Operating and Maintenance Manual

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Introduction

This document has been prepared to ensure the equipment constructed by Extec Screens & Crushers Ltd is installed, put into use and operated efficiently and safely.

Read the manual carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or damage to the equipment.

It is recommended that this manual is thoroughly understood before operating the equipment.

Operation of the C-12^{+} Crusher contrary to the instructions contained in this manual or modification to the machine without prior agreement with Extec Screens & Crushers Ltd will invalidate any undertakings given by the manufacturer in regard to this machine.

Whilst every effort has been made to ensure the accuracy of information contained within this manual, Extec Screens & Crushers Ltd can assume no responsibility for any errors, omissions or their consequences. As operating conditions vary considerably, all performance data is indicative only for the C-12^{+} Crusher operated in accordance with the conditions set out in this manual.

Please contact Extec Screens & Crushers Ltd regarding any part of this manual that requires further clarification.

A copy of this manual must be kept at the operational site for easy reference.

Extec Screens & Crushers Ltd reserve the right to change the content of this manual without prior notice.

The information contained within this manual should be considered to be commercially confidential and should not be released to any third party without prior consent from Extec Screens & Crushers Ltd.

Certificate of Conformity

Supply of Machinery Safety Regulations - Machinery Directive 98/37/EC

Serial No:

Engine Serial No:

Production Manager:

Date of build:

Issued Declaration of Conformity on next page.

DECLARATION OF CONFORMITY

98/37/EC Machinery
89/336/EEC EMC

Name of manufacturer or supplier
Extec Screens and Crushers Ltd

Full postal address including country of origin
Hearthcote Road, Swadlincote, Derbyshire, England, DE11 9DU

Description of product
Crusher

Name, type or model, batch or serial number
C12+ Crusher
In built diesel
21804/D438

Extec Screens and Crushers Ltd
Swadlincote, Derbyshire, DE11 9DU

Standards used, including number, title, issue date and other relative documents
EN292-1, EN292-2, EN349, EN418, EN954-1, EN60204-1; EN55011, EN61000-4-2, EN61000-4-3, EN61000-4-6

Place of issue
Extec Screens and Crushers Ltd

Originating certification by
Laidler Associates, Belasis Business Centre, Coxwold way, Billingham, Teesside, TS23 4EA
Certificate number 21804/D438

Declaration
I declare that the above information in relation to the supply / manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of the above Directives and their amendments.

Signature Date

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Section 1 Safety Instructions

1.1 Notes

a. Read this manual and familiarise yourself with any associated documentation.

b. Ensure that a copy of this manual is available for any persons installing, using, maintaining or repairing this equipment.

c. Training should be provided to ensure safe working practices. Initial commissioning and starting must only be undertaken by a competent person who has read and fully understands the information provided in the manual pack.

d. To avoid the risk of electric shock always isolate this equipment from the supply prior to carrying out any maintenance adjustment or removing any guards or covers.

e. Always follow the procedures outlined in the operating and maintenance instruction.

f. If in doubt ask. Do not take personal risk.

g. This equipment is manufactured in accordance with the Machinery Directive 98/37/EC[1]. The customer should ensure that this equipment is in conformance with local and national legislation if used outside of the EU.

h. Only trained personal should be allowed to install, set, operate, maintain, and decommission this equipment.

1.2 Alarms and Warnings

a. All electrical control boxes are labelled. Ensure these labels remain in place.

b. Any residual risks are identified within this manual with the equipment marked where appropriate. Ensure these warnings are maintained.

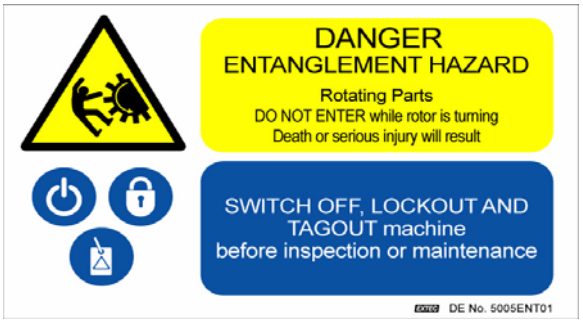
1. Directive 98/37/EC of 22.06.98 (OJ n° L 207 of 23.07.98, p.1)

1.3 Warnings marked on the machine

The following labels are posted on the machine for your safety. Please observe all warnings.

- You can be injured if you do not obey the safety instructions as indicated on warning stickers.
- Observe all safety instructions and warnings attached to the plant.
- Ensure that safety instructions and warnings attached to the plant are always complete and perfectly legible.
- Keep warning and instruction labels clean.
- Replace unreadable or missing labels with new ones before operating the plant. See “Stickers - English” on page 160 for part numbers.
- Make sure replacement parts include warning or instruction labels where necessary.

1.3.1 Personnel Safety Warnings




DANGER
ENTANGLEMENT HAZARD
Do not reach into unguarded machine you can be pulled in.
Risk of serious injury will result.
Keep all guards in place.
SWITCH OFF, LOCKOUT AND TAGOUT
machine before opening or removing guards
DE No. 5010ENT03


DANGER
IMPACT HAZARD
Do not allow spring loaded door to be opened unrestrained.
Risk of injury
DE No. 5013IMP


WARNING
LOCKOUT PROCEDURE
When carrying out maintenance or adjustment to the plant the following procedure must be followed.
1. Switch off engine
2. Remove the ignition key
3. Keep the ignition key on person during lockout
4. Place appropriate maintenance warning signs (ie. TAG OUT)
5. NEVER work alone
DE No. 5019LKOUT


IMPORTANT
STOP AND LOCKOUT PLANT BEFORE MAINTENANCE
DE No. 5022STLK


DANGER
STRONG MAGNETIC HAZARD
STAY CLEAR OF MAGNET
Strong magnetic field produced by magnet will have serious adverse effect on heart pacemakers, which could result in death.
DE No. 5003MAG


ATTENTION
Read and understand operator's manual and all safety signs before using or maintaining machine.
If you do not understand the information in the manuals consult your supervisor, the owner, or manufacturer.
DE No. 5021OPPS

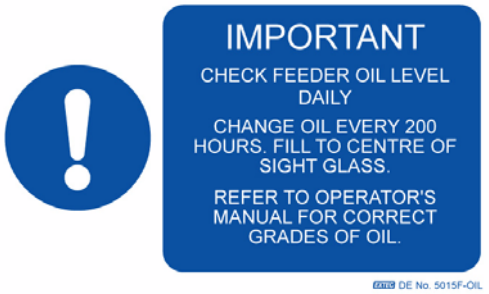

DANGER
SKIN INJECTION HAZARD
Use a piece of cardboard to check for hydraulic hose leaks.
DO NOT USE YOUR HAND
If fluid is injected under the skin seek medical help immediately
DE No. 5011INJ01

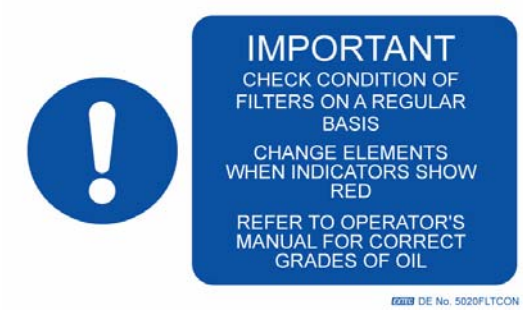

DANGER
CRUSHING HAZARD
Do not place hands or feet under jacking legs. Risk of serious injury.
KEEP HANDS AND FEET CLEAR before lowering or raising jacking legs.
DE No. 5008CR502

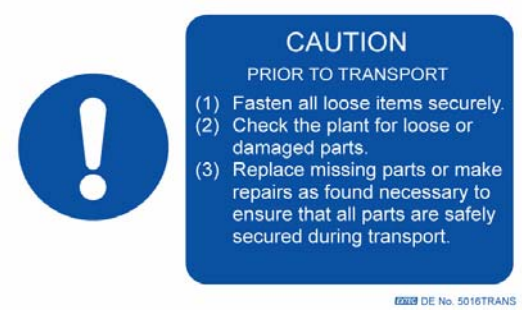

DANGER
FALLING HAZARD
Falling from and/or onto a machine can cause serious injury or even death.
DO NOT climb onto the machine whilst in operation.
ALWAYS use walkways/platforms provided or a safe and secure platform approved by the local regional safety enforcing authority.
ALWAYS use an E.N./A.N.S. approved safety harness when reaching any points 7ft (2m) or more above ground level.
DE No. 5004FH02


DANGER
ENTANGLEMENT HAZARD
In-running nip points can cause serious injury or death.
DO NOT reach into an unguarded machine. Your arm could be pulled in and amputated.
SWITCH OFF, LOCKOUT AND TAGOUT machine before opening or removing guards.
DE No. 5007ENT02

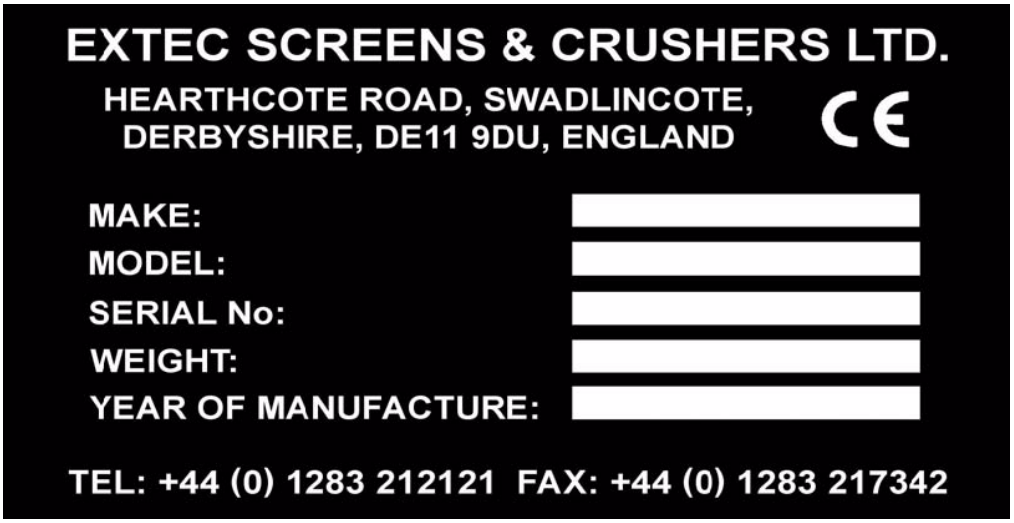
1.3.2 Machine Safety Warnings







1.3.3 Machine Legend Plate



1.4 Component Safety Features

a. Do not use this equipment with guards removed or incorrectly fastened.

b. Do not use this equipment with safety devices maladjusted or removed.

1.5 Features for Operator Safety

a. Safety features associated with this equipment have been assessed in accordance with BS EN 954-1 to Category 3.

b. The Emergency Stop circuit is a 24 V DC series circuit and hard wired to remove power from the ECU Engine management system and stop the engine. A residual hazard has been identified in as much as the hydraulic circuit incorporates an accumulator fitted to protect the system. When the Safety Circuit is activated this will takes approximately five seconds to de-energize.

c. The detailed Safety Circuit diagram can be found within the drawing pack as an appendix to this manual.

d. Safety Components - Emergency Stop Buttons, Ensure all Guards are bolted down.

e. Steps handrails, tread plates and fixed guards are provided where personnel are required to climb on the machine.

f. If for any reason other areas need to be accessed the risk associated with the activity must be assessed and appropriate control measures implemented.

1.6 Environmental Safety

It is essential that the service intervals detailed in the maintenance procedures are followed to ensure that engine emissions are kept to a minimum.

1.6.1 Consumable Materials

- Diesel spillages must be dealt with immediately.
- Only use the lubricating oils recommended in the maintenance schedule.
- Observe the COSHH information contained in the appendix to this manual.
- Local & National regulations must be observed when disposing of waste.
- Improperly disposing of waste can threaten the environment and ecology and is illegal.
- Potentially harmful waste used on this equipment includes such items as oil, fuel, coolant, filters and batteries, etc. Details can be found in the appendix to this manual.
- Use leak proof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.
- Do not pour waste onto the ground, down a drain or into any water source.
- Ensure that all consumables and replaced parts are disposed of safely and with minimum environmental impact.

1.6.2 Machine Disposal

- This machine must only be disposed of at a specialist machine breaker.

1.7 Personal Protective Equipment (PPE)

a. Loose or baggy clothing can get caught in running machinery.

b. Where possible when working close to engines or machinery, only do so when they are stopped. If this is not practical, remember to keep tools, test equipment and all other parts of your body well away from the moving parts.

c. For reasons of safety, long hair must be tied back or otherwise secured. Garments must be close fitting and no jewellery such as rings may be worn. Injury may result from being caught up in the machinery or from rings catching on moving parts.

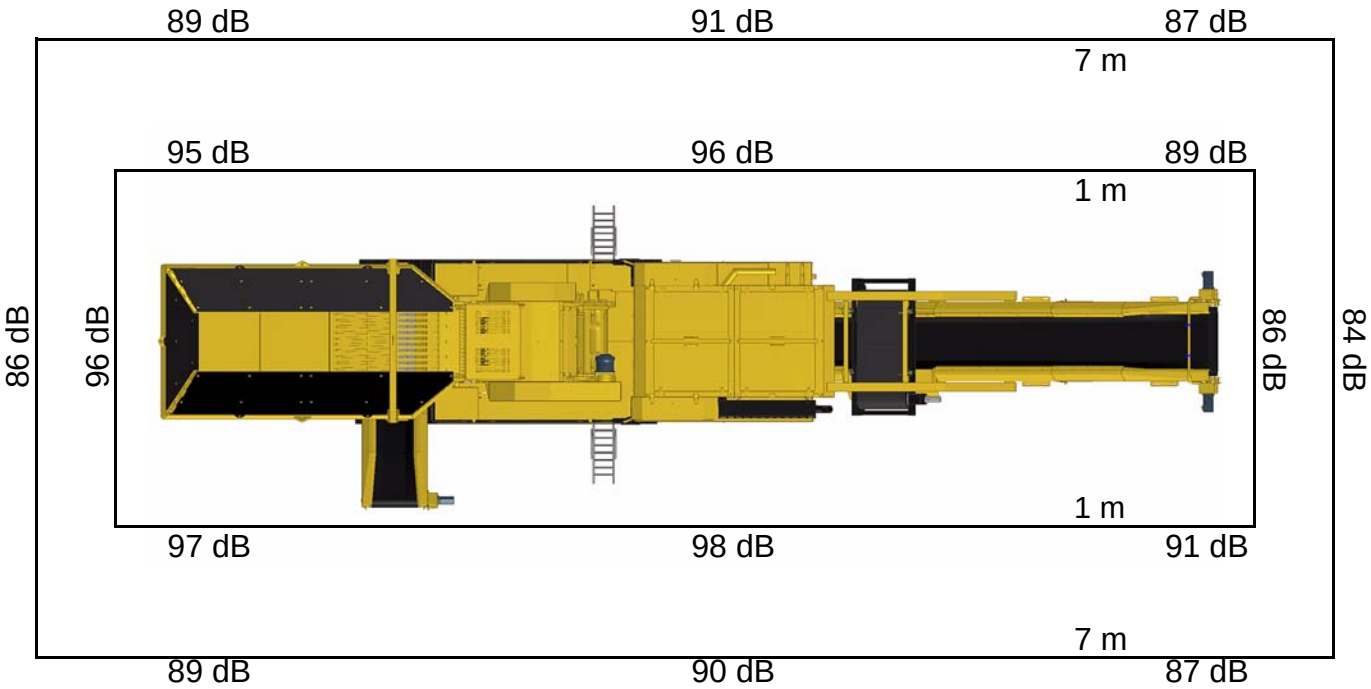
d. Always wear correctly fitting (CE approved) personal protective equipment.

Recommended Personal Protective Equipment includes:

- Hard Hat

- Safety Glasses/ Goggles
- Hearing Protection
- Dust Mask
- Close fitting Overalls
- Safety Boots
- Industrial Gloves
- High Visibility Vest or Jacket.

1.8 Measured Noise Level



1: Measured Noise Level

The above diagram indicates the measured noise levels at a measured distance. i.e. 7 m - 85 dB indicates that at 7 meters the sound measured was 85 decibels. The readings were measured using a Castle GA101/701 meter with a calibration date of 20/06/06 and with all systems running situated on the factory assembly line.

The product and local conditions will affect the noise levels.

Ear protection is compulsory within 10 meters of the machine when the engine and all other parts of the machine are running.

1.9 Vibration Levels

There are no circumstances where an operator needs to be on or touching this equipment when it is running.

1.10 Organisational Safety Measures

- Understand the service procedure before doing work. Keep area clean and dry.
- Never lubricate, clean, service or adjust machinery while it is moving. Keep hands, feet and clothing clear of power driven parts and in running nip-points. Disengage all power and operate controls to relieve pressure. Stop the engine. Implement lockout procedures. Allow the machinery to cool.
- Keep all parts in good condition. Ensure that all parts are properly installed. Fix damage immediately. Replace worn and broken parts. Remove any build up of grease, oil and debris.
- Disconnect battery ground cable before making adjustments on electrical systems or welding on plant.
- During maintenance only use the correct tool for the job.
- Never make any modifications, additions or conversions which might affect safety without the manufacturer's approval.
- In the event of safety relevant modifications or changes in the behaviour of the plant during operation, stop the plant and lock out immediately and report the malfunction to the competent authority/ person.

1.11 Personnel Qualification, Requirements and Responsibilities

a. Any work on and/ or with the plant must be executed by trained, reliable and authorised personnel only. Statutory minimum age limits must be observed.

b. Work on electrical system and equipment of the plant must be carried out only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.

c. Work on the hydraulic system must be carried out only by personnel with special knowledge and experience of hydraulic equipment.

1.12 Safety Advice Regarding Specific Operational Phases

1.12.1 Standard Operation

- Take the necessary precautions to ensure that the plant is used only when in a safe and reliable state.
- Operate the plant only for it's designed purpose and only if all guarding, protective and safety orientated devices, emergency shut-off equipment, sound proofing elements and exhausts, are in all place and fully functional.
- Ensure that any local barriers erected to stop unauthorized entry to this equipment are in place.
- Before starting the engine ensure it is safe to do so.

1.12.2 Blockage or Malfunction

In the event of material blockage, any malfunction or operational difficulty, stop the plant immediately and lockout. Have any defects rectified immediately.

1.12.3 Unguarded Areas

- In-running nip points on moving machinery can cause serious injury or even death.
- Do not reach into unguarded machinery. Your arm could be pulled in and amputated.
- Switch off and lockout the plant before removing any safety devices or guarding.
- Limit access to the machine and its surrounds by erecting barrier guards to reduce the risk of residual mechanical hazards, falling lifted loads and ejected materials.

1.13 Special Work

Such as Plant Maintenance and Repairs during Operation; Disposal of Parts and Consumables

Observe the adjusting, maintenance and intervals set out in these operating instructions, except where:

a. Warning, horn/ light/ gauge or indicator calls for immediate action.

b. Adverse conditions necessitate more frequent servicing.

c. Always read instructions supplied with replacement of parts and equipment. Ensure only properly trained personnel undertake these tasks.

1.13.1 Isolation

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

- Switch off the engine using the ignition key. Switch off at isolation point and remove the ignition key.
- Implement lockout procedures.
- Attaching a warning sign(s) to the plant in appropriate positions.

1.13.2 Maintenance Site Conditions

Prior to starting any maintenance work ensure the machine is positioned on stable and level ground and has been secured against inadvertent movement and buckling.

1.13.3 Replacement & Removal of Components

- Always observe handling instructions itemised in this manual, the Original Equipment Manufacturer's manuals or the spare parts suppliers' instructions.
- Never allow untrained staff to attempt to remove or replace any part of the plant.
- The removal of large or heavy components without adequate lifting equipment is prohibited.
- To avoid the risk of accidents, individual parts and large assemblies being moved for replacement purposes should be carefully attached to lifting tackle and secured. Use only suitable and technically adequate lifting gear supplied or approved by Extec Screens & Crushers Ltd.
- 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 due to the loading and removal of material.
- Limit access to the machine and its surrounds by erecting barrier guards to reduce the risk of residual mechanical hazards, falling lifted loads and ejected materials.

1.13.4 Climbing, Falling

- Falling from and/ or onto this plant could cause injury or even death.
- Never climb on the plant whilst it is in operation.
- Never use plant parts as a climbing aid.
- Always keep the area around the plant clear of debris and trip hazards.
- Beware of moving haulage and loading equipment in the vicinity of the plant.
- For carrying out overhead assembly work always use specially designed or otherwise safety-oriented ladders and working platforms.

- Only use any walkway/ platforms provided on the machine or on an approved safe and secure platform.
- Only use CE certified safety harness when reaching any points 2 m or more above the ground level.
- Keep all handles, steps, handrails, platforms, landing and ladders free from dirt, oil, snow and ice.

1.13.5 Safety Consideration during Advanced Maintenance

Prior to undertaking all but normal planned maintenance activities it is essential that a method statement regarding safe working practices for the job in hand is produced.

- Restrict access to the maintenance to essential staff only. Where appropriate erect barrier guards and post warnings.
- The fastening of loads and instructing of crane operators should be entrusted to qualified persons only.
- The marshal providing instructions must be within sight or sound of the operator with an all round view of the operation.
- Always ensure that any safety fitment such as locking wedges, securing chains, bars or struts are utilised as indicated in these operating instructions.
- Particularly make sure that any part of the plant raised for any reason is prevented from falling by securing in a safe reliable manner.
- Never work under unsupported equipment.
- Never work alone.

1.13.6 Safety Considerations during Cleaning

- This equipment must be isolated prior to cleaning.
- Do not direct power washers near or into control boxes and devices.
- After cleaning, examine all fuel, lubricant, and hydraulic fluid lines for leaks, loose connections, chafe marks and damage. Any defects found must be rectified without delay.

1.13.7 Removal of Safety Devices and Guards

- All safety devices (control devices or guards) temporarily removed for set-up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work prior to operation.
- Never operate the machine with safety devices or guards removed or unsecured.

- Always report any defects regarding guards, safety devices or control devices.

1.13.8 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.
- Any temporary structures erected around the machine must be removed prior to operating this equipment.

1.13.9 Safety when Refuelling

- Only refuel with diesel from approved storage and supply equipment.
- Diesel fuel is flammable.
- Never remove the filler cap, or refuel with the engine running.
- Never add gasoline or any other fuels mixed to diesel because of increased fire or explosion risks and damage to the engine.
- Do not carry out maintenance on the fuel system near naked lights or sources of sparks, such as welding equipment or whilst smoking.
- To avoid spillages use drip trays.
- Immediately clear up spilt fuel and dispose of correctly to minimise any environmental impact.

1.14 Specific Hazards

1.14.1 Electrical Energy

External Considerations and Hazards

When working with the plant, maintain a safe distance from overhead electric lines. If overhead cables are in the vicinity a risk assessment must be completed prior to operating this equipment.

If your plant comes into contact with a live wire;

- Vacate the area,
- Warn others against approaching and touching the plant,
- Report the incident and have the live wire de-energized.

Machine - Electrical

Work on the electrical system or equipment may only be carried out by a skilled and qualified electrician or by specially instructed personnel under the control and supervision of such an electrician and in accordance with applicable electrical engineering rules.

The power supply to the plants, on which inspection, maintenance and repair work is to be carried out must be isolated before starting any work. Check the de-energised parts for presence of power and ground or short circuit them in addition to insulating adjacent live parts and elements.

The electrical equipment of the plant is to be inspected and checked at regular intervals. Defects such as loose connections or scorched or otherwise damaged cables must be rectified immediately.

Use only original fuses with the specified current rating. Switch off the plant immediately if trouble occurs in the electrical system.

This plant is wired on a negative earth. Always observe correct polarity.

Battery

- Always disconnect 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.
- Avoid contact with the skin, eyes or clothing.
- No smoking when maintaining the battery.
- Wear appropriate PPE.

1.14.2 Gas, Dust, Steam, Smoke and Noise

Always operate internal combustion engines out of doors or in a well ventilated area.

If plant is operated for maintenance purposes in an enclosed area, ensure that there is sufficient ventilation or provide forced ventilation.

Observe the regulations in force at the respective site.

Dust found on the plant or produced during work on the plant must not be removed by blowing with compressed air.

Dust waste must only be handled by authorised persons dampened, placed in a sealed container and marked to ensure safe disposal.

1.14.3 Welding or Naked Flames

Welding, flame cutting and grinding work on the plant must only be carried out if this has been expressly authorised, as there may be a risk of explosion and fire.

Before carrying out welding, flame cutting and grinding operations, clean the plant and its surroundings from dust and other inflammable substances and make sure the premises are adequately ventilated (as there may be a risk of explosion). The battery must be isolated.

Avoid all naked flames in the vicinity of this equipment.

1.14.4 Hydraulic Equipment

Work on hydraulic equipment must be carried out by persons having special knowledge and experience of hydraulic systems.

Check all lines, hoses and screwed connections regularly for leaks and obvious damage. Repair damage immediately. Splashed oil may cause injury and fire.

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

Depressurise all system sections and pressure pipes (hydraulic system, compressed air system) to be removed in accordance with the specific instructions for the unit concerned before carrying out any repair work.

Hydraulic and compressed air lines must be laid and fitted properly. Ensure that 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.

Hydraulic fluid under pressure can penetrate the skin causing serious injury.

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.

1.14.5 Hazardous Substances

Ensure that correct procedures are formulated to safely handle hazardous materials by correct identification, labelling, storage, use and disposal, all strictly in accordance with the manufacturer’s instructions and that all applicable regulations are observed at all times.

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

Section 2 Transportation

2.1 Transport

This machine must only be transported between sites on a suitable low loader or by utilising the optional bogie/ fifth wheel where available.

The machine must be tracked onto and off the trailer. See “Tracking Procedure” on page 34

Note: This equipment must never be tracked on gradients that are more than: 10 degrees Port to Starboard or 20 degrees Front to Back. The machine must always be on flat, solid ground when operating in its normal mode.

A bogie and fifth wheel is available as an optional extra. The fifth wheel fits at the rear (feeder hopper door) end of the machine and attaches directly to the back of a tractor. The bogie fits at the front of the machine underneath the main conveyor. This is installed by lowering all four jack legs to lift the machine off the ground allowing the bogie to be rolled into position. When in position the machine is lowered until all four brackets align and locks the bogie into position. If this option is chosen full instructions may be found in the applicable section.

2.2 Loading

Ensure the loading/ unloading site is clear of non essential personnel. Barrier the area and post warning signs where site conditions warrant this.

Loading/ unloading must only be carried out on firm flat ground.

The operator must be fully trained in the operation of this equipment.

When tracking, the operator must be in a position to have an all round view of the operation. A banks man or marshal should assist where this is not possible.

The total weight of this machine is 46.38 tonnes.

2.3 Machine Transportation Dimension

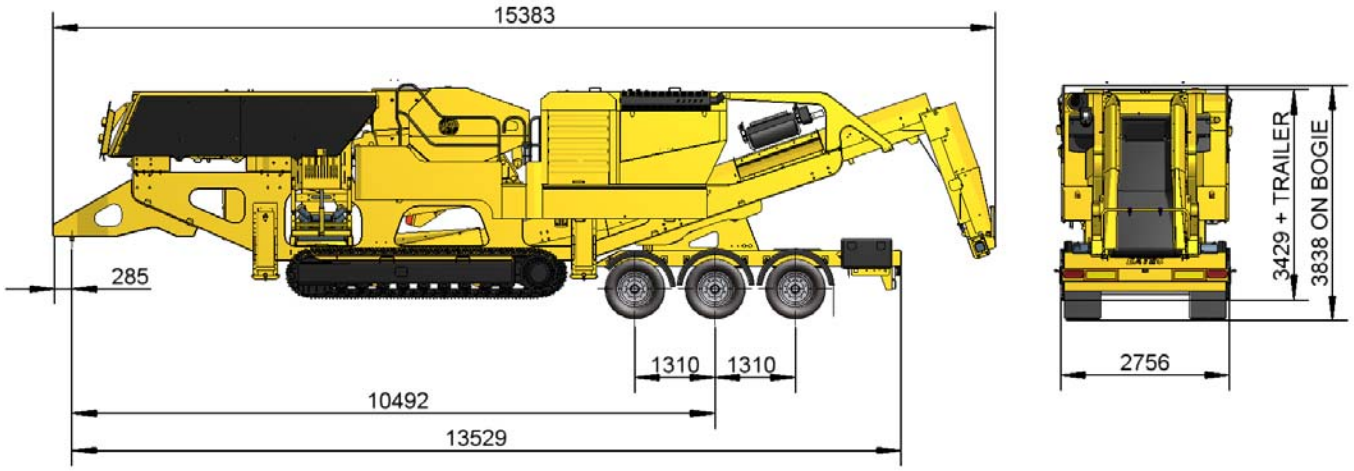


Figure 2-1: C-12+ Crusher Transport Dimensions

Ensure that Hopper Doors, Inlet Chute Cover, Spray bar, the Main and Side Conveyors are all Folded Prior to Transportation.

Before transporting this machinery all measurements of the machine should be checked to ensure they are within the legal transport dimensions.

Section 3 Description and Technical Information

3.1 Application & Limitations

The C-12+ Crusher has been designed and constructed to reduce minerals such as stone and concrete including steel reinforced concrete to a predetermined size. The C-12+ Crusher must not be used for any other purpose without first contacting Extec Screens & Crushers Ltd technical department.

The C-12+ Crusher must not be operated until the instructions supplied with the machine are read and fully understood.

3.2 Description

The C-12+ Crusher is a self contained tracked machine built to withstand the rigours and conditions of operating in quarries and within the construction industry.

The C-12+ Crusher 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 the Machinery Directive 98/37/EC.

3.3 Operation Description

Section 3 and 4 of this manual provides details of Transport, Commissioning and Operation. This must be read and fully understood before operating this equipment.

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 where it is transferred either to the main conveyor or directed onto the side 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 reinforcing bar mixed in with the material will be removed.

The material continues along the main conveyor where it is unloaded to a pile or to waiting transport.

3.4 Key Features of the C-12+ Crusher

- Diesel hydraulic power via Caterpillar C-9 Industrial C 350 bhp 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.
- Uniquely small closed size setting.
- 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 instantly reversed to clear any blockage.
- High crushing speed.
- Over band magnet ensures the removal of reinforcing bar when concrete is crushed.
- Spray mounted dust suppression.
- Access 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.

3.5 Common Applications

- Granite
- Slate
- Bricks
- Limestone
- Rebar
- Recycling/ Demolition
- Asphalt

This list is by no means exhaustive. Please contact Extec Screens & Crushers Ltd for further details of performance figures and advice on your material.

3.6 Machine Layout Indicating Main Components

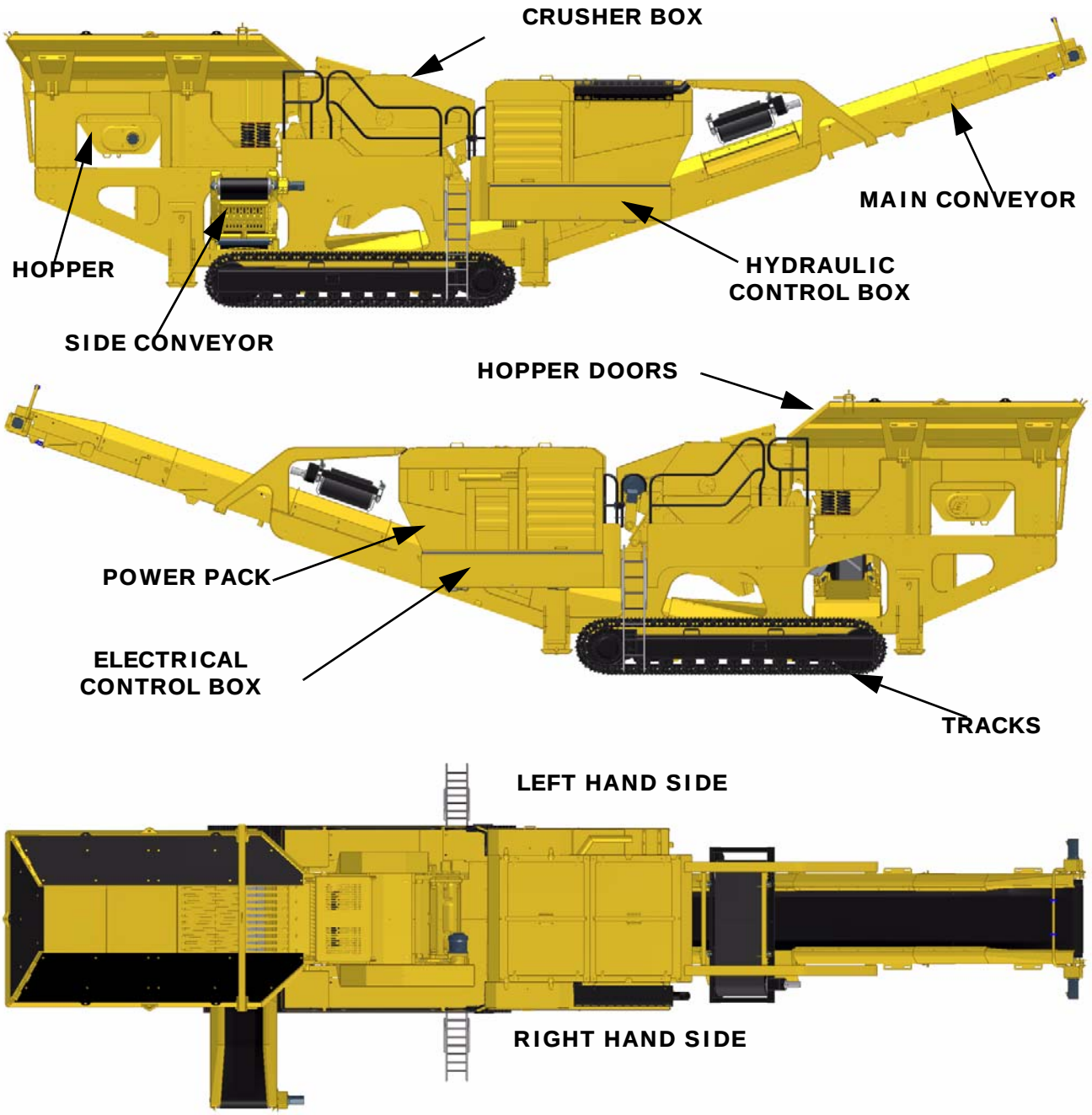


Figure 3-1: Main Components

3.7 Machine Layout Indicating Emergency Stop Positions

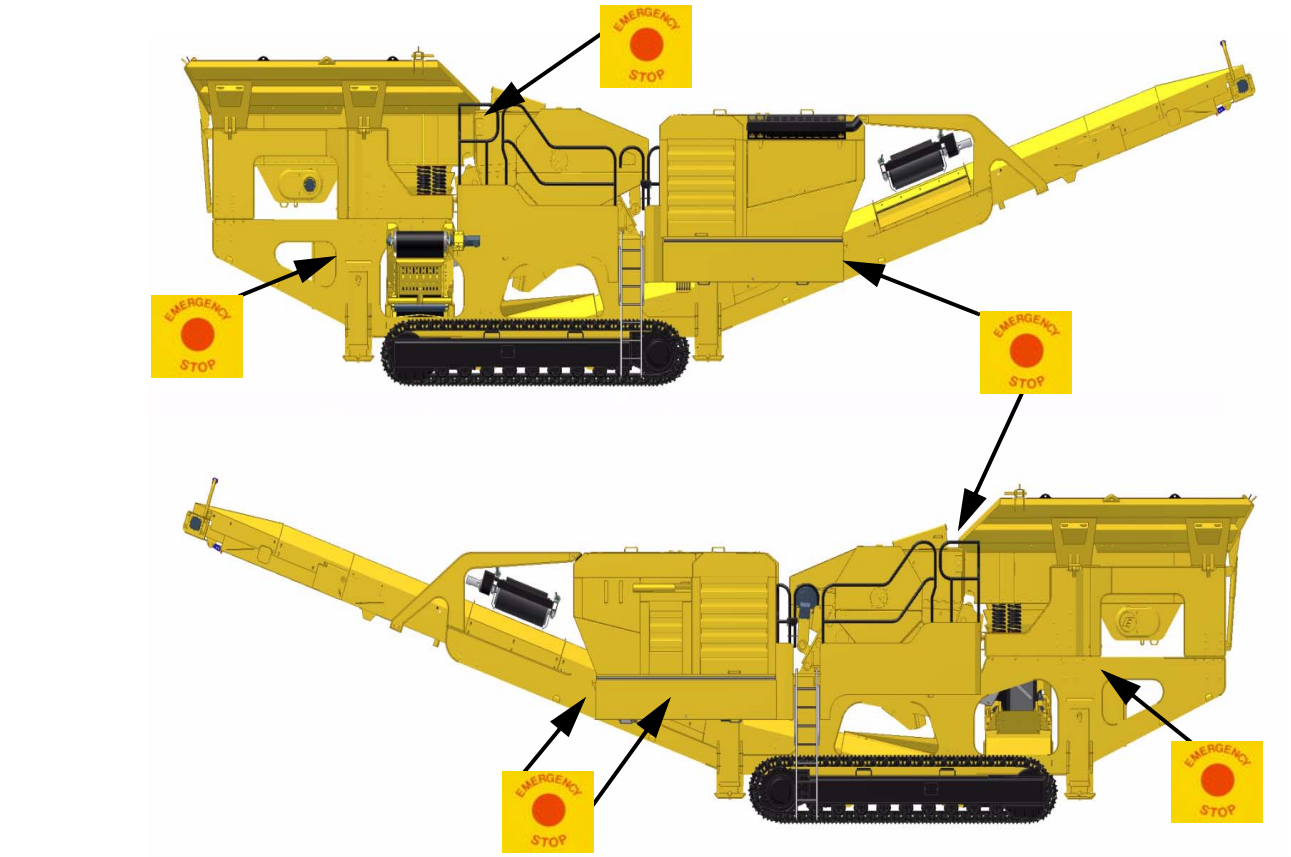


Figure 3-2: Emergency Stop Positions

3.8 Data

Crusher

Feed Opening	1200 x 750 mm
Crusher Speed	300 rpm
Drive	Hydraulic

Feeder

Hopper Width	2751 mm
Feeder Width	1100 mm
Feeder Length	4000 mm
Hopper Capacity	5.3 cubic meters

Conveyors

Side Conveyor	650 x 3100 mm
Extended Side Conveyor	650 x 5100
Main Conveyor	1000 x 12000 mm
Main Conveyor Speed	123 rpm

Dimensions

Transport Length	14646 mm
Transport Length (Bogie)	15098 mm
Transport Width	2756 mm
Transport Height	3429 mm
Transport Height (Bogie)	3838 mm
Working Length	15750 mm
Working Width	4108 mm
Working Height	4063 mm
	4068 mm (Minimum without jacking legs down)
	4387 mm (Maximum with jacking legs fully down)
Weight	48.86 tonnes

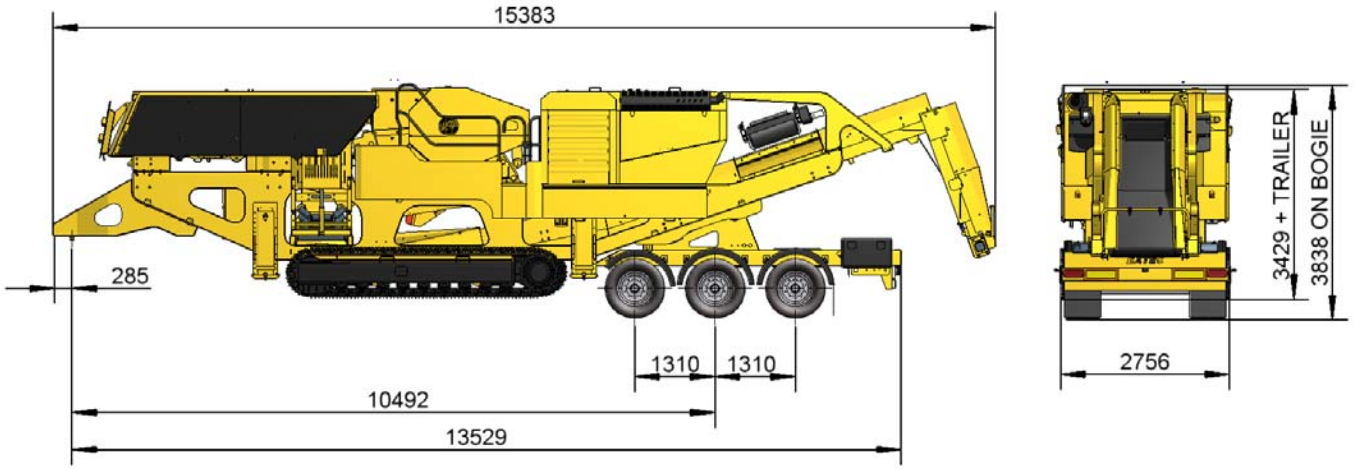
Engine Details

Engine	Caterpillar C-9 Industrial C 350 bhp
Engine Maximum Power	261 kW (350bhp) @ 1900 rpm
Fuel Tank Capacity	420 litres
Hydraulic Tank Capacity	1400 litres

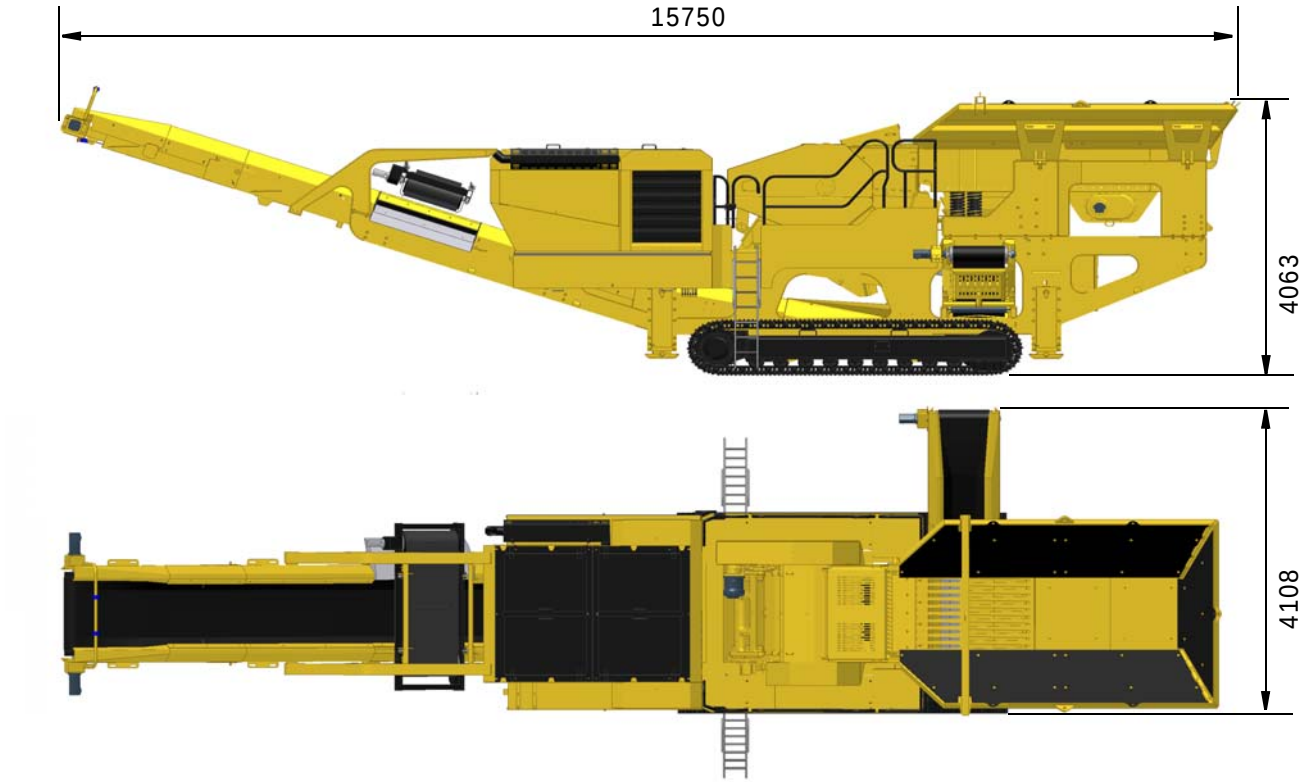
Fuel Consumption Guide

100% Full load, continuous	67.8 litres/ hour
70% load	47.4 litres/ hour

3.9 Machine Dimensions



1: C-12+ Crusher Transport Dimensions



2: C-12+ Crusher Working Dimensions

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Section 4 Commissioning and Operation

4.1 Pre-Start Instructions

Before starting this machine it is important that the instructions below are followed:

1. Ensure that this manual is read and understood.
2. Do not attempt to start this machine until you are aware of all aspects of its operation.
3. Remove any temporary sealing and transport straps.
4. Check that the machine is in good mechanical condition and that there is no component damage or loss.
5. Ensure that all bolts and fixings are tight and that all guards are in place with all safety devices operating correctly. Never start this equipment without guards and safety devices operating correctly.
6. Ensure that crusher chamber, feeder and conveyor belts are free of material.
7. Remove all tools and equipment from the operational area.
8. Ensure all personnel are well clear of the machine, drives, tracks and auxiliary equipment.
9. Ensure that the pre-start checks outlined in the engine manufacturer's instruction manual are complied with.
10. Check the oil levels in the engine and vibrating feeder.
11. Check that all drums and rollers turn freely. This must be done by hand. (Never attempt to touch the drums or rollers whilst the machine is running.)
12. Ensure that the skirting rubbers and scrapers are in good condition and working properly.

13. The machine is transported with the inlet chute top cover in the open position. Rotate the cover into the position shown and attach the chains.

