A fault indicated by the main hydraulic oil level sensor. Signal goes low on fault. C1p14	Stop the feeder conveyor immediately. Intermittent bleeper will sound Display warning (Red screen Fault) Main hydraulic oil level low, fault Number...log fault.	Go to state 500. Set desired time periods for sequence shut down. State return to 200 Engine shut down
Hydraulic Oil Temperature warning	If the oil temperature reaches hydraulic oil temperature warning set point....? degrees C.	Stop the feeder conveyor immediately. Intermittent bleeper will sound Display warning (Blue screen Fault) Main hydraulic oil temperature warning, fault Number 010...log fault.	Restart If the temperature drops below its set warning value, reset by pressing the Ok button, and continue with the start sequence. Manually start the feeder from the screen (Auto page number 4001 Manual Page number 9001), press button - audible warning for 10secs. Option to shut down plant.

Fault	Cause	Actions	State Sequence
Hydraulic Oil Temperature High	If the oil temperature reaches hydraulic oil temperature High set point....? degrees C	Stop the feeder conveyor immediately. Intermittent bleeper will sound Display warning (Red screen Fault) Main hydraulic oil temperature warning, fault Number...log fault.	Shutting down, go to state 501. Set desired shut down time intervals....? State return to 200 Wait for next choice.
Engine speed	If engine speed drops below a Setpoint for a time period.	Stop the feeder conveyor immediately. Display alarm for shutting down feeder.	If speed recovers manually start the feeder from the screen (Auto page number Manual Page number. Press button audible warning for 10 second. 1 second pause feed conveyor re-starts.

7.1.2. Original Equipment Manufacturer (OEM) Trouble shooting

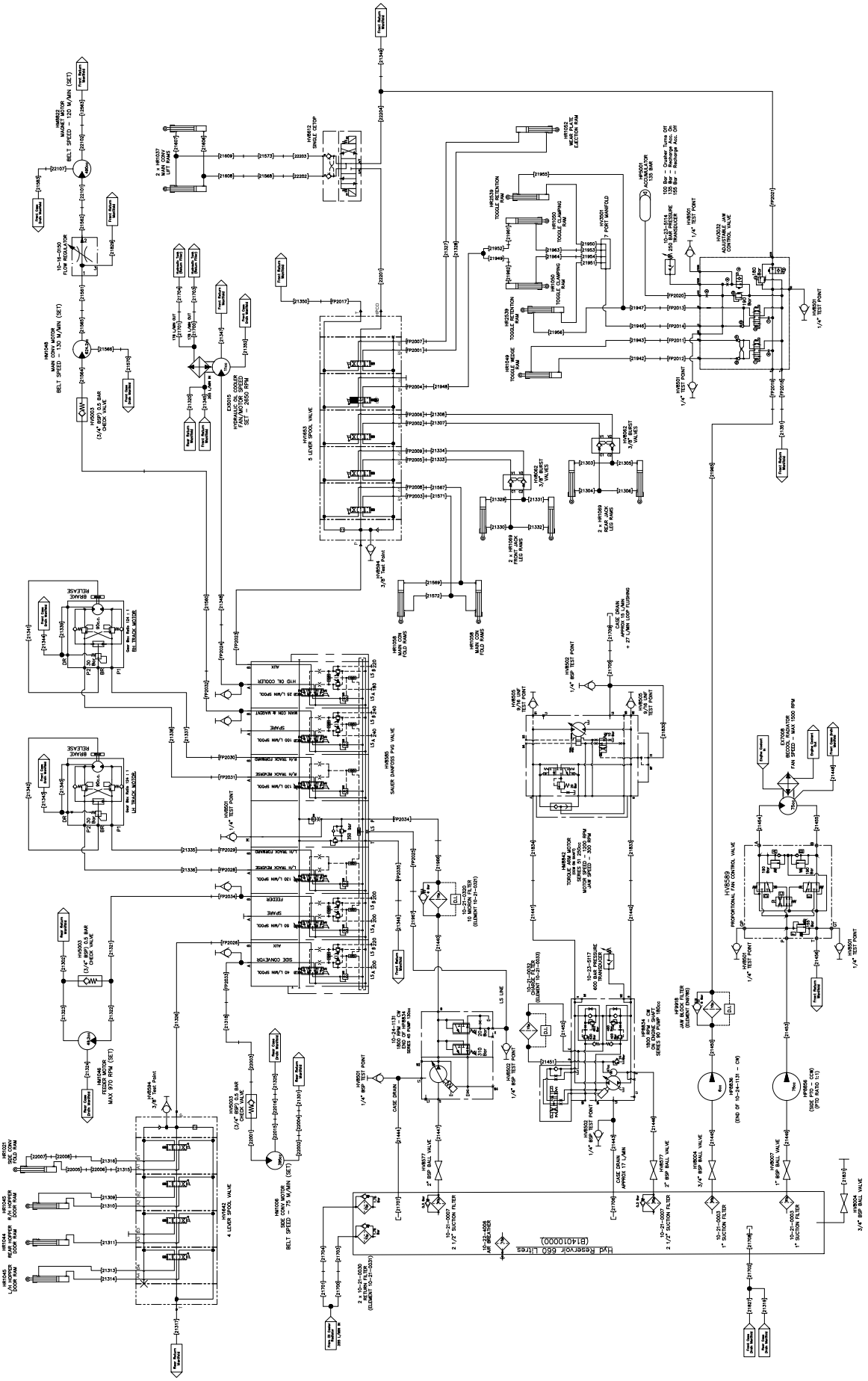
For information regarding OEM trouble shooting, refer to the relevant documentation listed in ***Information and Data Sheets, page 207***.