Figure 4-1: Inlet chute positions

4.2 Main Control Devices

4.2.1 Electrical Control Box

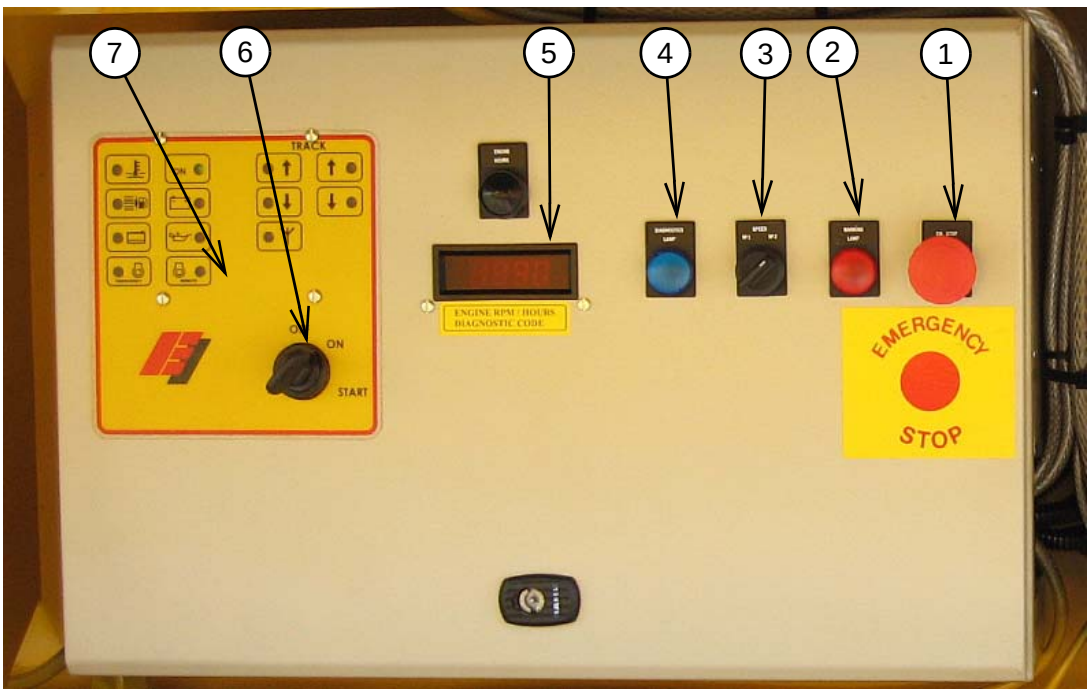


Figure 4-2: Electrical Control Box

1. Emergency Stop
2. Warning Lamp
3. Engine Speed Control
4. Diagnostic Lamp

5. Engine rpm Meter
6. Ignition Key (ON/OFF)
7. Engine Warning Lights

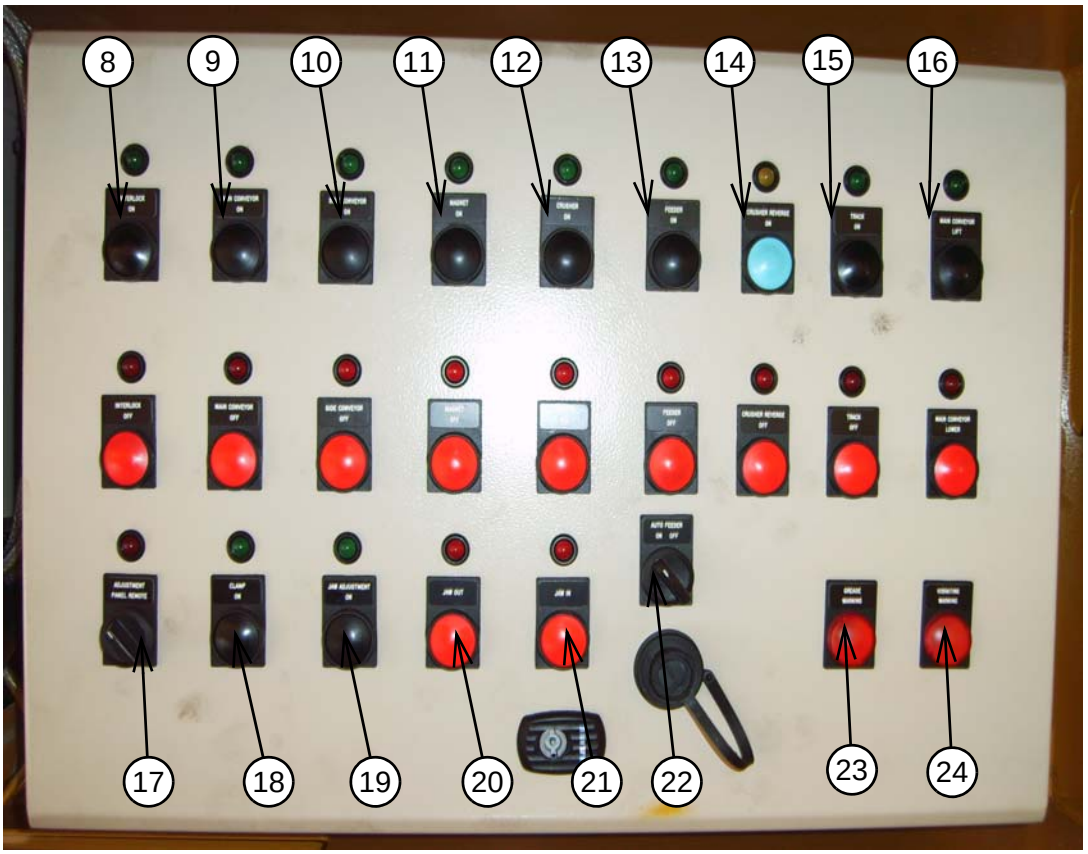


Figure 4-3: Electrical Control Box

8. Interlock (ON/OFF)
9. Main Conveyor (ON/OFF)
10. Side Conveyor (ON/OFF)
11. Magnet (ON/OFF)
12. Crusher (ON/OFF)
13. Feeder (ON/OFF)
14. Crusher Reverse (ON/OFF)
15. Tracks (ON/OFF)
16. Main Conveyor (LIFT/LOWER)
17. Adjustment Panel Remote
18. Clamp ON
19. Jaw Adjustment ON

20. Jaw OUT
21. Jaw IN
22. Auto Feeder (ON/OFF)
23. Vogel Grease Warning (See “Vogel Pump Unit” on page 56.)
24. Vibration Fault Warning

4.2.2 Remote Control

1: Remote Control

4.3 Starting Procedure

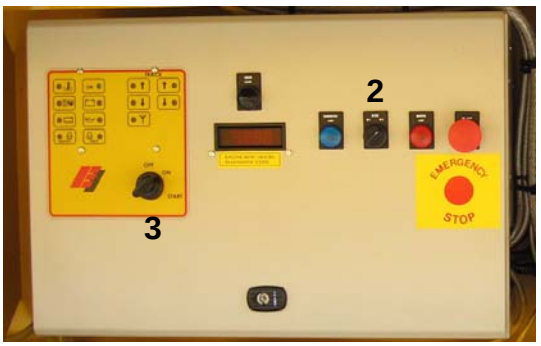


Figure 4-4: Starting procedure

1. Turn on at main isolation switch (1) positioned in the hydraulic control box next to the battery.
2. Set the speed control (2) to the No.1 position.
3. Turn the key (3) clockwise to the “ON” position. All lights will flash for several seconds.
4. Turn the key to the 'Start' position and hold until the engine starts.

5. Release key. Key will return to “ON” position.
6. Engine is now running at idling speed.

COLD START: When starting the machine in temperatures of 0°C or below, run all systems at engine speed No.1 for 15 minutes to allow the hydraulic oil to reach working temperature. ***DO NOT*** feed material into machine during this time. When this is done stop all systems, turn engine speed switch to No.2 and restart all systems. ***DO NOT*** turn engine speed switch from position 1 to 2 while any systems are running. ***DO NOT*** operate systems contrary to these instructions.

Note: The machine ***MUST*** be level in both longitudinal and traverse planes and set up on firm level ground before being operated. Failure to comply with this or any other instructions in this manual may cause damage to the machine and may invalidate any warranty.

4.4 Stopping the Machine

To stop the machine, it is ***ESSENTIAL*** that the following steps be followed in order to prevent damage to the machine:

1. Stop feeding material into hopper.
2. Wait for all material to fully discharge from feeder, crusher chamber and conveyor belts.
3. Shut down systems in following order using the “stop” buttons in electrical control box:
   a. Feeder
   b. Crusher
   c. Main conveyor
   d. Magnet
   e. Side conveyor
4. Wait for each system to come to a complete stop.
5. Turn engine speed switch to position No.1 and allow engine to idle briefly.
6. Stop engine by turning ignition key to 'OFF' position.

4.5 Stopping Machine in an Emergency

THE MACHINE CAN BE STOPPED IN AN EMERGENCY BY PRESSING THE EMERGENCY STOP BUTTONS LOCATED ON THE ELECTRICAL CONTROL PANEL

AND ALONG EACH SIDE OF THE MACHINE OR BY TURNING THE IGNITION KEY OR ISOLATION SWITCH DIRECTLY TO 'OFF' POSITION.

ENSURE THAT ALL PERSONNEL IN THE VICINITY OF THE MACHINE ARE FULLY AWARE OF THE LOCATION OF THE EMERGENCY STOPS.

4.5.1 Emergency Stop Locations

1: Emergency stop and ignition switch in control box

2: Emergency stop on L/H & R/H jacking legs

3: Emergency stop on L/H side of crusher box

4: Emergency stop on hydraulic box

5: Emergency stop on control box

6: Emergency stop on R/H side of crusher box

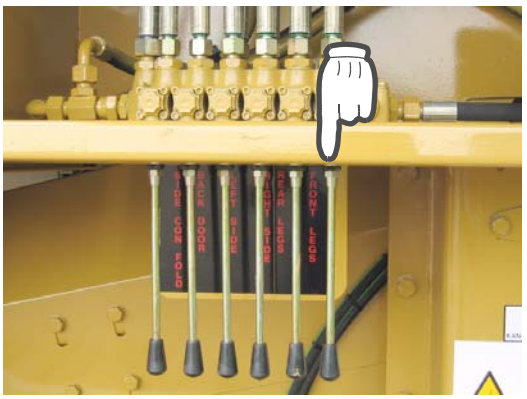
Note: ***Emergency Stop*** switches should only be used in an emergency situation and not for normal stopping. Frequent use will cause damage to the hydraulic components.

Note: ***Emergency Stop*** switches must be reset before the machine can be restarted.

4.6 Removing Tractor Unit and Bogie - (Where fitted)

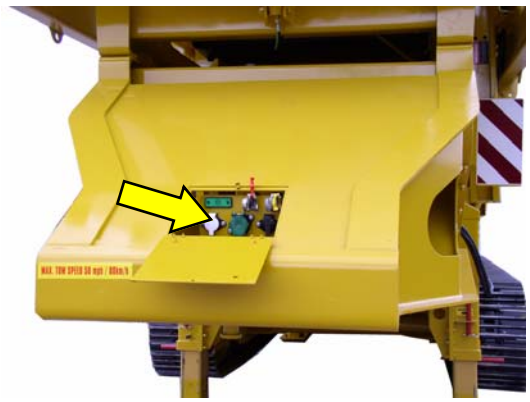
1: Remove jacking leg retention screws.

Note: Before attempting to lower the jacking legs ALL of the leg transportation retaining screws MUST be removed.



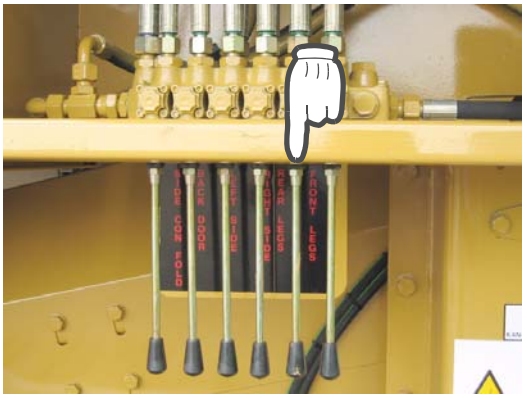
2: Front jacking legs lever.

3: Lower front jacking legs to raise fifth wheel neck by approximately 100 mm.



4: Remove tractor unit air brakes & lighting connections then unhitch from machine.

5: Unlock bogie from machine (4 positions).

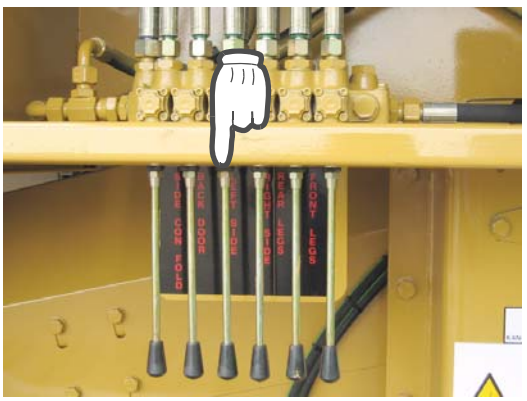


6: Rear jacking legs lever.

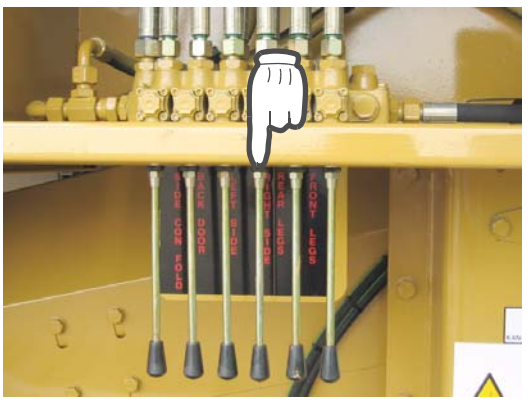
7: Lower rear jacking legs to raise machine clear of the bogie locking mechanism.

8: Remove bogie air brakes & lighting connections then tow away from machine.

9: Retract both front and rear jacking legs so that weight of machine is taken on tracks.



10: Raise left hand hopper side.



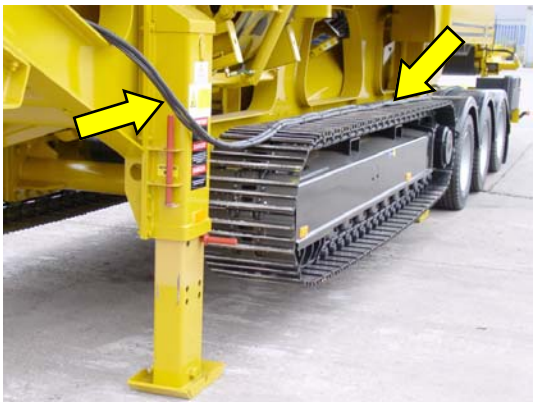
11: Raise right hand hopper side.

12: Hopper side door being raised.

13: Raise hopper back door.

14: Hopper back door being raised.

15: Hopper sides fully raised.



16: Remove connection panel & umbilical cord completely from machine.

Fitting the bogie and attaching the tractor for transportation is a reversed procedure to that describe above.

IMPORTANT: Before transporting with the bogie fitted ensure that the jacking legs are fully retracted and the leg transportation retaining screw have been refitted and tightened to prevent the legs from dropping.

4.7 Tracking Procedure

The operator must be fully trained in the operation of this equipment. When tracking, the operator must be in a position to have an all round view of the operation. A banks man or marshal should assist where this is not possible.
Ensure the site is clear of non essential personnel. Erect barriers around the area and post warning signs where site conditions warrant this.
Loading/ unloading must only be carried out on firm flat ground.

Note: This equipment must never be tracked on gradients that are more than: 10 degrees Port to Starboard or 20 degrees Front to Back. The machine must always be on flat, solid ground when operating in its normal mode.

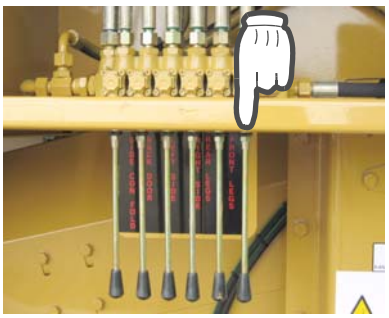
When engine is running at speed No.1, the machine can be moved to desired position on site by following the procedures in the order listed below:

1: Press button CLAMP ON.

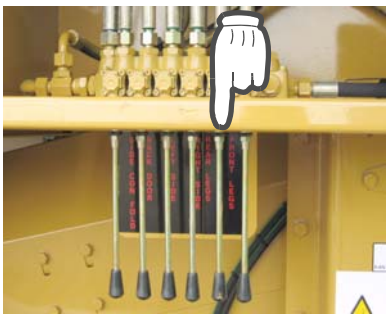
2: Press button INTERLOCK ON.

3: Press button MAIN CONVEYOR LIFT.

4: Main conveyor in raised position



5: Activate levers to raise front jacking legs.



6: Activate levers to raise rear jacking legs.

7: Jacking legs fully raised

8: Press button TRACKS ON.

After following instructions on the previous page, use either the Remote Handset or Hard Wire Drive to move machine to desired position.

Note: The Remote Handset will be supplied as either yellow or white (not both) and must be fully recharged at regular intervals. Use the correct instructions for your type of controller.

1: Yellow Remote Handset

2: White Remote Handset

3: Plug in Hard Wire Umbilical Socket

4: Hard Wire Handset

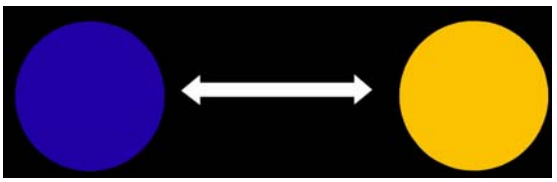
WARNING: Under NO circumstances try to move the machine when engine speed is set at position No.2 or when ANY personnel are standing on the machine.

For safety reasons, it is essential to check all around machine for obstacles or personnel which may be endangered by moving the machine.

When moving machine, ensure that it is only moved over firm ground suitable for carrying the weight of the machine. Prior to operating the machine, it is *ESSENTIAL* that both tracks are in contact with firm level ground to avoid excessive vibration or rocking of the machine. *DO NOT MOVE THE MACHINE ACROSS EXCESSIVELY SLOPING GROUND.*

NOTE:

1. When operating the White Remote Handset, the yellow buttons are for forward movement and the blue ones for reverse. (These correspond to direction indicator stickers on the machine.)
2. 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.)



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When the machine is moved to its desired operating position, prepare the crusher for operation by following the procedures laid out in the following pages.

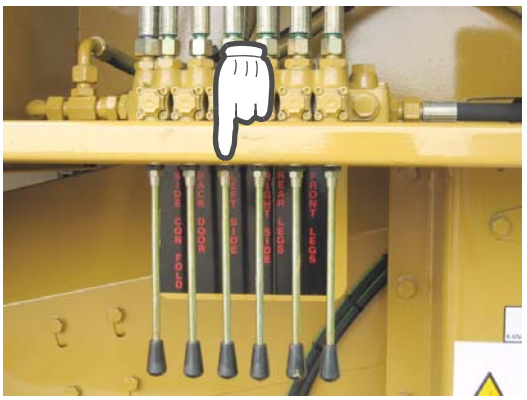
4.8 Preparing the Crusher for Operation

1: Press button CLAMP ON.

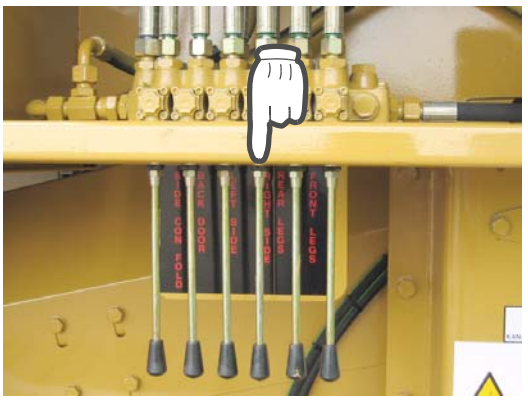
2: Press button INTERLOCK ON.

3: Press button MAIN CONVEYOR LOWER.

4: Main conveyor in working position

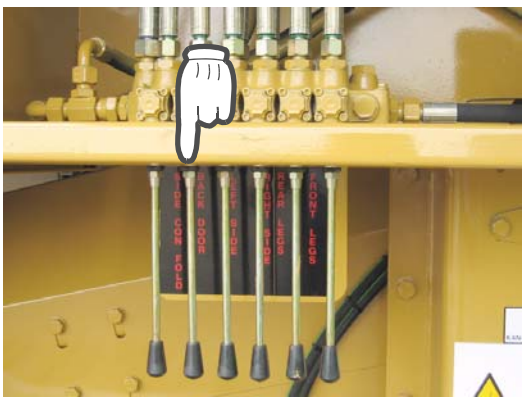


5: Raise left hand hopper side.



6: Raise right hand hopper side.

7: Hopper side door being raised.



8: Raise hopper back door.

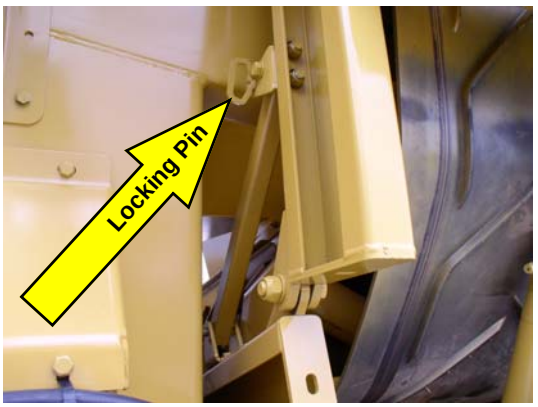
9: Hopper back door being raised.

10: Hopper sides fully raised.

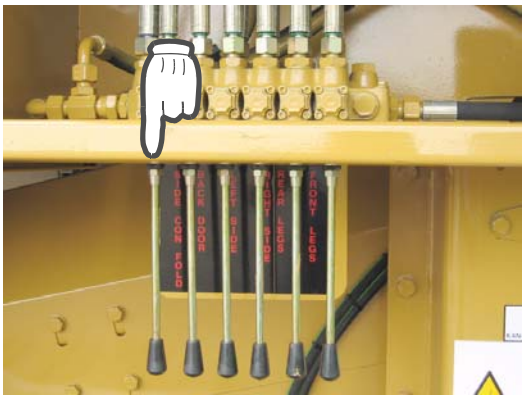
11: Fit locking pins to hopper sides/ rear.

12: Fit hopper cross-tie box and secure with pins and R-clip.

13: Fit & tighten bolts at hopper leg/ chassis. (Both sides.)

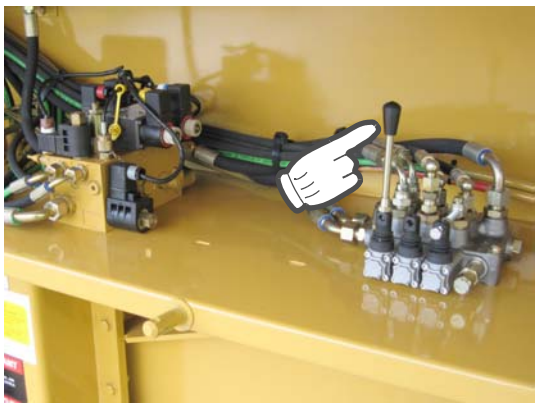


14: Remove side conveyor locking pin.



15: Activate lever marked SIDE CON FOLD to lower side conveyor.

16: Side conveyor in working position



17: Raise main conveyor.

18: Lock main conveyor and lock in position with pin.

19: Raise main conveyor spray bar to working position.

20: Fix main conveyor spray bar in working position and secure.

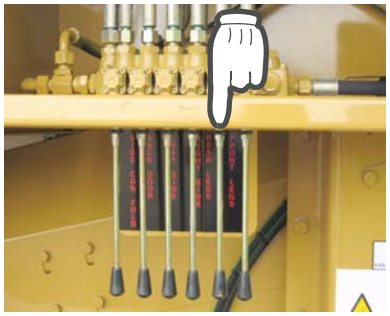
21: Unfold ladder, ensuring its locked into position.

22: Lift rail into position and lock with pin.

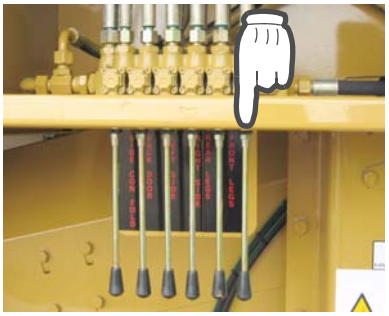
23: Lift up rotating gate section, rotate & lower into position. Repeat the procedure on other side of machine.

24: Lower the railing into position. Repeat the procedure on other side of machine.

Note: While operator is using the platforms the safety gates MUST be closed.



25: Lower rear jack legs by operating levers.



26: Lower front jack legs by operating levers.

27: Fit pins & R-clips to jack legs (8 off).

WARNING:

a. Ensure the machine is on a level surface before operating the jack leg levers.

b. Lift the machine uniformly.

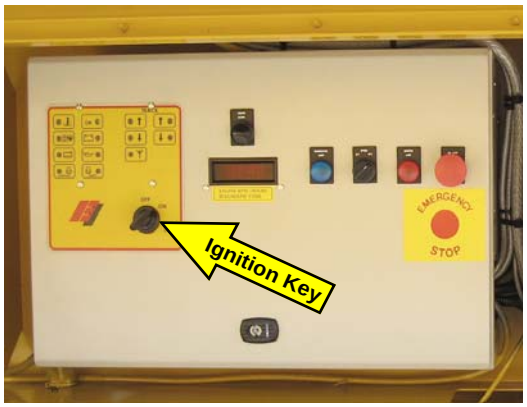
4.9 Setting Material Output Size

Figure 4-5: Control Panel

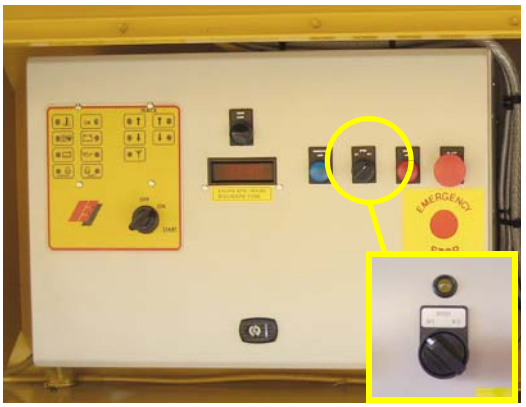
The C-12 Crusher has an adjustable discharge setting capacity. To set the size of the output material, carry out the following procedure.

WARNING: The machine MUST be stationary and the crusher turned off whilst this procedure is carried out.

Note: MACHINE MUST BE SHUT DOWN AND RESTARTED (Step 1 & 2) BEFORE JAW CAN BE OPENED/ CLOSED.

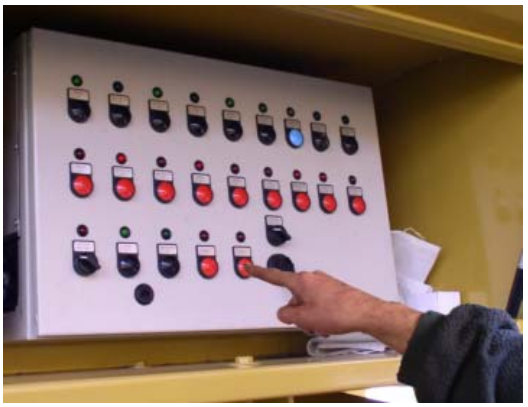


1: Stop the machine. Refer to "Stopping the Machine" on page 29.



2: Restart the machine. Refer to "Main Control Devices" on page 26.

3: Press button JAW ADJUSTMENT ON.

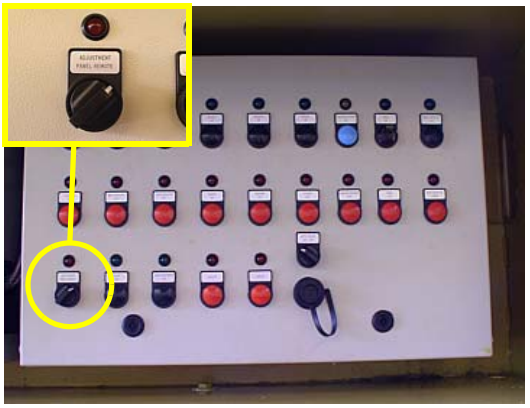


4: Press button JAW IN to close up jaw.

5: Press button JAW OUT to open up jaw.

6: Lock jaw when adjustment is complete.

4.9.1 Using Remote Pendent For Setting Material Output Size

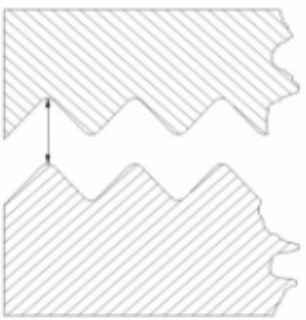


1: Turn to remote.

2: Remote pendent for opening jaw

4.9.2 Setting Material Output Size

Use suitable measuring equipment - ideally callipers - to measure distance between opposing points on jaw plates at minimum jaw opening, known as closed size setting - (CSS).
Measure jaw plates at opposing points as shown in the diagram.



The crusher must not be operated at Closed Size Settings (CSS) of less than 75 mm (3") without prior approval in writing from Extec Screens & Crushers Ltd.

Determining when the jaw is fully closed can be done by examining the position of the alignment arrow on the jaw stock shaft end plate. When the indicator arrow is pointing vertically up, the jaw stock is in its fully closed position. This can be seen by looking through the slotted area on the flywheel guards. Use crusher operating buttons on engine idle speed.

1: Look through slotted area on guard at alignment arrow on shaft end plate.

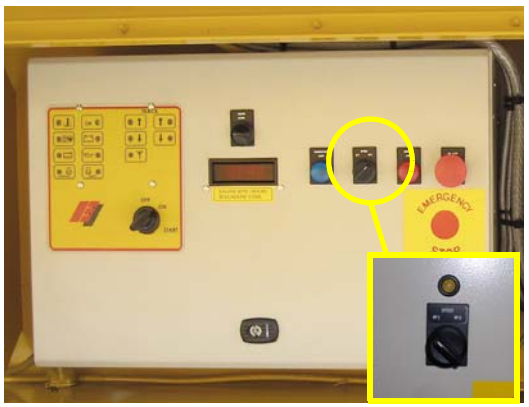
2: Alignment arrow points vertically up at minimum jaw opening.

4.10 Operating The Machine (Crushing)

When the machine is set up as described in the previous pages, it is now ready to be operated. To operate machine, turn engine speed to No.2 position and then start systems in the following sequence:

1. Side conveyor
2. Magnet
3. Main conveyor
4. Crusher
5. Feeder
6. Water Pump. (Where Fitted)

DO NOT START THESE SYSTEMS IF THEY ARE FULL OF MATERIAL. CLEAR ANY MATERIAL AWAY BEFORE STARTING.



1: Turn engine speed switch to position No.2.

2: Start systems as per above sequence.

Prior to loading material into the machine, ensure that the machine is not vibrating or rocking excessively. Stabilise with jacking legs if required, or relocate machine to more suitable ground.

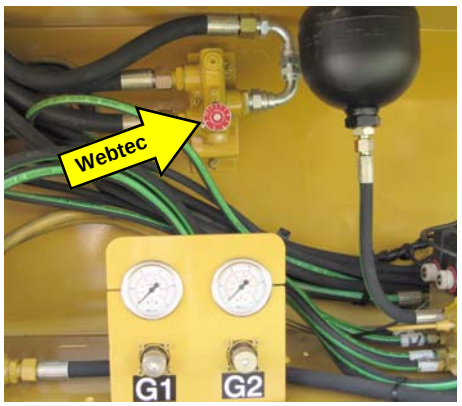
Loading Material Into Machine:

1. Feeder *MUST* be running *PRIOR* to feed material being placed upon it. *DO NOT* start feeder if it is full of material.
2. Material which is larger than 80% of feeder discharge chute should not be presented to the feeder. *STOP 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 Extec Screens & Crushers Ltd warrantees.
3. Material should be fed carefully, (not dropped onto feeder) from about 300 mm above feeder. Ensure 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. Pressure switches are fitted to the crusher box side plate and should the crusher chamber become overfilled for "X" minutes ("X" being adjustable to suit material) the feeder will STOP until the material is reduced to an acceptable level. See *1: Adjusting feeder speed using Webtec control. on page 44* for adjusting feeder control speed. See *2: Starting/ Stopping feeder speed using remote control. on page 44* for feeder cut-out switch.



1: Adjusting feeder speed using Webtec control.

2: Starting/ Stopping feeder speed using remote control.

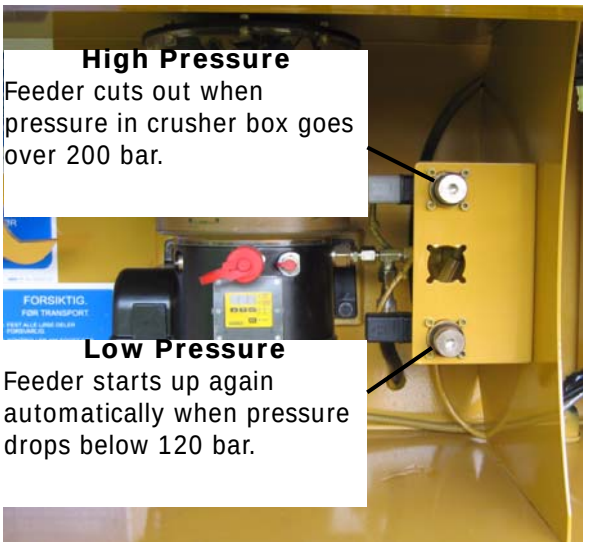
When the machine is set up as described in the previous pages, it is now ready to be used to crush the desired material. ***DO NOT START CRUSHING UNTIL YOU HAVE READ AND FULLY UNDERSTOOD THIS MANUAL.***

Feeder Cut-out:

The C-12 Crusher is fitted with a pressure sensing device that will cut out the operation of the feeder when the pressure in the crusher chamber exceeds specified limits.

This reduces the chances of the crusher becoming choked with material, as the machine will have more time to deal with what is in the crusher chamber.

Once the pressure in the crusher chamber drops to within specified limits, the feeder will automatically restart to give an uninterrupted crushing process. This system reduces the chances of having to manually clear the crusher chamber and reduces the amount of down time.



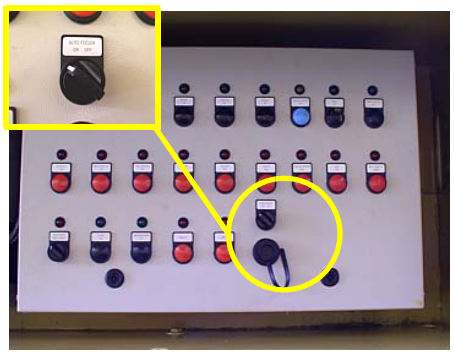


Figure 4-6: Feeder cut out switch - on.

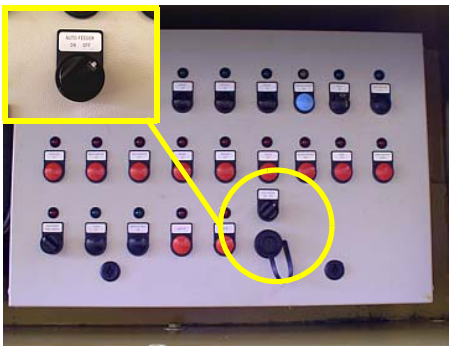


Figure 4-7: Feeder cut out switch - off.

4.11 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. Stop the crusher.
2. Close down all running systems. See “Stopping the Machine” on page 29
3. Switch engine to No.1 position and restart all running systems except crusher. See “Operating The Machine (Crushing)” on page 43 Use **CRUSHER REVERSE ON**.
4. Run crusher in reverse until material has become loose.
5. Close down all running systems. See “Stopping the Machine” on page 29
6. Switch engine to No.2 position and restart all running systems to resume normal crushing. Use **CRUSHER REVERSE OFF**.

The above 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.

STOP MACHINE COMPLETELY & REMOVE IGNITION KEY BEFORE ATTEMPTING TO MANUALLY CLEAR OBSTRUCTIONS FROM CRUSHER BOX.

FIGURE 4-8: CRUSHER REVERSE ON

FIGURE 4-9: CRUSHER REVERSE OFF

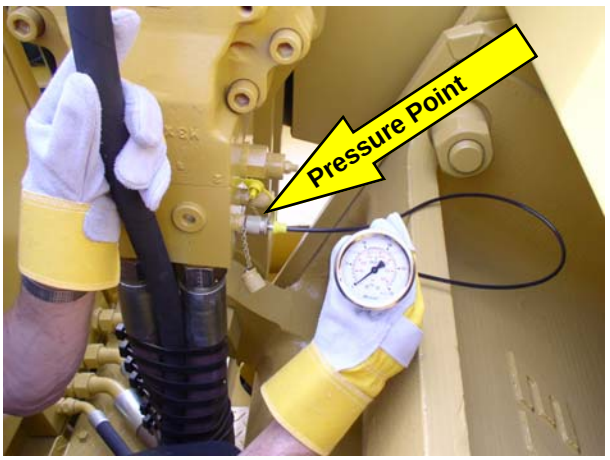
Reverse jaw crushing should only be operated whilst engine speed is at No.1 position as damage can be done to machine if used at No.2 position.

4.12 Jaw Brake Pressure Adjustment

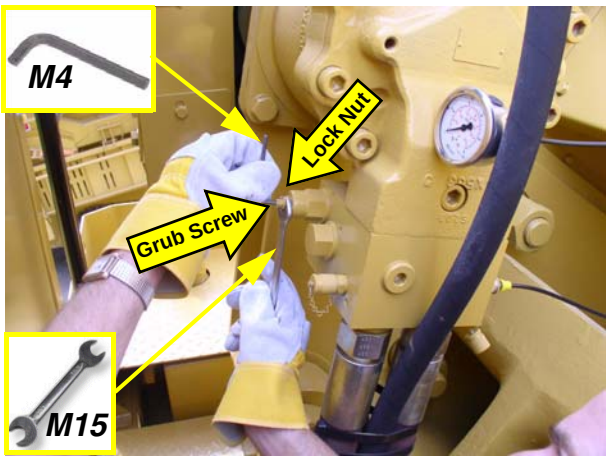
SAFETY NOTICE

The following procedures are carried out with the machine running so extra care ***MUST*** be taken to ensure the safety of ***ANY*** personnel on or in the vicinity of the machine.

Forward Jaw Brake Pressure



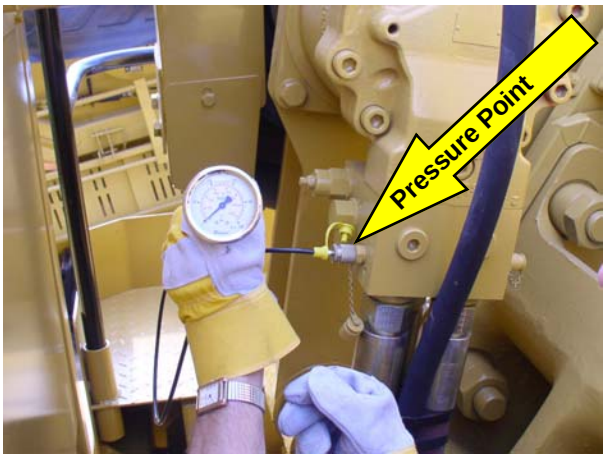
1: Forward Jaw Brake Pressure



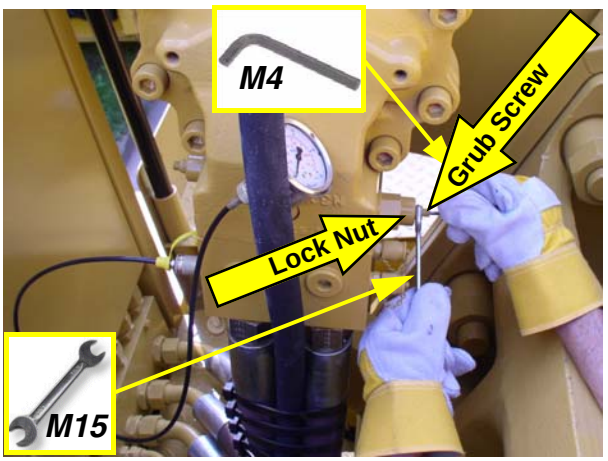
2: Adjusting Pressure

1. Attach pressure gauge to pressure point as shown.
2. Start crusher on speed on No.2 then stop crusher. The pressure gauge should read 250 bar. If required, adjust the pressure using following procedure.
3. Unscrew lock nut on relief valve grub screw. To reduce the pressure, turn the screw anti-clockwise. To increase pressure, turn the screw clockwise. Turn screw about ¼ of a turn.
4. Repeat procedures 2 & 3 checking the pressure each time.
5. When the pressure reads 250 bar lock the screw in position with the attached lock nut.
6. The jaw will run for approximately 5 seconds when stopping.

Reverse Jaw Brake Pressure



1: Reverse Jaw Brake Pressure



2: Adjusting Pressure

Note: The jaw should only be run in reverse on speed No.1.

1. Attach pressure gauge to pressure point as shown.
2. Start crusher in reverse jaw on speed on No.1 then stop crusher. The pressure gauge should read 350 bar. If required, adjust the pressure using following procedure.
3. Unscrew lock nut on relief valve grub screw. To reduce the pressure, turn the screw anti-clockwise. To increase pressure turn the screw clockwise. Turn screw about ¼ of a turn.
4. Repeat procedures 2 & 3 checking the pressure each time.
5. When the pressure reads 350 bar lock the screw in position with the attached lock nut.
6. The jaw will run for approximately 2 seconds when stopping.

Section 5 Machine Maintenance

5.1 Introduction

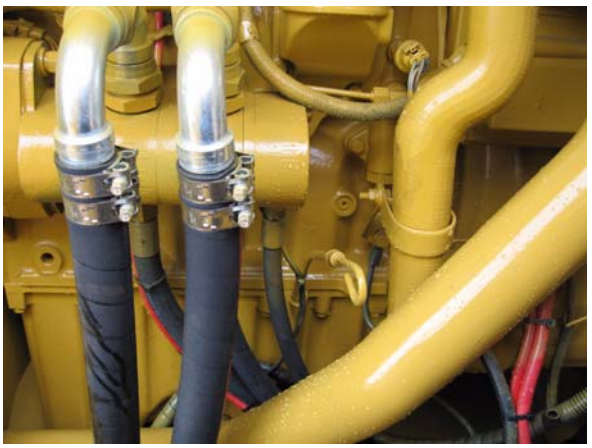
Maintenance is essential for safety and to ensure the best possible performance from your C-12+ Crusher by reducing the chances of breakdowns.

WARNING: The machine **MUST** be switched off and isolated with the ignition keys removed **BEFORE** making any adjustments.

DO NOT stand on any part of the engine whilst operating or carrying out any maintenance on the machine.

All adjustments must **ONLY** be carried out by trained personnel. All adjustments to modify hydraulic system must **ONLY** be carried out by trained Extec service engineers.

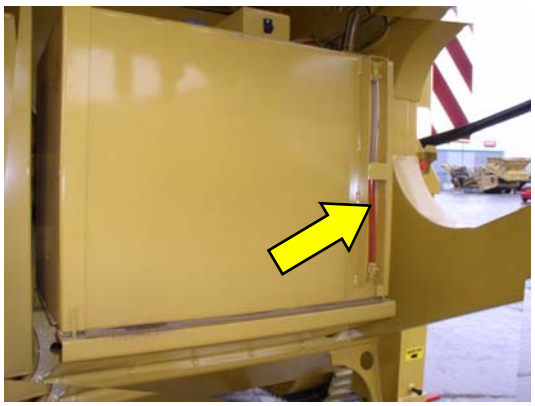
5.2 Daily Maintenance Schedule



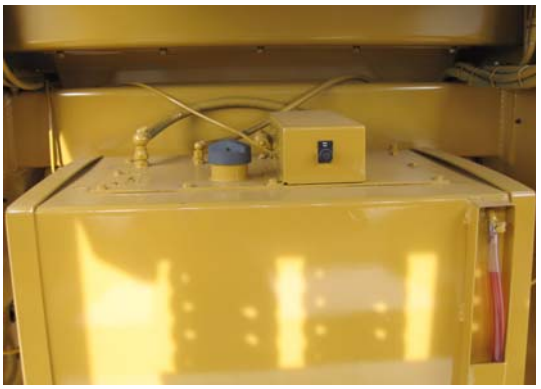
1: Check engine oil level.

2: Refill if necessary. (CN6125)

(Refer to the engine manufacturer's handbook for engine oil specification.)

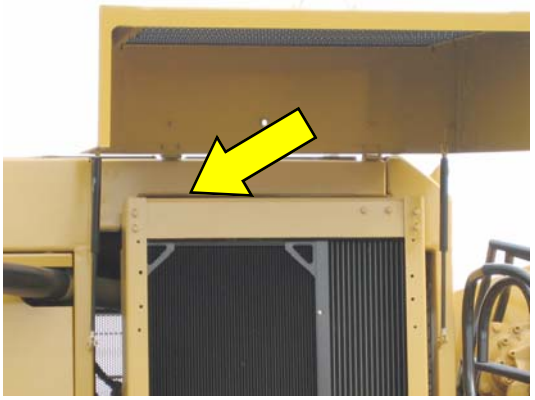


3: Check fuel level.



4: Refill diesel tank using the diesel pump and fuel suction pipe. Alternatively refill manually after cleaning around the cap opening. (CN6004)

5: Bleed diesel water trap. (EN1002)



6: Check radiator water level & refill if necessary.
Use a 50/50 mixture of anti freeze and water.

5.2.1 Air Cleaner Servicing

Check the service indicators on the air cleaner. Regardless of the condition of the service indicator, remove the primary air cleaner as shown below and clean, from the inside, using compressed air. Only clean the primary filter a maximum of 6 times. Never clean the secondary air cleaner. After 3 primary air cleaner replacements, replace the secondary air cleaner.

Note: Service indicators are for showing when the air filter needs to be replaced or cleaned. Test the service indicator as laid out in the engine manufacturer's handbook.

1: Check the service indicator daily. (EN1008)

2: Unclip the cover and remove.

3: Remove and clean the primary air cleaner. The primary air cleaner can be used up to six times if properly maintained. Replace at least once a year. (EN1003)

4: Only remove and replace secondary air cleaner after three services. (EN1004)

When the engine is operating in environments that are dusty or dirty, air cleaner elements may require more frequent replacement.

5: Cover the turbocharger air inlet in order to keep dirt out. Clean the inside of the air cleaner cover and body with a clean, dry cloth.

6: Replace air cleaners and cover after cleaning. Reset the air cleaner service indicator.

For detailed cleaning instructions, refer to the instructions in the engine manufacturer's handbook.

Filter Maintenance List

Part Number	Description	QTY
1. EN1003	AIR PRIMARY FILTER	1
2. EN1004	AIR SECONDARY FILTER	1
3. EN1008	INDICATOR-AIR FILTER CHANGE	1
4. EN5020	VORTEX PRE-CLEANER	

5.3 Weekly Maintenance Schedule

Maintenance is essential for safety and to ensure the best possible performance from your C-12+ Crusher by reducing the chances of breakdowns.

WARNING: The machine **MUST** be switched off and isolated with the ignition keys removed **BEFORE** making any adjustments.

DO NOT stand on any part of the engine whilst operating or carrying out any maintenance on the machine.

All adjustments must **ONLY** be carried out by trained personnel.

STOP MACHINE, ISOLATE AND REMOVE IGNITION KEY BEFORE CARRYING OUT ANY MAINTENANCE ON THIS MACHINE.

1. Check the condition of conveyor belts, rollers and other moving parts.
2. Clear any obstructions from the grizzly bars and crusher chamber.
3. Check all bolts and panels are in place and secure.
4. Clear any build up of dust from the oil cooler and radiator using compressed air.
5. Check jaw plates for wear, and turn around or replace if necessary.
6. Check condition of service indicators on hydraulic filters, water trap and air breather. Replace if necessary.
7. Examine toggle plate to make sure that it is free from cracks and other defects. Replace if necessary.
8. Check toggle assembly for damage and clear any debris to ensure free movement of the hydraulic cylinders.
9. Check toggle clamping ram and link arm ram bearings for any damage or wear. Replace if necessary.
10. Examine liner plates inside crusher chamber for wear. Replace if necessary.
11. Check jaw brake pressure. Adjust if necessary. See “Jaw Brake Pressure Adjustment” on page 46
12. Check emergency stops are working correctly.
13. Check crusher box front and rear beam fixing bolts. Tighten if necessary.
14. Check feeder oil level and grease bearings. See “Greasing Bearings” on page 54
15. Inspect and adjust all belt scrapers and sealing rubbers if necessary.

Note: ***FULL*** movement of the jaw should be performed on a weekly basis, to ensure the adjustment wedge & clamping system are ***FREE*** moving and clear from any obstruction.

5.3.1 Checking Feeder Oil Level

Note: Always check both sides.

1: Remove oil level plug.

If oil trickles out, there is enough oil in feeder - if not, oil level needs to be topped up.

2: Remove oil filler plug.

Refill using Shell Omala 220 Gear Oil until oil comes out of level hole. (CN6160)

5.3.2 Checking/ Changing Hydraulic Tank Air Breather

1: Raise cover plate and examine service indicator.

If the service indicator is green, it is time to replace the tank air breather (EN1523). Simply remove air breather and replace with new one. Also shown is the filter unit (EN1601)

Note: If optional oil cooler is fitted, then it must be in the raised position & cover plate removed to access the air breather.

5.3.3 Greasing Bearings

Extec Screens & Crushers Ltd. use SKF sealed-for-life bearings that reduce grease consumption, lower life cycle cost, lower recycling costs and reduce pressure on the environment. The results are dramatically increased uptime for the machines and the consequent reduction in maintenance costs. Only apply grease where otherwise indicated.

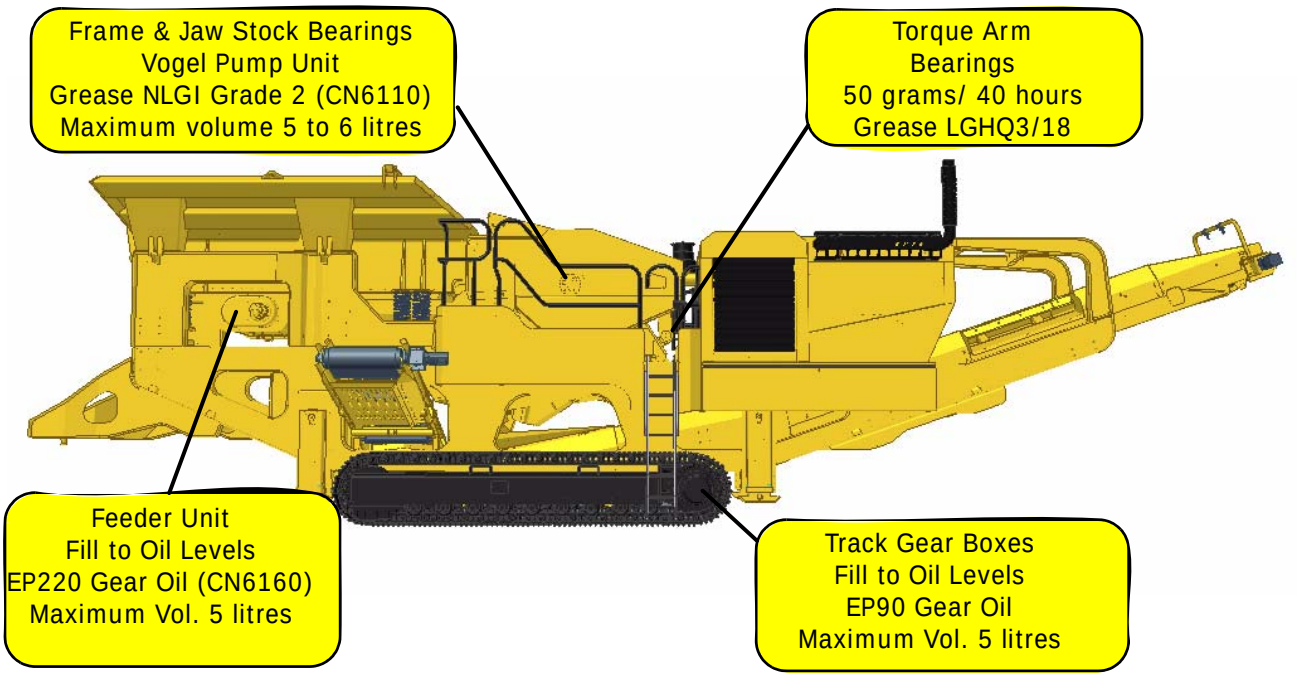
Follow maintenance instructions laid out in the engine manufacturer's handbook.

WARNING: NEVER USE GREASE CONTAINING MOLYBDENUM. DOING SO MAY CAUSE DAMAGE TO MACHINE PARTS AND WILL INVALIDATE ANY WARRANTY.

See following pictograms for details of grease points and types.

1: Torque Arm motor bearings

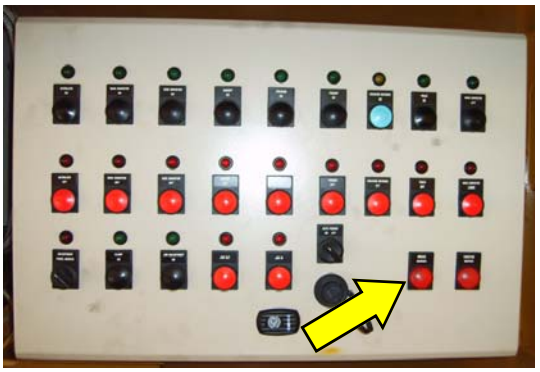
2: Torque Arm shaft bearings



3: Grease Points

5.3.4 Vogel Pump Unit

1: The Vogel greasing system is used for jaw stock shaft and frame bearings.

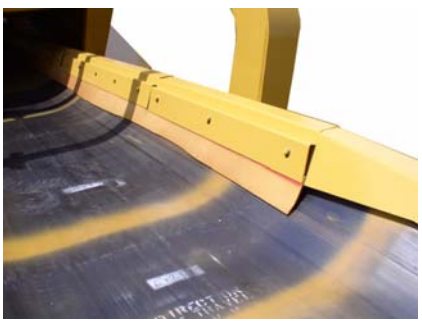


2: Vogel Grease Warning Light

1. The Vogel Grease Warning Light on the control panel will lights up when the unit is empty of grease. Refill the greasing unit using only NLGI Grade 2 grease. (CN6110)
2. Follow the maintenance and filling instructions as laid out in the manufacturer's handbook.
3. The Vogel Pump Unit are factory preset and should not need routine adjustment. The recommended setting is 6 min./ hour.

Only refill the greasing system with a NLGI Grade 2 grease. (CN6110)

5.3.5 Inspecting/ Adjusting Belt Sealing Rubbers



1: Sealing rubber in correct position & condition

2: Adjust as required.

3: Refit clamp fixing screws.

5.3.6 Adjusting Belt Scraper

Figure 5-1: Adjusting Belt Scraper

If required, adjust head drum scraper by loosening bolts in Rosta springs, adjusting scraper and re-tightening bolts.

Both sides should be adjusted simultaneously.

5.3.7 Hydraulic Filter

Check service indicators on hydraulic filters when the machine is running. **CHECKING CONDITION OF FILTER INDICATORS IS THE ONLY CHECK TO BE MADE WHEN MACHINE IS RUNNING. STOP MACHINE BEFORE REPLACING ELEMENTS.**

1: Lift up cover (EN1402) & inspect service indicator. (EN1505)

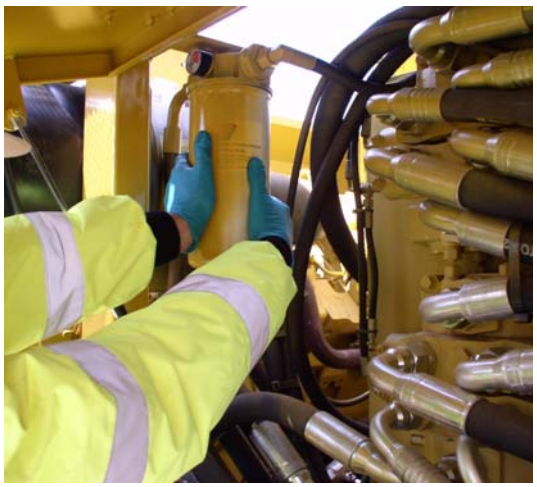
2: Replace elements if service indicator is red. (EN1403)

3: Replace cap, ensuring O-ring is in place.

Note: If optional oil cooler is fitted, please refer to next page for maintenance instructions for hydraulic filters.

4: Close and secure cover plate.

5.3.8 Changing Hydraulic Water Trap



1: Replacing hydraulic water trap. (EN1401 & EN1404)

Note: When the water trap is taken off, oil will spill out. Use a suitable container to catch any waste oil - expect between 3 and 5 litres. Replace water trap as shown.

CLEAN UP ANY OIL SPILLS AFTER PERFORMING THESE OPERATIONS.

5.4 250 Hour Maintenance Schedule

Every 250 hours, the following maintenance must be carried out to ensure the best performance and least possible amount of downtime from your machine. Refer to list in 5.10 for part No.

1. Follow maintenance instructions laid out in the engine manufacturer's handbook.
2. Change the hydraulic water trap ***regardless*** of condition of service indicator.
3. Change the hydraulic tank air breather ***regardless*** of condition of service indicator.
4. Flush hydraulic system and change the hydraulic filters ***regardless*** of condition of service indicator. To flush hydraulic system, proceed as follows:
   a. Ensure all material has passed through the crusher and off the conveyor belts.
   b. Stop the machine and replace the hydraulic filters with 3 micron flushing filters (EN1405).
   c. Fit new 10 micron water trap.
   d. Check condition of hydraulic tank air breather. If the service indicator is red, change it. Otherwise clean all dust from the base of the filter.
   e. Run all systems for 4 hours with engine speed set to No.1 position. ***(DO NOT FEED MATERIAL INTO THE MACHINE DURING THIS OPERATION.)***
   f. Stop machine and replace flushing filters with new 25 micron hydraulic filters.
5. Check for leaks on hydraulic pipes.

6. Inspect condition of conveyor belts and tracking.
7. Inspect condition of all drums and rollers.
8. Inspect toggle clamping and link arm ram bearings.

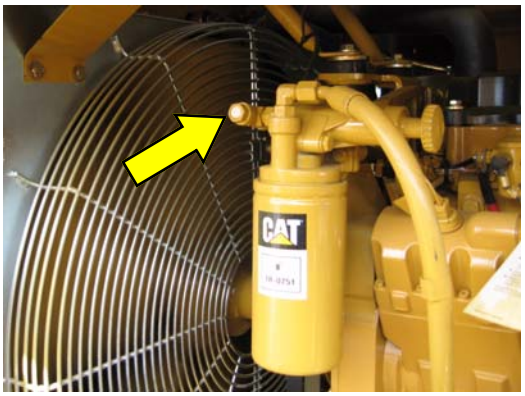
Note: The bearings on the jaw rams needs a thorough inspection with a view to change at next 250 hour service.

9. Check drive belts for wear, swelling, softening and tension. Replace if necessary.

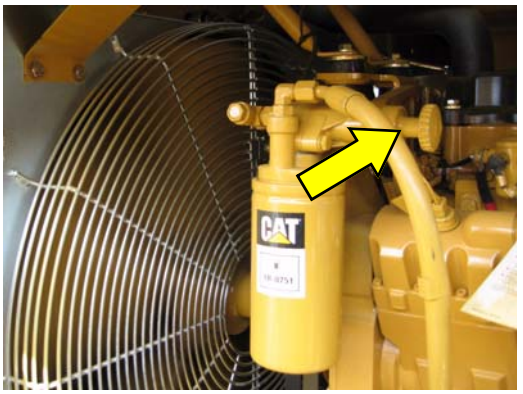
Note: Tension should remain constant during the belts working life and should not be re-tensioned.

10. Clean out sediment bowl on fuel pre-filter.

Note: When sediment bowl is cleaned out, the fuel system will have to be re-primed. Proceed as follows:



1: Loosen bleed screw on fuel filter. (EN1001)



2: Unscrew hand primer and pump until a steady flow of fuel comes out of filter. (No bubbles must be coming through fuel line.) Re-secure hand primer after use. Re-tighten bleed screw.

5.5 1000 Hour Maintenance Schedule

Every 1000 hours, the following maintenance must be carried out (refer to the list in 5.10 for part No.):

1. Repeat 250 hour maintenance schedule.
2. Change oil in vibrating feeder.
3. Change diesel filters.
4. Replace toggle clamping & link arm ram bearings.
5. Change oil in tracks.

5.5.1 Changing Oil in Tracks

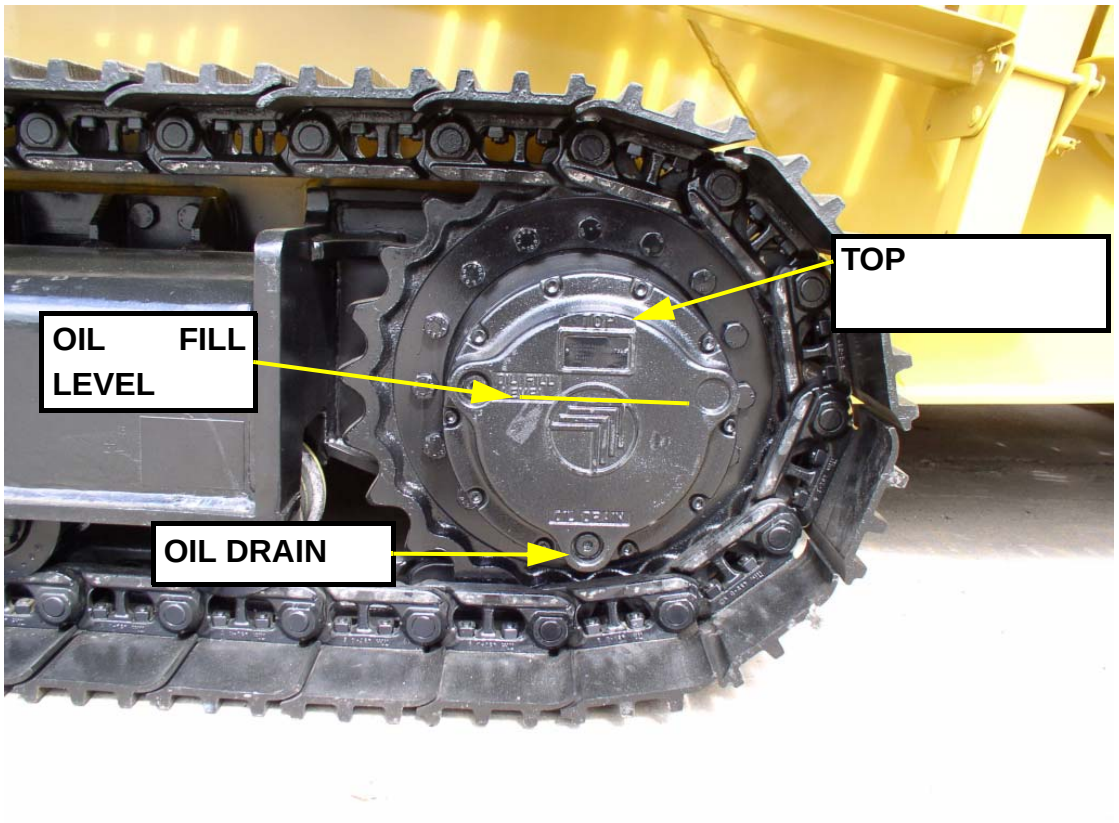
To drain oil from the track gearbox, drive the machine until the oil drain plug is at the bottom of the gearbox. Remove both plugs and the oil will drain out. Use a suitable container to collect waste oil. Replace drain plug.

Disposing of waste oil must be done in a manner that complies with current environmental legislation.

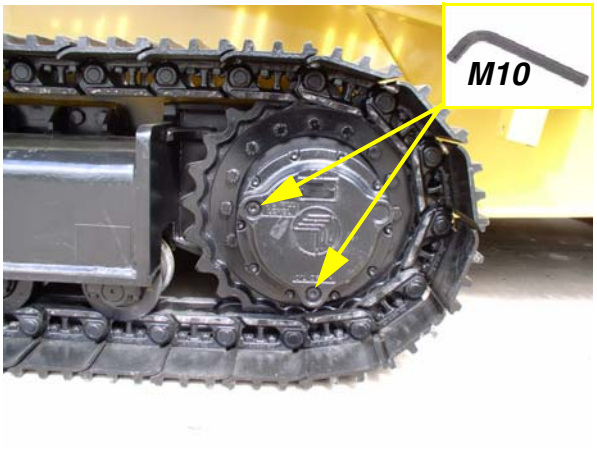
To refill track gearbox with oil, drive the machine until the gearbox is in the correct position. See below.

Note: This will only be 1/3 turn of the track gearbox.

DO NOT drive machine any further until oil has been replaced in tracks. Remove the oil level plug as shown in the photographs below. Fill with oil into the oil level plug until it starts to come out of the plug hole. Replace oil level plug ***BEFORE*** driving the machine. Each track gearbox will have to be maintained separately.



1: Track gearbox in correct position to refill with oil.



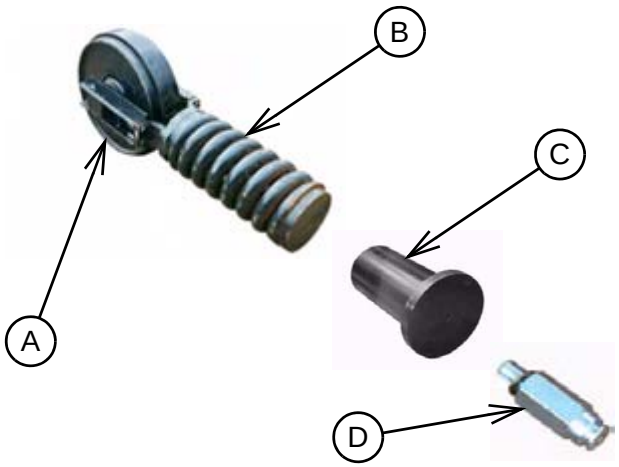
When changing oil in the tracks, use Exol Ethena EP90 Gear Oil.

2: Remove oil level plug.

5.6 Track Adjustment

WARNING!
Grease under pressure can cause serious injury. Never unscrew a track adjuster valve by more than a ½ turn, when the track is under tension.

After maintenance or over time the track will become slack and will have to be adjusted. The adjustment of the tracks operates through a tensioning cylinder (C). When the cylinder is filled with grease it extends and pushes the spring tension unit (B), and the idler (A), forward. The grease is filled through the track adjuster grease valve (D).



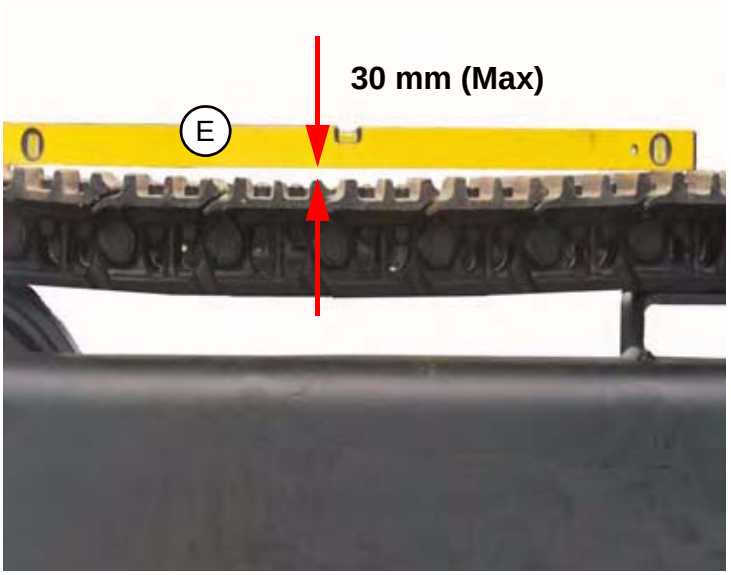
1: Track Adjustment

In order to establish if the track requires tensioning, move the Host machine a few metres forwards and backwards on level ground. This allows the tracks to adopt their natural degree of tension.

Note: Do not slew the machine.

Using a straight edge and a measuring tape, measure the droop of the track group as shown at (E). For this particular track set, the droop should not exceed 30 mm.

Note: It is also important that the track is not tensioned too tightly as this places excessive loads on the gearbox and idler bearings. It will also lead to accelerated wear and premature failures.



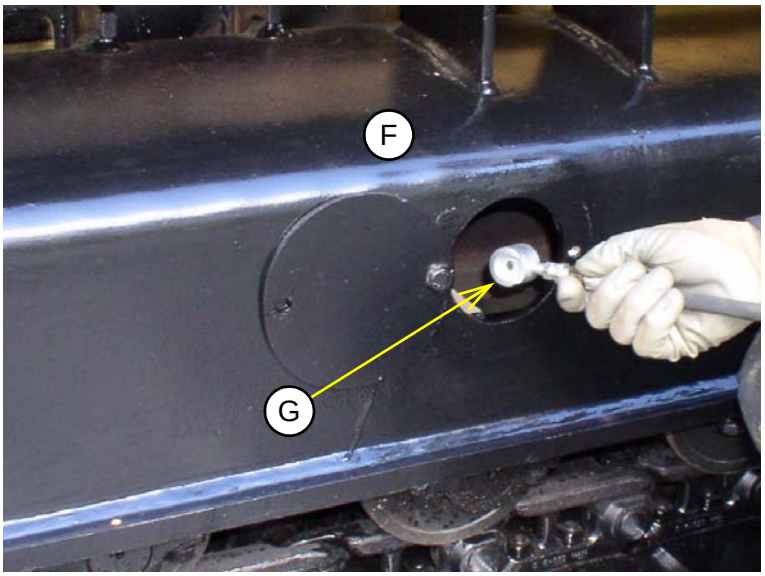
2: Track Adjustment Settings

5.6.1 Increasing The Track Tension

To increase the tension of the track:

1. Remove the inspection cover on the side of the track frame as shown at (F).
2. Ensure that the track adjuster valve (H), is tight.
3. Attach the special grease gun connector (G), to a grease gun and fit it onto the track adjuster valve (H).
4. Pump grease into the valve until the droop of the track is correct.
5. Move the Host machine backwards and forwards a few times more and then re-check the droop. Add more grease if required.
6. Check for any escaping grease around the tensioning unit and finally close the inspection cover when finished.

Important: Ensure that the correct grease is used.

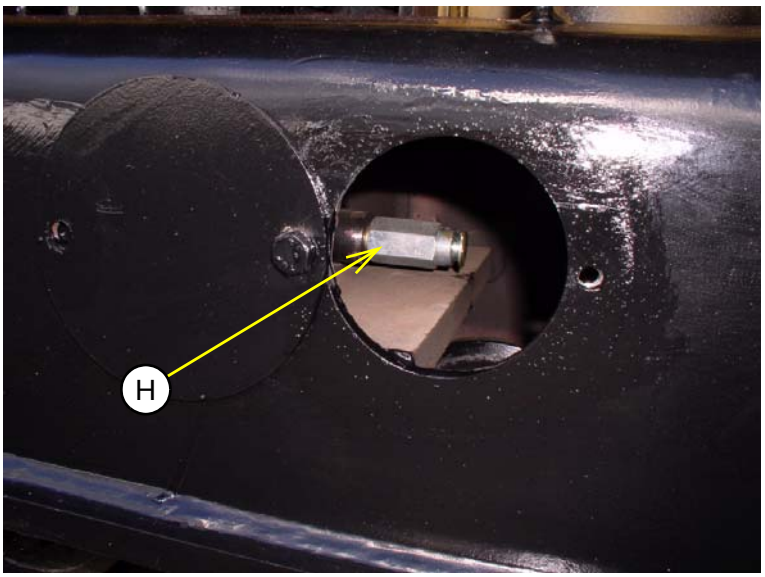


3: Increasing The Track Tension

5.6.2 Releasing The Track Tension

To the release the tension on the tracks:

1. Remove the inspection cover on the side of the track frame as shown at (F).
2. Loosen the track adjuster valve (H), by turning it one half turn anticlockwise.
3. Grease should now escape slowly from the track tensioning cylinder and the track should slacken.
4. If the track fails to loosen, apply a little pressure to the idler end of the track to push the idler group in.
5. Replace the inspection cover when completed.



4: Releasing The Track Tension

5.7 Turning/ Changing Jaw Plates

If, when examining 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. To change or turn jaws proceed as follows:

Do not allow jaw plate to become so badly worn that the seats for the jaw plate in crusher box or jaw stock become excessively worn. This may result in the need for expensive repairs or new crusher box or jaw stock.

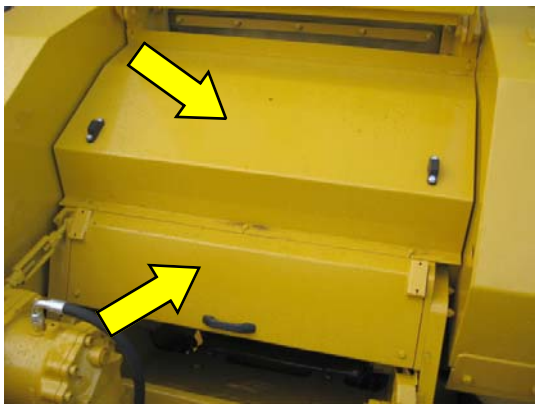
SAFETY
All personnel operating or servicing the crusher must read and fully understand the safety information included in Section 1 of this manual.

1. Always lockout the controls for the engine and the crusher.
2. Disconnect the batteries using the battery isolation switch located in the electrical control box.
3. Do not allow personnel to work or walk under loads supported by a crane or hoist.
4. Use appropriate lifting devices to secure the load to the crane. See the following paragraphs of this section for additional information.

1: Inspect lifting equipment. Ensure the lifting tools are undamaged.

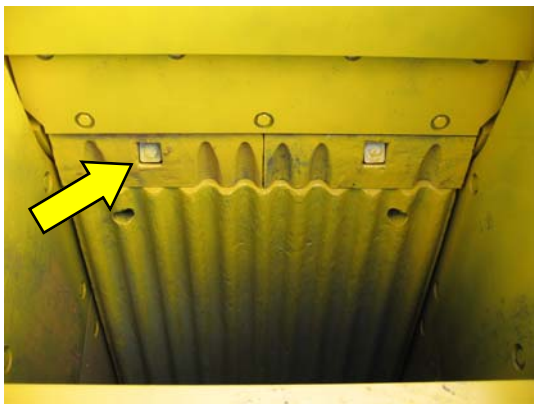
Note: Only use certified and approved lifting equipment. Ensure that lifting equipment used meets the applicable regulations i.e. that lifting equipment is strong and stable enough for the intended use, is marked with a Safe Working Load (SWL), is suitably positioned and is operated in a planned manner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

5.7.1 Removing Swing Jaw Plates



1: Remove the guard and toggle cover plate above the jaw stock.

2: Loosen and remove the wedge bolts.



3: Remove wedge bolts and wedges from swing jaw stock only.

4: Wedges removed.

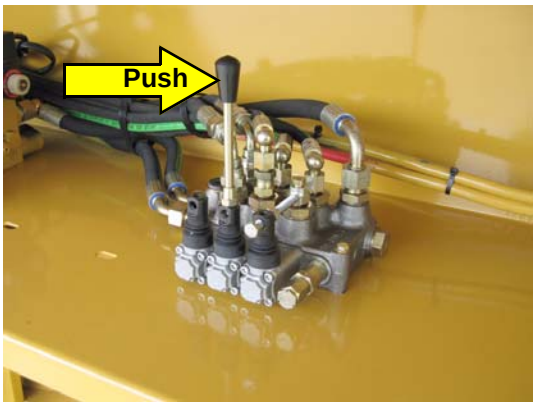
5: Insert lift hooks, ensuring they are central to the wear plate and kept vertical / above the point of lift.

6: Remove jaw plates using lifting hook & ropes provided with machine and suitable lifting equipment.

5.7.2 Removing Fixed Jaw Plates

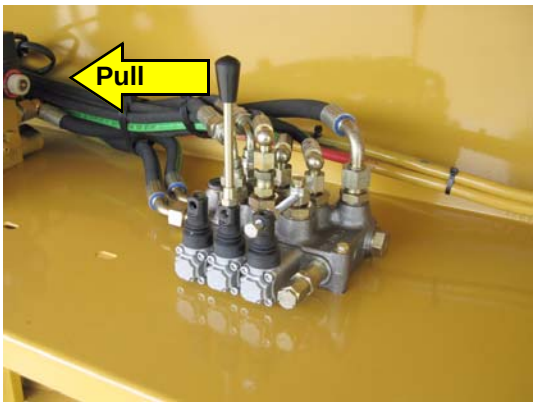
Screw control valve lever into the position as shown below. Remove again after use. Accidental use could result in damage to the jaw plates.

1: Remove locking nuts to remove fixed jaw plate.



2: Push wear plate release lever to bring fixed wear plate forward.

3: Remove jaw plate using lifting hook & ropes provided with machine and suitable lifting equipment.



4: Pull wear plate release lever to move wedge rams back into position.

5.7.3 Replacing the Fixed Jaw Plate

1: Place lifting tools in jaw plate. Before lifting the plate ensure the back face and pockets are clean of debris.

2: Ensure the lifting tool catches in the hole. Lift jaw plate with suitable lifting equipment.

3: Ensure back of the plate is clean and smooth. Clean out any accumulated debris in the recesses.

4: Place wedge in recess. The wedge should not rest on the lifting tool. See above photos for approximate position.

5: Wedges in place and lined up.

6: Retract ram using the lever in the control box.

7: Pull wear plate release lever to move wedge rams back into position.

8: Ram pin fully back. Clean mounting plate.

9: Loosen bolts on sealing plate. (C-10 Only.)

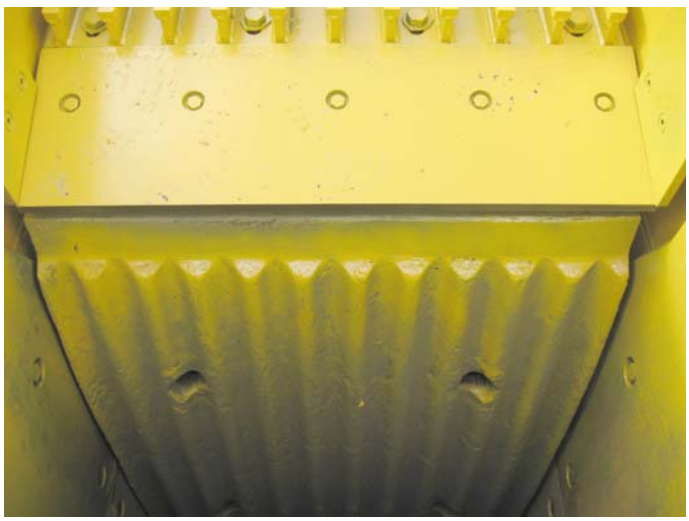
10: Sealing plate moved furthest back. (C-10 Only.)

11: Lower fixed jaw plate slowly into the crusher box. Stand well clear off the jaw plate.

12: Leave a 10 to 15 mm gap on either side of the jaw plate.

13: After lowered, check no gap exists at the bottom.

14: Visually position the fixed jaw plate against the sealing plate. (C-10 Only.)



15: Remove lifting equipment and fit jaw plate bolts.

16: Screw on both nuts before tightening.

17: Using a suitable pry bar check plate for central position.

18: Tighten plain nut and torque. Lock after with Nyloc nut.

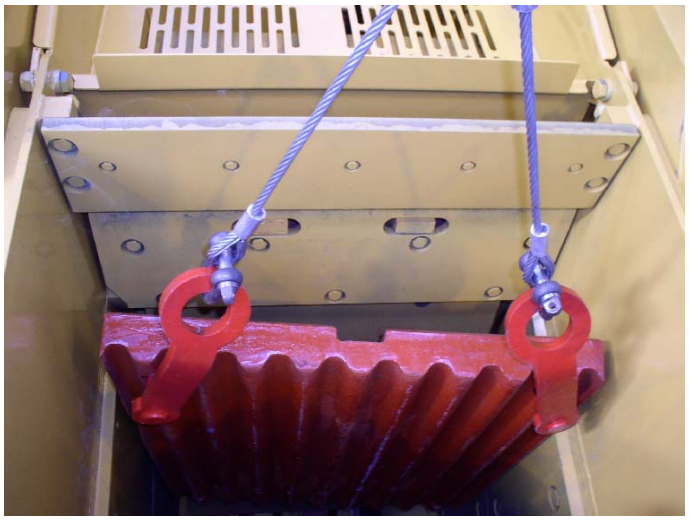
5.7.4 Replacing the Swing Jaw Plate

1: Lift wedges onto machine.

2: Lift swing jaw plate as shown. Clean face and pockets of the jaw plate first before lifting.

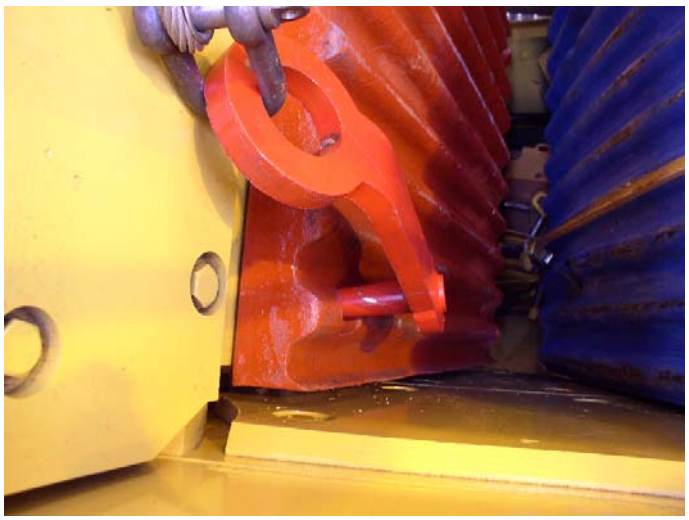
3: Position of hooks after jaw plate lifted

4: Lift jaw plate slowly into position.

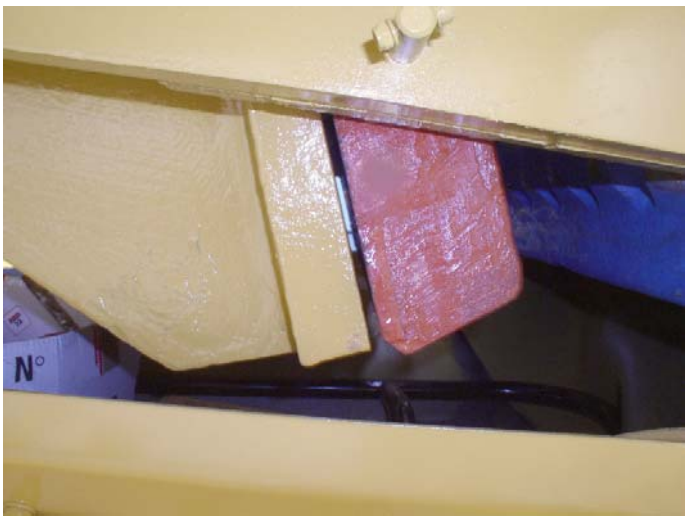


5: Lift jaw plate slowly into position. Keeping well clear slowly lower jaw plate into position.

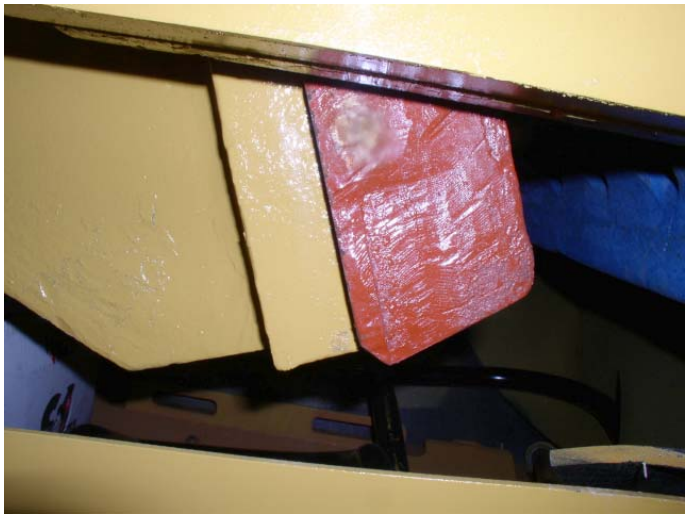
6: The jaw plate recesses will audibly drop onto the location point.



7: Ensure a even gap on both side. The jaw plate must be flush with the mounting face.



8: The photo show a gap at the bottom which is incorrect. Plate must be flush with jaw face.



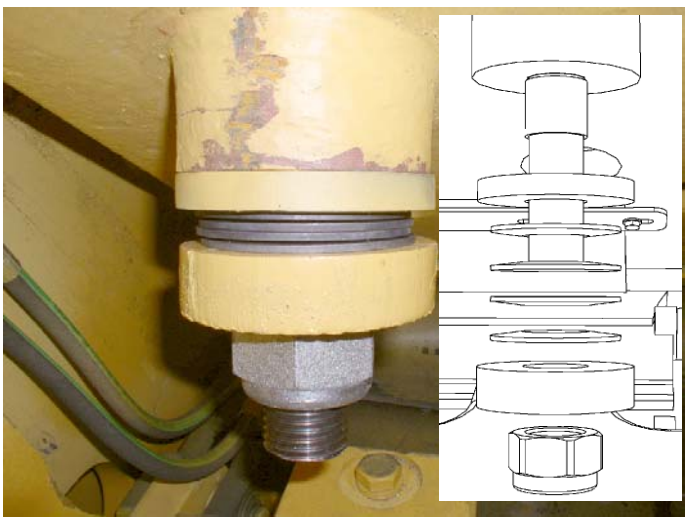
9: The photo show no gap at the bottom which is correct. The plate is flush with jaw face.

10: Adjust plate position using lifting equipment.

11: Place a suitable bar in hole to help with lining up the wedge.

12: Carefully slide the wedge into position. Remove bar and slide wedge bolt into place.

13: Knock home wedge bolt. Repeat steps 10 to 12 for the opposite wedge.

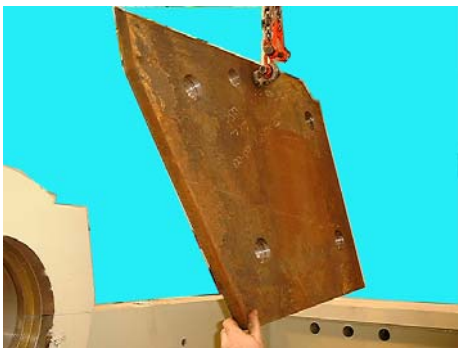


14: Secure wedge bolt as shown. No gap must be visible between the compression discs as in the photo.

15: Close inlet chute cover.

16: Refit toggle cover plate and guard.

5.7.5 Changing Crusher Box Liner Plates



1: Changing Liner Plates

If, when examining liner plates, excessive wear is discovered, change liner plates by loosening all bolts and removing liner plate as shown. Refit new liner plates and torque bolts to 711 Nm. Always use suitable lifting equipment to remove plates.

DO NOT ATTEMPT TO REMOVE LINER PLATES BY HAND.

5.8 Oils And Fluids

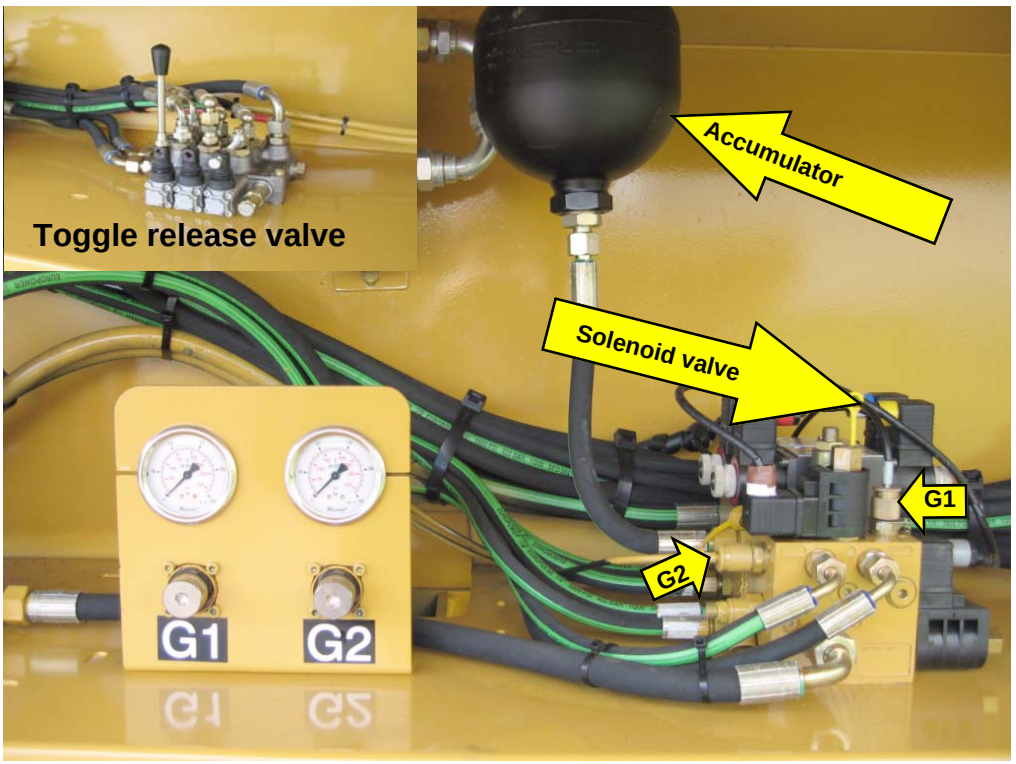
Lub/ Oil and Grease Points	Max. Vol.	Temperature	Viscosity	Manufacturers Equivalent Specifications	Extec Part Number
Anti Freeze				Shell Safe Anti Freeze Concentrate	
Diesel	420Lt			Shell Agricultural Gas Oil	CN6004
Engine Oil	30Lt			Shell Rimula Signia 10W-40	CN6125
	30Lt	Cold Weather		Shell Diesel Engine Oil Rimula 5W-30	
Engine Oil - Alternative	30Lt			See Manufacturer's Handbook	
Feeder Gearbox	5Lt			Shell Omala 220 Gear Oil	CN6160
Frame & Jaw stock Bearings	5-6Lt	-20°C to +150°C		SKF LGHB 2 (NLGI Grade 2)	CN6110
Hydraulic System	1400Lt		ISO VG 32	Shell Tellus Arctic 32	
	1400Lt		ISO VG 46	Shell Tellus 46	CN6070
	1400Lt		ISO VG 68	Shell Tellus Oil 68	
	1400Lt		ISO VG 100	Shell Tellus Oil 100	
	1400Lt	Environmentally friendly		Shell Naturelle HF-E 46	
General Lubrication Points	As req.			Shell Albida EP2	
		Arctic		Shell Aeroshell 33	
Torque Arm Bearings	1Lt			Exxon Unirex N 3 Grease (LGHQ3)	
Tracks	5Lt			Exol Ethena EP90 Gear Oil	
Tracks - Alternative	5Lt			Shell SPIRAX GSX75W-80	

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

5.9 Toggle Plate Removal/ Replacement

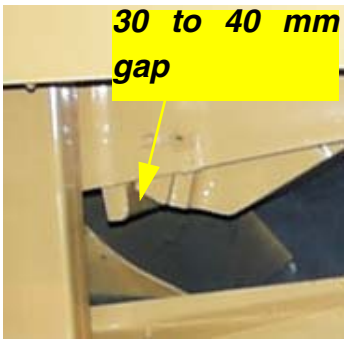
To protect the crusher from the excessive loads generated by un-crushable objects, the jaw stock is fitted with an overload protection device - "Toggle Plate". When the permissible loads are exceeded, the Toggle Plate will collapse from elastic buckling. The crusher will then automatically shut down, 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.



G1 - Charge Gauge
G2 - Clamp/ Accumulator Gauge

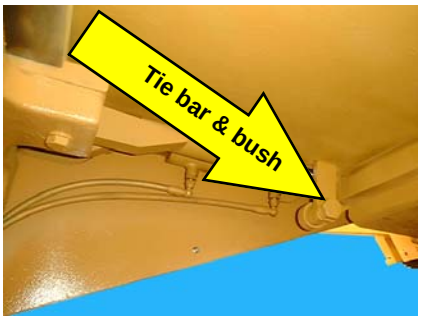
Figure 5-2: View on hydraulic control box



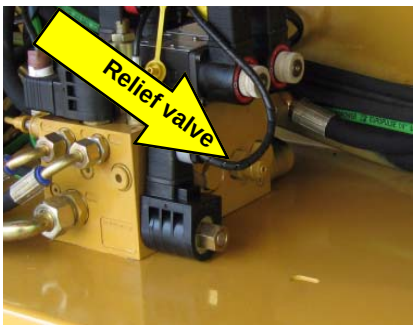
1: Close jaw up to give a 30 to 40 mm gap.

2: Stop the machine. See "Stopping the Machine" on page 29

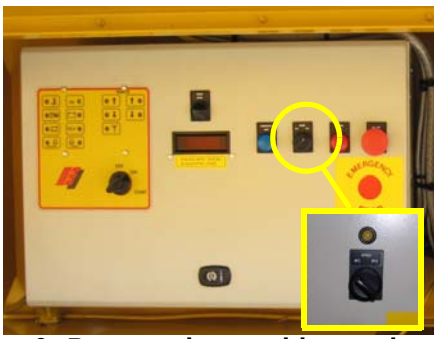
3: Using appropriate equipment support the toggle plate.



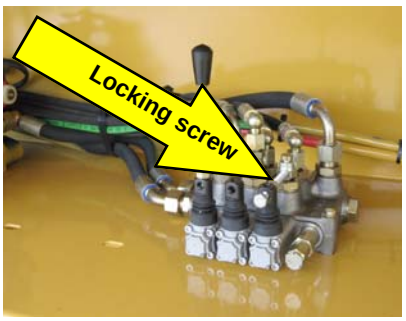
4: Remove toggle support arm tie bar & bush. (Note: Only one bolt shown.)



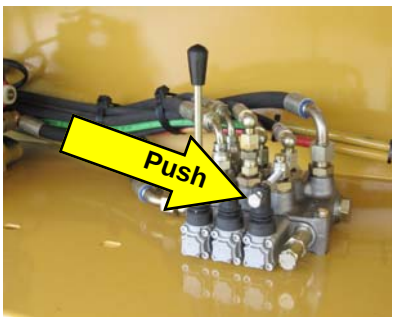
5: Screw in relief valve cartridge to disperse the accumulator pressure.



6: Restart the machine and leave speed switch at position No.1. *Do Not Operate the Jaw Lock.*



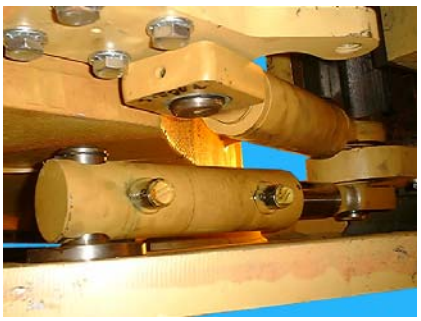
7: Unscrew locking screw.



8: Utilise screw as a valve handle and push valve handle to release toggle plate.

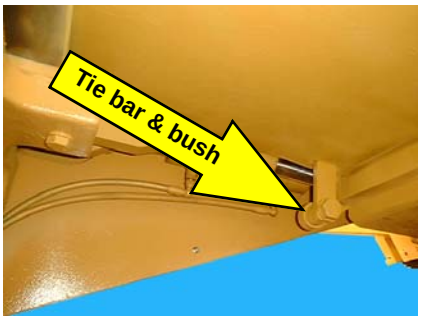
9: Stop the machine. See “Stopping the Machine” on page 29

10: Lower existing toggle onto main conveyor. Remove and replace with new toggle plate.

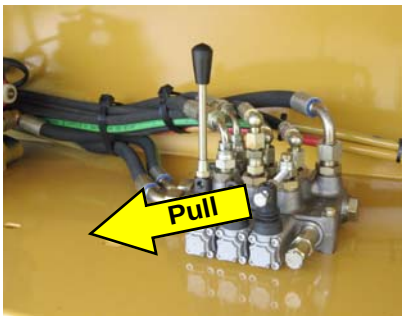


11: Examine toggle clamping and lift ram bearings for cracks due to toggle replacement. Replace if necessary.

12: Raise new toggle plate into position.

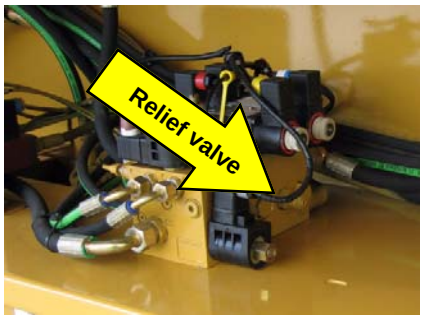


13: Replace toggle support arm tie bar and bush. (Note: Only one bolt shown.)



14: Pull back the toggle release valve handle. This will then clamp the toggle plate into position.

15: Remove valve handle and lock back into position shown above.



16: Restart machine and press Jaw Lock ON button. Screw out relief valve until accumulator pressure gauge reads 155 - 170 bar.

17: Adjust to the required closed size setting. See "Setting Material Output Size" on page 40

WARNING:

a. Ensure ***ALL*** personnel are clear of the machine ***BEFORE*** releasing the jaw stock.

b. Ensure that ***ALL*** guards are refitted and that the feeder, crusher and conveyor belts are empty ***BEFORE*** restarting machine.

5.10 Maintenance and Service Parts

For 250 hours the required items are:

Part No.	Part Description	Quantity
1. EN5020	VORTEX PRE-CLEANER - CV-15922	1
2. EN1402	FILTER HOUSING	2
3. EN1505	VISUAL POP UP INDICATOR - SUITS MP1003A	2
4. EN1601	FILTER UNIT	1
5. HF1017	FILTER SUCTION STR1004SG1M90-2	6
6. EN1523	DESICCANT AIR BREATHER COMPLETE	1
7. EN1401	HYDRAULIC WATER TRAP FILTER	1
8. EN1504	VISUAL POP UP INDICATOR - SUITS MP1002	1
9. EN1403	RETURN LINE ELEMENT	2
10. EN1404	HYDRAULIC WATER TRAP FILTER	1
11. EN1008	AIR FILTER INDICATOR	1
12. EN1003	PRIMARY AIR FILTER	1
13. EN1004	SECONDARY AIR FILTER	1
14. EN1000	ENGINE OIL FILTER	1
15. EN1001	ENGINE PRIMARY FUEL FILTER	1
16. EN1002	ENGINE SECONDARY FUEL FILTER	1
17. EN1405	3 MICRON FLUSHING FILTER	1

For a 1000 hours add the extra items:

Part No.	Part Description	Quantity
18. EN1000	ENGINE OIL FILTER	1
19. EN1001	ENGINE PRIMARY FUEL FILTER	1
20. EN1002	ENGINE SECONDARY FUEL FILTER	1

Section 6 Trouble Shooting Guide

Below is a list of some of the common problems that might occur on your machine. If these problems arise, carry out the checks listed.

PROBLEM	SOLUTION
Engine losing power or hard to start.	*Check air filter isn't blocked.* *Check diesel filter and sediment bowl.*
Engine won't start or keeps shutting off.	*Check that emergency stops are not pushed in.* *Check water level in radiator.* *Check fuel level.* *Check that the batteries are charged and that the terminals are tight.* *Check oil pressure, temperature, battery and over-speed warning lights on electrical control panel.*
Crusher won't start.	*Check that "Crusher" button is "ON" in electrical box.* *Check fuel level.* *Check hydraulic oil level in tank.* *Check that there are no hydraulic pipes leaking.* *Check flywheel belt tension.* *Check engine speed switch is at No.2 position.* *Clean air filter, diesel filter & diesel sediment bowl.* *Check control pressure. See "Control Block Pressure" on page 84*
Flywheel slowing under load.	*Check hydraulic oil level in tank.* *Check that there are no hydraulic pipes leaking.* *Check flywheel belt tension.* *Check engine speed switch is at No.2 position.* *Clean air filter, diesel filter & diesel sediment bowl.* *Check pressure at motor control block. See "Control Block Pressure" on page 84*
Feeder not working.	*Check Webtec is fully open.* *Check pressure on at 4 station manifold using 0 - 250 bar pressure gauge. See "Checking 5 Station Manifold Pressure" on page 83*

PROBLEM	SOLUTION
"Knocking" noise coming from toggle.	*Check clamp pressure is between 155 - 170 bar.* *Check operation of toggle cylinders and ensure area is clear of debris.*
Machine "Rocking" excessively.	*Check flywheel alignment.* *Check ground conditions are firm and level.* *Check tracks are not slack. If they are see 5.6.1 Increasing The Track Tension on page 62.*
Machine not tracking.	*Check oil level in the hydraulic tank.* *Check that Interlock and Track buttons are on.* *Check remote handset is fully charged. Plug in Hard Wire Drive and try to move machine.* *Check that all levers are in their central position and check if the crusher operates. If Crusher operates and levers are central but the machine still won't track, this may indicate an electrical problem. Contact Extec Screens & Crushers Ltd immediately.*
Main, Side or Magnet Conveyor belts jammed.	*Check belt tension.* *Ensure that there is no build-up of material underneath machine.* *Clean under machine as shown in following photographs as required.*
Vogel Grease Warning Light on the control box lights up.	*Refill the greasing unit. Follow the maintenance and filling instructions as laid out in the manufacturer's handbook.* *If the light persist check that the manifold on the jaw stock is funtioning correctly.* *Check for any possible blockages.*

1: Using jacking legs, lift the machine off ground.

2: Ensure that locking pins and R-clips are fitted BEFORE cleaning below the machine.

6.1 Test Procedures for Electronics

See drawings in the Appendix B: Drawing Pack for lamp diagnostics, jaw control and wiring diagrams.

Symptoms:

Engine is shutting down and **REMOTE STOP** lamp on EPU is showing.