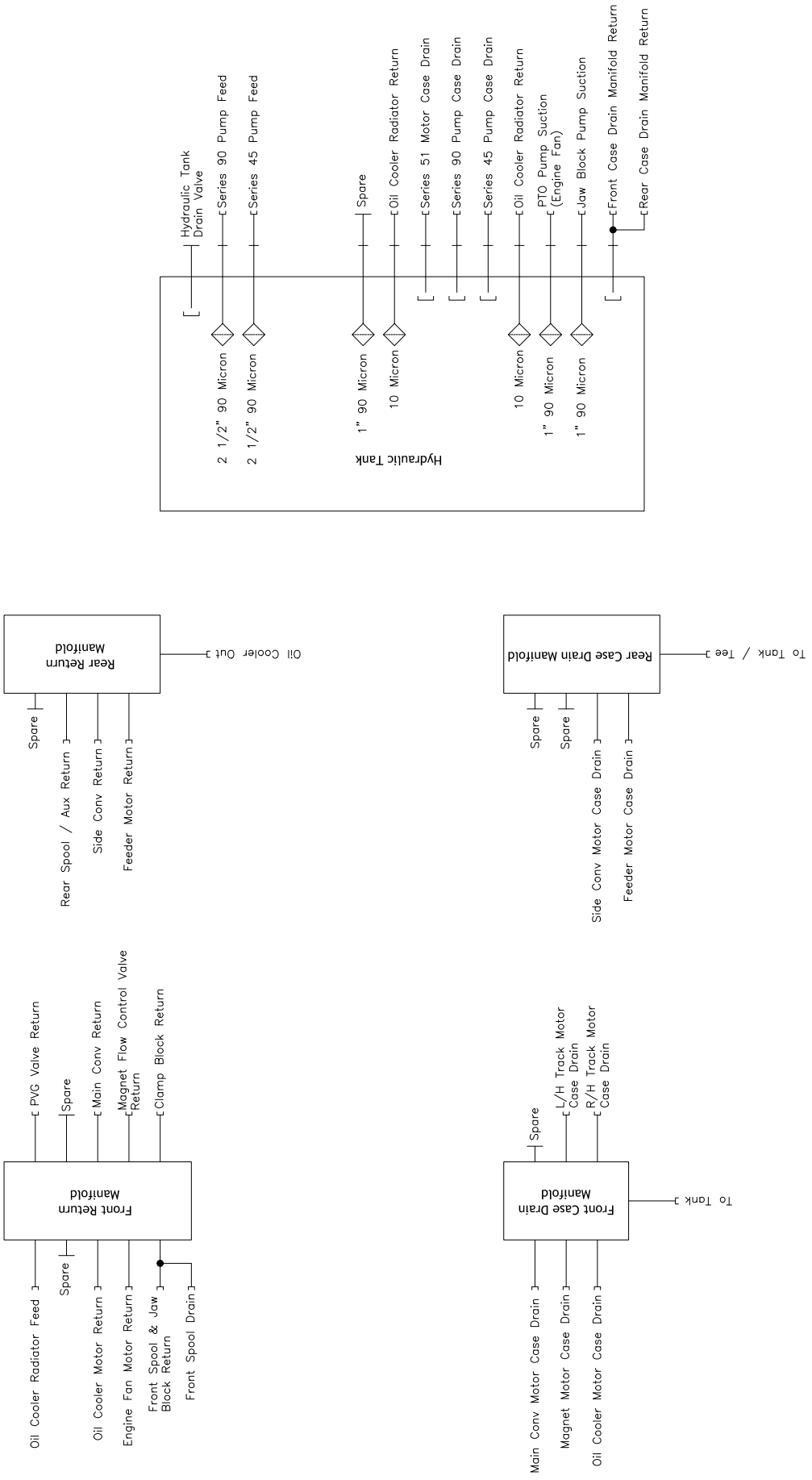
Electrical and Hydraulics

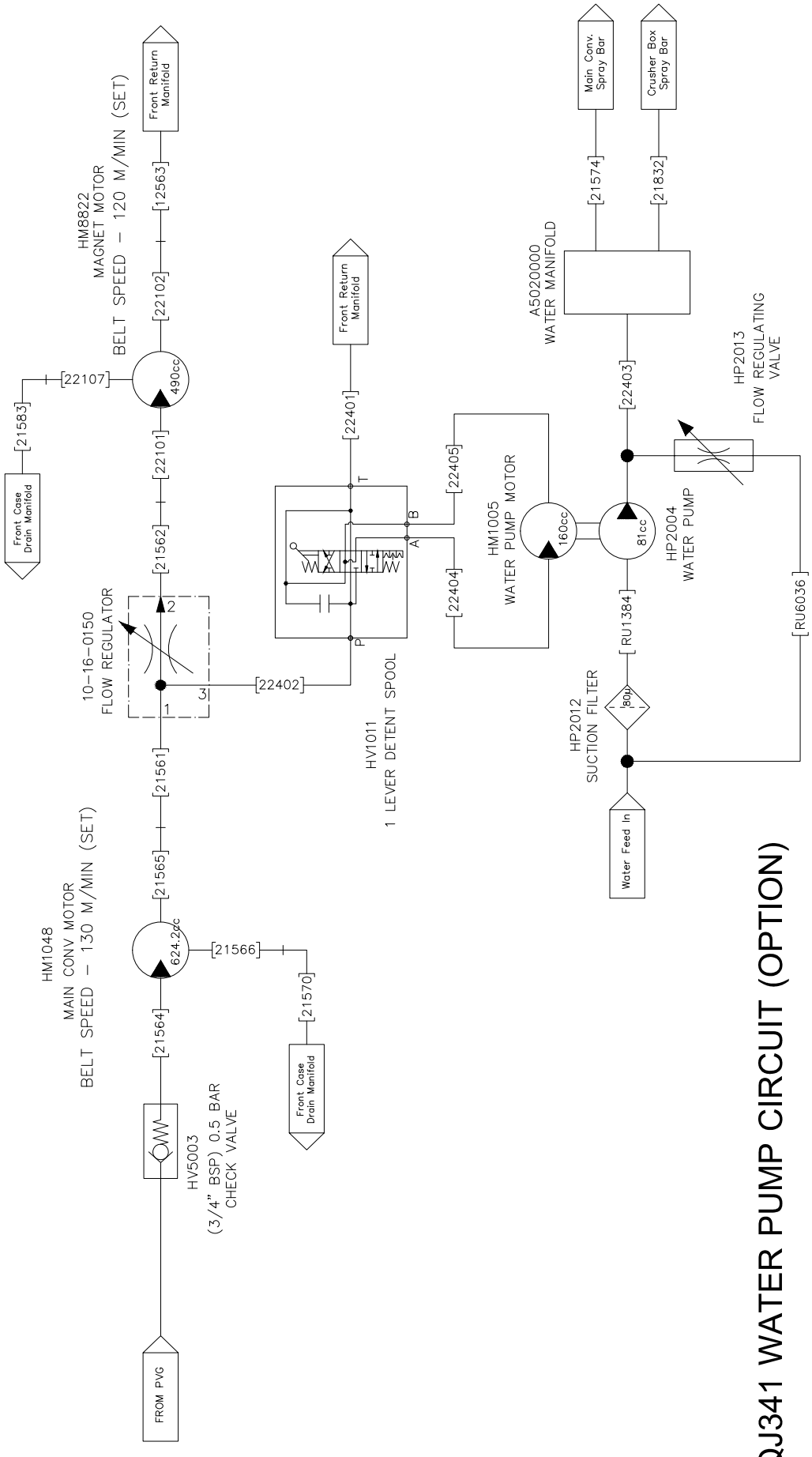
Ver : QJ341-en-01/07/2011

Electrical Schematics

Hydraulic Schematics







QJ341 WATER PUMP CIRCUIT (OPTION)

Information and Data Sheets

ID : QJ341-en-01/07/2011

1. Original Equipment Manufacturer Information

Note: ***Please ensure you read this section carefully. It contains information supplied by original equipment manufactures of components used in the machine, therefore Sandvik has reservations for misprints.***

- Eriez magnetic separator.
- Strickland tracks.
- Vogel pump.
- Engine (manual supplied separately).

2. Hazardous Substances

- Shell Agricultural gas oil.
- Shell antifreeze.
- Shell Albida EP2 grease.
- Shell Naturelle HF-E 46 hydraulic fluid.
- Shell Tellus 46 hydraulic oil.
- Shell Tellus 68 hydraulic oil.
- Shell Omala oil 220.
- Exol Athena EP 90 oil.
- Aeroshell 33 grease.
- Shell Rimula 10W-40.

3. Variations and Options (if applicable)

- Variations.
- Options.
- Optional extra equipment.