The crusher electronics shuts down the engine via the EPU for 3 reasons:

1. Signal received by receiver from correctly coded handset requesting “fast stop”.
2. Red button on override handset has been pressed.
3. Crusher control box has lost communications with the receiver unit.

To identify which of the above cases is correct please look at the lamps above the **INTERLOCK ON** switch, the **INTERLOCK OFF** switch and the lamp above the **JAW REMOTE** switch.

Case 1)

Receiver believes it is receiving a signal from a handset. Lamp state as follows:

Lamp above **JAW REMOTE** switch: **Flashing**

Lamp above **INTERLOCK OFF** switch: **Lit**

Lamp above **INTERLOCK ON** switch: **Dark**

Before the crusher shuts down, the green lamp on the track LED box should flash briefly to indicate signal being received from handset.

Check:

All handsets are switched off. If necessary remove batteries from small handset.

Case 2)

Override handset used. Lamp state as follows:

Lamp above **JAW REMOTE** switch: **Flashing**

Lamp above **INTERLOCK OFF** switch: **Dark**

Lamp above **INTERLOCK ON** switch: **Dark**

Check:

Unplug manual handset, check back of socket for manual handset for dirt/ water contamination or damage to wiring.

Case 3)

Lost communications. The crusher control box (unit with 36 way connector inside switch box) is having problems communicating with the receiver unit. Lamp state as follows:

Lamp above **JAW REMOTE** switch: **Lit**

Lamp above **INTERLOCK OFF** switch: **Flashing**

Lamp above **INTERLOCK ON** switch: **Flashing**

Check:

- Receiver is switched on, red lamp should flash whilst crusher is still running, will change to constantly illuminated when crusher shuts down.
- Track lamps run through start up test, this test is actually performed by the receiver, if the track lamps perform test then the receiver is communicating correctly with the track lamps box.
- Check 6 way connector near the receiver; all wires are matched up with the correct colour wire on both sides of the receiver. Connector is plugged in securely and all wires are secure in the crimp contacts.
- Check yellow and white wires inside switch box are securely fitted to screw terminals.
- Check yellow and white wires from screw terminal inside switch box to 36 way connector on crusher control box. White wire should go to bottom row, end contact on the right of the connector as you look into the switch box. The yellow wire is on the same row to the left of this. The important point is that the white wire is on the end contact and the yellow is one contact in. Check these wires to ensure they are not swapped or poorly crimped.

6.2 Checking Hydraulic Pressure

1: Check tank return pressure using a 0 - 10 bar pressure gauge - this should be not greater than 4 bar.

2: Check control pressure using a 0 - 100 bar pressure gauge. This should be 40 bar at all times.

3: Check suction pressure using a 0 - 6 bar pressure gauge - this should be between ½ bar min. and 1½ bar max.

6.3 Checking 5 Station Manifold Pressure

Check pressure at test points shown to check the feeder, magnet, side and main conveyor using a 0 - 250 bar pressure gauge. Pressure readings when running empty should be:

4. Side conveyor - 30 bar. Peak pressure - 200 bar.
5. Feeder (Cold start) - 100 bar - this should drop to 50 bar when warm. Peak pressure - 200 bar.
6. Spare
7. Main conveyor - 50 bar. Peak pressure - 240 bar.
8. Magnet - 30 bar. Peak pressure - 200 bar.

Figure 6-1: Test points are on manifold block on side of valve plate.

6.4 Control Block Pressure

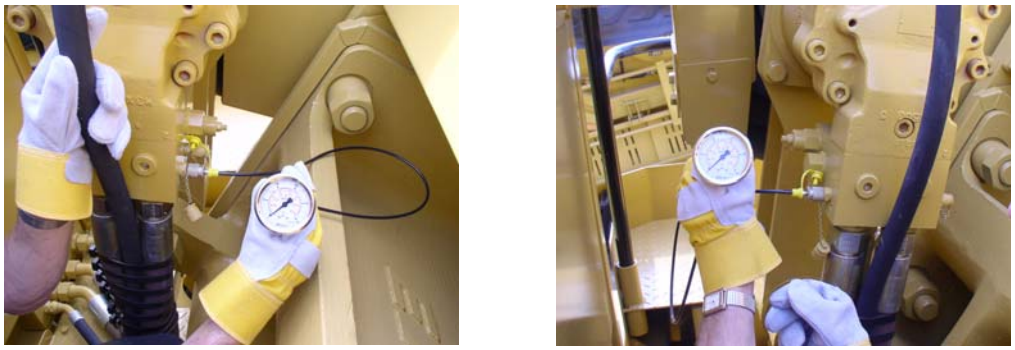


Figure 6-2: Checking Control Block Pressure

Check pressure at motor control block using a 0 - 400 bar pressure gauge as shown. Pressure readings should be:

Running empty	cold start up max 70 bar. Should drop to 10 - 20 bar when warm.
Recycling concrete, etc.	100 - 150 bar.
Medium rock	150 - 250 bar.
Hard rock	200 - 300 bar.

Note: A high pressure reading when crusher is empty would indicate a mechanical problem with the crusher, such as an obstruction between jaw stock and side of crusher box. If this occurs, **STOP MACHINE & INVESTIGATE IMMEDIATELY.**

IF ANY PROBLEM PERSISTS AFTER CARRYING OUT THE RECOMMENDED SOLUTION, OR A PROBLEM ARISES THAT IS NOT ON THIS LIST, CONTACT Extec Screens & Crushers Ltd SERVICE DEPARTMENT FOR FURTHER ASSISTANCE.

ADJUSTING PRESSURE SETTINGS OR REFILLING HYDRAULIC OIL ON THE MACHINE SHOULD ONLY BE CARIED OUT BY TRAINED Extec Screens & Crushers Ltd SERVICE ENGINEERS.

Appendix A Parts Manual

Contact Details

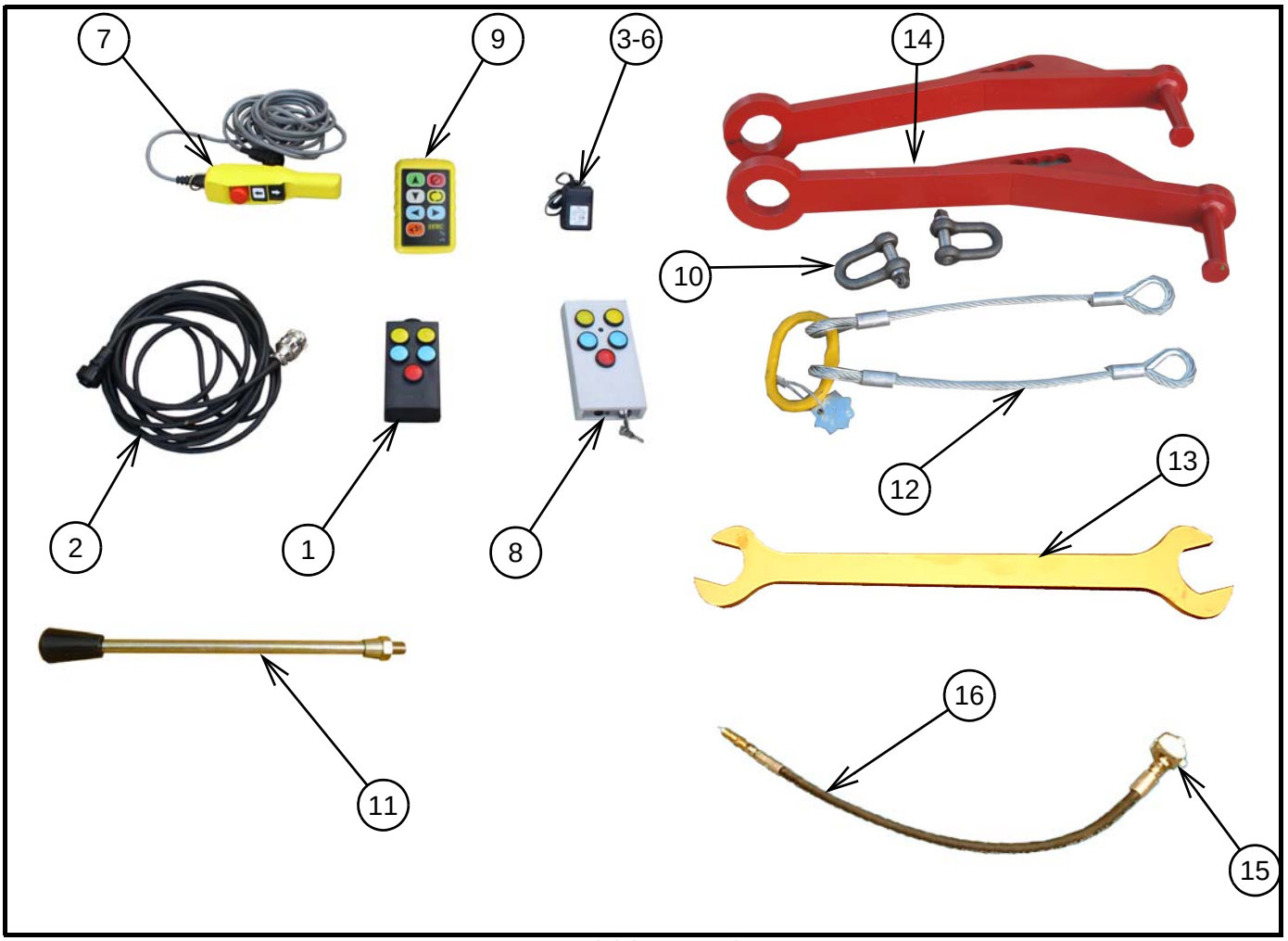
Extec Screens & Crushers Ltd
Hearthcote Road
Swadlincote
Derbyshire
DE11 9DU
United Kingdom

Telephone: +44 (0)1283 212121
Fax: +44 (0)1283 226465
Parts and Service: +44 (0)8000 181945
www: http://www.extecscreens.com

Note: Every effort has been made to ensure the accuracy of this manual at the time of publication. However, with Extec Screens & Crushers Ltds' policy of continually improving their products, your machine may not coincide exactly with this manual. Therefore, before placing any order for spare parts, we recommend that you contact our Service Department (with your machine Serial No.) for Part No. verification.

Parts Manual Contents

AA.1 Loose Items

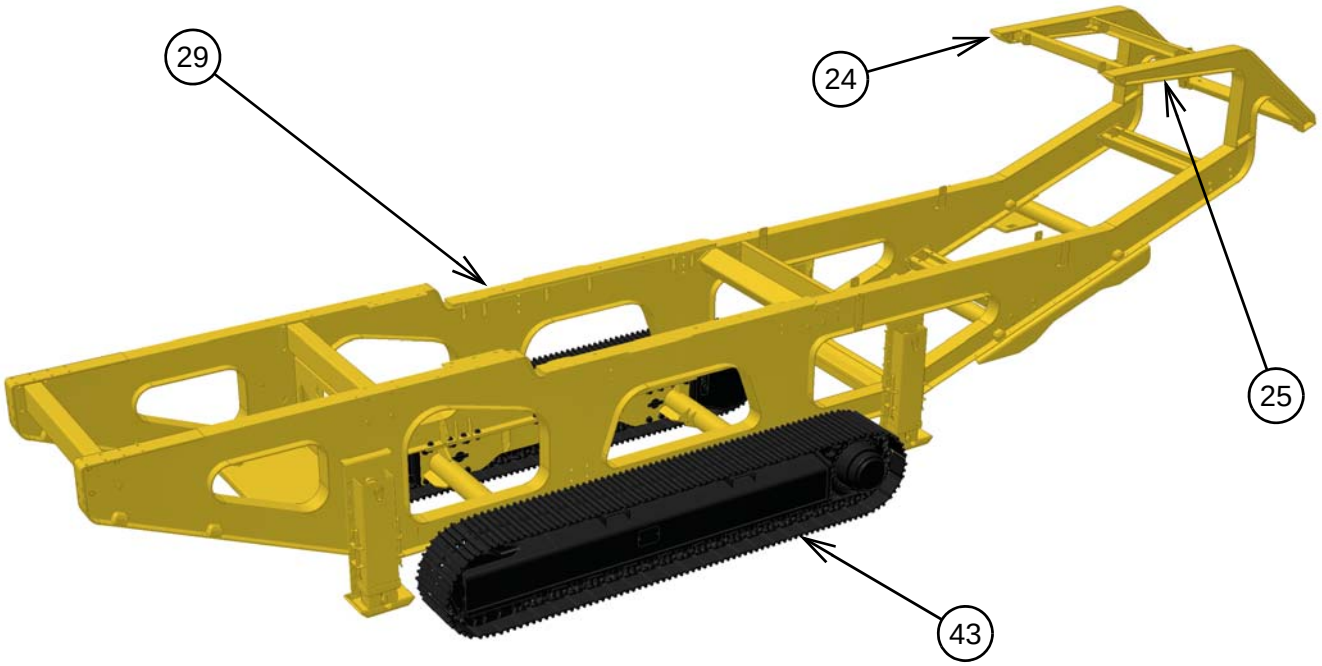


1: LOOSE ITEMS

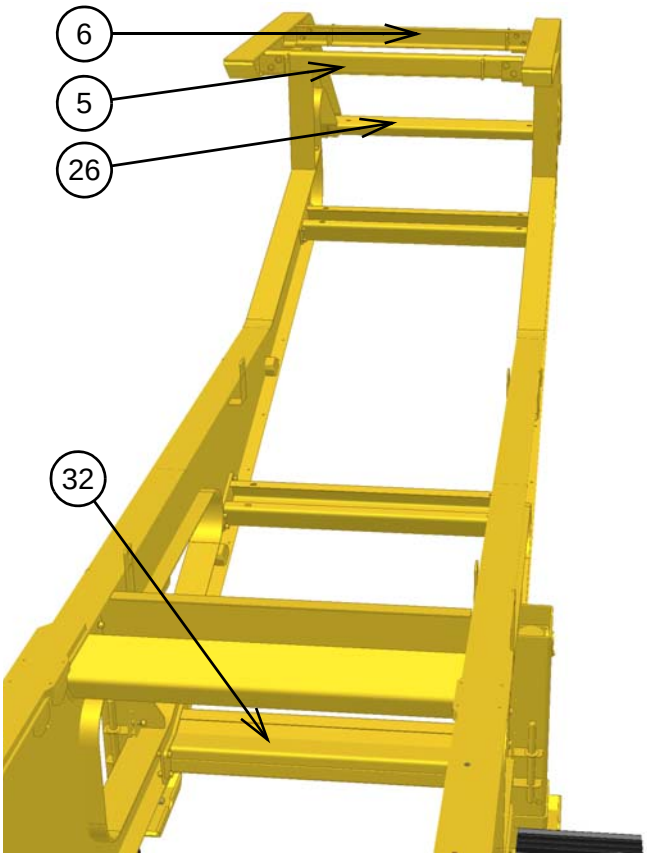
Part No.	Part Description	Quantity
1. EL2069	MANUAL HANDSET	1
2. EL2009	UMBILICAL CHORD (7 m)	1
3. EL2104	REMOTE CONTROL HANDSET CHARGER (UK ONLY)	1
4. EL2105	REMOTE CONTROL HANDSET CHARGER (CONTINENT ONLY)	1
5. EL2106	REMOTE CONTROL HANDSET CHARGER (JAPAN ONLY)	1
6. EL2109	REMOTE CONTROL HANDSET CHARGER (USA ONLY)	1
7. EL2110	JAW ADJUST REMOTE CONTROL	1
8. EL4424	REMOTE CONTROL HANDSET (433 MHz)	1
9. EL4420	FEEDER REMOTE CONTROL (433 MHz)	1
10. FADL1006	1 D SHACKLE (M24 PIN)	2
11. HV1052	SPOOL LEVER HANDLE	2

Part No.	Part Description	Quantity
12. J4840000	LIFTING PLATE ROPES	1
13. J4870000	FIXED WEARPLATE WEDGEBOLT SPANNER (55 & 65 A/F)	1
14. J6360000	FIXED JAW WEARPLATE LIFTING TOOL	2
15. UC4003	GREASE NIPPLE ADAPTOR (TRACKS)	1
16. HHGR33	GREASE NIPPLE ADAPTER HOSE	1

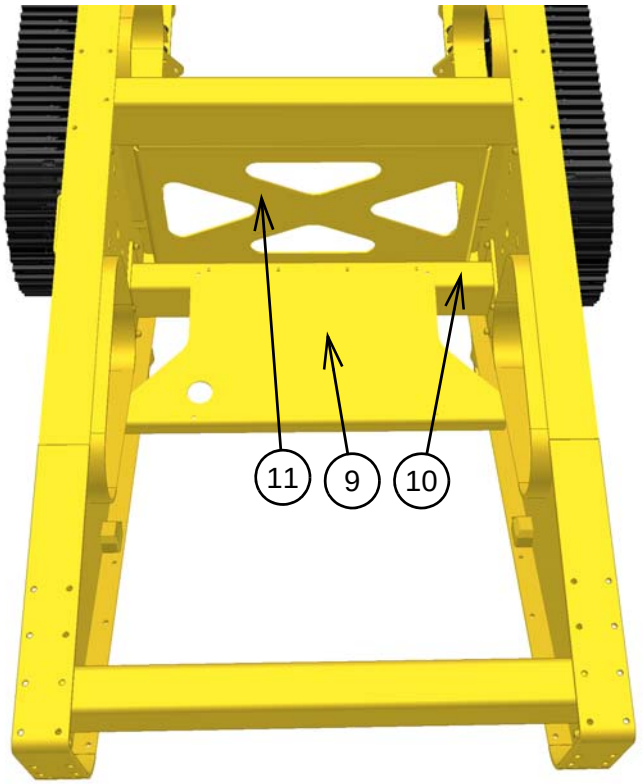
AA.2 Chassis, Walkways and Tracks



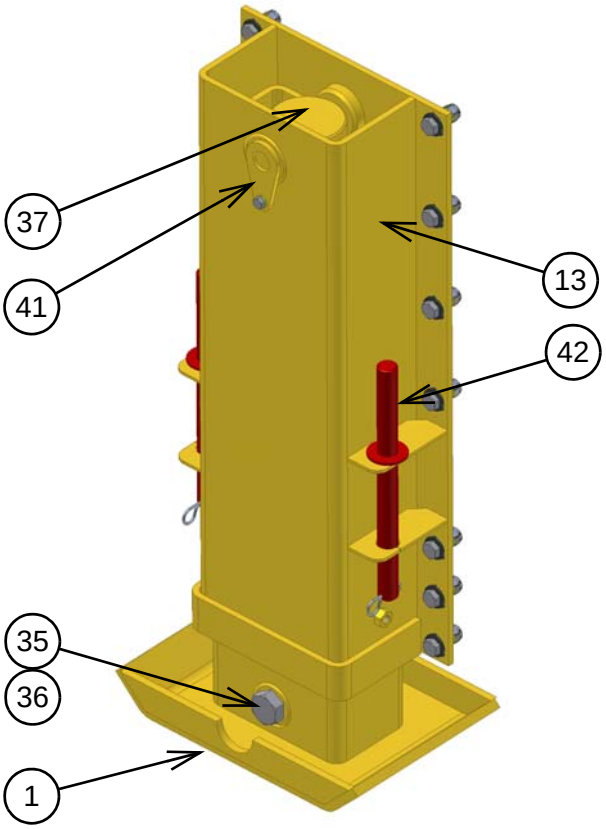
1: CHASSIS ON TRACK



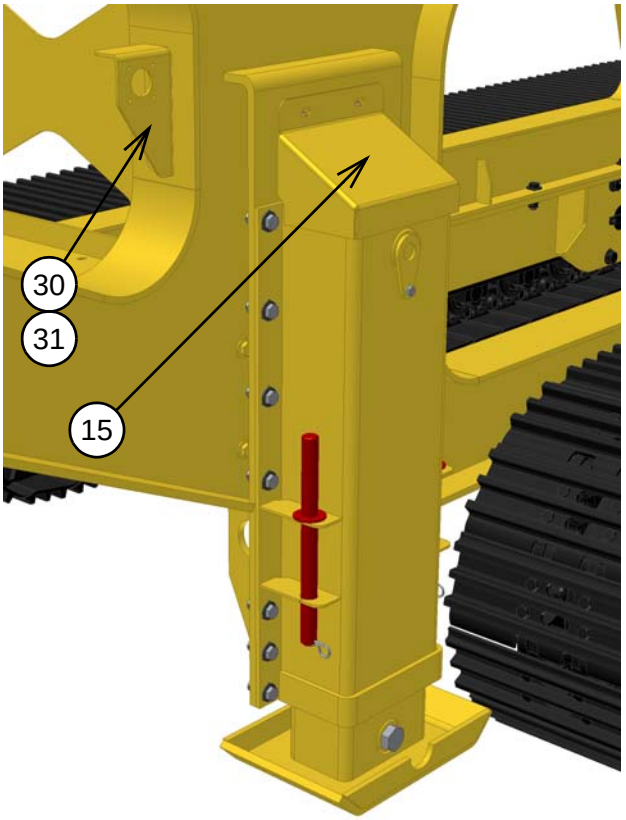
2: CHASSIS FRONT END



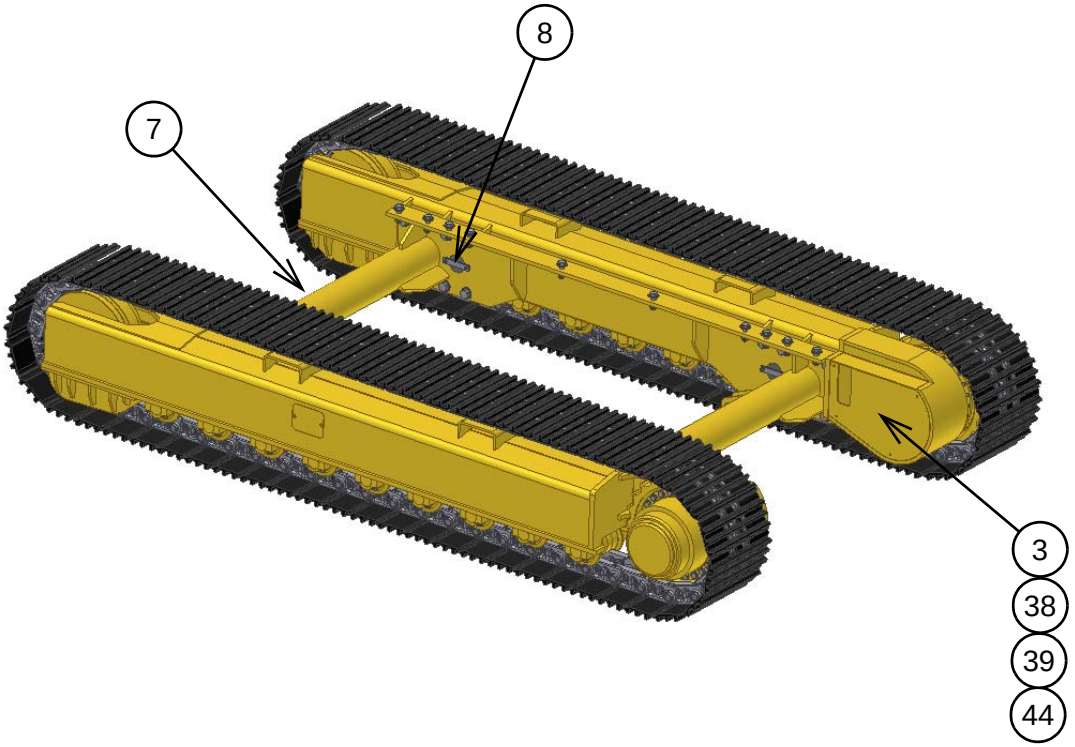
3: CHASSIS REAR END



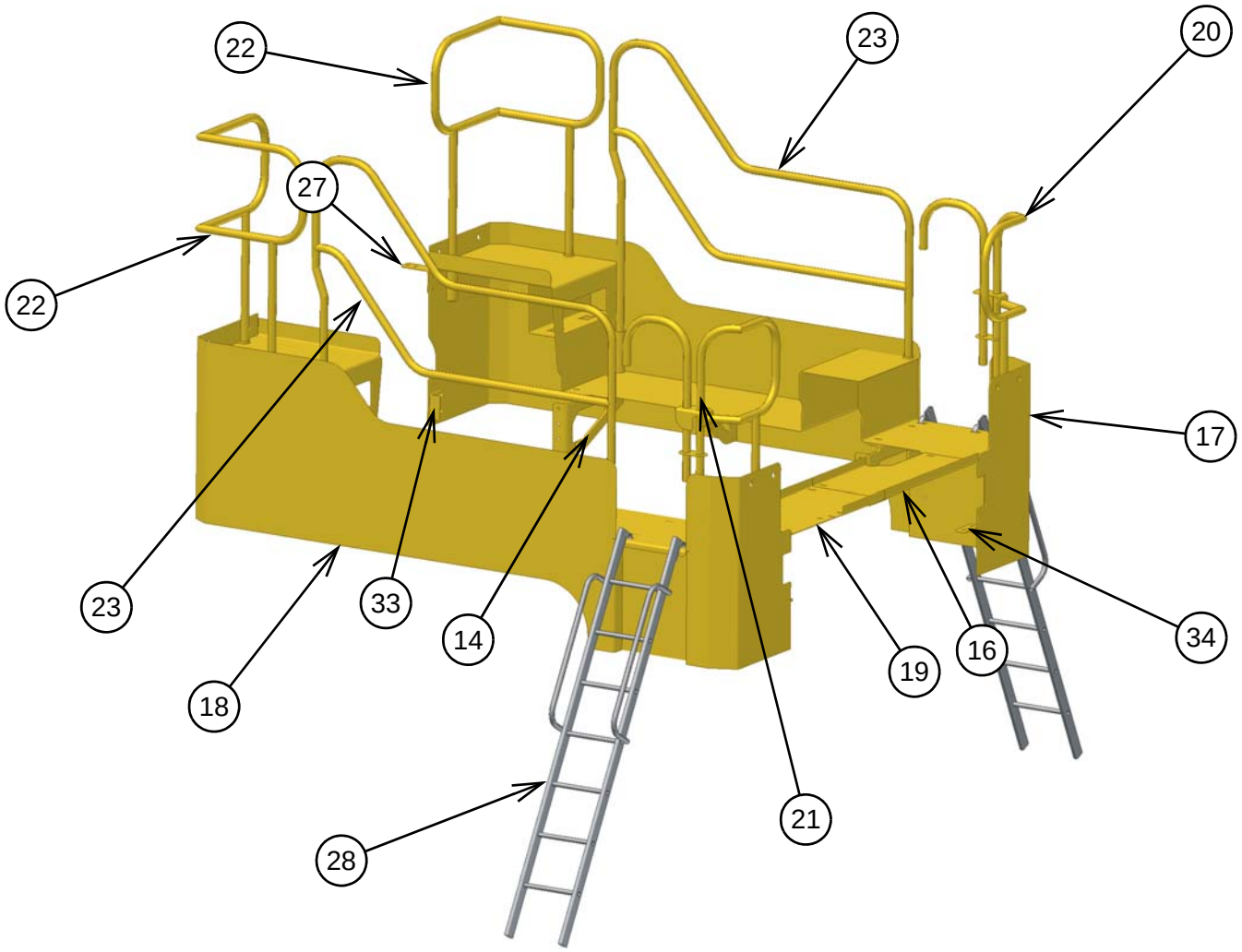
4: JACKING LEG



5: JACKING LEG MOUNTED



6: VIEW OF TRACKS

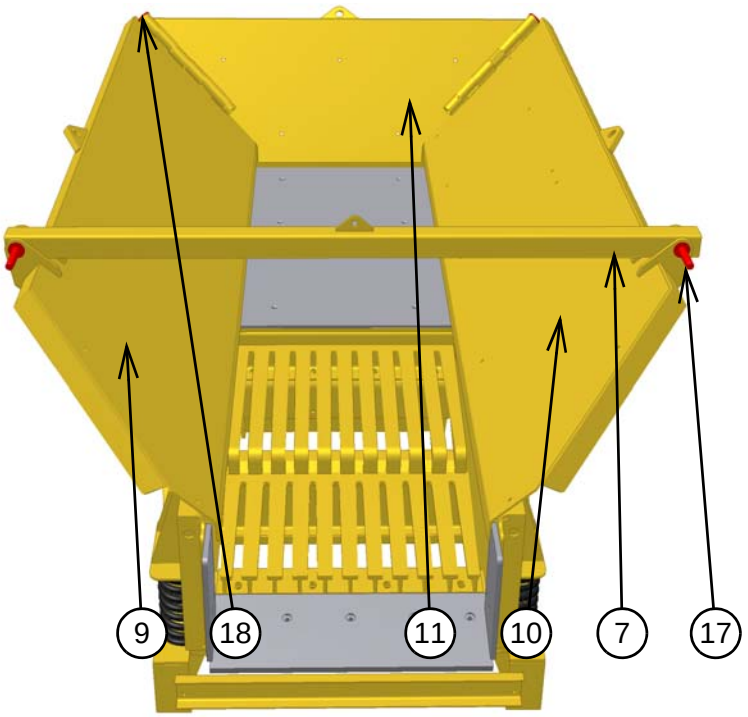


7: WALKWAY

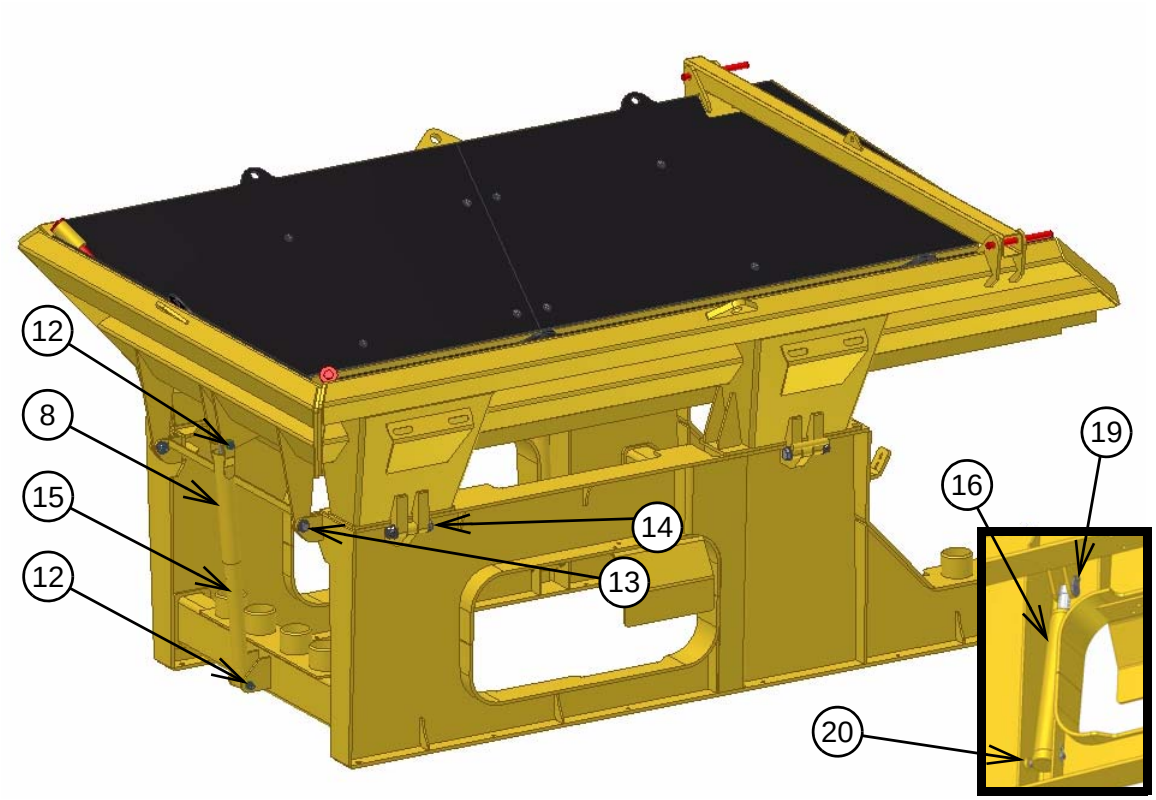
Part No.	Part Description	Quantity
1. A4110000	JACKING LEG INNER	4
2. A5020000	WATER MANIFOLD	1
3. A6080000	TRACK MOTOR COVER PLATE	2
4. A6160000	JACKING LEG COVER REAR LEFT	1
5. A8880000	MAGNET SUPPORT FRAME (DRIVE SIDE)	1
6. A8890000	MAGNET SUPPORT FRAME	1
7. A13920000	UNDERCARRIAGE MOUNTING FRAME	1
8. A13930000	TRACK LOCATION DOWEL	4
9. A14040000	DIESEL TANK SUPPORT	1
10. A14050000	REAR BASE CROSS MEMBER	1
11. A14060000	CHASSIS STIFFENING PLATE	1

Part No.	Part Description	Quantity
12. A14130000	TRI-AXLE BOGIE MOUNTING	A/R
13. A14180000	JACKING LEG	4
14. A14200000	WALKWAY BRACKET	4
15. A14460000	JACKING LEG COVER	2
16. A14830000	INFILL PANEL	1
17. A14840000	WALKWAY ASSEMBLY NON-DRIVE SIDE	1
18. A14850000	WALKWAY ASSEMBLY DRIVE SIDE	1
19. A14860000	ACCES PLATFORM INFILL PANEL	1
20. A14880000	WALKWAY END RAILING (LARGE R/H)	1
21. A14890000	WALKWAY END RAILING (LARGE R/H)	1
22. A14900000	WALKWAY RAILING	2
23. A14910000	WALKWAY RAILING	2
24. A14920000	MAGNET SUPPORT R/H	1
25. A14930000	MAGNET SUPPORT L/H	1
26. A14960000	CONVEYOR SUPPORT BEAM	1
27. A14970000	WALKWAY BRACKET	2
28. A15000000	ALUMINIUM LADDER	2
29. A15160000	CHASSIS	1
30. A15240000	EMERGENCY STOP GUARD	1
31. A15250000	EMERGENCY STOP GUARD	1
32. A15780000	BOTTOM CROSS BEAM	1
33. A15870000	TIE BRACKET	2
34. A15880000	TIE BRACKET	2
35. FAB30X200	M30X200 HT BOLT	4
36. FAN30N	M30 NYLOC NUT	4
37. HR1028	JACKING LEG HYDRAULIC RAM	4
38. HV3019	TRACK CONTROL BLOCK	2
39. HV3530	TRACK RELIEF VALVE	4
40. HV8004	¾" BSP BALL VALVE	2
41. PN1085	PIN	4
42. PN1088	PIN	8
43. UC2020	TRACK COMPLETE	1
44. UC5002	TRACK MOTOR	2

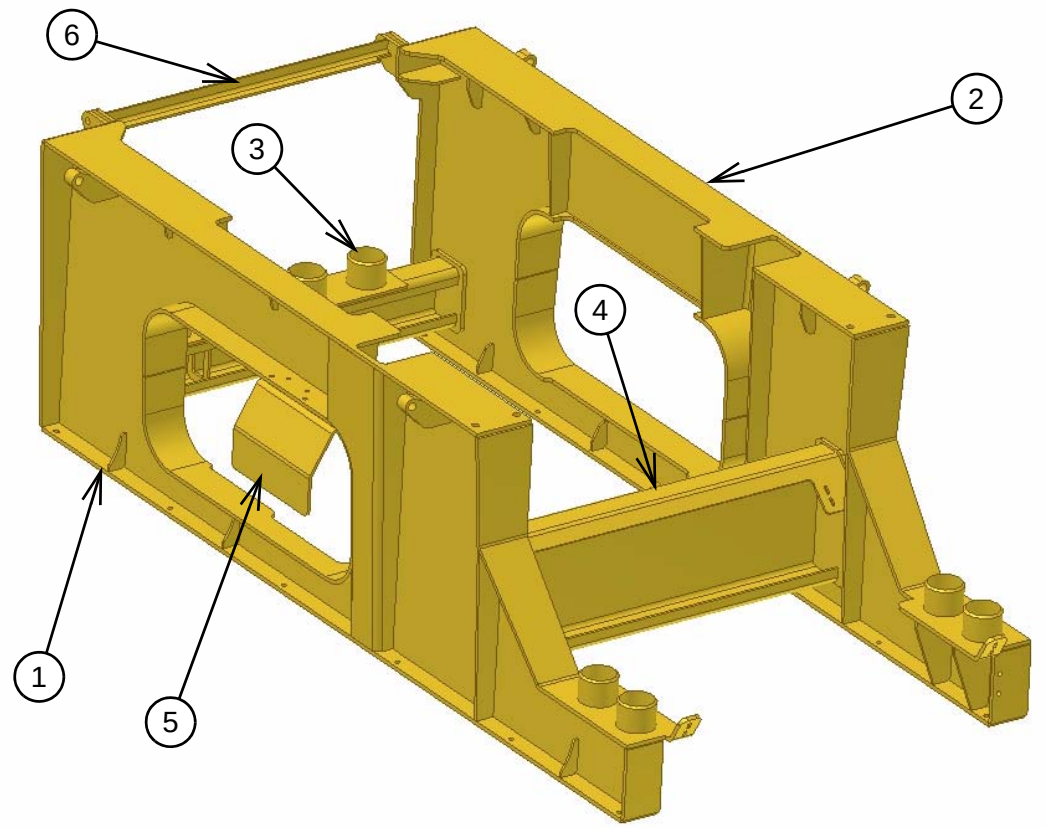
AA.3 Hopper



1: HOPPER DOORS



2: HOPPER RAMS

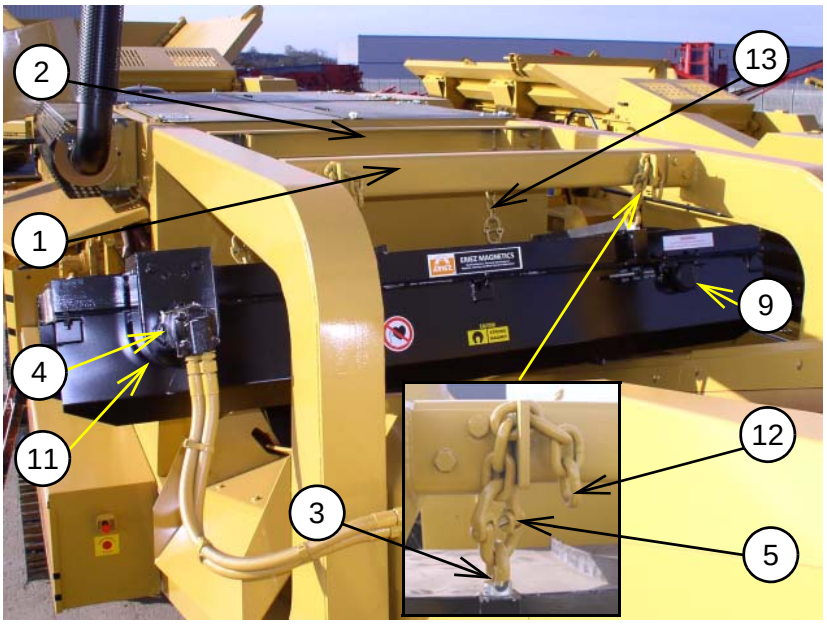


3: HOPPER FRAME

Part No.	Part Description	Quantity
1. A15140000	FEEDER MOUNTING FRAME ASSY	1
2. A15150000	FEEDER MOUNTING FRAME ASSY	1
3. A15170000	FEEDER REAR CROSS BRACE	1
4. A15180000	FEEDER FRAME CROSS BEAM	1
5. A15200000	FEEDER MOTOR GUARD	1
6. A16590000	FEEDER FRAME CROSS BEAM	1
7. C1020000	HOPPER DOOR TIE BAR	1
8. C1080000	HOPPER REAR DOOR RAM SHIELD	1
9. C9250000	HOPPER R/H SIDE DOOR	1
10. C9260000	HOPPER L/H SIDE DOOR	1
11. C9270000	HOPPER REAR DOOR	1
12. FAB20X150	M20 X 150 BOLT	1
13. FAB24X90	M24 X 90 HT BOLT	2
14. FAB30X200	M30 X 200 HT BOLT	4

Part No.	Part Description	Quantity
15. HR1044	HYDRAULIC RAM	1
16. HR1045	HYDRAULIC RAM	2
17. PN1087	PIN	2
18. PN1089	PIN	2
19. PN1092	PIN	2
20. PN1179	PIN	2

AA.4 Magnetic Conveyor and Supports

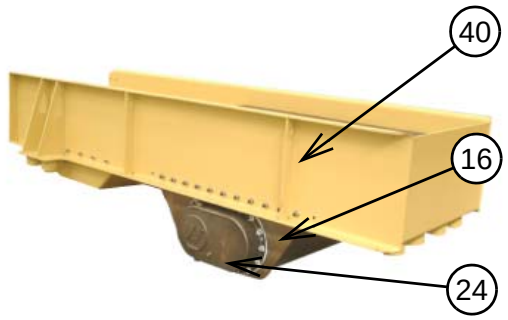


4: MAGNETIC CONVEYOR FITTED

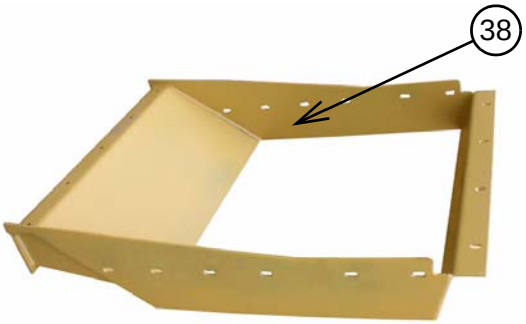
5: MAGNETIC CONVEYOR

Part No.	Part Description	Quantity
1. A8880000	MAGNET SUPPORT FRAME (DRIVE SIDE)	1
2. A8890000	MAGNET SUPPORT FRAME	1
3. FAEB1002	M24 LIFTING EYE	4
4. HM1010	BELT DRIVE MOTOR 305 cc	1
5. MA1001	COUPLEX CONNECTOR	4
6. MA1050	CP20/80SC2 ERIEZ MAGNET	1
MA1150	CP25/80 SC2 ERIEZ MAGNETCOMPLETE WITH MOTOR (OPTION)	1
7. MA1051	DRIVE PULLEY	1
8. MA1052	NON DRIVE PULLEY	1
9. MA1053	PLUMBER BEARINGS	4
10. MA1054	CONVEYOR BELT	1
11. MA1055	DRIVE COUPLING	1
12. MA1060	CHAIN (10 LINK)	2
13. MA1065	CHAIN (16 LINK)	2

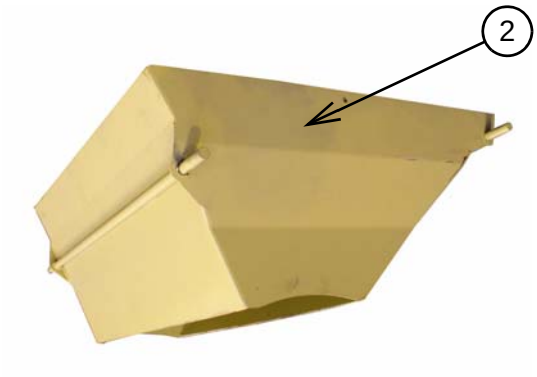
AA.5 Feeder and Vibrator Box



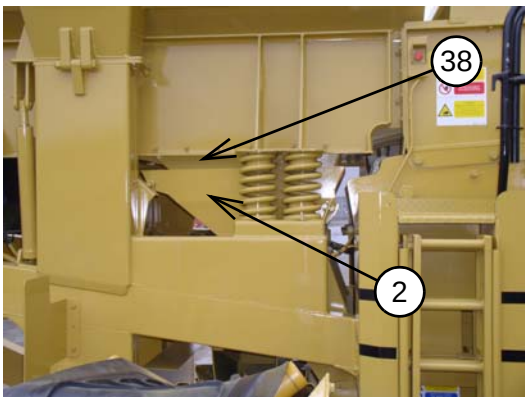
1: VIEW ON FEEDER ASSEMBLY



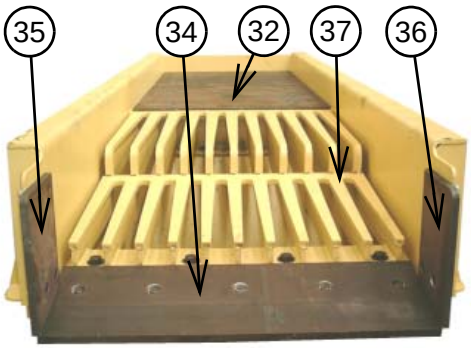
2: VIEW ON DISCHARGE CHUTE



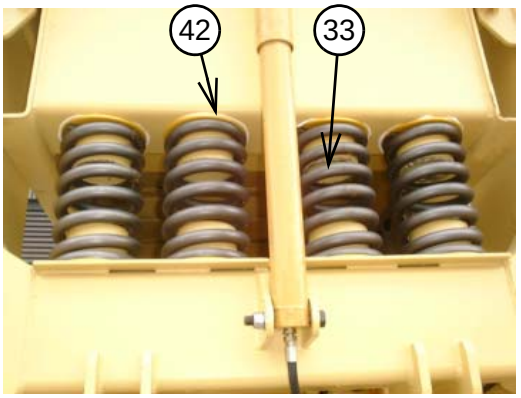
3: VIEW ON DISCHARGE CHUTE EXTENSION



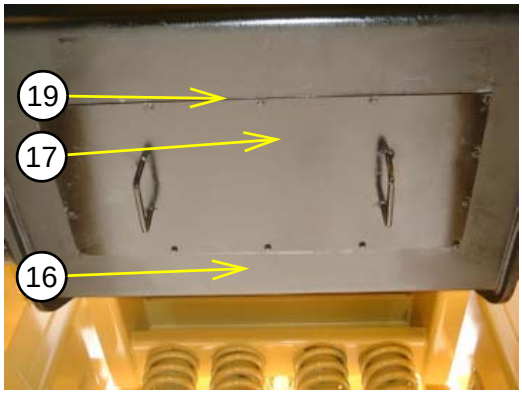
4: VIEW ON DISCHARGE CHUTE



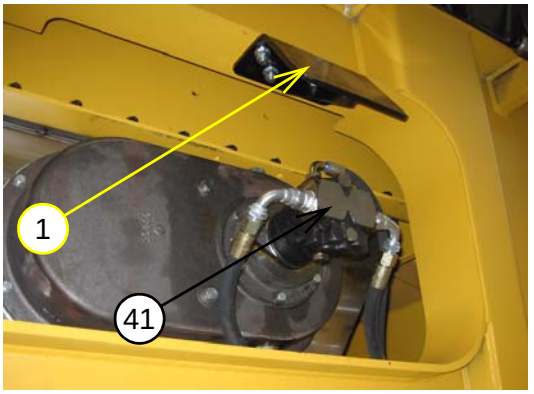
5: VIEW ON FEEDER WEAR PLATES



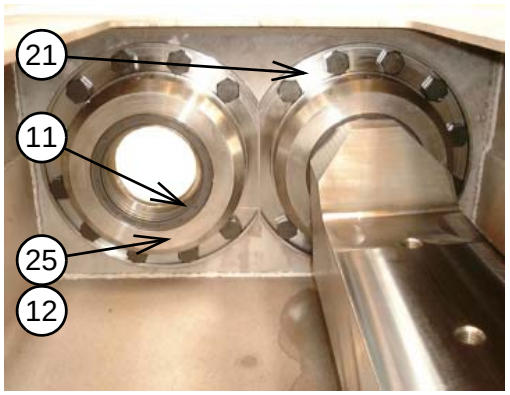
6: VIEW ON FEEDER SUPPORT SPRINGS



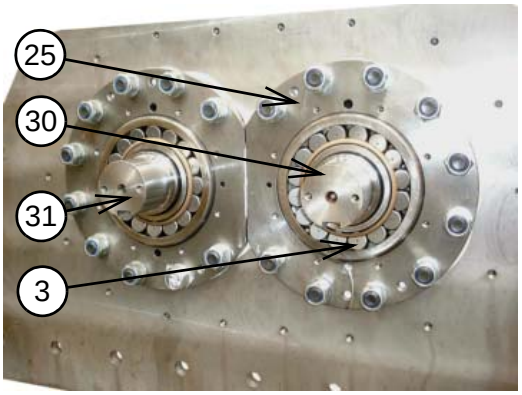
7: VIEW ON UNDERSIDE OF FEEDER



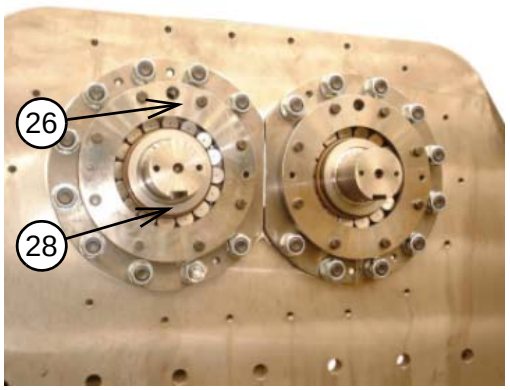
8: VIEW ON MOTOR GUARDS



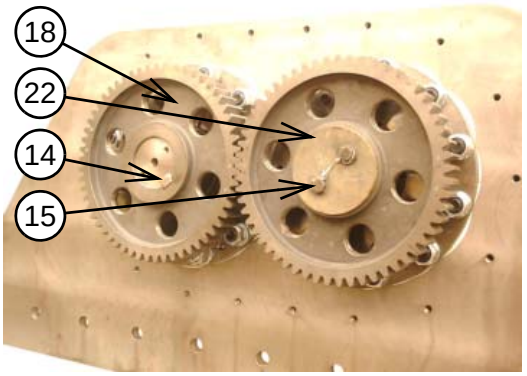
9: VIEW ON IN SIDE OF VIBRATOR BOX



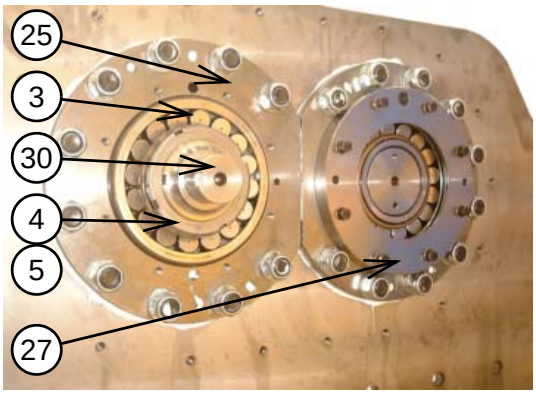
10: VIEW ON NON-DRIVE SIDE BEARINGS



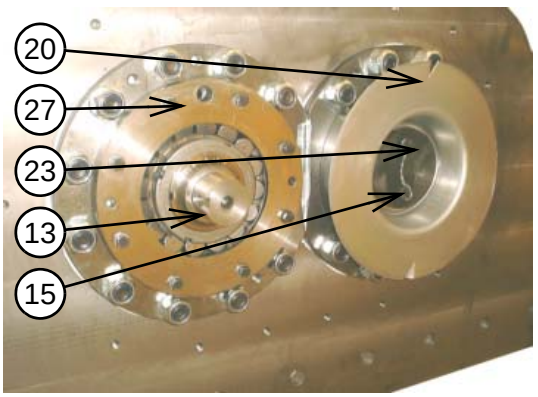
11: VIEW ON NON-DRIVE SIDE BEARING PLATES



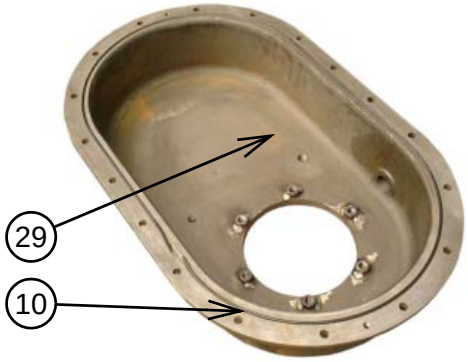
12: VIEW ON GEARS



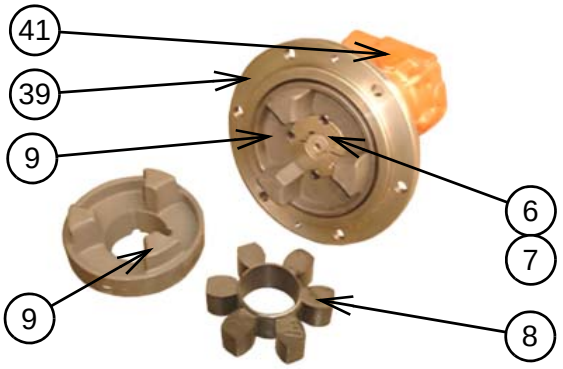
13: VIEW ON DRIVE SIDE BEARINGS



14: VIEW ON OIL THROWER



15: VIEW ON DRIVE SIDE BEARING COVER

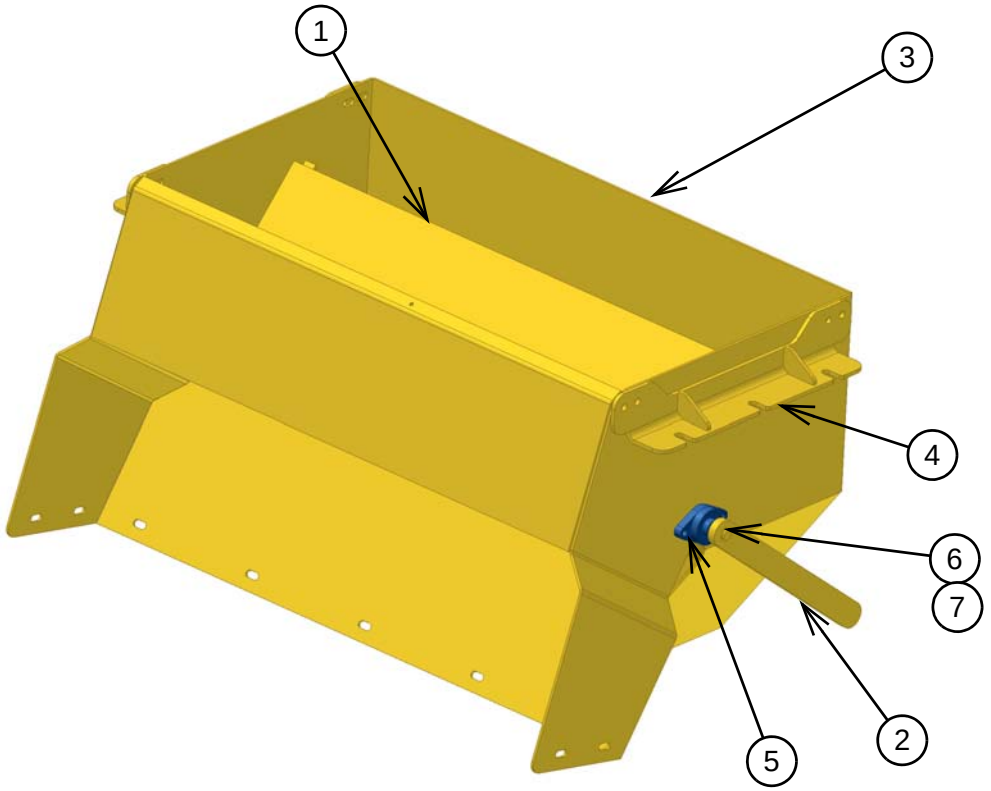


16: VIEW ON MOTOR & COUPLING ASSEMBLY

Part No.	Part Description	Quantity
1. A15200000	FEEDER MOTOR GUARD	1
2. A13570000	DISCHARGE CHUTE EXTENSION	1
3. BT3001	BEARING	4
4. BT3503	LOCK NUT	1
5. BT3504	LOCK WASHER	1
6. BT5006	TAPER LOCK BUSH (SHAFT)	1
7. BT5020	TAPER LOCK BUSH (MOTOR)	1
8. BT6514	SPIDER	1
9. BT6515	COUPLING INCLUDES 6, 7 8	1
10. BT8001	O-RING SEAL	2
11. BT8006	OIL SEAL	4
12. BT8506	O-RING SEAL	4
13. FAKS14X09	KEY (14 x 9 x 25 mm)	1
14. FAKS22X14	KEY (22 x 14 x 50 mm)	2
15. FAS10X20	M10 x 20 SET SCREW DRILLED	6
16. H2000000	VIBRATOR BOX HOUSING ASSEMBLY	1
17. H2010000	INSPECTION COVER PLATE	1
18. H2020000	GEAR WHEEL (57 TEETH)	2
19. H2030000	COVER PLATE GASKET	1
20. H2040000	OIL THROWER	1
21. H2050000	INNER BOLT RETAINING PLATE	4
22. H2060000	SHAFT END PLATE	2
23. H2070000	SHAFT END PLATE (DRIVE SIDE)	1
24. H2080000	OUTER COVER	1
25. H2090000	BEARING CARTRIDGE	4
26. H2100000	BEARING RETAINING PLATE	2
27. H2120000	BEARING RETAINING PLATE (DRIVE SIDE)	2
28. H2140000	GEAR SPACER RING	2
29. H2160000	OUTER COVER (DRIVE SIDE)	1
30. H2170000	DRIVE SHAFT	1
31. H2180000	DRIVEN SHAFT	1
32. H2310000	FEEDER BED WEAR PLATE	2

Part No.	Part Description	Quantity
33. H2390000	SPRING	8
34. H2480000	OUTLET WEAR PLATE	1
35. H2550000	OUTLET SIDE WEAR PLATE	1
36. H2560000	OUTLET SIDE WEAR PLATE (DRIVE SIDE)	1
37. H2610000	GRIZZLY BAR ASSEMBLY (44 - 70mm)	1
H488000	GRIZZLY BAR ASSEMBLY (50mm GAP) (OPTION)	1
38. H4970000	DISCHARGE CHUTE	1
39. H7450000	MOTOR MOUNTING COWL	1
40. H8260000	FEEDER ASSEMBLY	1
41. HM1034	HYDRAULIC MOTOR	1
42. RU5103	SPRING MOUNT	16

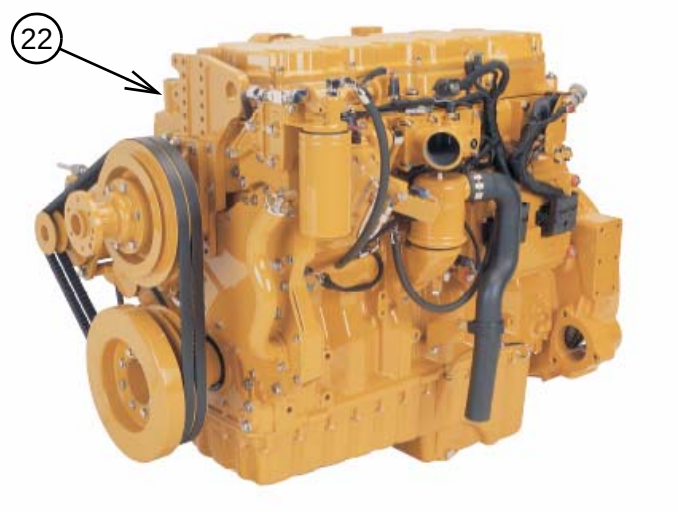
AA.6 Transfer Chute



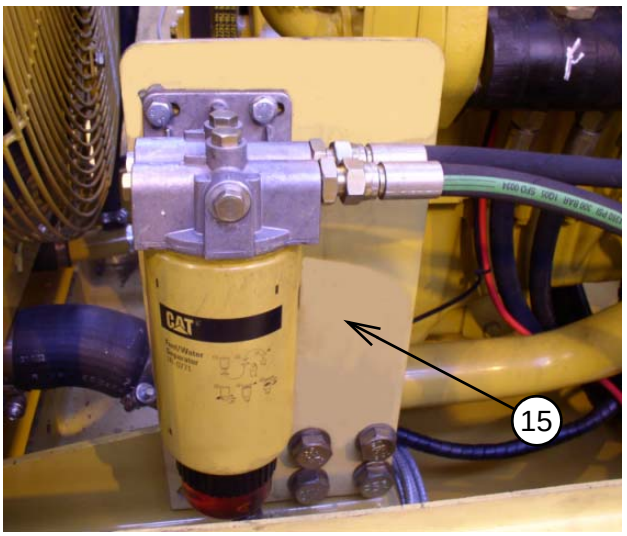
1: TRANSFER CHUTE ASSEMBLY

Part No.	Part Description	Quantity
1. A4650000	DEFLECTOR PLATE	1
2. A7730000	TRANSFER CHUTE HANDLE	1
3. A7840000	TRANSFER CHUTE	1
4. A14120000	MOUNTING BRACKET	2
5. BT2501	DISCHARGE CHUTE PIVOT BEARING	2
6. PN1093	DEFLECTOR PLATE PIVOT BAR	1
7. PN1094	DEFLECTOR PLATE PIVOT BAR	1

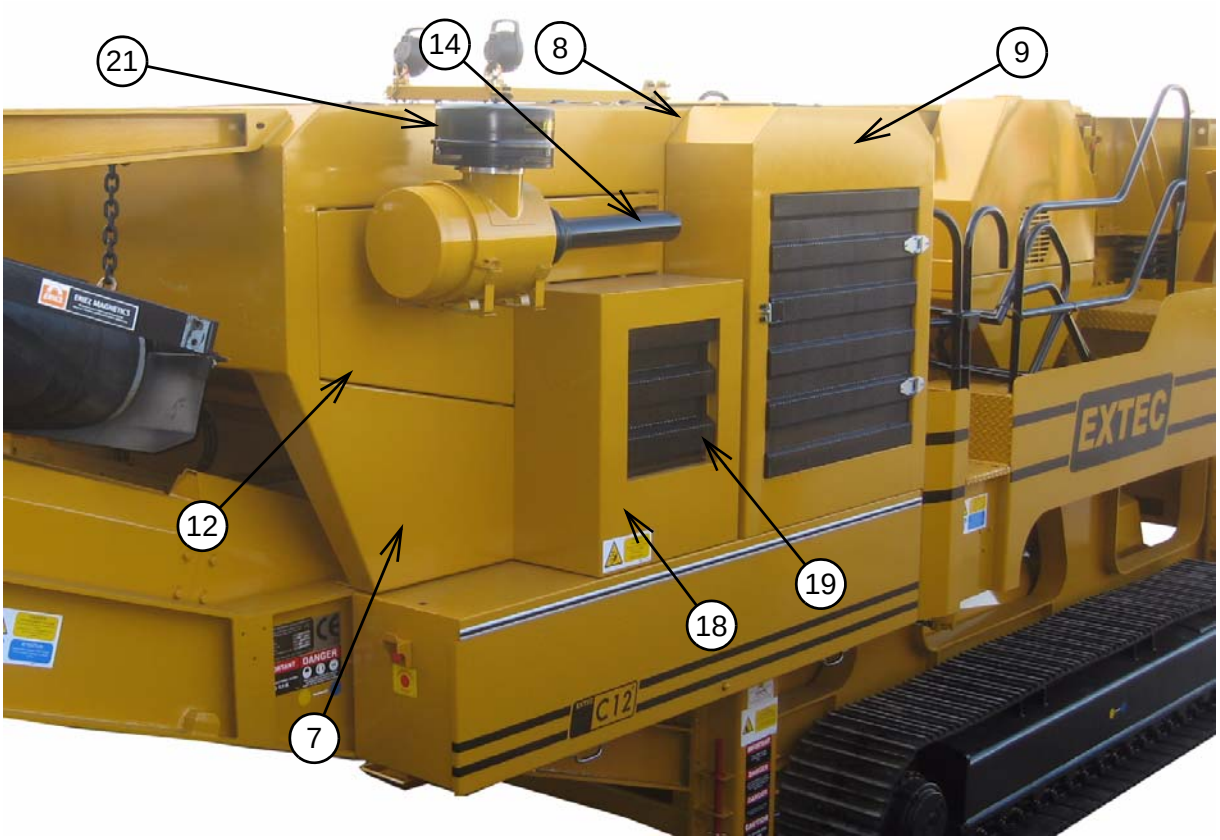
AA.7 Power Pack



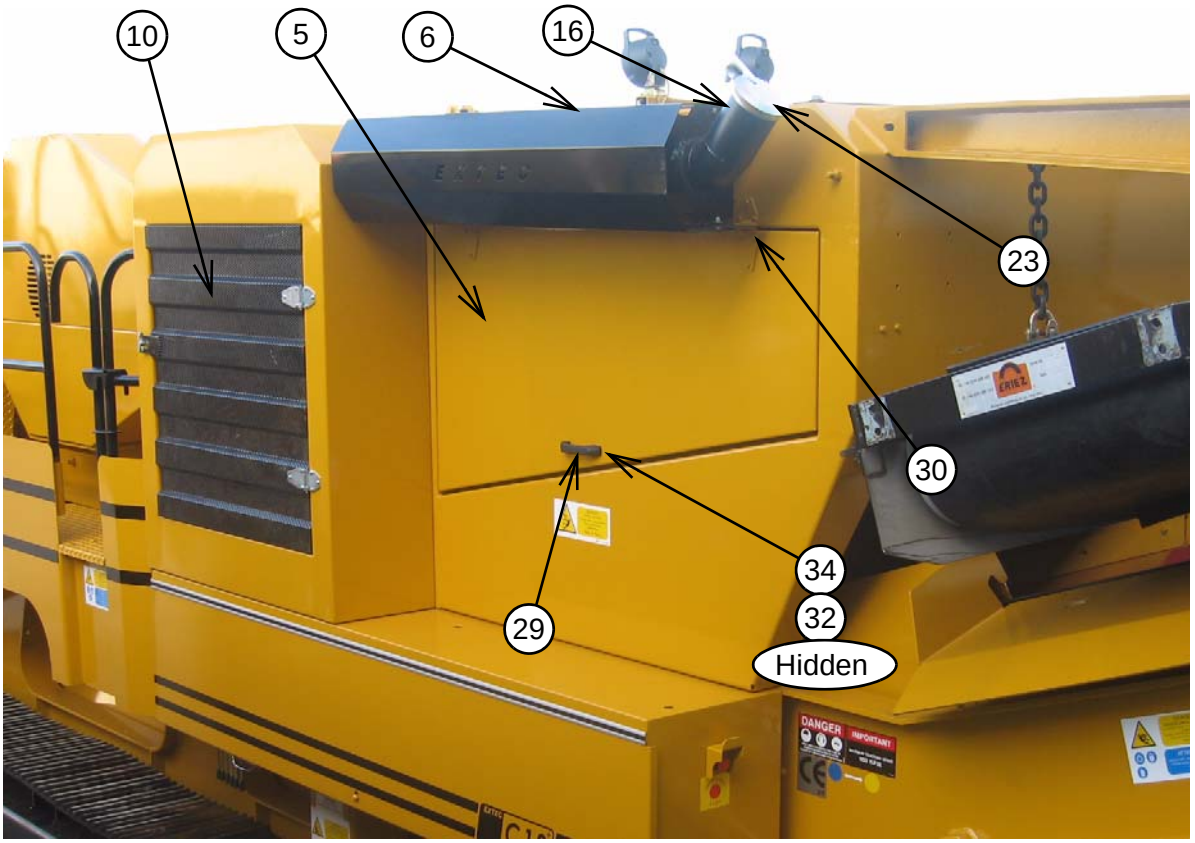
1: VIEW OF ENGINE



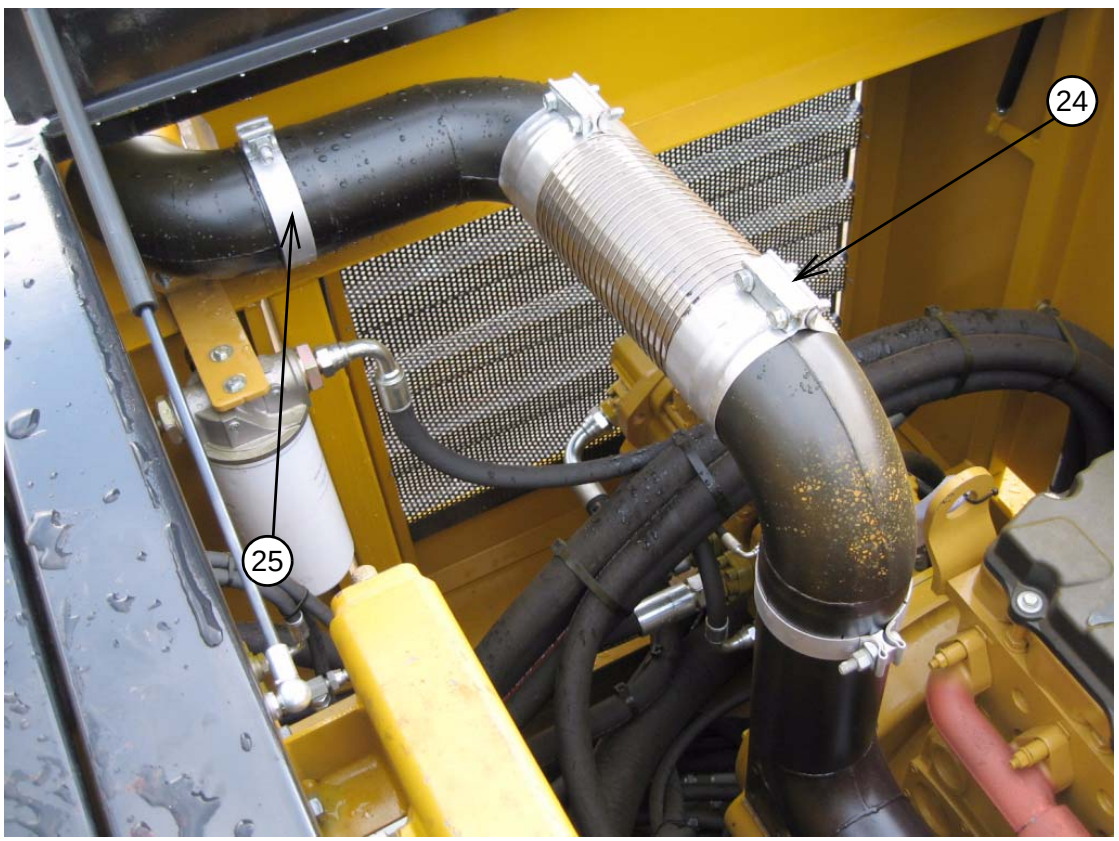
2: DIESEL WATER TRAP



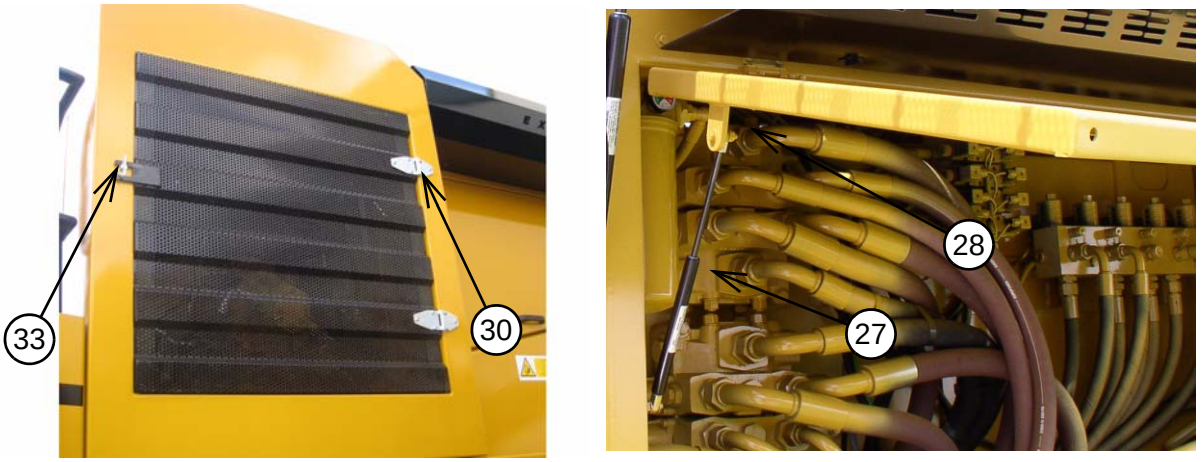
3: L/H VIEW OF POWER PACK



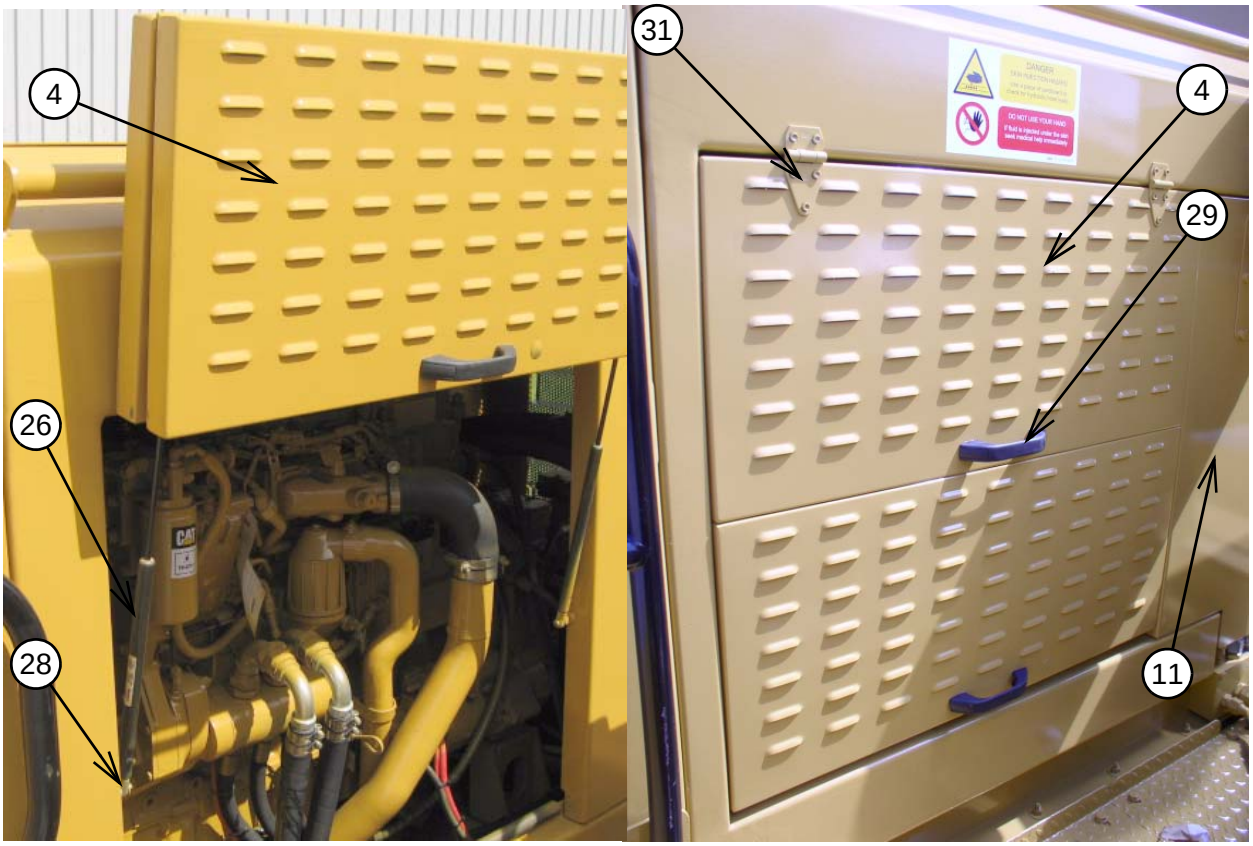
4: R/H VIEW OF POWER PACK



5: EXHAUST CLAMPS

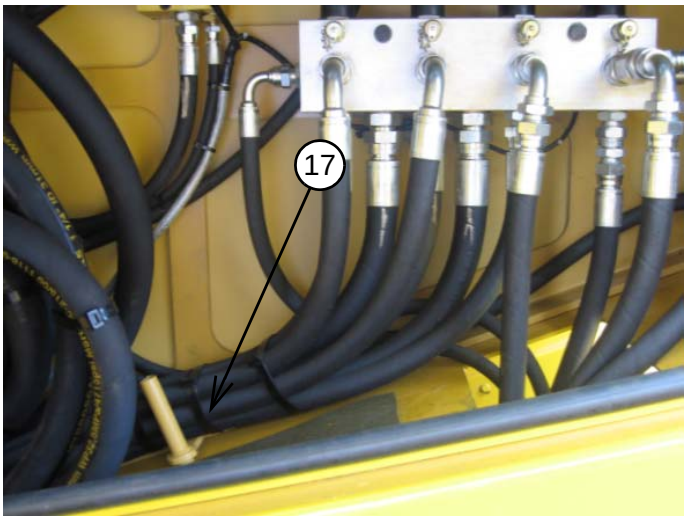


6: ACCESS DOORS

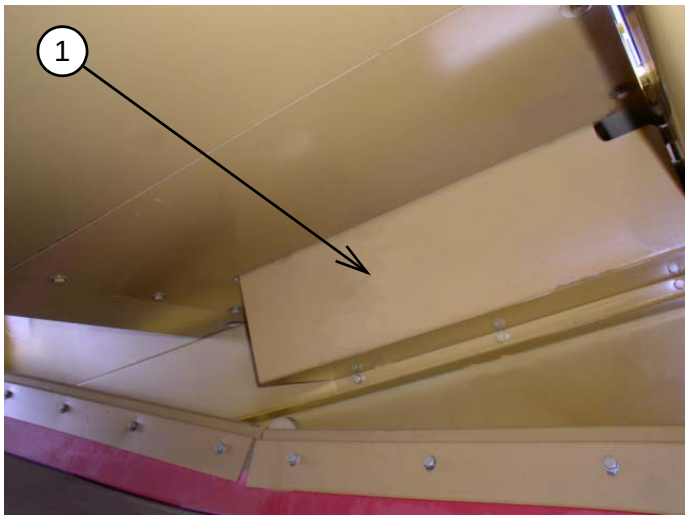


7: ACCESS DOOR

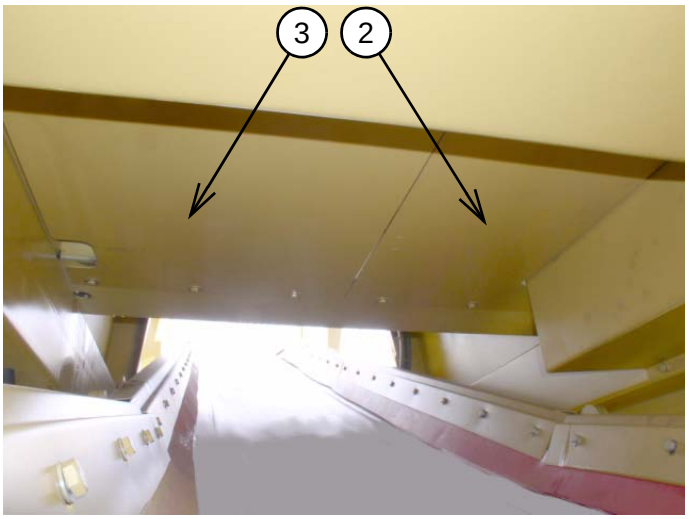
8: VIEW ON TOP OF POWER PACK



9: VIEW INSIDE POWER PACK



10: VIEW ON BOTTOM OF POWER PACK

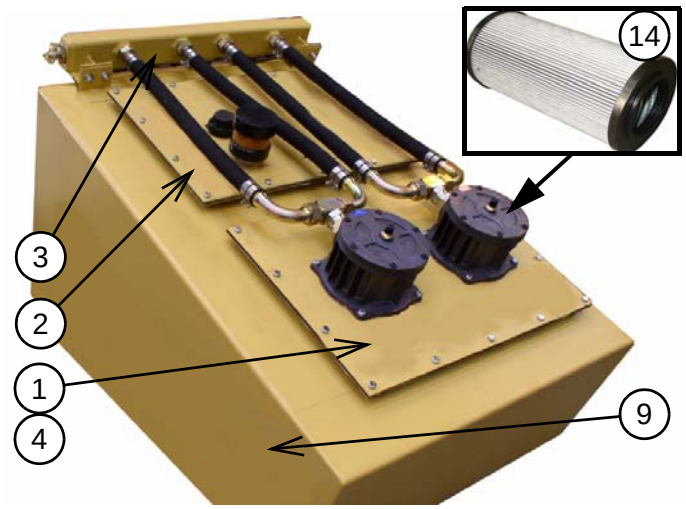


11: VIEW ON BOTTOM OF POWER PACK

Part No.	Part Description	Quantity
1. A15900000	PIPE TRAY	1
2. B3320000	BASE PLATE	1
3. B3330000	BASE PLATE	1
4. B3470000	ACCESS DOOR	1
5. B5060000	VALVE ACCESS DOOR	1
6. B5610000	EXHAUST SHROUD	1
7. B6640000	POWER PACK FRAME	1
8. B6650000	FRAME INFILL PANEL	1
9. B6660000	RADIATOR DOOR	2
10. B6670000	PERFORATED PUMP COVER	1
11. B6690000	END SIDE PANEL	1
12. B6700000	INFIL PANEL	1
13. B6740000	ENGINE COVER	1
14. B6750000	AIR FILTER PIPE	1
15. B6760000	FILTER BRACKER	1
16. B6770000	COMPLETE EXHAUST	1
17. B7740000	PIPE BRACE	1
18. B7890000	OIL COOLER COVER	1
19. B7910000	MESH PANEL	1
20. CN6125	RIMULA SIGNIA ENGINE OIL	30

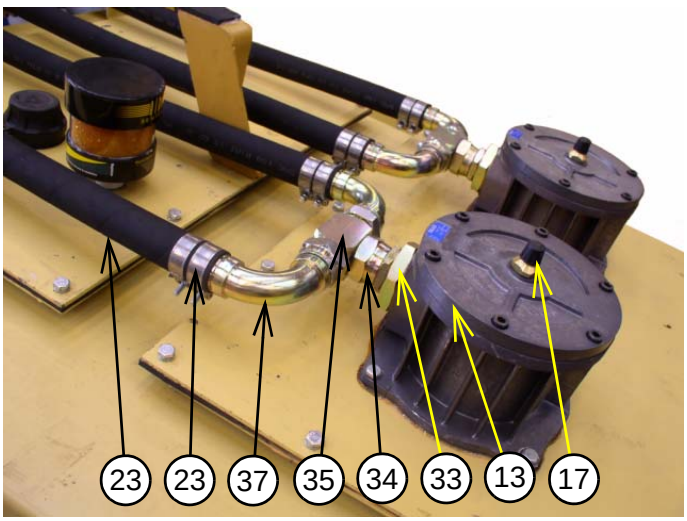
Part No.	Part Description	Quantity
21. EN5020	VORTEX PRE-CLEANER	1
22. EN7974	CATERPILLAR C9 INDUSTRIAL C ENGINE	1
23. EX2013	RAIN CAP	1
24. EX2014	FLEXIBLE HOSE CLAMP	2
25. EX2015	CLAMP	3
26. FD1005	GAS STRUT	4
27. FD1006	GAS STRUT	2
28. FD1504	GAS STRUT EYE	8
29. FD2007	PLASTIC PULL HANDLE	5
30. FD2102	HINGE	14
31. FD2105	HINGE	2
32. FD3112	CAM BAR	1
33. FD3114	ANTI LOOSE FASTNER	2
34. FD4001	LOCKING BARREL	1
35. HV8506	DRAIN TAP	1

AA.8 Power Pack - Hydraulics

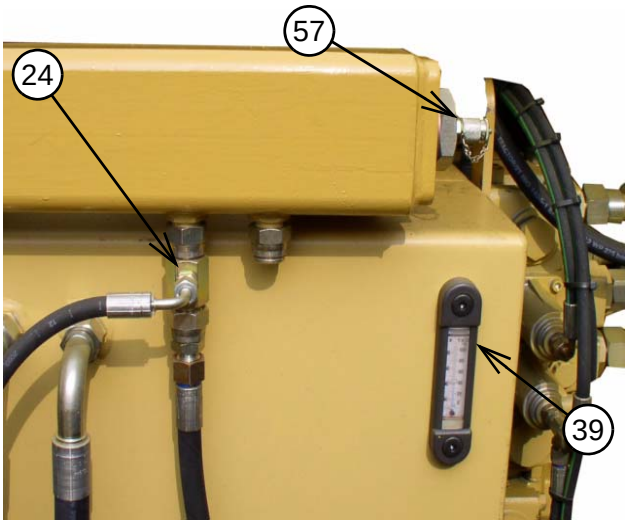


1: HYDRAULIC TANK

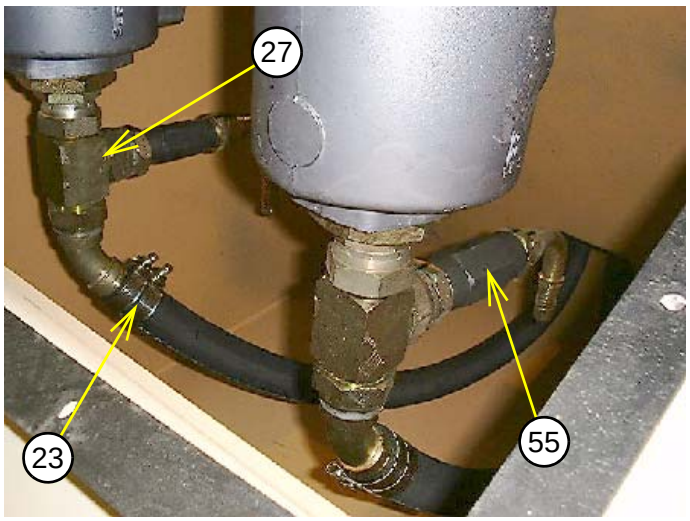
2: HYDRAULIC TANK BREATHER



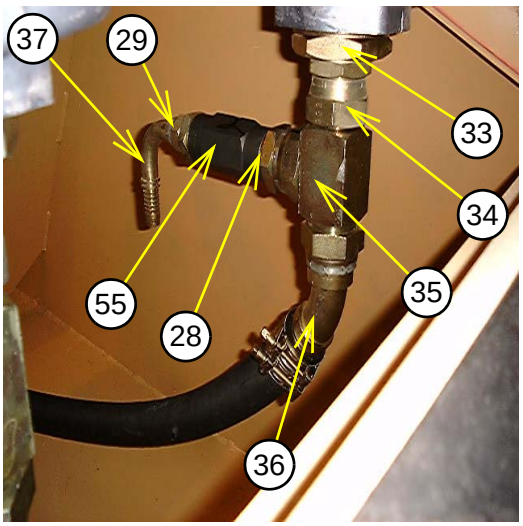
3: HYDRAULIC RETURN FILTERS



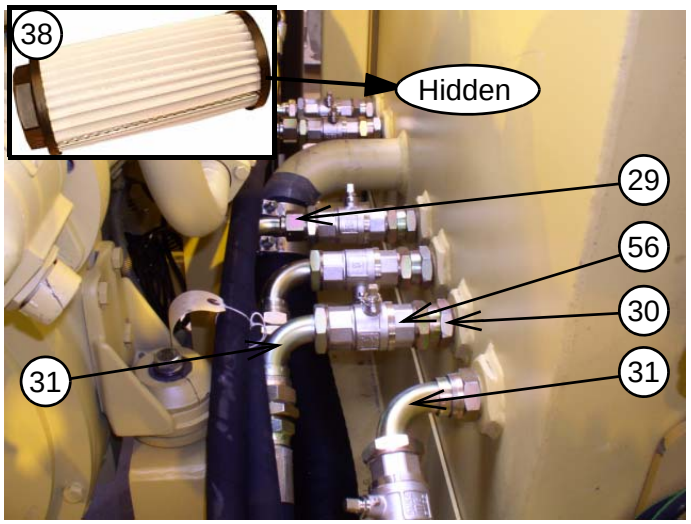
4: HYDRAULIC TANK MANIFOLD AND GAUGE



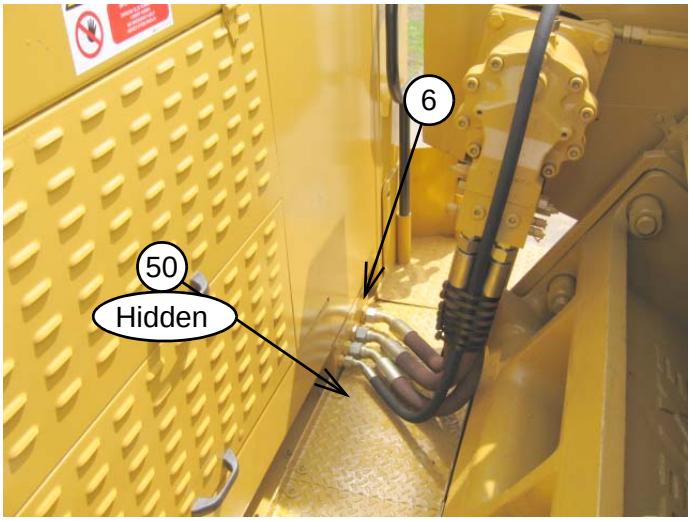
5: HYDRAULIC TANK - BELOW RETURN FILTERS



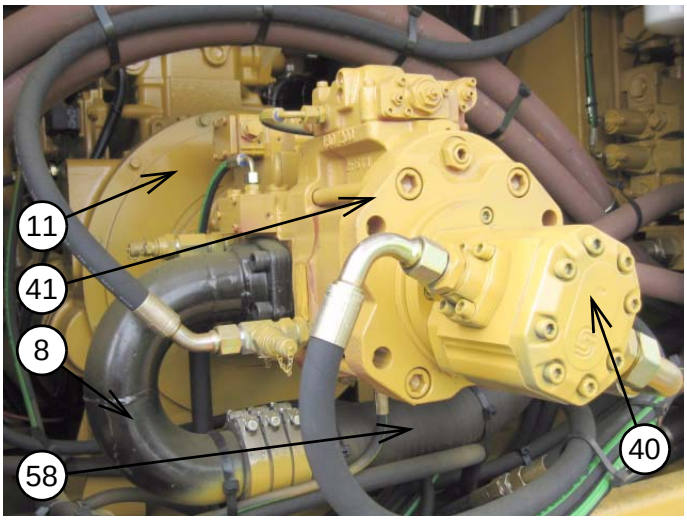
6: HYDRAULIC TANK - BELOW RETURN FILTERS



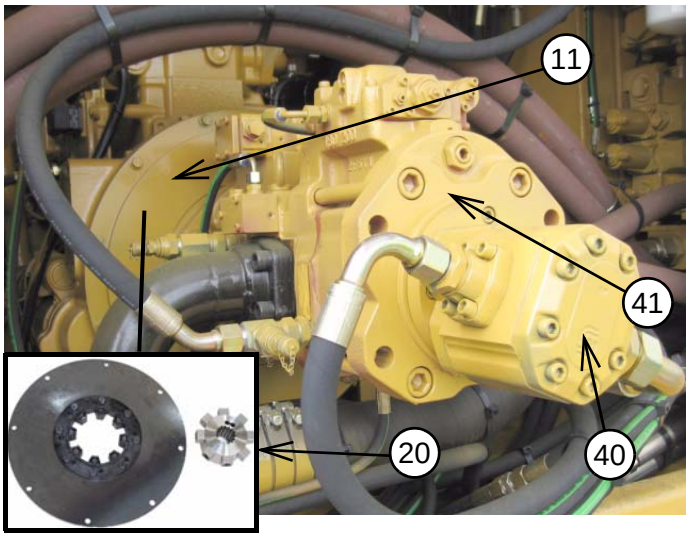
7: HYDRAULIC TANK BULKHEAD



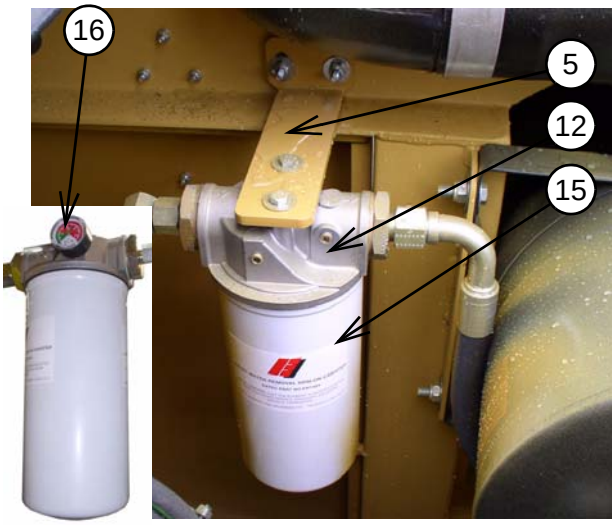
8: VIEW ON CENTRE WALKWAY



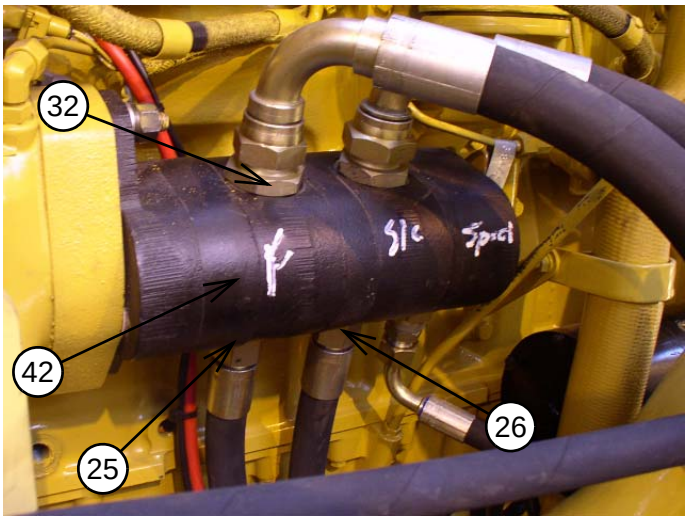
9: VIEW ON HYDRAULIC PUMPS



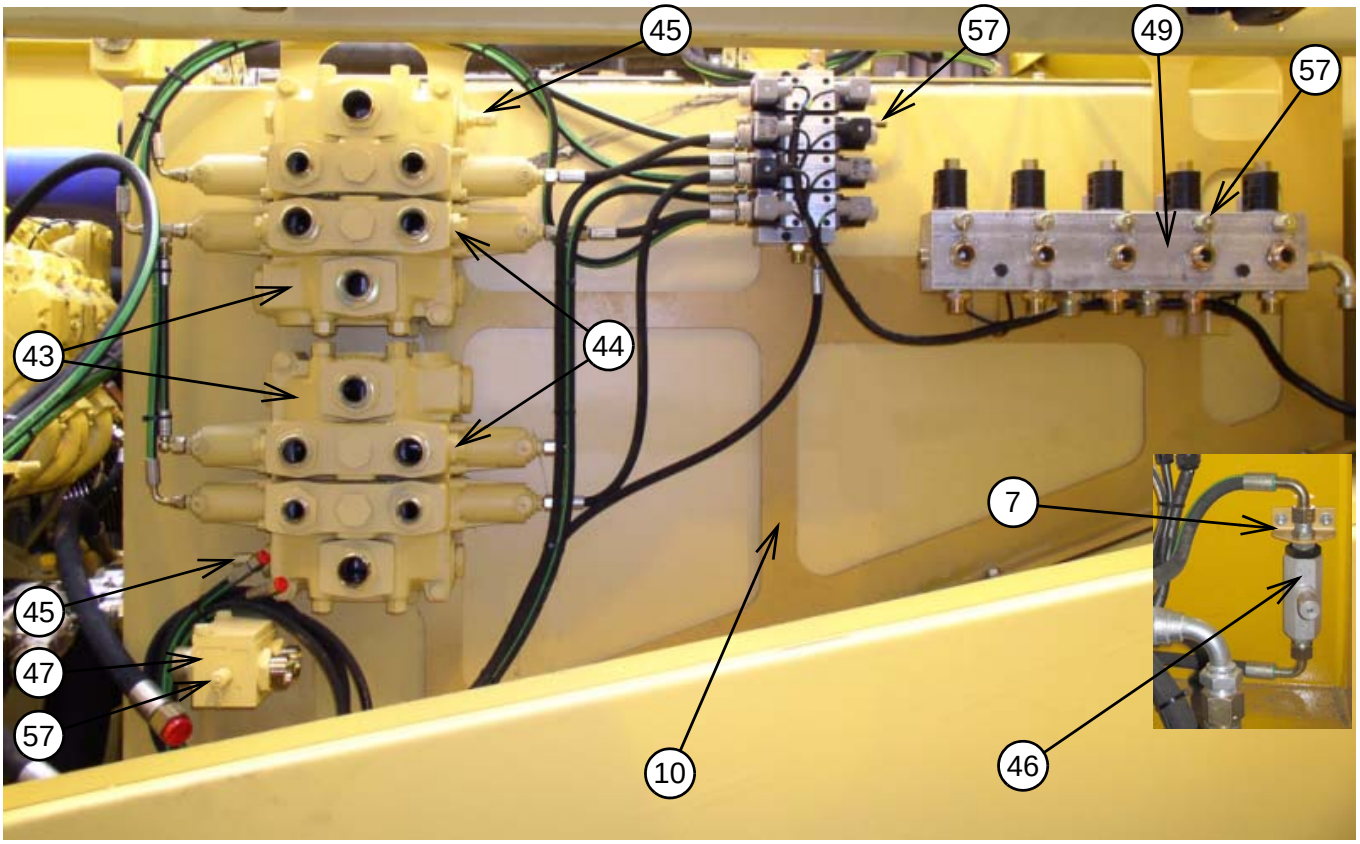
10: VIEW ON HYDRAULIC PUMPS



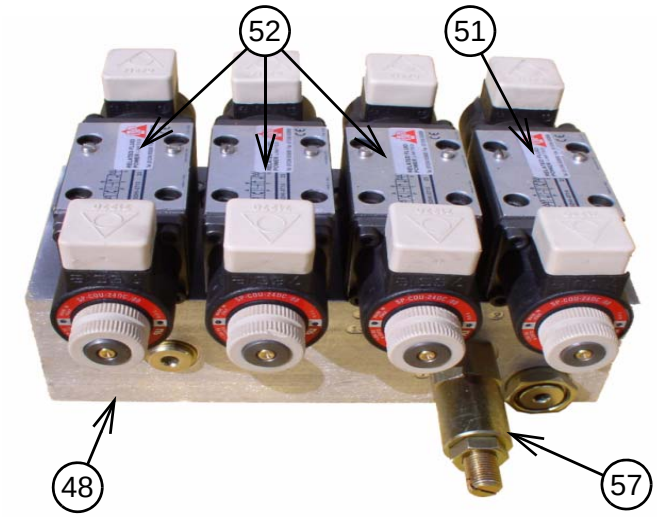
11: HYDRAULIC WATER TRAP



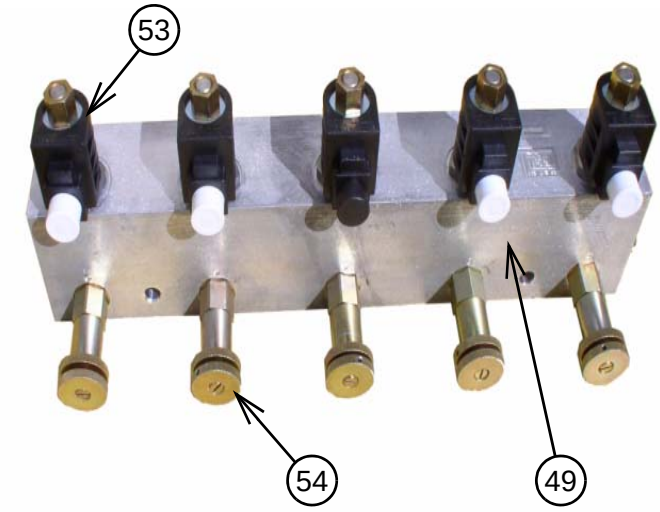
12: VIEW ON PTO PUMP



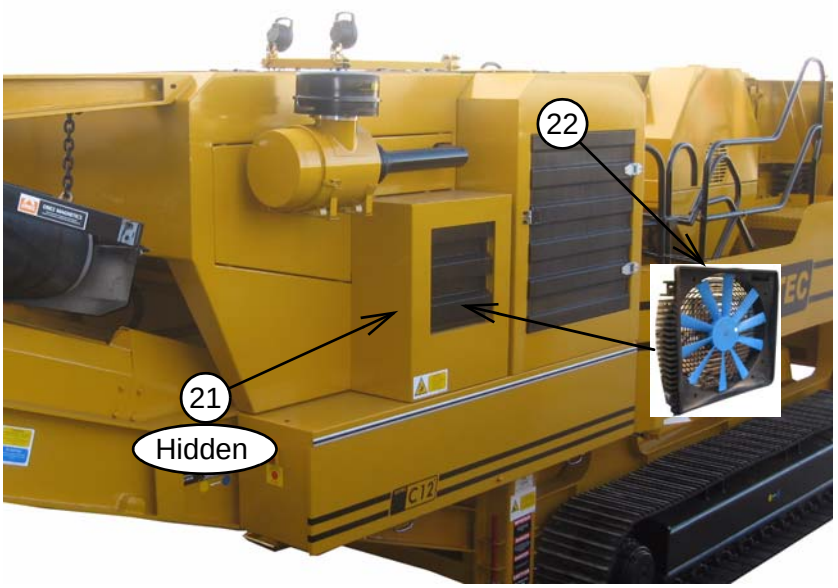
13: VIEW ON VALVE PLATE ASSEMBLY



14: VIEW ON SOLENOID VALVE



15: VIEW ON 5 STATION MANIFOLD BLOCK



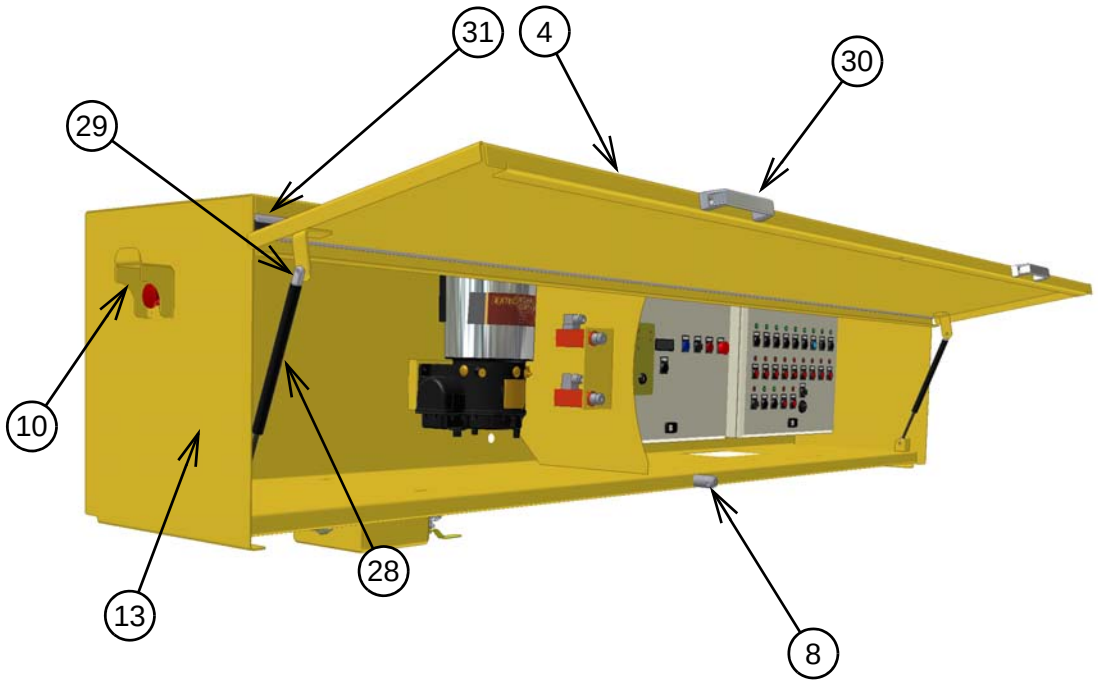
16: OIL COOLER HOUSING

Part No.	Part Description	Quantity
1. B1300000	HYDRAULIC TANK LID	1
2. B1310000	HYDRAULIC TANK LID	1
3. B1390000	HYDRAULIC TANK MANIFOLD	1
4. B2410000	HYDRAULIC TANK LID GASKET	2
5. B3260000	WATER TRAP FILTER BRACKET	1
6. B3340000	HYDRAULIC MANIFOLD	1
7. B5420000	WEBTEC LUG	1
8. B6680000	SUCTION PIPE	1
9. B6720000	HYDRAULIC TANK	1
10. B6730000	VALVE MOUNTING PLATE	1
11. B8340000	HYDRAULIC PUMP SUPPORT HOUSING	1
12. EN1401	HYDRAULIC WATER TRAP CASING WITH FILTER	1
13. EN1402	COMPLETE FILTER ASSEMBLY (GASKET INCLUDED)	2
14. EN1403	RETURN LINE ELEMENT (25 µm)	2
15. EN1404	HYDRAULIC WATER TRAP	1
16. EN1504	VISUAL POP UP INDICATOR - SUITS MP1002	1
17. EN1505	VISUAL POP UP INDICATOR	2
18. EN1523	DESICCANT AIR BREATHER COMPLETE	1
19. EN1601	LOCKABLE FILLER CAP	1

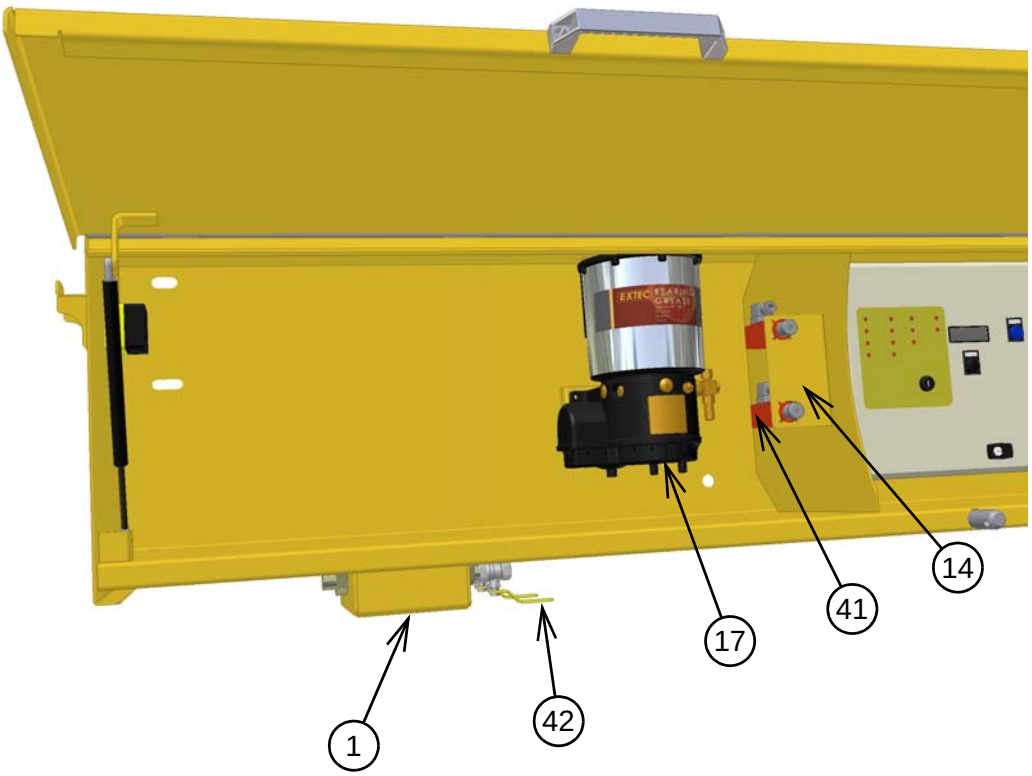
Part No.	Part Description	Quantity
20. EN2029	COUPLING	1
21. EX5000	OIL COOLER	1
22. EX5001	FAN ASSY	1
23. FAHC1035	MIKLOR CLIP 47-51	24
24. HA00014045	HA00014045	1
25. HA01200087	1/2 BSP X 1 1/16 SAE M/M	1
26. HA0340052	3/4"BSP-1 1/16"SAE MM ADAPT	2
27. HA03400062	1½" - ¾" BSP M-F ADAPTER	1
28. HA1000019	1½" - 1" BSP M-F ADAPTER	1
29. HA1000026	1" - 1¼" BSP M-M ADAPTER	2
30. HA1014007	1¼" BSP M-F ADAPTER	4
31. HA1014012	1¼" BSP M-F 90° SWEPT SWIVEL	5
32. HA1051603	1 5/16 12UNF x 1¼ BSP M/M	2
33. HA1120001	1½" - 2½" BSP F-M BUSH	4
34. HA1120004	1½" BSP M-F ADAPTER	4
35. HA1120005	1½" BSP MALE TEE	4
36. HA1120006	1½" BSP 135° INSERT	2
37. HA1120007	1½" BSP SWEPT 90° INSERT	4
38. HF1017	SUCTION FILTER	6
39. HG1002	5" TEMP/LEVEL GAUGE	1
40. HP1034	HYDRAULIC PUMP	1
41. HP1042	HYDRAULIC PUMP	1
42. HP1055	TRIPLE PUMP	1
43. HV1047	TWO DIRECTIONAL SPOOL VALVE	2
44. HV1505	ANTICAVITATION VALVE	4
45. HV1516	RELIEF VALVE	
46. HV2006	FLOW CONTROL VALVE	1
47. HV3013	PIPE MANIFOLD	1
48. HV3017	4 STATION SOLENOID VALVE (INCL HV3521, HV3522, HV8501)	1
49. HV3021	5 STATION SOLENOID BLOCK (INCL HV3527, HV3528)	1
50. HV3501	7 PORT MANIFOLD BLOCK	1
51. HV3521	VALVE	1
52. HV3522	VALVE	3

Part No.	Part Description	Quantity
53. HV3527	VALVE	5
54. HV3528	RELIEF VALVE	5
55. HV5002	1" BSP 0.5 BAR CHECK VALVE	2
56. HV8008	1¼" L/P BALL VALVE	6
57. HV8501	¼" TEST POINT	16
58. RU6012	OIL SUCTION HOSE	1

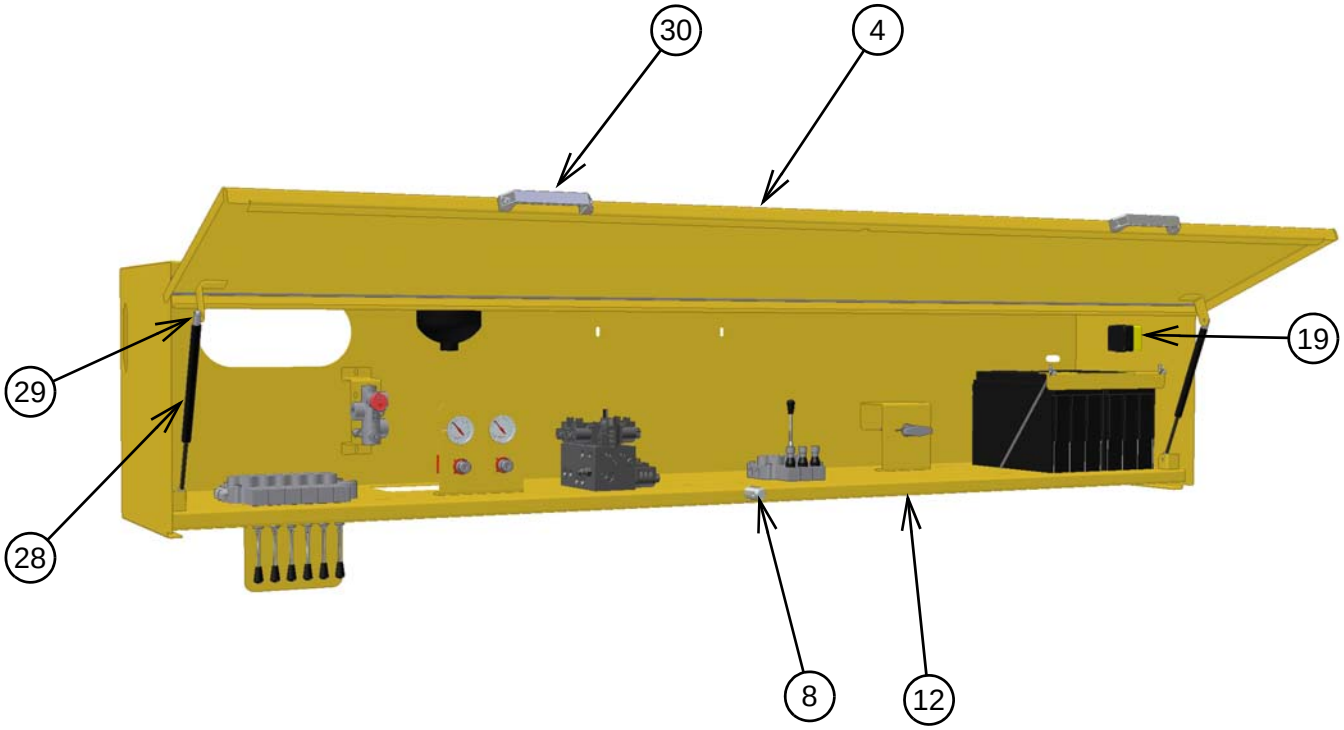
AA.9 Control Boxes



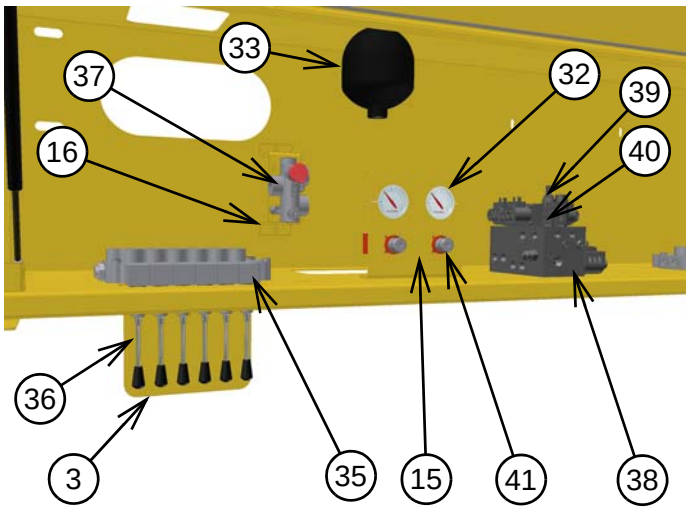
17: ELECTRICAL CONTROL BOX



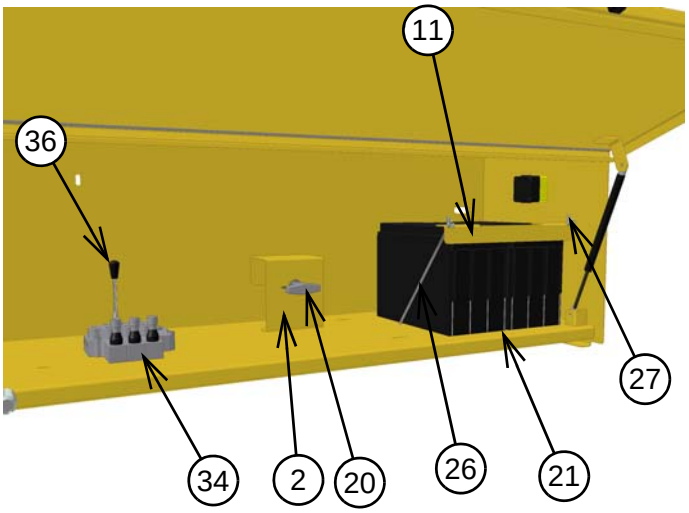
18: VIEW ON INSIDE OF ELECTRICAL CONTROL BOX



19: HYDRAULIC CONTROL BOX



20: VIEW ON ACCUMULATOR PRESSURE GAUGES



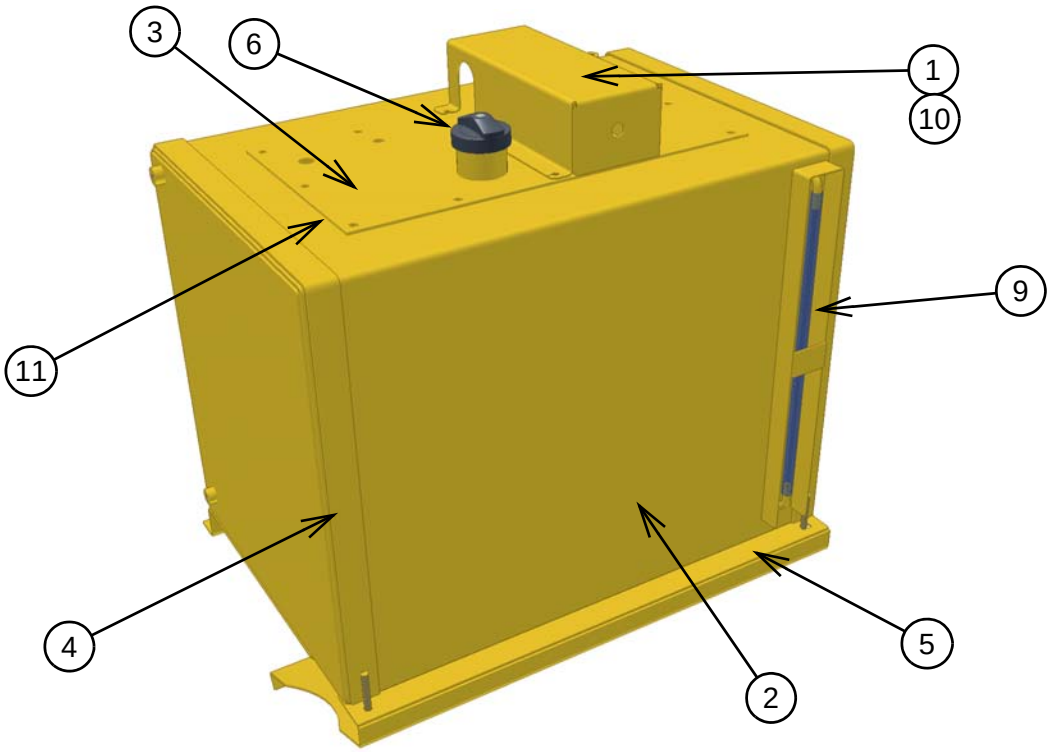
21: VIEW ON ISOLATION SWITCH AND BATTERIES

Part No.	Part Description	Quantity
1. A5020000	WATER MANIFOLD	1
2. A6590000	MOUNTING BRACKET	1
3. A7700000	INDICATOR PLATE	1
4. A7820000	CONTROL BOX LID	2

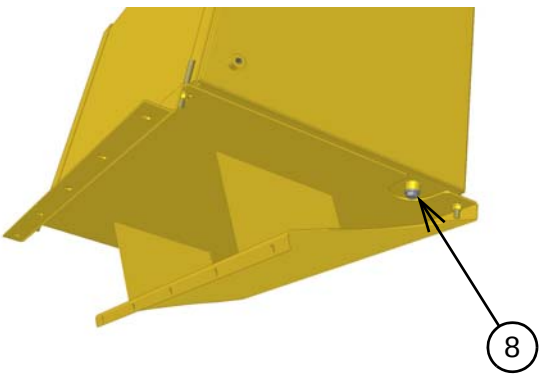
Part No.	Part Description	Quantity
5. A7830000	ELECTRICAL CONTROL BOX	1
6. A7940000	SUPPORT BRACKET	1
7. A7950000	SUPPORT BRACKET	1
8. A8850000	LYNCH PIN	2
9. A10060000	SUPPORT BRACKET	2
10. A10630000	EMERGENCY STOP GUARD	2
11. A14390000	BATTERY LOCATION ANGLE	1
12. A14730000	HYDRAULIC CONTROL BOX	1
13. A14740000	ELECTRICAL CONTROL BOX	1
14. A15320000	VALVE MOUNTING PLATE	1
15. A15370000	SUPPORT BRACKET	1
16. B0070000	WEBTEC MOUNTING BRACKET	1
17. BT1600	LUBRICATION SYSTEM	1
18. EL1050	ELECTRICAL KIT CAT C9	1
19. EL2030	EMERGENCY STOP SWITCH	4
20. EL2143	BATTERY ISOLATING SWITCH	1
21. EL3001	HEAVY DUTY BATTERY	2
22. EL3010	BATTERY CROSSOVER	1
23. EL3023	C9 ENGINE POSITIVE LEAD	1
24. EL3024	C9 ENGINE NEGATIVE LEAD	1
25. EL3025	C9 ENGINE CROSS OVER LEAD	1
26. FAB06X300H	BATTERY HOOK BOLT	2
27. FAW06W	WING NUT	2
28. FD1007	GAS STRUT (ONE EYE)	4
29. FD1504	GAS STRUT EYE	4
30. FD2006	CHROME PULL HANDLE	6
31. FD2109	POLIALL HINGE	2
32. HG2009	0-250 BAR PRESSURE GAUGE	3
33. HP5001	ACCUMULATOR	1
34. HV1028	3 LEVER SPOOL VALVE	1
35. HV1049	6 LEVER DOUBLE ACTING SPOOL VALVE	1
36. HV1502	SPOOL HANDLE	8
37. HV2002	FLOW DIVERTER	1

Part No.	Part Description	Quantity
38. HV3026	SOLENOID BLOCK (INCL HV3522)	1
39. HV3522	VALVE	3
40. HV3527	VALVE	5
41. HV5009	PRESSURE SWITCH	2
42. HV8004	¾" BSP BALL VALVE	2

AA.10 Diesel Tank



1: DIESEL TANK ASSEMBLY

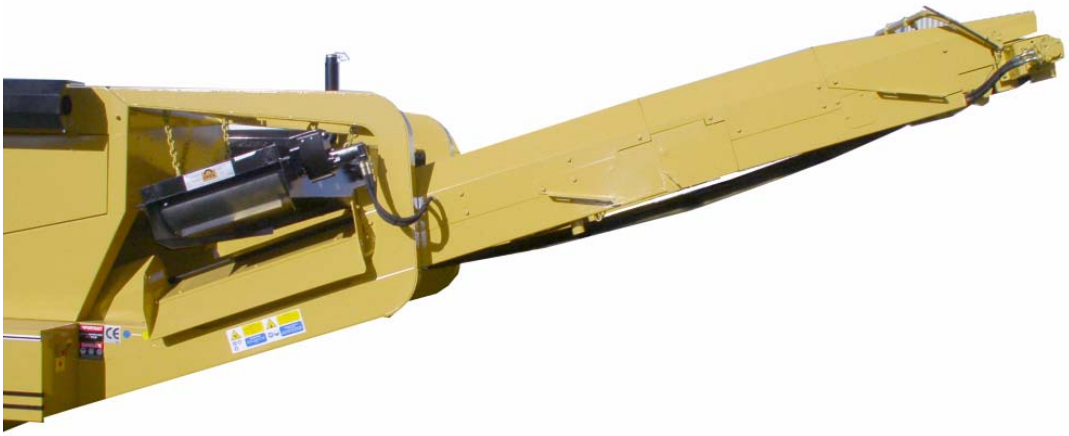


2: VIEW ON BOTTOM OF DIESEL TANK

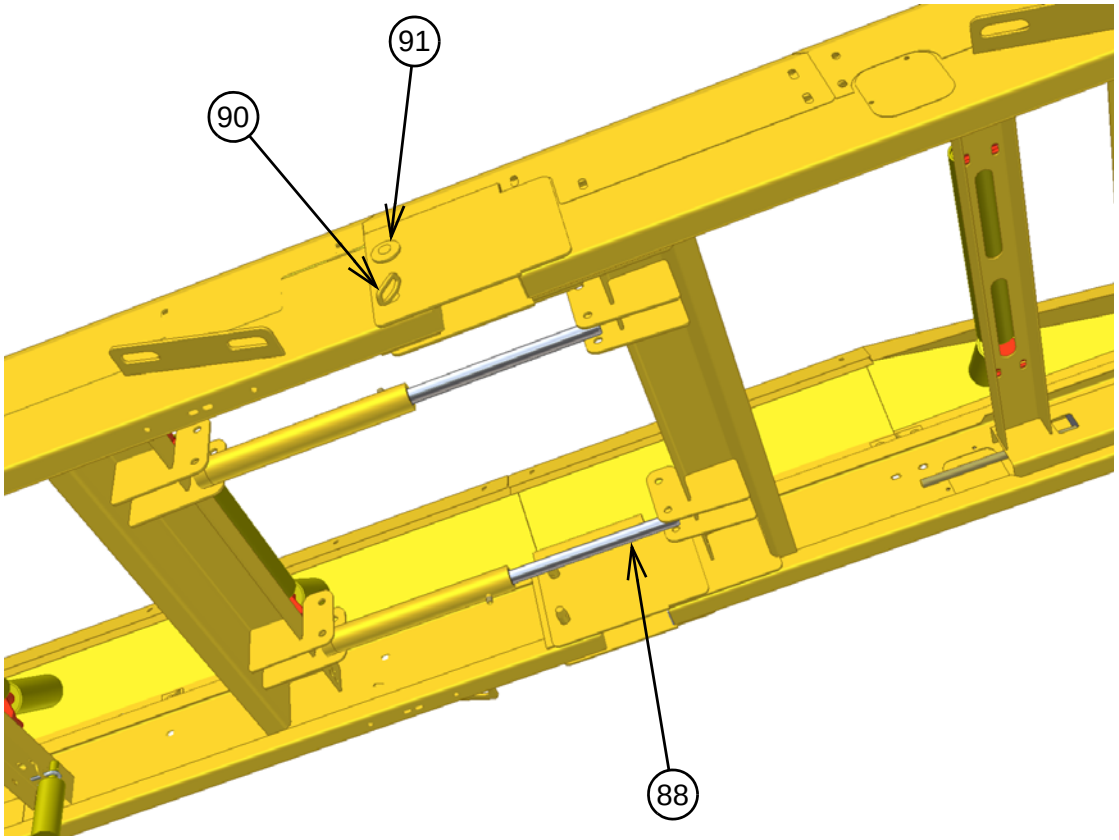
Part No.	Part Description	Quantity
1. A10800000	DIESEL PUMP GUARD	1
2. A12500000	DIESEL TANK	1
3. A12510000	DIESEL TANK LID	1
4. A12530000	DIESEL TANK STRAPS	2
5. A14040000	DIESEL TANK PLATFORM	1
6. EN1609	FILLER CAP	1
7. FAHC1001	SIZE 00 JUBILEE CLIP	2
8. HAP034001	¾" BLANKING CAP	1

Part No.	Part Description	Quantity
9. HG3006	PIPE SIGHT GAUGE	1
10. HP3001	DIESEL FILLER PUMP	1
11. RU1047	DIESEL TANK GASKET	1

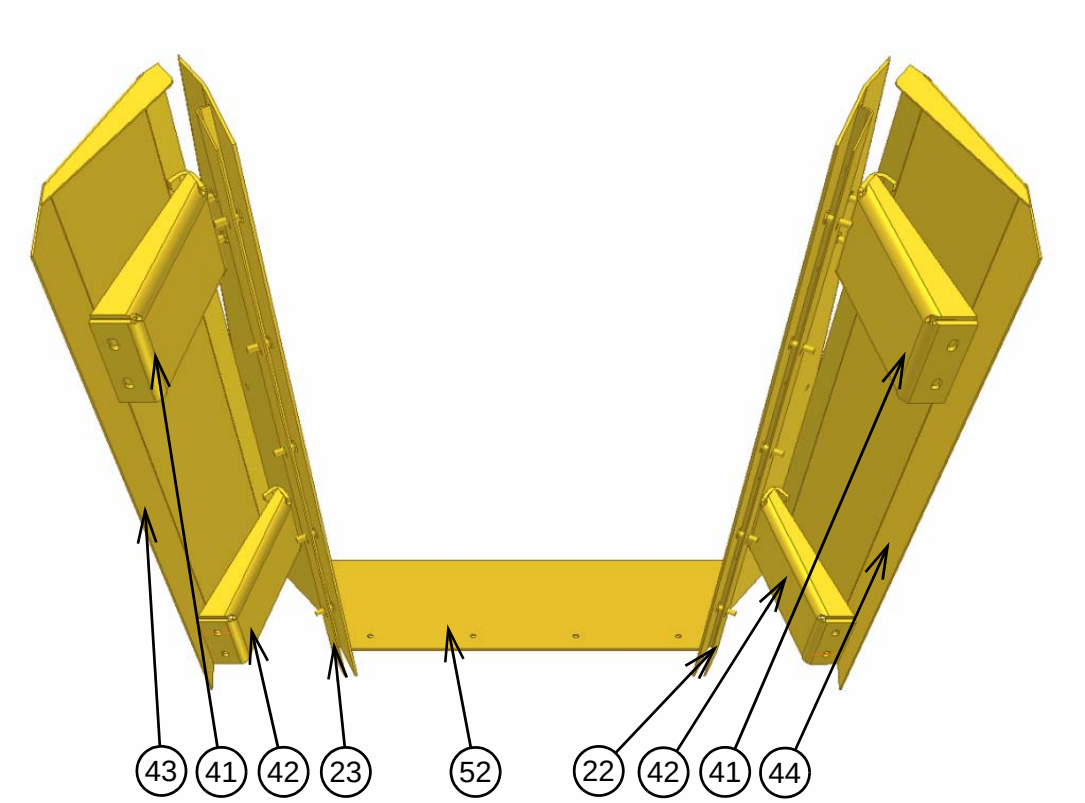
AA.11 Main Conveyor



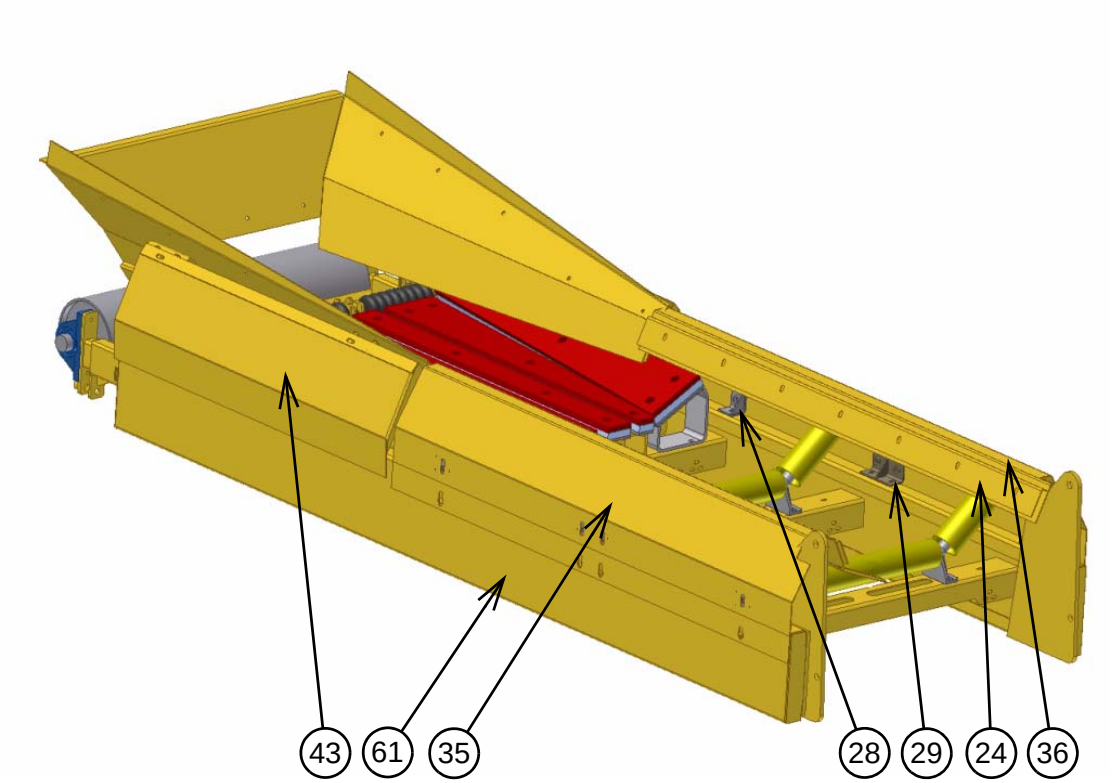
1: LEFT VIEW OF EXTENDED MAIN CONVEYOR



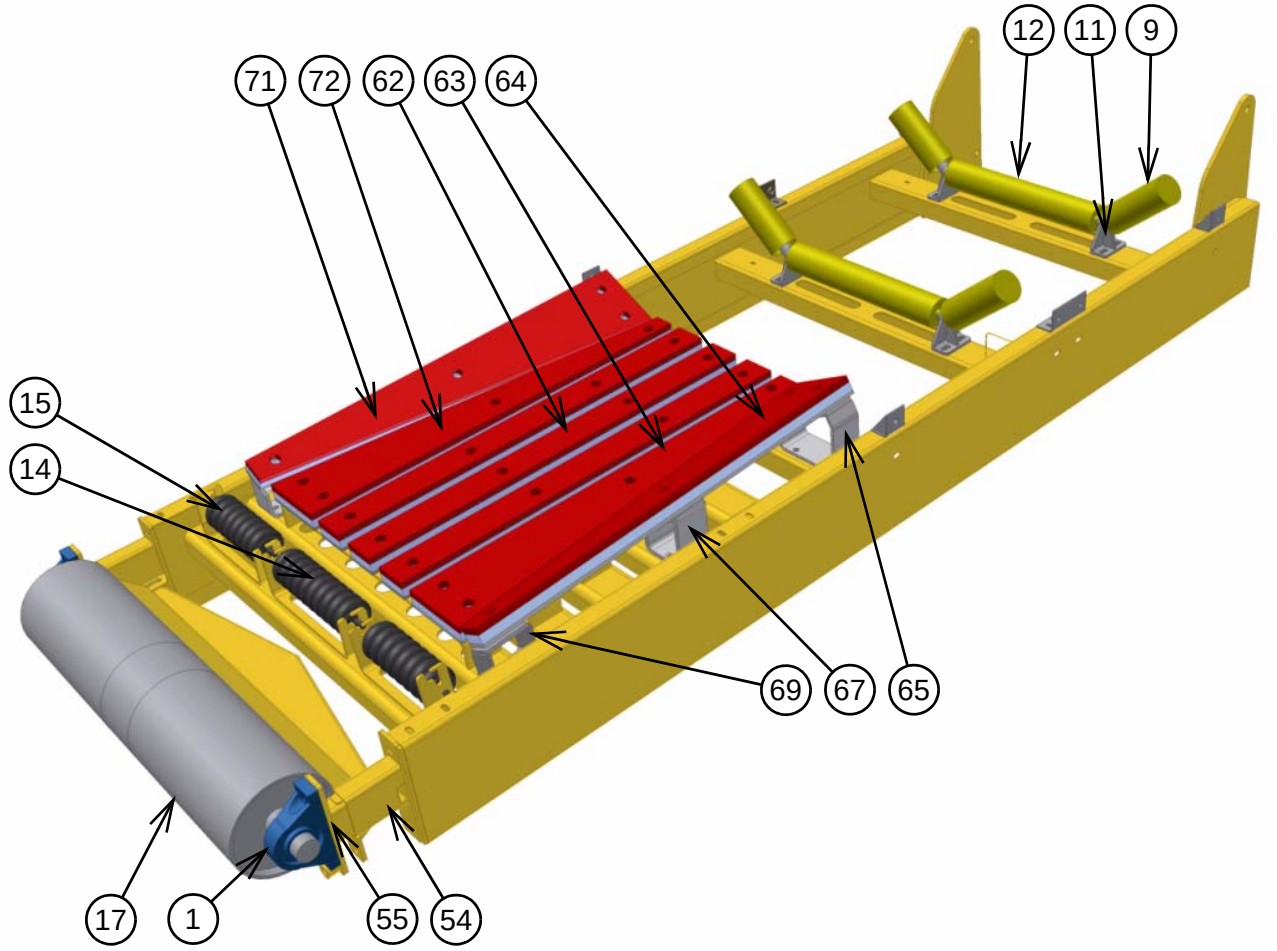
2: VIEW ON UNDERSIDE OF CONVEYOR



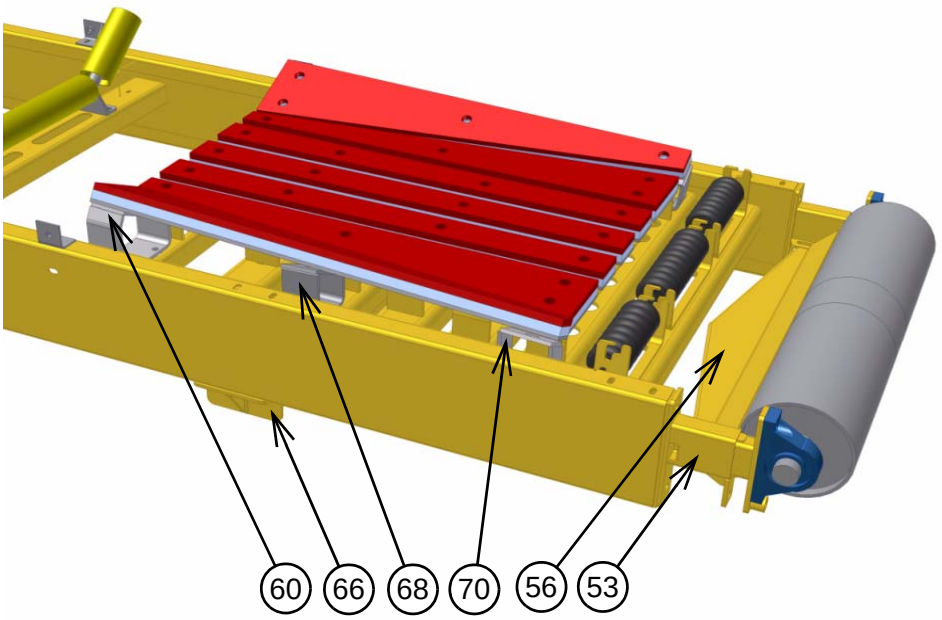
3: FEED BOOT ASSEMBLY



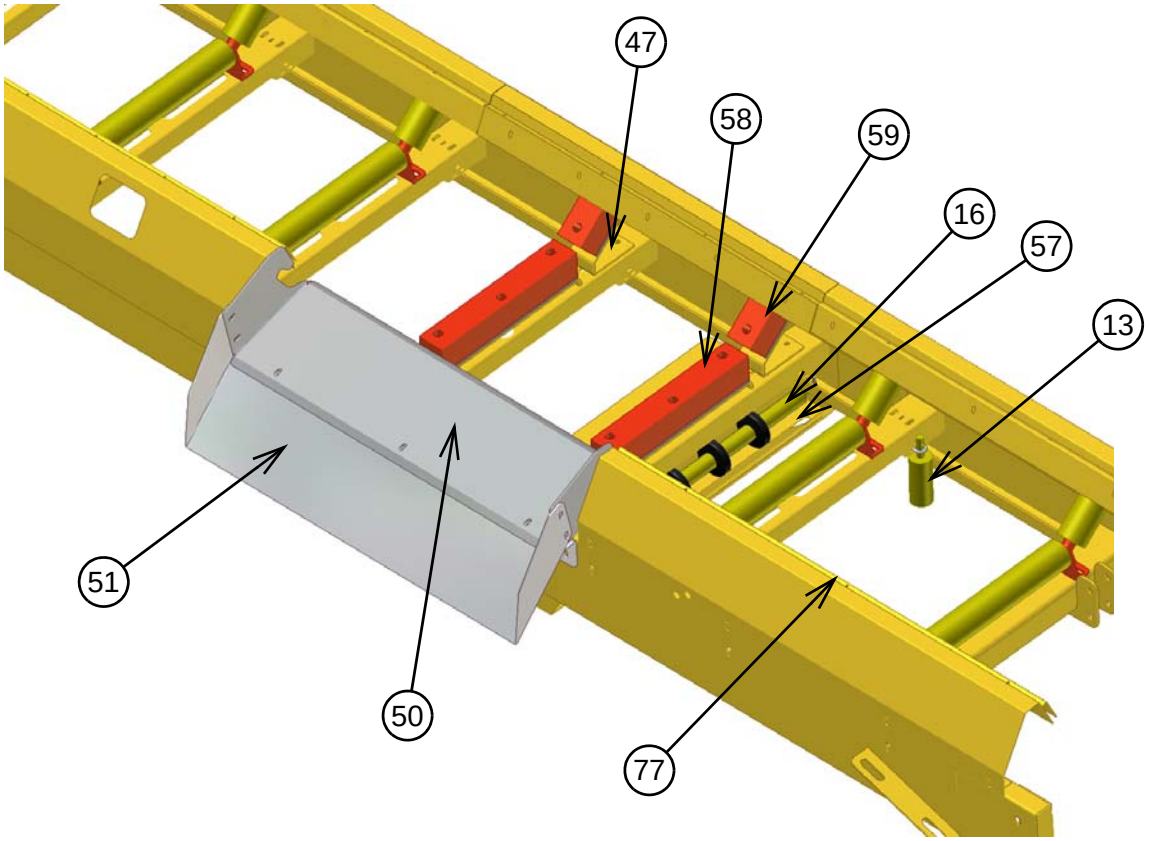
4: VIEW ON CONVEYOR BOTTOM



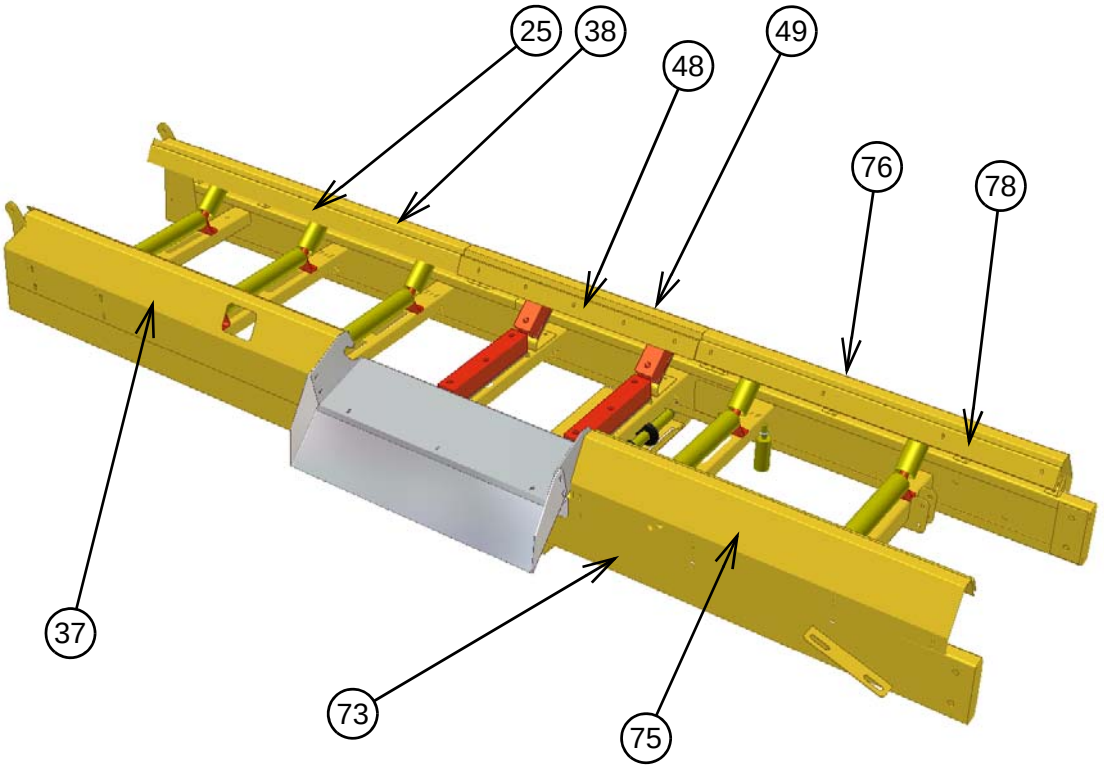
5: MAIN CONVEYOR BOTTOM RIGHT HAND SECTION



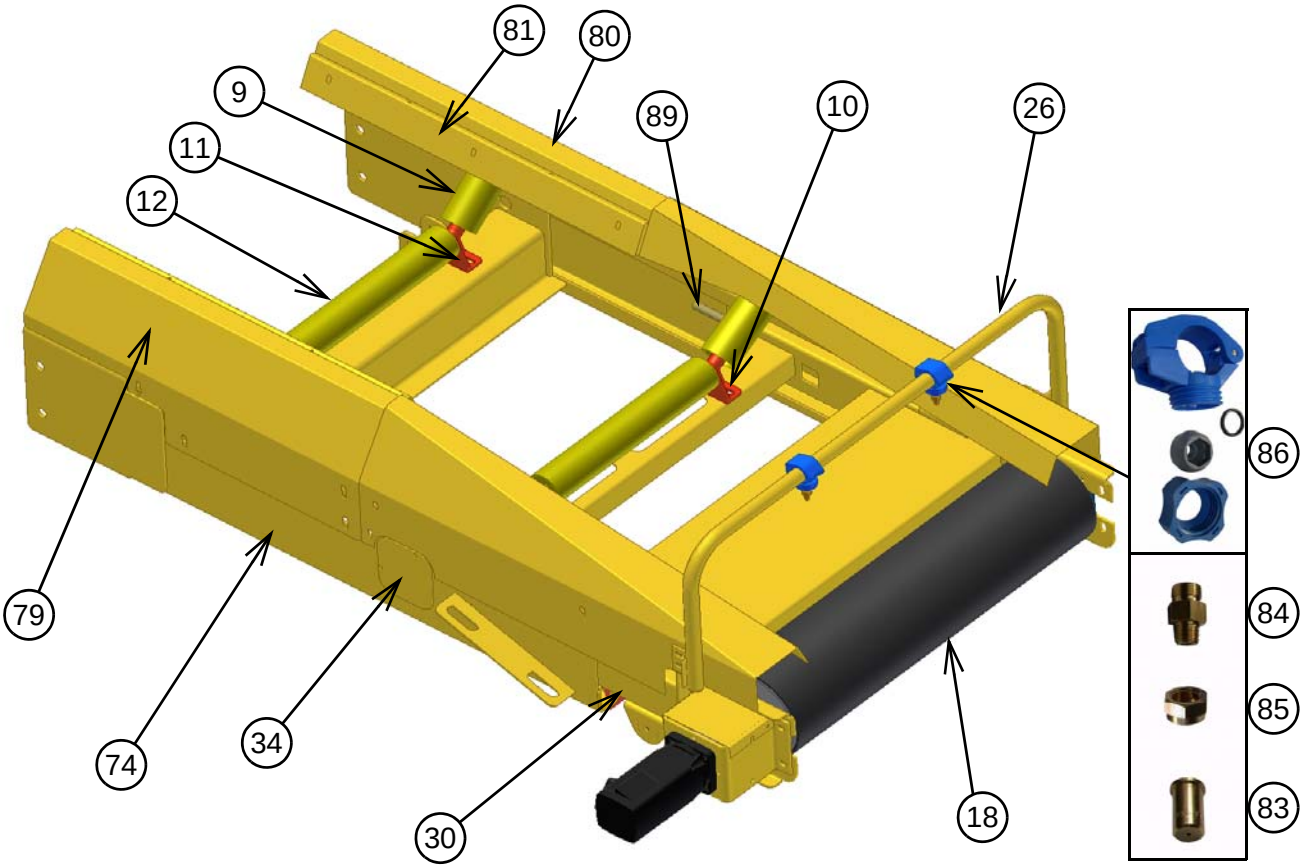
6: MAIN CONVEYOR BOTTOM RIGHT HAND SECTION



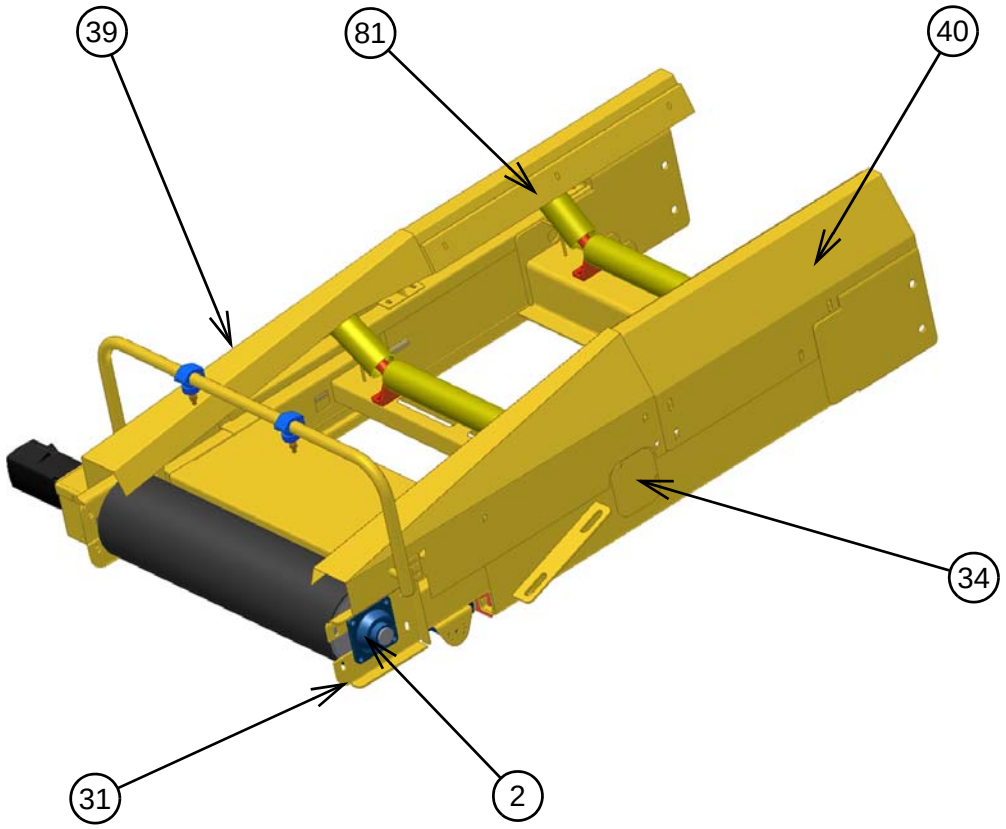
7: MAIN CONVEYOR MID SECTION



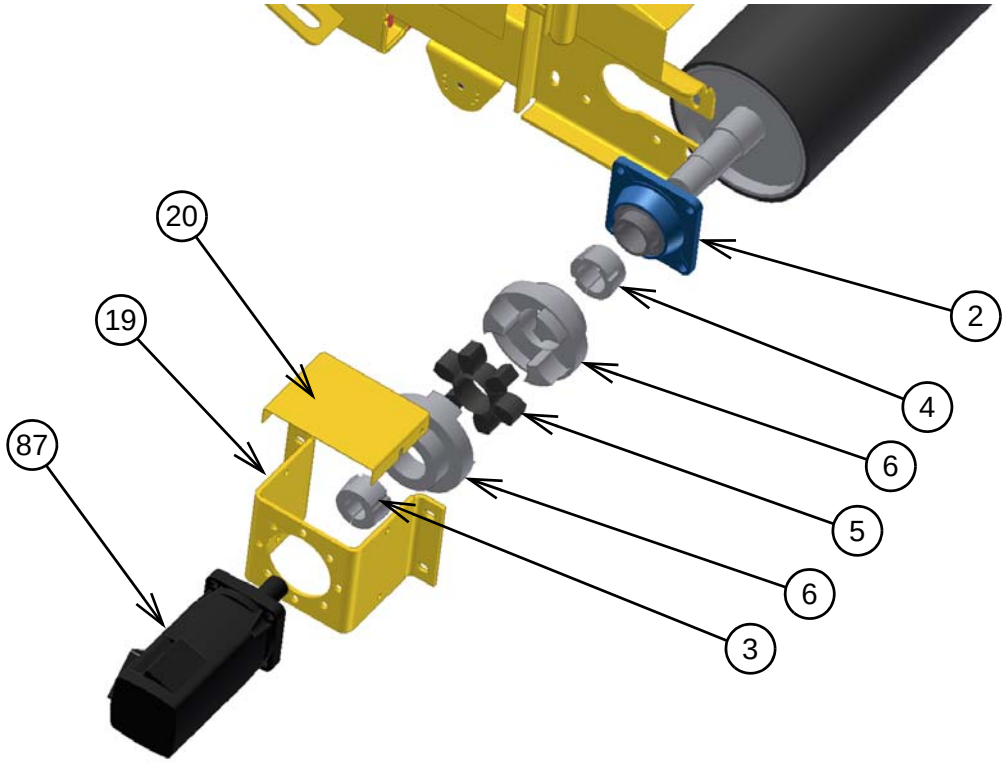
8: MAIN CONVEYOR MID SECTION



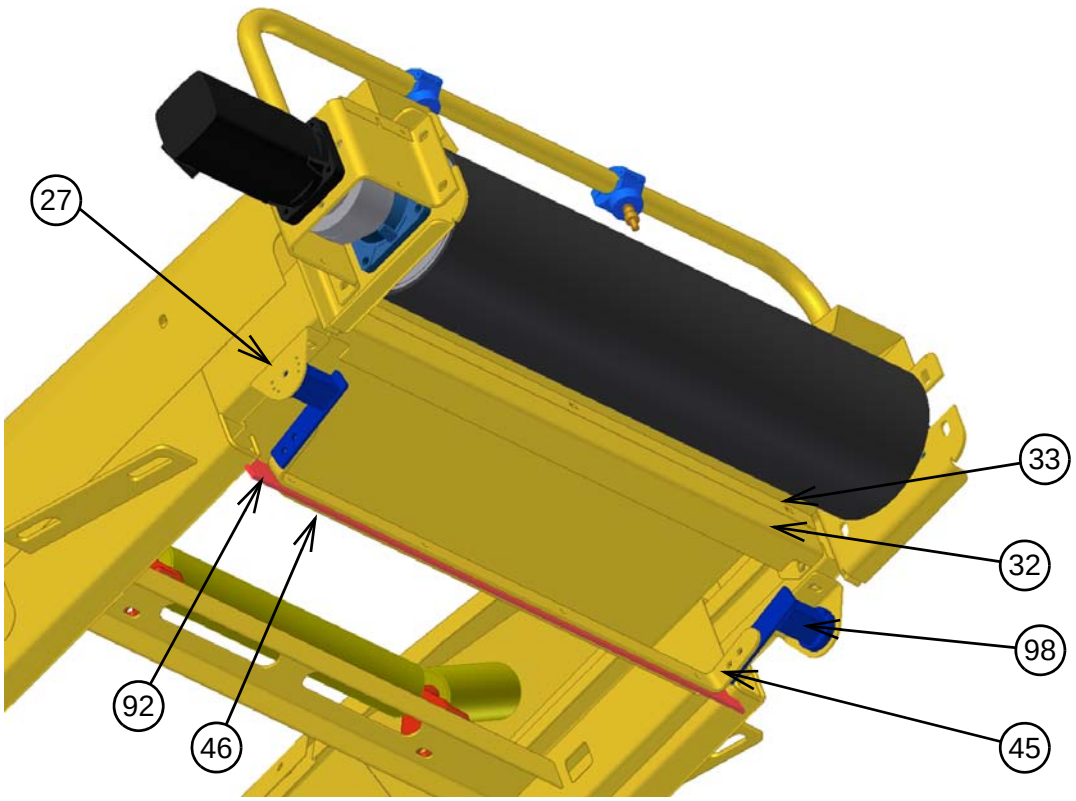
9: MAIN CONVEYOR TOP SECTION



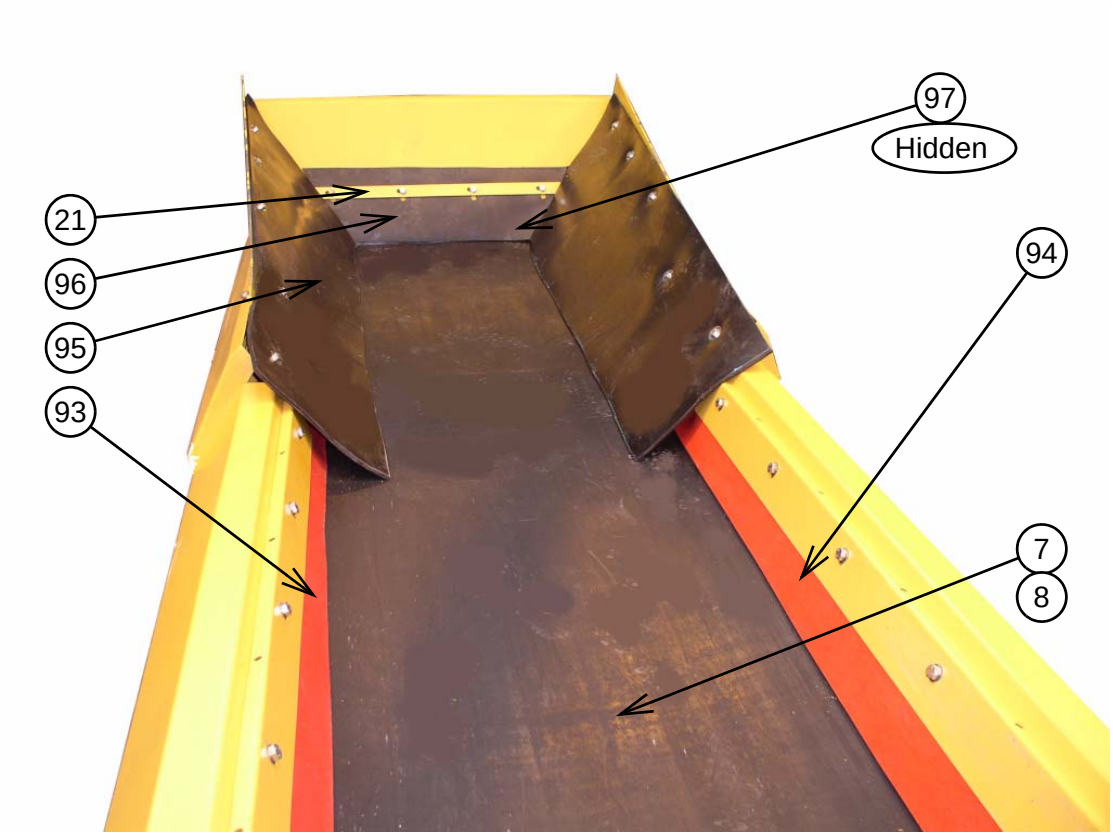
10: MAIN CONVEYOR TOP SECTION



11: DRIVE COUPLING



12: VIEW ON HEAD DRUM SCRAPER



13: FEED BOOT RUBBERS

Part No.	Part Description	Quantity
1. BT1010	PLUMMER BEARING	2
2. BT2010	FLANGE BEARING	2
3. BT5009	TAPER LOCK BUSH	1
4. BT5011	TAPER LOCK BUSH	1
5. BT6516	DRIVE COUPLING INSERT	1
6. BT6517	DRIVE COUPLING (SET)	1
7. CBHD242001000	ENDLESS CONVEYOR BELT	1
8. CBR242001000	REINFORCED ENDLESS CONVEYOR BELT	A/R
9. CR1003	WING ROLLER	14
10. CR1004	30° ROLLER BRACKET	2
11. CR1006	40° ROLLER BRACKET	12
12. CR1017	CENTRE ROLLER	7
13. CR1024	TRACKING ROLLER	4
14. CR1042	CENTRE IMPACT ROLLER	1

Part No.	Part Description	Quantity
15. CR1043	SIDE IMPACT ROLLER	2
16. CR1041	DISC RETURN ROLLER	3
17. D0100000	TAIL DRUM	1
18. D0140000	HEAD DRUM	1
19. D0180000	MOUNTING BRACKET	1
20. D0190000	MOUNTING BRACKET COVER	1
21. D1460000	FEED BOOT CLAMP	2
22. D1470000	FEED BOOT CLAMP	1
23. D1480000	FEED BOOT CLAMP	1
24. D1570000	RUBBER CLAMP	2
25. D1610000	RUBBER CLAMP	2
26. D1790000	SPRAY BAR	1
27. D4080000	ROSTA BRACKET	2
28. D4910000	SINGLE FLARE MOUNTING BRACKET	13
29. D4920000	DOUBLE FLARE MOUNTING BRACKET	6
30. D5090000	HEAD DRUM MOUNTING PLATE	1
31. D5100000	HEAD DRUM MOUNTING PLATE	1
32. D5110000	HEADRUM SUPPORT FRAME	1
33. D5120000	NIP GUARD CLAMP	1
34. D5130000	COVER PLATE	2
35. D5160000	CONVEYOR FLARE	1
36. D5170000	CONVEYOR FLARE	1
37. D5180000	CONVEYOR FLARE	1
38. D5190000	CONVEYOR FLARE	1
39. D5230000	CONVEYOR FLARE	1
40. D5240000	CONVEYOR FLARE	1
41. D5300000	FEED BOOT LEG	2
42. D5310000	FEED BOOT LEG	2
43. D5430000	FEED BOOT GUARD	1
44. D5440000	FEED BOOT GUARD	1
45. D5450000	TOP SCRAPER	1
46. D5460000	TOP SCRAPER CLAMP	1
47. D5490000	IMPACT BAR MOUNTING	2

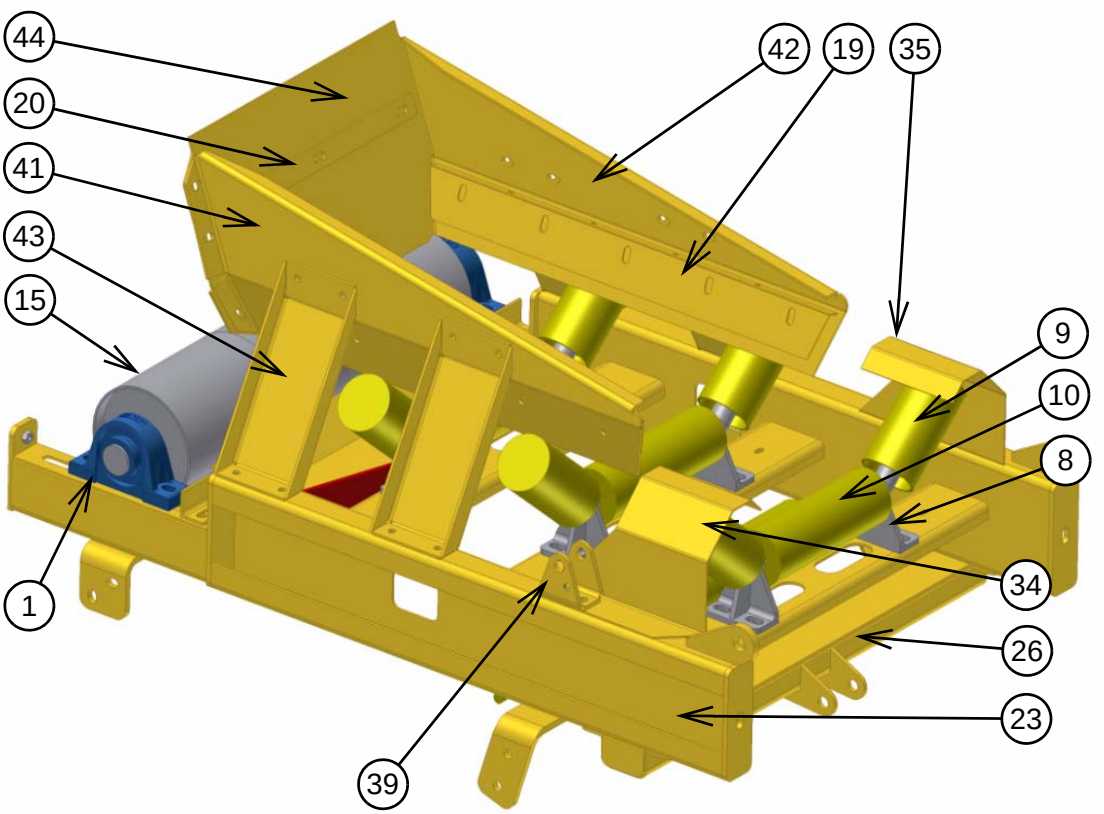
Part No.	Part Description	Quantity
48. D6700000	RUBBER CLAMP	1
49. D6670000	FLARE UPPER L/HS	1
50. D6680000	ALLUMINIUM DISCHARGE CHUTE	1
51. D6690000	ALUMINIUM DISCHARGE CHUTE EXTENTION	1
52. D6760000	FEED BOOT ASSEMBLY	1
53. D6770000	BEARING SUPPORT - OUTER SLIDE	1
54. D6780000	BEARING SUPPORT - OUTER SLIDE	1
55. D6790000	BEARING SUPPORT SLIDE	2
56. D6800000	TAIL DRUM SCRAPER	1
57. D6810000	RETURN ROLLER GUARD	2
58. D6890000	IMPACT BAR	2
59. D6900000	WING IMPACT BAR	2
60. D7100000	LIFT RAM CROSS MEMBER	1
61. D7110000	TAIL SECTION	1
62. D7140000	CONVEYOR BASE IMPACT BAR	3
63. D7150000	CONVEYOR BASE IMPACT BAR	1
64. D7160000	CONVEYOR WING IMPACT BAR	1
65. D7170000	WING IMPACT BAR MOUNTING	1
66. D7180000	WING IMPACT BAR MOUNTING	1
67. D7190000	WING IMPACT BAR MOUNTING	1
68. D7200000	WING IMPACT BAR MOUNTING	1
69. D7210000	IMPACT BAR MOUNTING	1
70. D7220000	IMPACT BAR MOUNTING	1
71. D7230000	WING IMPACT BAR	1
72. D7240000	BASE IMPACT BAR	1
73. D10140000	MAIN CONVEYOR MIDDLE SECTION	1
74. D10150000	MAIN CONVEYOR UPPER SECTION	1
75. D11700000	UPPER FLARE	1
76. D11710000	UPPER FLARE	1
77. D11720000	RUBBER CLAMP	1
78. D11730000	RUBBER CLAMP	1
79. D11740000	FLARE TOP SECTION	1
80. D11750000	FLARE TOP SECTION	1

Part No.	Part Description	Quantity
81. D11760000	FLARE RUBBER	2
82. FATB20X250	M20X250 THREADED BAR	2
83. HA99000010	30° FULL CONE TIP	2
84. HA99000011	THREADED NIPPLE	2
85. HA99000012	RETAINING CAP	2
86. HA99000013	CLAMP, CAP AND SPHERE	2
87. HM1016	HYDRAULIC MOTOR	1
88. HR1058	HYDRAULIC RAM	2
89. PN1033	ADJUSTER BOLT	2
90. PN1170	LOCK OUT PIN	2
91. PN1174	FOLDING PIN	2
92. PY1004	POLY SCRAPER	2
93. RU1027	SUPER RED RUBBER	1
94. RU1028	SUPER RED RUBBER	1
95. RU1079	FEED BOOT RUBBER	2
96. RU1080	FEED BOOT RUBBER	1
97. RU1081	FEED BOOT RUBBER	1
98. RU5501	TENSIONING ELEMENT	2
99. RU6032	7MTR WATER HOSE	1

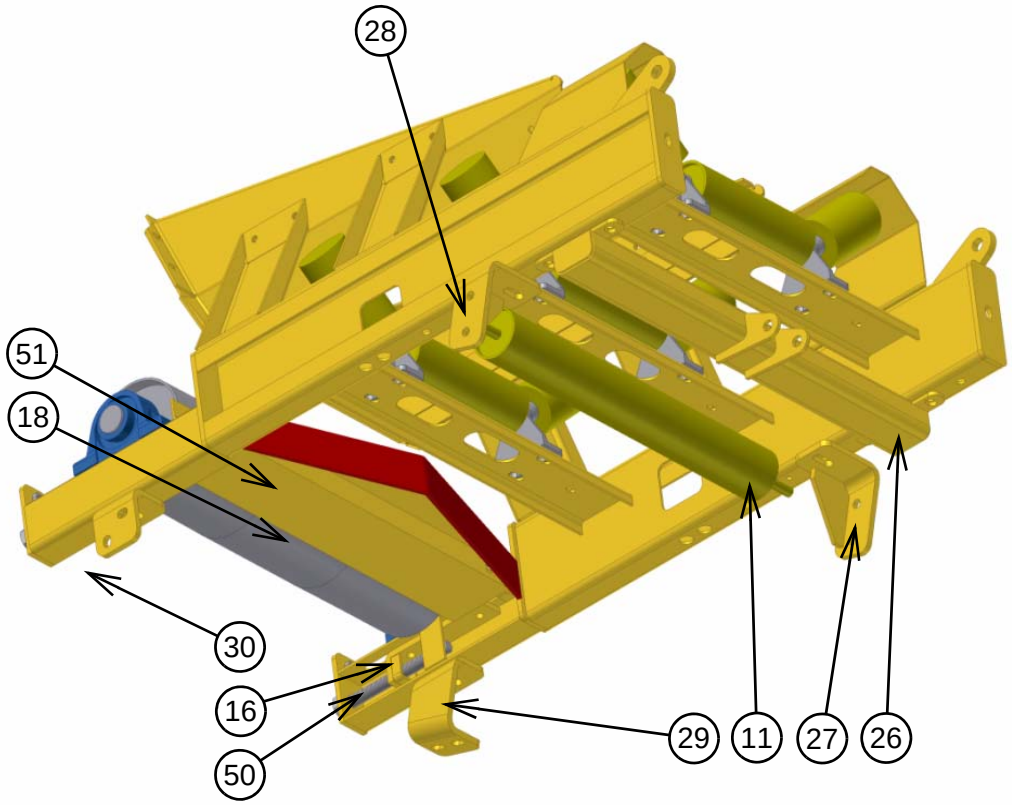
AA.12 Side Conveyor

14: VIEW OF SIDE CONVEYOR

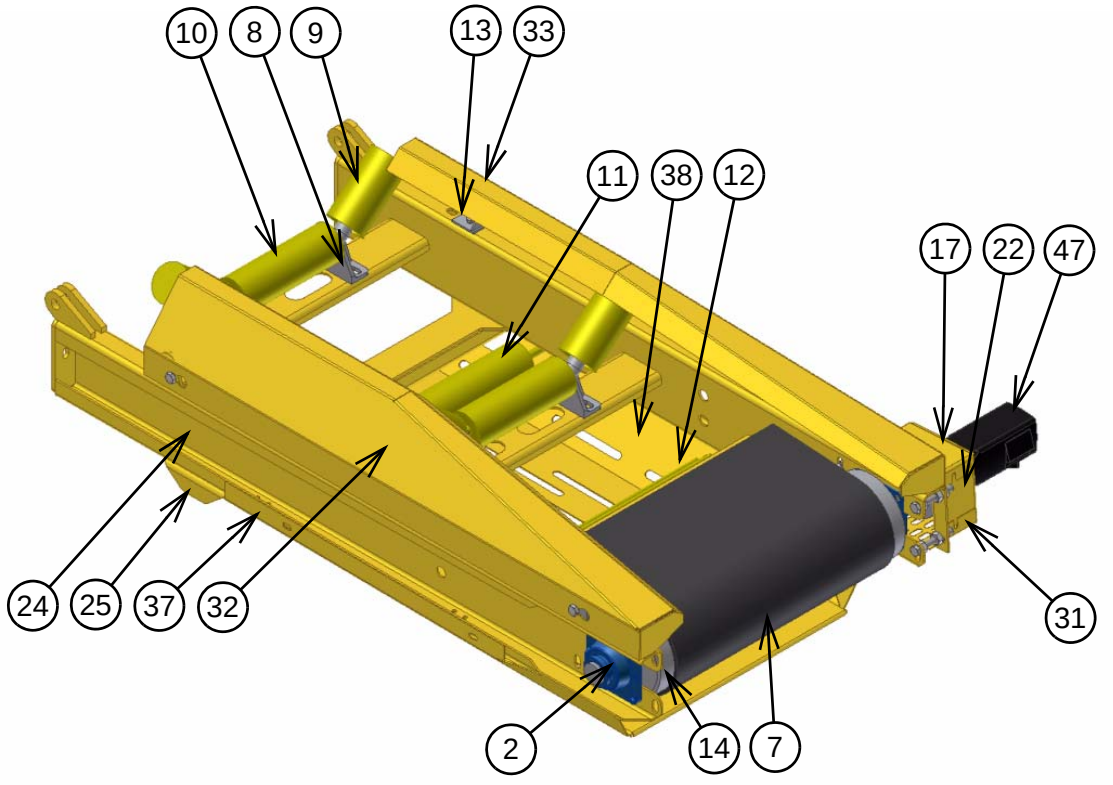
15: VIEW OF FOLDED SIDE CONVEYOR



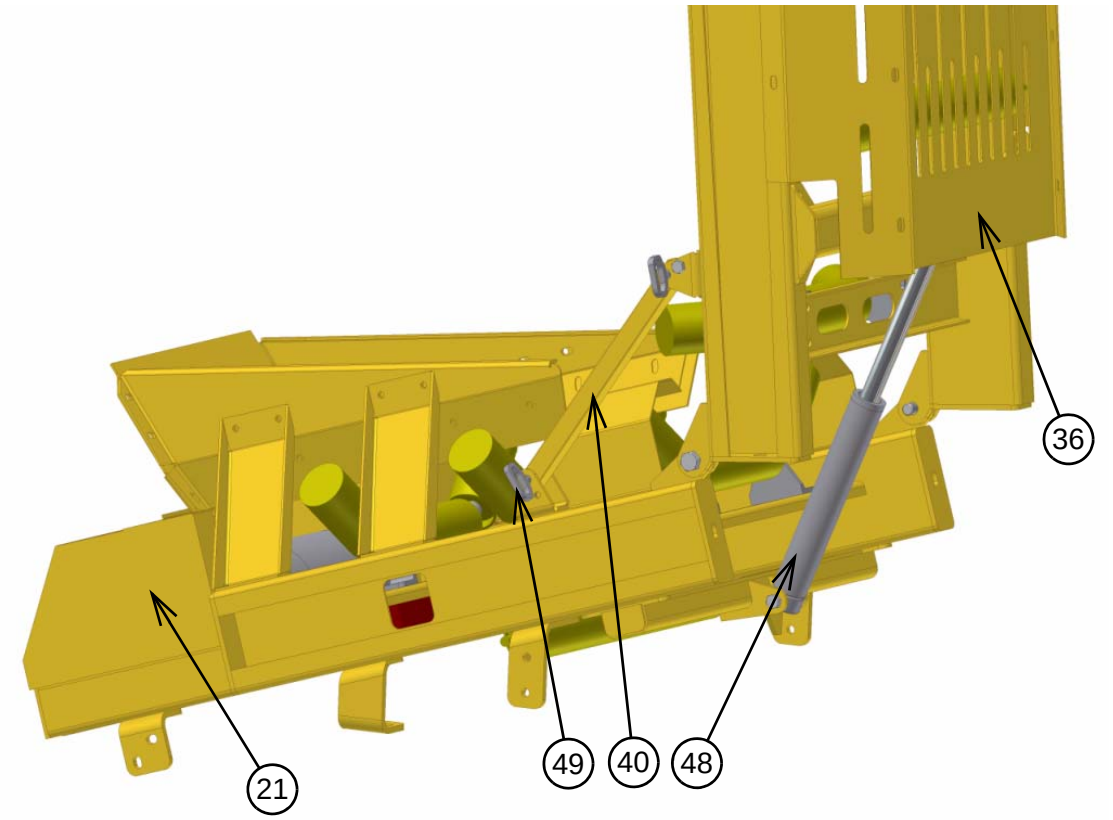
16: SIDE CONVEYOR BOTTOM SECTION



17: SIDE CONVEYOR BOTTOM SECTION



18: SIDE CONVEYOR TOP SECTION



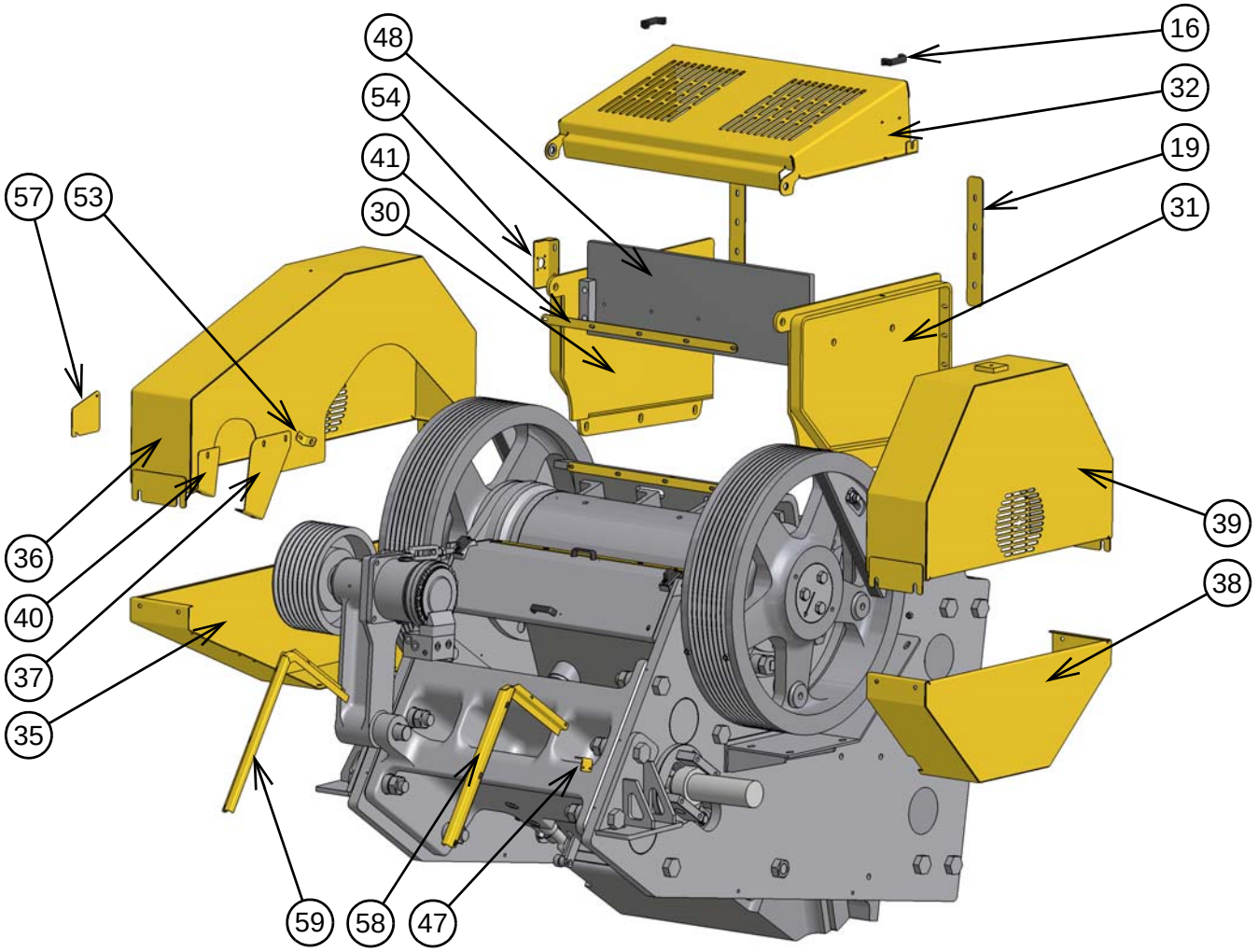
19: CONVEYOR IN TRANSPORT POSITION

20: DRIVE COUPLING

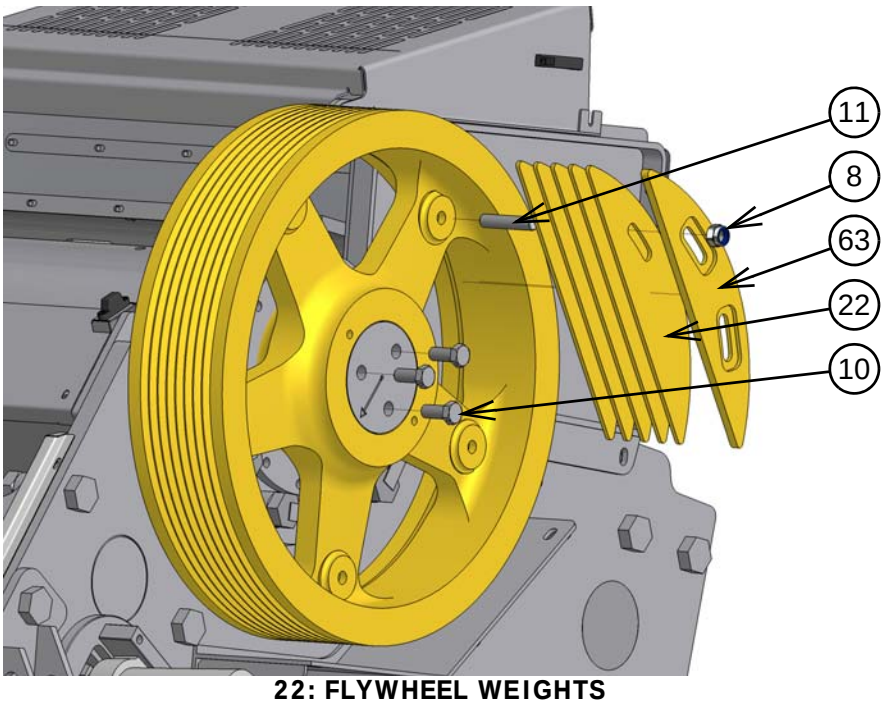
Part No.	Part Description	Quantity
1. BT1009	PLUMBER BLOCK BEARING	2
2. BT2009	FLANGE BEARING	2
3. BT5005	TAPER LOCK	1
4. BT5006	TAPER LOCK	1
5. BT6514	COUPLING INSERT	1
6. BT6515	DRIVE COUPLING - INCLUDES 3, 4, 5	1
7. CB69250700CH	ENDLESS CHEVRON BELT	1
8. CR1006	40° ROLLER BRACKET	2
9. CR1013	SIDE WING ROLLER	8
10. CR1016	CENTRE ROLLER	4
11. CR1028	RETURN ROLLER	2
12. CR1031	SLAPPER ROLLER	1
13. D4910000	MOUNTING BRACKET	3
14. E0070000	DRIVE DRUM	1
15. E0080000	END DRUM	1
16. E0150000	BEARING SLIDER	2
17. E0240000	MOUNTING BRACKET COVER	1
18. E1030000	TAIL DRUM SCRAPER	1
19. E1070000	FEED BOOT CLAMP	2

Part No.	Part Description	Quantity
20. E1090000	FEED BOOT CLAMP	1
21. E1130000	END DRUM GUARD	1
22. E1440000	MOTOR MOUNTING	1
23. E1500000	SIDE CONVEYOR BOTTOM SECTION	1
24. E1510000	SIDE CONVEYOR TOP SECTION	1
25. E1520000	FOLD RAM - TOP MOUNTING BRACKET	1
26. E1530000	FOLD RAM - BOTTOM MOUNTING BRACKET	1
27. E1540000	MOUNTING BRACKET	1
28. E1550000	MOUNTING BRACKET	1
29. E1560000	MOUNTING BRACKET	1
30. E1570000	MOUNTING BRACKET	1
31. E1860000	MOUNTING BRACKET COVER	1
32. E1890000	CONVEYOR FLARE	1
33. E1900000	CONVEYOR FLARE	1
34. E1920000	NIP GUARD	1
35. E1930000	NIP GUARD	1
36. E1940000	LOWER BOTTOM GUARD	1
37. E1950000	LOWER SIDE GUARD	1
38. E1960000	LOWER SIDE GUARD	1
39. E2020000	TRANSPORT LINK ARM BRACKET	2
40. E2030000	TRANSPORT LINK ARM	1
41. E2110000	FEED BOOT SIDE	1
42. E2120000	FEED BOOT SIDE	1
43. E2130000	FEED BOOT LEG	4
44. E2140000	FEED BOOT BACK	1
45. E2910000	PIPE CLAMP	1
46. HA00014025	MEDIUM GREASE BULKHEAD	2
47. HM1006	CHARLYNN 2K395 BAA MOTOR - TAIL1 SIDE 2	1
48. HR1021	HYDRAULIC RAM	1
49. PN1019	TRANSPORT PIN	2
50. PN1076	TENSIONING BOLT	2
51. PY1008	POLY SCRAPER	1

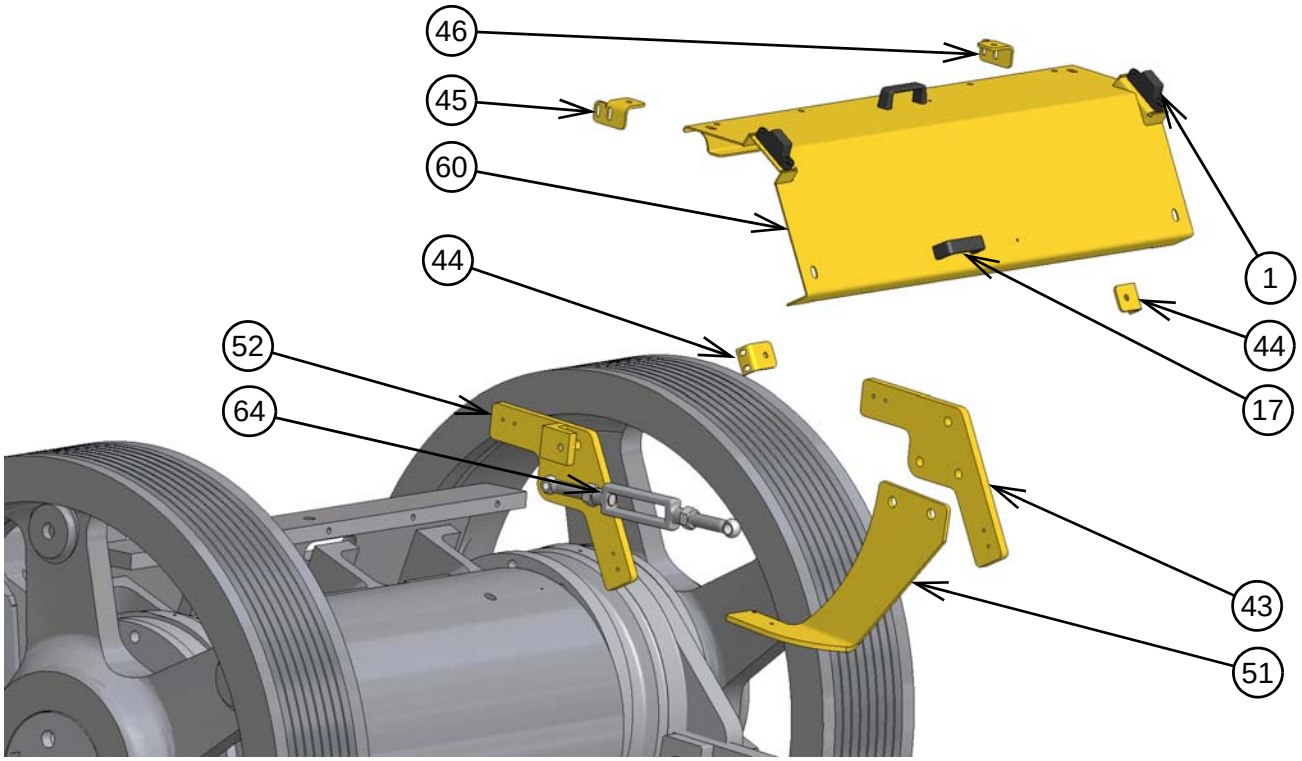
AA.13 Crusher - Assembly



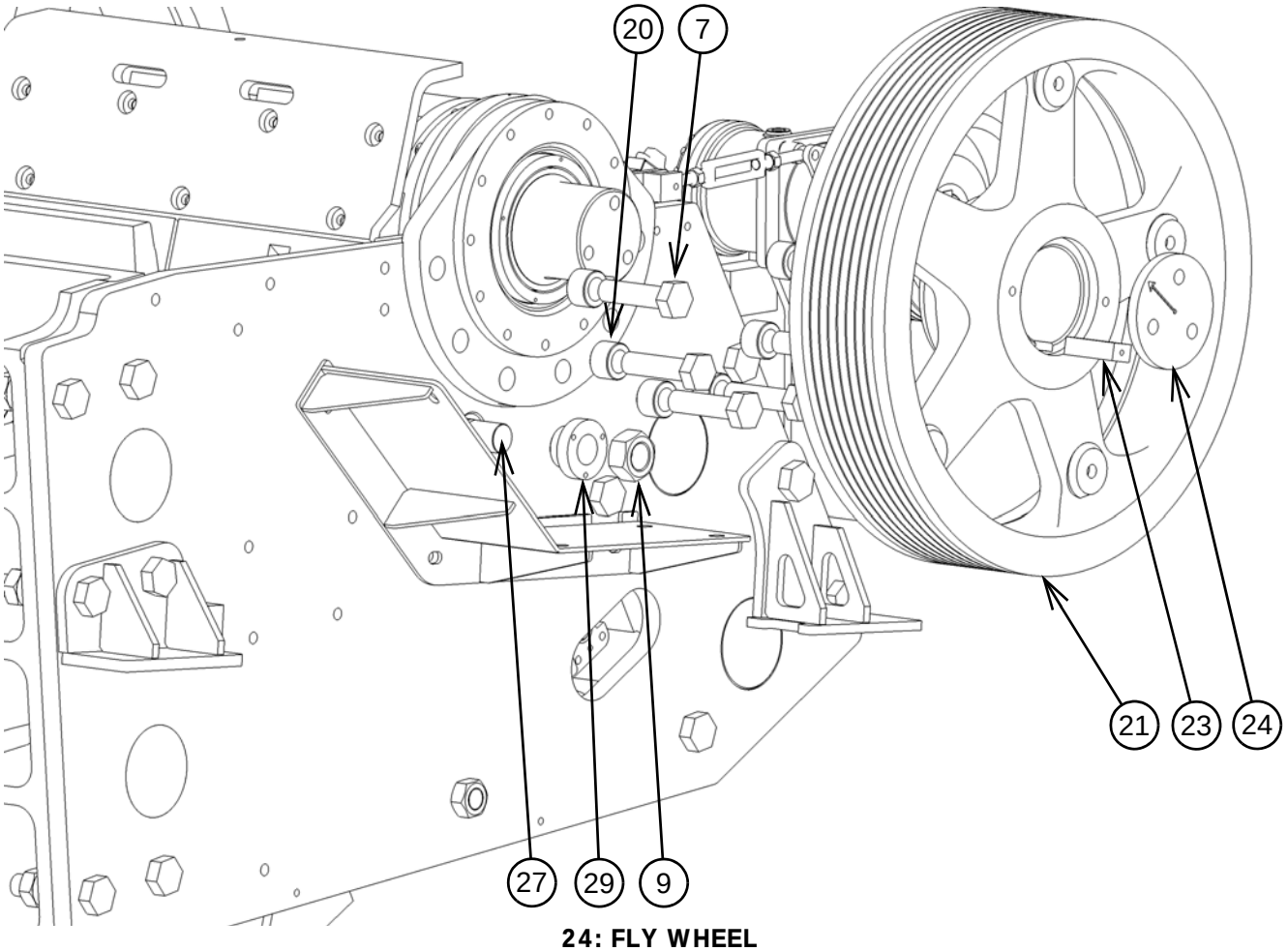
21: CRUSHER BOX COVERS



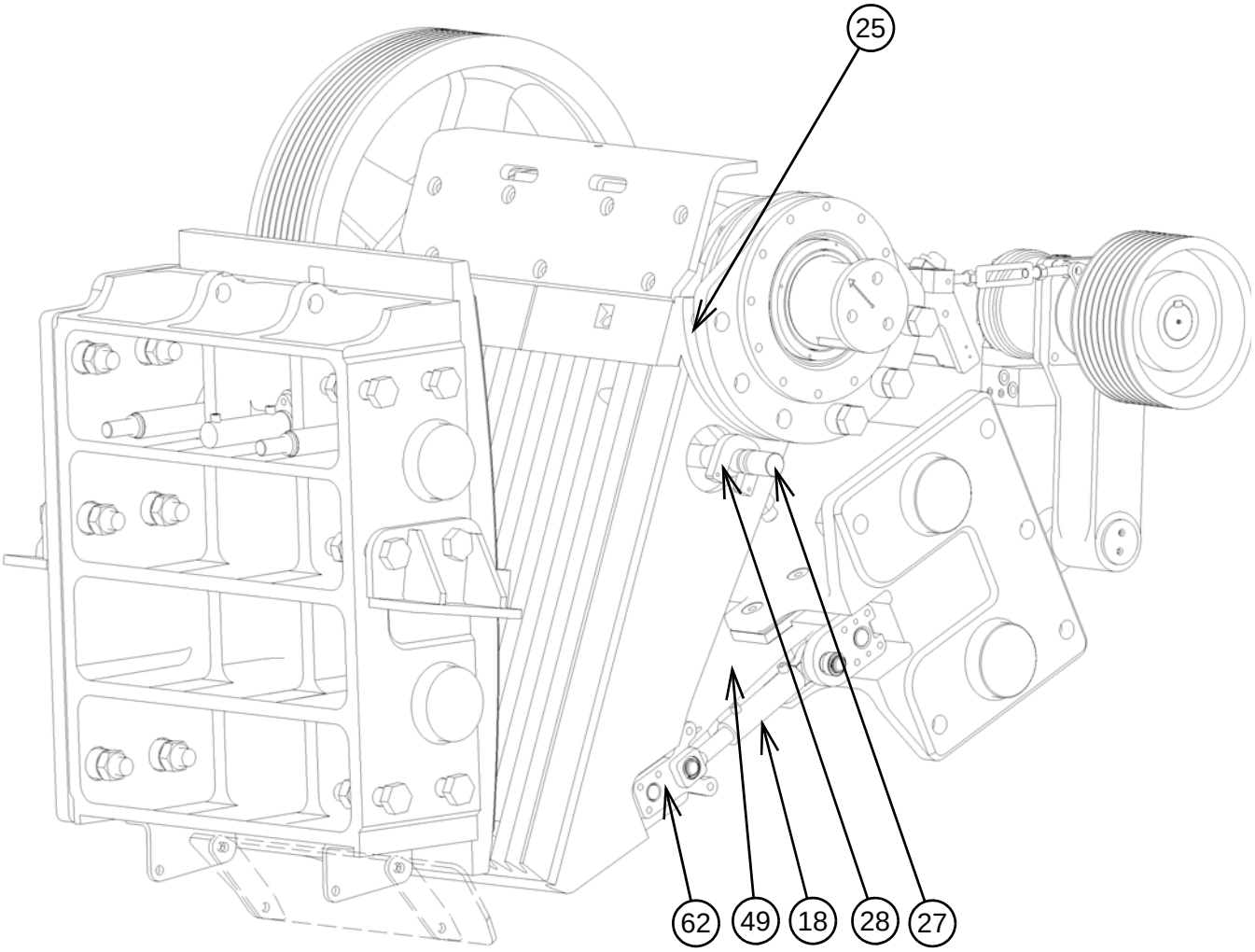
22: FLYWHEEL WEIGHTS



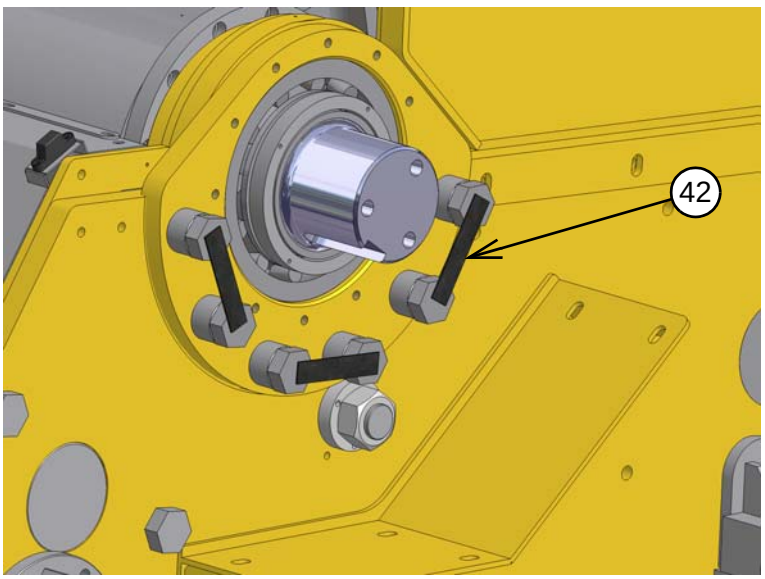
23: TOGGLE COVER



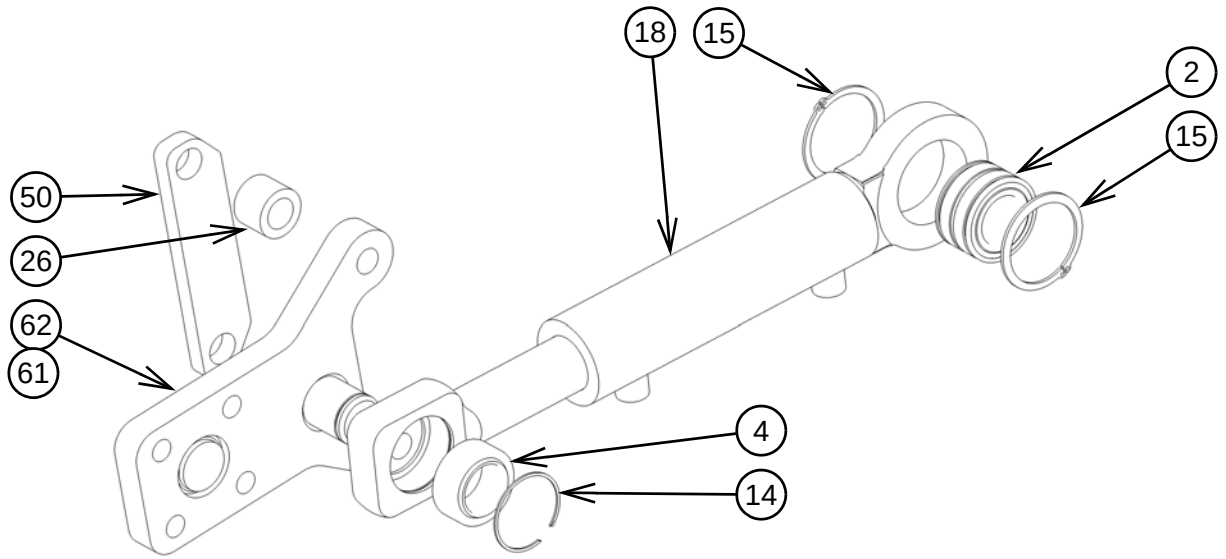
24: FLY WHEEL



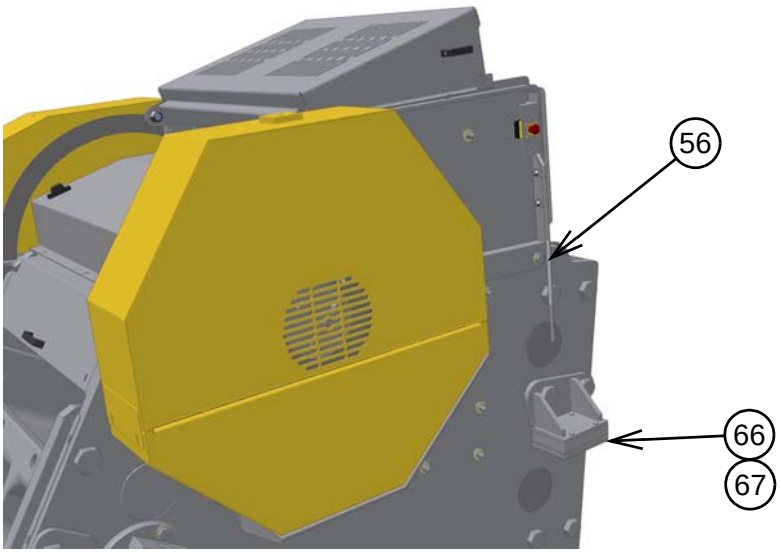
25: VIEW WITH SIDE PLATE REMOVED



26: RETAINING PLATE



27: LINK ARM



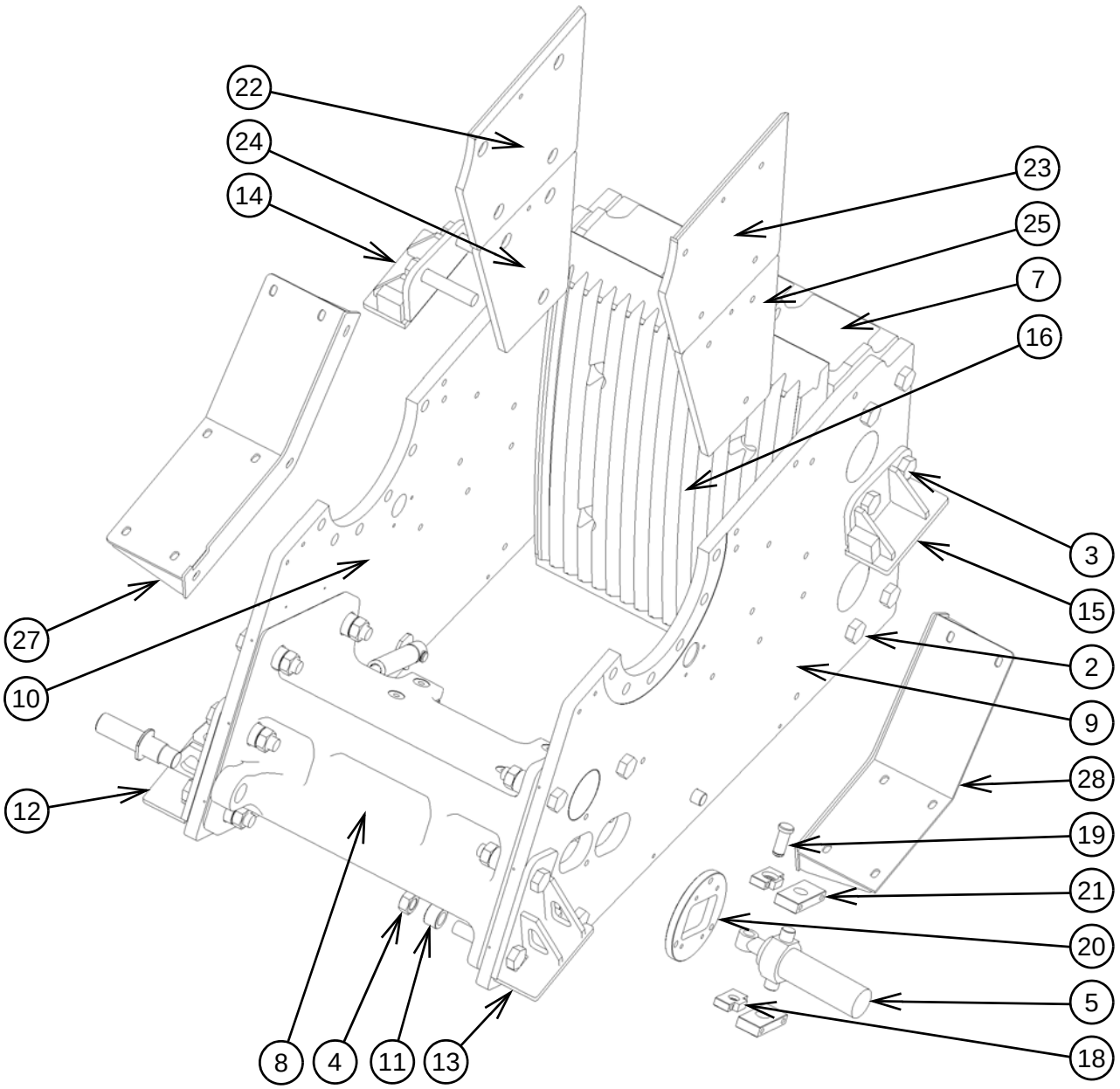
28: VIEW ON CRUSHER BOX

Part No.	Part Description	Quantity
1. BB2015	TOP HAT BUFFER	2
2. BT3009	LINK ARM BEARING	2
3. BT4506	SPC4750 V BELT	8
4. BT6006	SMALL RAM BEARING	2
5. EL2063	EMERGENCY STOP	4
6. EL2120	3 CORE PRESSURE SWITCH LOOM	1

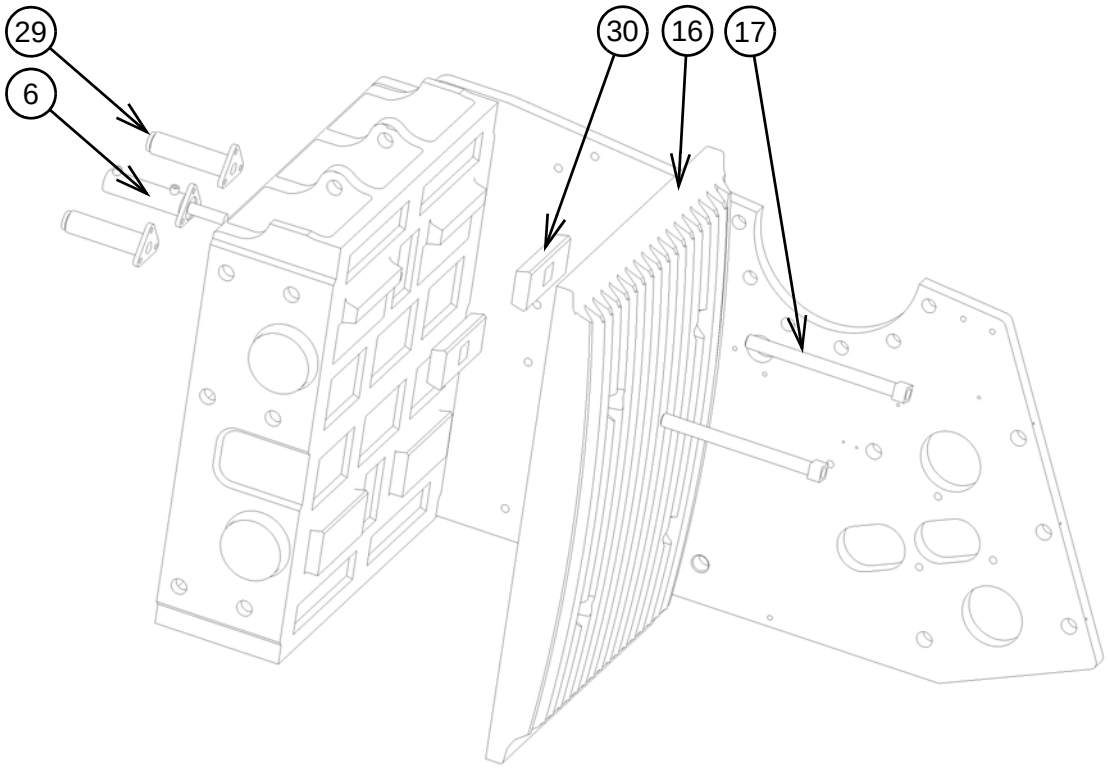
Part No.	Part Description	Quantity
7. FAB48X180(10.9)	M48x180 LG	12
8. FAN30N	NYLOC NUT	2
9. FAN64	M64 HEX NUT	2
10. FAS30X70DH	M30X70 HT SETSCREW DRILLED HEAD	6
11. FATB30X145	M30 STUD	2
12. FAW38XC	EXTERNAL CIRCLIP	6
13. FAW62IC	INTERNAL SNAP RING	8
14. FAW78IC	INTERNAL SNAP RING	2
15. FAW68XC	EXTERNAL CIRCLIP	8
16. FD2005	DOOR HANDLE	2
17. FD2007	DOOR HANDLE	2
18. HR1051	HYDRAULIC RAM	2
19. J2060000	INLET CHUTE RUBBER CLAMP	2
20. J4060000	BOLT SPACER WASHER	12
21. J4200000	FLYWHEEL	2
22. J4210000	FLYWHEEL BALANCE WEIGHT	10
23. J4220000	FLYWHEEL KEY	2
24. J4230000	FLYWHEEL END CAP	2
25. J4240000	BEARING HOUSING LOCATION	2
26. J5370000	SUPPORT BUSH	4
27. J4540000	SIDE PLATE TIE BAR	1
28. J4550000	SIDE PLATE TIE BOLT SPACER	2
29. J4560000	SIDE PLATE TIE BAR OUTER BUSH	2
30. J4620000	TOP INLET CHUTE L/H SIDE FRAME	1
31. J4630000	TOP INLET CHUTE R/H SIDE FRAME	1
32. J4670000	TOP INLET CHUTE TOP COVER	1
33. J4720000	REAR FOOT MOUNTING PAD	2
34. J4730000	FRONT FOOT MOUNTING PAD	2
35. J4770000	DRIVE FLYWHEEL BOTTOM COVER	1
36. J4780000	DRIVE FLYWHEEL TOP COVER	1
37. J4790000	PULLEY GUARD	1
38. J4810000	NON-DRIVE FLYWHEEL BOTTOM COVER	1
39. J4820000	NON-DRIVE FLYWHEEL TOP COVER	1

Part No.	Part Description	Quantity
40. J4880000	PULLEY GUARD	1
41. J4890000	RUBBER MOUNTING CLAMP	3
42. J5090000	BOLT RETAINING STRAP	6
43. J5170000	TOGGLE COVER SIDE PLATE	1
44. J5180000	TOGGLE GUARD LOWER SUPPORT BRACKET	2
45. J5220000	SUPPORT BRACKET	1
46. J5230000	SUPPORT BRACKET	1
47. J5240000	RAM HOSE BULKHEAD BRACKET	2
48. J5250000	TOP INLET CHUTE FACE PLATE	1
49. J5280000	25 mm TOGGLE PLATE	1
50. J5390000	TOGGLE PLATE TIE BAR	2
51. J5400000	CUT OUT SWITCH MOUNTING BRACKET	1
52. J5410000	TURN BUCKLE FIXING BRACKET	1
53. J5420000	SUPPORT BRACKET	1
54. J5430000	MOUNTING BRACKET	1
55. J5510000	EMERGENCY STOP CABLE GUIDE	1
56. J5570000	EMERGENCY STOP CABLE GUIDE	1
57. J5640000	INSPECTION COVER	1
58. J6550000	HOSE COVER	1
59. J6560000	HOSE COVER	1
60. J6990000	TOGGLE COVER PLATE	1
61. J8080000	L/H TOGGLE JAW BRACKET	1
62. J8090000	R/H TOGGLE JAW BRACKET	1
63. J6210000	FLYWHEEL BALANCE WEIGHT	2
64. J6970000	TURN BUCKLE ASSEMBLY	1
65. RU1012	THICK FOAM	1
66. RU1150	MOUNTING BLOCK	4
67. RU1151	WASHERS	32

AA.14 Crusher - Box



1: CRUSHER BOX

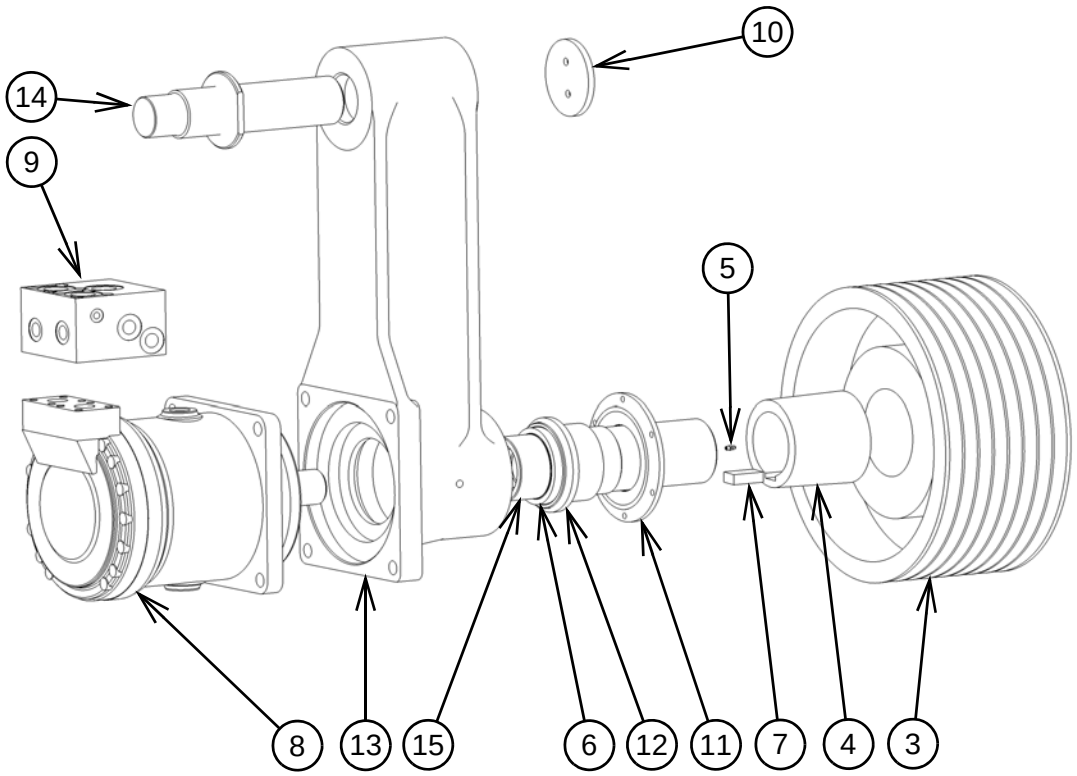


2: CRUSHER BOX

Part No.	Part Description	Quantity
1. FAB48X180(10.9)	M48 BOLT	24
2. FAB48X200(10.9)	M48X210	10
3. FAB48X240(10.9)	M48X240	4
4. FAN48	M48 HEX NUT	22
5. HR1049	TOGGLE WEDGE RAM	1
6. HR1052	HYDRAULIC RAM	1
7. J4010000	FRONT BEAM	1
8. J4020000	BACK BEAM	1
9. J4030000	RIGHT HAND PLATE	1
10. J4040000	LEFT HAND PLATE	1
11. J4060000	BOLT SPACER	22
12. J8000000	LEFT HAND FRONT FOOT	1
13. J8010000	RIGHT HAND FRONT FOOT	1
14. J8020000	LEFT HAND REAR FOOT	1
15. J8030000	RIGHT HAND REAR FOOT	1

Part No.	Part Description	Quantity
16. J4250000	FIXED WEAR PLATE TALL TOOTH	A/R
17. J4290000	FIXED WEAR PLATE WEDGE BOLT	2
18. J4420000	WEDGE RAM BRACKET	2
19. J4430000	WEDGE RAM PIN	1
20. J4450000	WEDGE RAM SUPPORT PLATE	1
21. J4460000	WEDGE RAM BASE BRACKET	2
22. J4580000	WALL WEAR PLATE	1
23. J4590000	WALL WEAR PLATE	1
24. J4600000	WALL WEAR PLATE	1
25. J4610000	WALL WEAR PLATE	1
26. J4700000	FIXED WEAR PLATE	A/R
27. J4760000	FLYWHEEL COVER BASE	1
28. J4800000	FLYWHEEL COVER BASE	1
29. J5080000	WEAR PLATE CLAMPING SLEEVE	2
30. J6910000	WEAR PLATE WEDGE	2

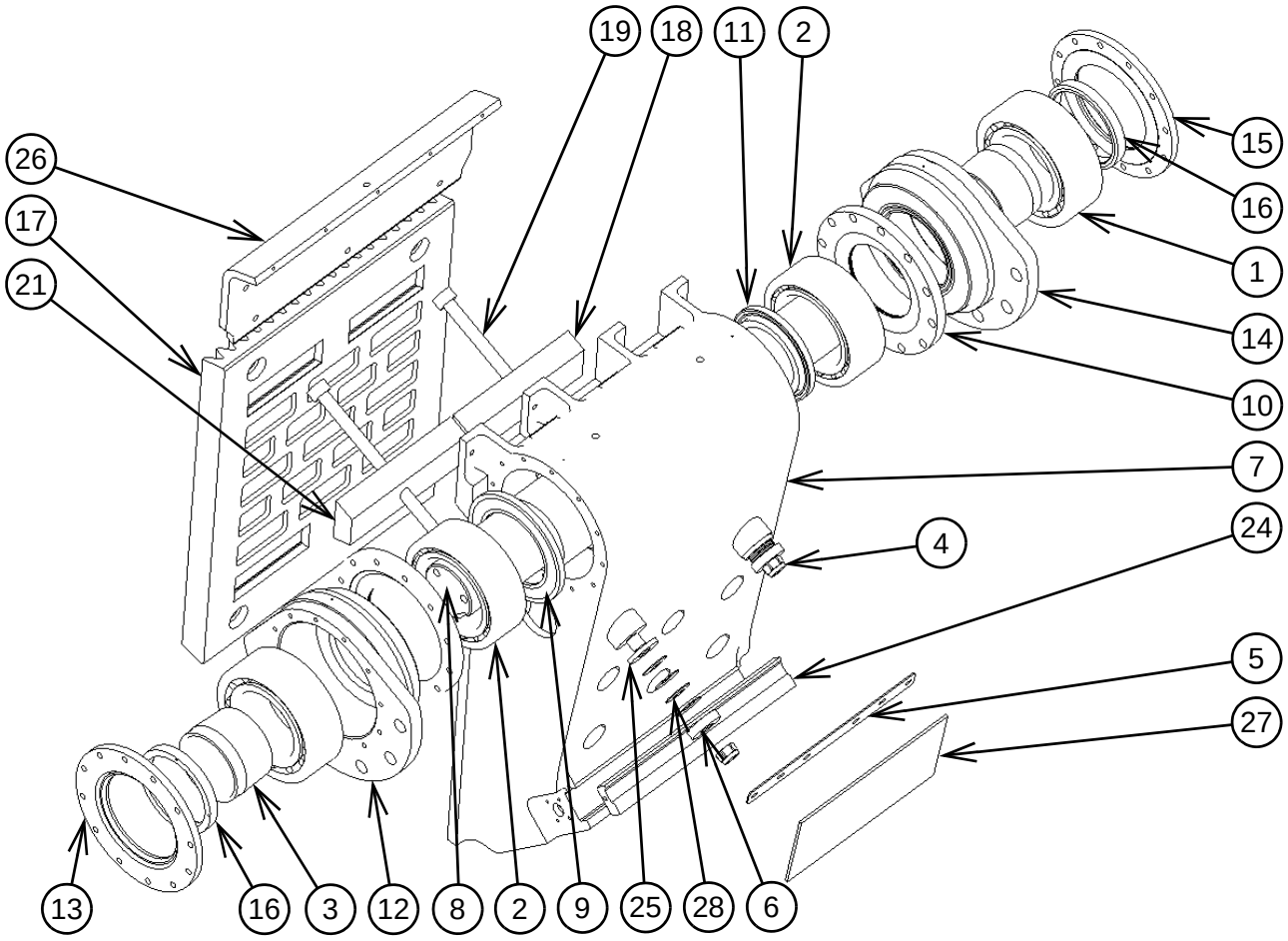
AA.15 Crusher - Torque Arm Assembly



3: VIEW ON TORQUE ARM ASSEMBLY

Part No.	Part Description	Quantity
1. BT3015	INNER BEARING	1
2. BT3016	OUTER BEARING	1
3. BT4008	8 GROOVE PULLEY WHEEL	1
4. BT5017	TAPER LOCK BUSH	1
5. BT5504	LUBRICATING NIPPLE	1
6. BT8013	SHAFT SEAL RING	2
7. FAKS28X16	KEY	1
8. HM1021	HYDRAULIC MOTOR	1
9. HV3025	MOTOR CONTROL BLOCK	1
10. J0250000	PIN CAP	1
11. J0330000	OUTER BEARING CAP	1
12. J0820000	INNER BEARING SPACER RING	1
13. J0930000	TENSIONING FRAME	1
14. J4920000	PULLEY ARM BACK BEAM SPIGOT	1
15. J5050000	PULLEY SHAFT	1

AA.16 Crusher - Jaw Stock

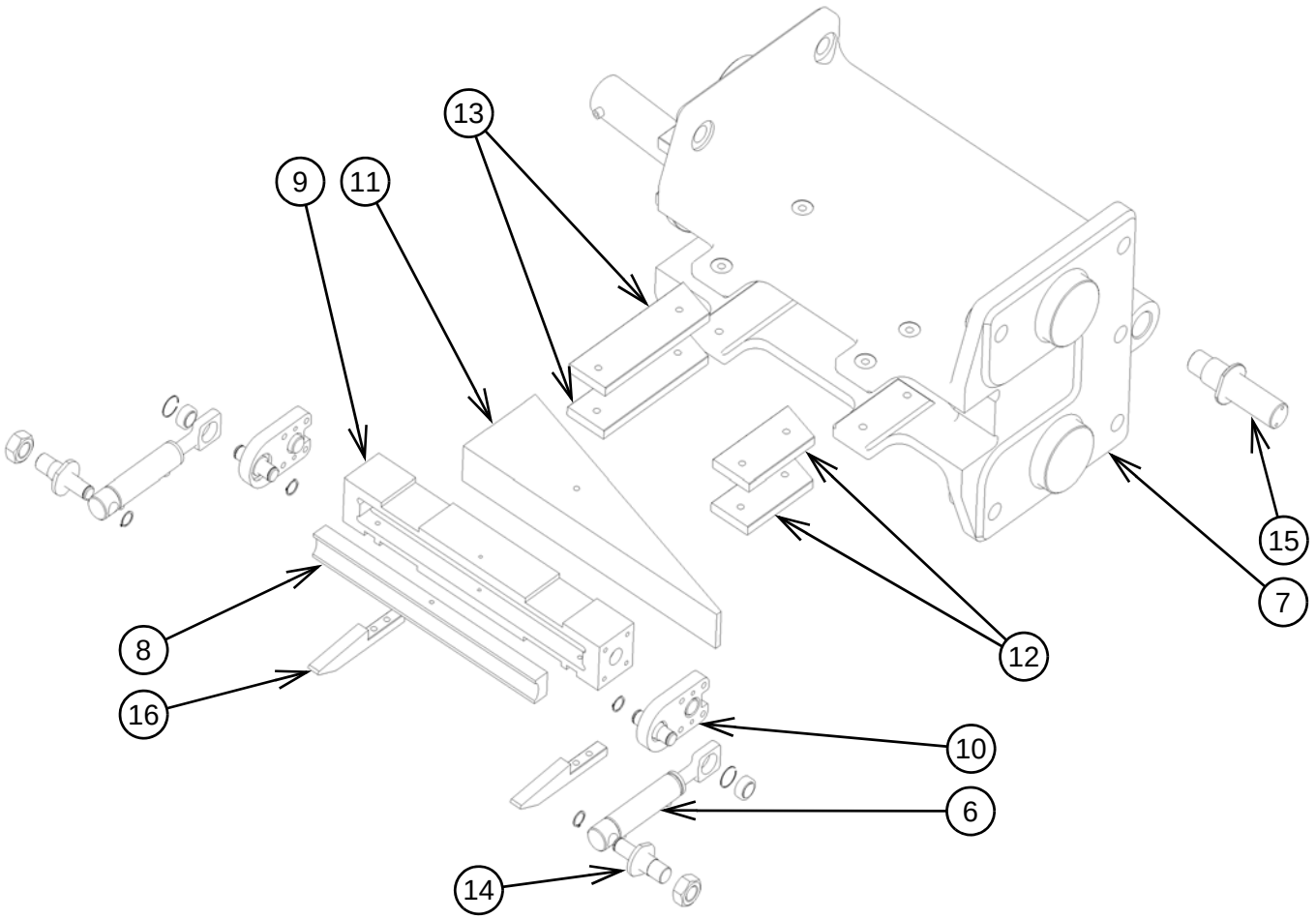


4: JAW STOCK ASSEMBLY

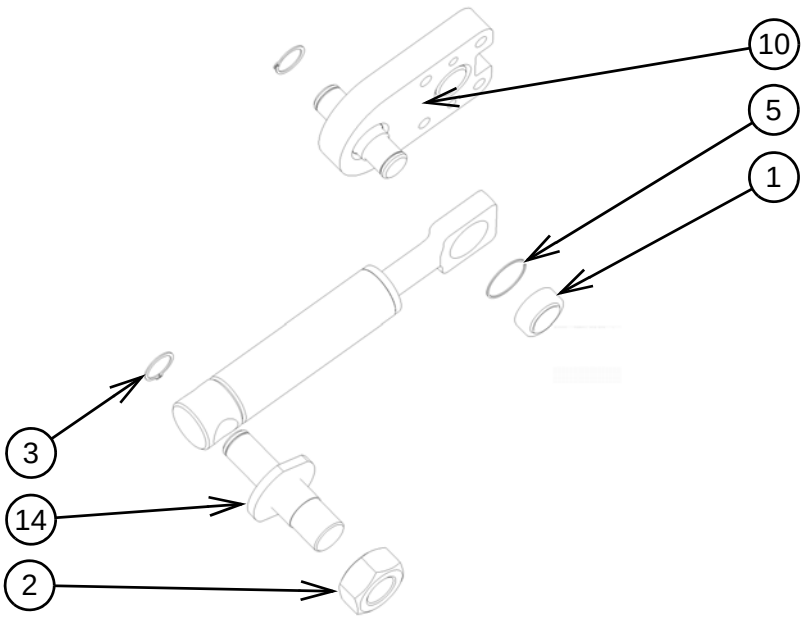
Part No.	Part Description	Quantity
1. BT3060	OUTER BEARING	2
2. BT3065	INNER BEARING	2
3. BT3501	OUTER BEARING SLEEVE	2
4. FAN42N	M42 NYLOC NUT	2
5. J0370000	TOGGLE DUST FLAP CLAMP	1
6. J3990000	DISK SPRING WASHER	2
7. J4000000	JAW STOCK	1
8. J4110000	SHAFT	1
9. J4120000	SHAFT INNER RING	2
10. J4130000	HOUSING COVER	2
11. J4140000	LABYRINTH SPACER	2

Part No.	Part Description	Quantity
12. J4150000	DRIVE SIDE BEARING HOUSING	1
13. J4160000	DRIVE SIDE HOUSING COVER	1
14. J4170000	NON-DRIVE SIDE BEARING HOUSING	1
15. J4180000	NON-DRIVE SIDE HOUSING COVER	1
16. J4190000	BEARING LOCKING RING	2
17. J4260000	WEAR PLATE TALL TOOTH	1
18. J4280000	WEAR PLATE R/H WEGGE	1
19. J4300000	WEAR PLATE WEDGE BOLT	2
20. J4710000	JAW WEAR PLATE	A/R
21. J4750000	WEAR PLATE L/H WEDGE	1
22. J4940000	WEAR PLATE WEDGE - USE WITH J4710000	A/R
23. J4950000	WEAR PLATE WEDGE - USE WITH J4710000	A/R
24. J5270000	TOGGLE SEAT	1
25. J5990000	TOP HAT WASHER	2
26. J8040000	TOP WEAR PLATE	1
27. RU1139	JAW STOCK RUBBER	1
28. SC1006	COMPRESSION DISK	8

AA.17 Crusher - Toggle Crossbeam



5: TOGGLE CROSSBEAM



6: TOGGLE RAM

Part No.	Part Description	Quantity
1. BT6006	SMALL RAM BEARING	2
2. FAN48	M48 HEX NUT	22
3. FAW36XC	EXTERNAL CIRCLIP	4
4. FAW62IC	INTERNAL SNAP RING	2
5. FAW78IC	INTERNAL SNAP RING	2
6. HR1050	TOGGLE CLAMPING RAM	2
7. J4020000	BACK BEAM	1
8. J4330000	TOGGLE SEAT	1
9. J4350000	TOGGLE SEAT CROSS BEAM	1
10. J4360000	TOGGLE SEAT CROSS BEAM END PLATE	2
11. J4390000	TOGGLE ADJUSTMENT WEDGE	1
12. J4400000	TOGGLE WEDGE SMALL SLIDER	2
13. J4410000	TOGGLE WEDGE LARGE SLIDER	2
14. J4520000	TOGGLE PUSH RAM SPIGOT	2
15. J4920000	PULLEY ARM BACK BEAM SPIGOT	1
16. J5380000	SUPPORT PLATE	2

AA.18 Hydraulic Hoses

When ordering hydraulic hoses, please quote the number stamped on the end of the hose. The number is in the format HH****.

Complete Hydraulic Hose Kits

Part No.	Part Description	Quantity
1. HH8000W	WATER PUMP HOSE KIT	1
2. HH8400CAT	TORQUE ARM HOSE KIT	1
3. HH9500	C9 ENGINE POWER PACK HOSE KIT	1
4. HH9700C	C12+ EXTENDED MAIN CONVEYOR HOSE KIT	1
5. HH9700D	C12+ SIDE CONVEYOR HOSE KIT	1
6. HH9700E	C12+ EXTENDED SIDE CONVEYOR HOSE KIT	1
7. HH9700G	C12+ CHASSIS HOSE KIT	1
8. HH9700H	C12+ MAIN CONVEYOR LIFT RAMS HOSE KIT	1
9. HH9700I	C12+ CONTROL BOX AND CHASSIS HOSE KIT	1

1. WATER PUMP HOSE KIT

Kit Number: HH8000W

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH8757	1/2" R2T		90C	135	
HH8758	1/2" R2T		90C	135	
HH8759	3/4" R2T	0.85	F	F	
HH8760	3/4" R2T	0.85	F	F	

2. TORQUE ARM HOSE KIT

Kit Number: HH8400CAT

Revision: 16

Date: 03/11/2005

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH8401	¼" R2T	0.7	F	90S	
HH8402	¼" R2T	0.7	F	90S	
HH8404	¼" R2T	3.2	F	F	

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH8405	¼" R2T	3.2	F	F	
HH8406	¼" R2T	0.9	90S	90S	
HH8407	¼" R2T	0.9	90S	90S	
HH8408	¼" R2T	1.8	F	F	
HH8409	¼" R2T	1.8	F	F	
HH8410	¼" R2T	2.15	F	90C	
HH8411	¼" R2T	1.85	F	F	
HH8412	¼" R2T	2.93	F	90C	
HH8413	¼" R2T	2.2	F	90C	
HH8414	¼" R2T	3.35	F	90C	
HH8415	¼" R2T	2.92	F	F	
HH8416	¼" R2T	1.91	F	F	
HH8417	¼" R2T	2.75	F	90C	
HH8418	¼" R2T	1.65	F	90C	
HH8534	¼" R2T	0.24	90S	F	
HH8419	3/8" R2T	0.3	F	F	
HH8420	3/8" R2T	0.75	F	F	
HH8421	3/8" R2T	0.69	F	F	
HH8422	3/8" R2T	1.67	F	90S	
HH8425	3/8" R2T	0.42	F	90C	
HH8426	3/8" R2T	0.42	F	90C	
HH8427	3/8" R2T	0.6	F	90C	
HH8428	3/8" R2T	0.6	F	90C	
HH8429	½" R2T	2.75	F	F	
HH8430	½" R2T	0.63	F	90S	
HH8432	½" R2T	0.41	90C	135	
HH8434	½" R2T	1.16	90S	90S	
HH8435	½" R2T	1.68	90S	135	
HH8547	¾" R2T	1.65	90S	135	
HH8437	1¼" R13	1	F	135	
HH8438	1¼" R13	0.95	F	135	
HH8439	1¼" R13	0.95	F	135	

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH8196	3/8" R2T	2.77	F	90S	
HH8197	3/8" R2T	2.77	F	90S	
HH8537	½" R2T	4	90S	90S	
HH8791	¾" R2T	2.5	F	F	

3. C9 ENGINE POWER PACK HOSE KIT

Kit Number: HH9500

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9501	¾" R2T	0.5	90S	90S	1
HH9502	¾" R2T	2.15	F	90S	
HH9503	¾" R2T	2.05	F	90S	
HH9504	¾" R2T	2.25	F	90S	
HH9505	¾" R2T	2.2	90S	90S	
HH9506	¾" R2T	2.97	F	90S	
HH9507	¾" R2T	1.6	135	90S	
HH9508	½" R2T	1.6	F	90C	
HH9509	¼" R2T	2	90S	90S	
HH9510	1" R2T	3.15	F	F	
HH9511	1" R2T	3.32	F	F	
HH9512	1" R2T	0.43	90S	135	
HH9513	1" R1T	2.36	F	F	
HH9514	1" R13	1.56	F	90S	
HH9515	1" R13	1.56	F	90S	
HH9516	1" R13	2.38	F	90S	
HH9517	1" R13	2.29	F	90S	
HH9518	1½" R13	2.01	F	135	
HH9519	1¼" R2T	2.98	F	90S	
HH9520	1¼" R2T	2.98	F	90S	
HH9521	1¼" R2T	3.5	F	F	
HH9522	1¼" R13	3.42	F	90S	
HH9523	1¼" R13	3.43	F	90S	
HH9524	1¼" R13	0.95	F	90S	

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9525	1¼" R13	1.2	F	90S	
HH9526	1¼" R13	0.86	F	90S	
HH9527	1¼" R13	2.4	F	90S	
HH9528	3½" SUCT	1.5			
HH9529	¾" R2T	2.25	F	90S	
HH9530	¾" R2T	3.25	F	F	
HH9531	¾" R2T	3.18	F	F	
HH9532	2" R1T	1.1	F	135	
HH9533	2" R1T	1.15	F	135	
HH9534	1¼" R1T	1.05	90S	135	
HH9535	3/8" R2T	2.2	F	F	
HH9536	½" R2T	1.6	F	F	
HH9537	½" R2T	2.5	F	F	
HH9538	½" R2T	3.2	F	90S	
HH9539	1¼" R1T	1.45	F	135	

4. C12+ EXTENDED MAIN CONVEYOR HOSE KIT

Kit Number: HH9700C

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	LOCATION
HH9866	3/8" R2T	0.4	F	F	
HH9867	3/8" R2T	0.8	F	90S	
HH9868	3/8" R2T	1.2	F	F	
HH9869	3/8" R2T	1.55	F	90S	
HH9870	3/8" R2T	8	F	F	
HH9871	3/8" R2T	8	F	F	
HH9872	¾" R2T	1.5	F	F	
HH9873	¾" R2T	1.2	F	135	
HH9874	¾" R2T	1.2	F	135	
HH9875	¾" R2T	2.2	F	135	
HH9876	¾" R2T	2.2	F	135	
HH9877	¾" R2T	7.2	F	F	
HH9878	¾" R2T	7.2	F	F	

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	LOCATION
HH9879	3/8" R2T	6	F	90S	
HH9880	3/8" R2T	6	F	90S	
HH9881	¾" R2T	0.86	F	F	
HH9882	¾" R2T	0.86	F	F	
HH9883	¾" R2T	3.73	F	90S	
HH9884	¾" R2T	3.88	F	90S	
HH9885	¾" R2T	8	F	90S	

5. C12+ SIDE CONVEYOR HOSE KIT

Kit Number: HH9700D

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9886	¾" R2T	0.63	90S	90S	
HH9887	¾" R2T	0.63	90S	90S	
HH9888	¾" R2T	3.7	90S	90S	
HH9889	¾" R2T	3.7	90S	90S	
HH9890	3/8" R2T	0.44	F	90C	
HH9891	3/8" R2T	0.9	90C	90C	
HH9892			F	F	
HH9893			F	F	

6. C12+ EXTENDED SIDE CONVEYOR HOSE KIT

Kit Number: HH9700E

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9894	¾" R2T	6.5	90S	90S	
HH9895	¾" R2T	6.6	90S	90S	
HH9888	¾" R2T	3.7	90S	90S	
HH9889	¾" R2T	3.7	90S	90S	
HH9890	3/8" R2T	0.44	F	90C	
HH9891	3/8" R2T	0.9	90C	90C	
HH9892			F	F	

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9893			F	F	

7. C12+ CHASSIS HOSE KIT

Kit Number: HH9700G

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9896	3/8" R2T	6.00	F	F	L/H HOPPER SIDE RAM TO 6 LEVER SPOOL VALVE
HH9897	3/8" R2T	7.20	F	F	L/H HOPPER SIDE RAM TO 6 LEVER SPOOL VALVE
HH9898	¼" R2T	2.80	F	F	BULKHEAD TO L/H TRACK BRAKE
HH9899	¼" R2T	9.00	F	90S	TANDEM PUMP TO FEEDER CONTROL HIGH PRESSURE
HH9900	¾" R2T	5.86	F	F	JOIN TO 8473 MALE/MALE TO BULKHEAD
HH9901	¾" R2T	7.50	F	F	FROM TEE FOR L/H & R/H TRACK
HH9902	1" R2T	8.20	F	F	CROSS IN CHASSIS TO BULKHEAD PLATE
HH9903	1" R13	1.95	F	90S	(V1) L/H TRACK MOTOR TO BULKHEAD PLATE
HH9904	1" R13	2.05	F	90S	(V2) L/H TRACK MOTOR TO BULKHEAD PLATE
HH9905	¾" R2T	1.80	F	90S	L/H TRACK CASE DRAIN TO TEE
HH9906	3/8" R2T	6.85	F	F	SIDE CONVEYOR LIFT RAM
HH9907	3/8" R2T	6.75	F	F	FROM TEE TO 6 LEVER SPOOL VALVE
HH9908	3/8" R2T	6.65	F	F	FROM TEE TO 6 LEVER SPOOL VALVE
HH9909	3/8" R2T	6.30	F	F	R/H HOPPER SIDE RAM TO 6 LEVER SPOOL VALVE
HH9910	3/8" R2T	5.85	F	F	R/H HOPPER SIDE RAM TO 6 LEVER SPOOL VALVE
HH9911	3/8" R2T	8.60	F	F	REAR HOPPER RAM TO 6 LEVER SPOOL VALVE
HH9912	¼" R2T	4.20	F	F	BULKHEAD TO R/H TRACK BRAKE
HH9913	¼" R2T	8.00	90C	90C	CRUSHER BOX RAM EXTEND
HH9914	¼" R2T	8.00	90C	90C	CRUSHER BOX RAM RETRACT
HH9915	½" R2T	10.40	F	90S	FEEDER CASE DRAIN
HH9916	¾" R2T	2.60	F	90S	R/H TRACK CASE DRAIN TO TEE
HH9917	¾" R2T	1.50	F	F	SIDE CONVEYOR RETURN TO CROSS IN CHASSIS
HH9918	¾" R2T	7.20	F	F	SIDE CONVEYOR FEED TO BULKHEAD
HH9919	¾" R2T	0.30	F	F	
HH9920	¾" R2T	1.60	F	F	
HH9921	1" R13	3.90	F	90S	(V2) R/H TRACK MOTOR TO BULKHEAD
HH9922	1" R13	3.40	F	90S	(V1) R/H TRACK MOTOR TO BULKHEAD

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9923	1" R2T	5.70	F	F	RETURN HOSE TO TANK
HH9924	½" R2T	7.80	F	90C	
HH9925	½" R2T	7.00	F	90C	
HH9926	¾" R2T	1.20	F	F	(PR) WEBTEC PLATE TO BULKHEAD
HH9927	¾" R2T	6.30	F	F	(REG) WEBTEC PLATE TO FEEDER MOTOR
HH9928	¾" R2T	1.90	F	F	FEEDER MOTOR TO CROSS IN CHASSIS
HH9929	¾" R2T	3.40	F	F	(BP) WEBTEC TO CROSS IN CHASSIS
HH9930	3/8" R2T	2.50	F	F	REAR NON DRIVE JACKING LEG TO REAR DRIVE SIDE RAM
HH9931	3/8" R2T	2.55	F	F	REAR NON DRIVE SIDE JACKING LEG TO REAR DRIVE SIDE RAM
HH9932	3/8" R2T	5.60	F	F	REAR DRIVE SIDE JACKING LEG TO 6 LEVER SPOOL VALVE
HH9933	3/8" R2T	5.60	F	F	REAR DRIVE SIDE JACKING LEG TO 6 LEVER SPOOL VALVE

8. C12+ MAIN CONVEYOR LIFT RAMS HOSE KIT

Kit Number: HH9700H

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9934	3/8" R2T	0.43	F	90S	HH8167 BULKHEAD FITTING ON MAIN CON FRAME TO LIFT RAM TEE
HH9935	3/8" R2T	0.43	F	90S	HH8079 BULKHEAD FITTING ON MAIN CON FRAME TO LIFT RAM TEE
HH9936	3/8" R2T	0.8	F	90C	LIFT RAM TO TEE ON OPPOSITE RAM
HH9937	3/8" R2T	0.8	F	90C	LIFT RAM TO TEE ON OPPOSITE RAM

9. C12+ CONTROL BOX AND CHASSIS HOSE KIT

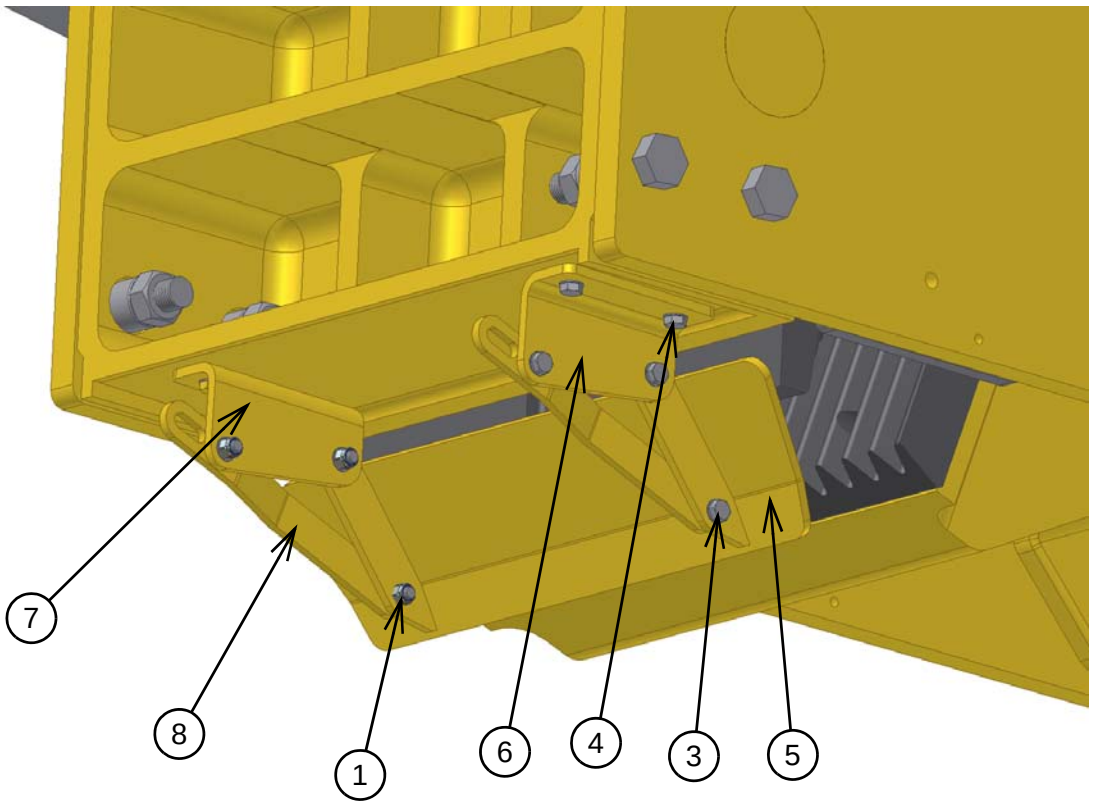
Kit Number: HH9700I

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9938	¾" R2T	1.65	90S	135	KAWASAKI MX 530 CASE DRAIN TO DISTRIBUTION BLOCK PORT 5
HH9939	3/8" R2T	2.77	F	90S	FRONT JACKING LEG CROSS PIPE
HH9941	¼" R2T	3.55	F	90S	PSW1 LOW PRESSURE SWITCH TO ADJUSTER CONTROL BLOCK

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9940	¼" R2T	3.55	F	90S	PSW2 HIGH PRESSURE SWITCH TO ADJUSTER CONTROL BLOCK
HH9942	¼" R2T	3.55	F	90S	(A) CHASSIS BULKHEAD TO SOLENOID CONTROL BLOCK
HH9943	¼" R2T	3.55	F	90S	(B) CHASSIS BULKHEAD TO SOLENOID CONTROL BLOCK
HH9944	¼" R2T	0.9	90S	90S	(A) CHASSIS BULKHEAD TO WEDGE RAM IN
HH9945	¼" R2T	0.9	90S	90S	(B) CHASSIS BULKHEAD TO WEDGE RAM OUT
HH9946	¼" R2T	1.8	F	F	(C) SOLENOID CONTROL BLOCK TO 7 WAY ADAPTOR
HH9947	¼" R2T	1.8	F	F	(D) SOLENOID CONTROL BLOCK TO TEE No 2
HH9948	¼" R2T	2.15	F	90C	DOUBLE LEVER TO TEE No 1
HH9949	¼" R2T	1.9	F	F	BULKHEAD FITTING TO TEE No 1
HH9950	¼" R2T	2.93	F	90C	TOGGLE CLAMP RAM IN TO 7 WAY
HH9951	¼" R2T	2.2	F	90C	TOGGLE CLAMP RAM IN TO 7 WAY
HH9952	¼" R2T	3.35	F	90C	BULKHEAD ON TOGGLE LINK RAM IN TO TEE No 1
HH9953	¼" R2T	2.92	F	F	TOGGLE LINK RAM IN BULKHEAD TO 7 WAY ADAPTOR
HH9954	¼" R2T	1.95	F	F	TOGGLE LINK RAM IN BULKHEAD TO 7 WAY ADAPTOR
HH9955	¼" R2T	2.75	F	90C	TOGGLE CLAMP RAM IN TO TEE No 2
HH9956	¼" R2T	1.65	F	90C	TOGGLE CLAMP RAM IN TO TEE No 2
HH9957	3/8" R2T	0.3	F	F	(A00) MOTOR CONTROL BLOCK TO ACCUMULATOR
HH9958	3/8" R2T	0.75	F	F	6 LEVER TO R/H JACKING LEG TEE
HH9959	3/8" R2T	0.69	F	F	6 LEVER TO R/H JACKING LEG TEE
HH9960	3/8" R2T	1.67	F	90S	6 LEVER SPOOL VALVE TO BULK HEAD (RETURN TO C TOP)
HH9961	3/8" R2T	0.42	F	90C	TOGGLE LINK RAM OUT TO BULKHEAD
HH9962	3/8" R2T	0.42	F	90C	TOGGLE LINK RAM OUT TO BULKHEAD
HH9964	3/8" R2T	0.6	F	90C	TOGGLE LINK RAM IN TO BULKHEAD
HH9963	3/8" R2T	0.6	F	90C	TOGGLE LINK RAM IN TO BULKHEAD
HH9965	½" R2T	2.75	F	F	6 LEVER SPOOL VALVE TO RETURN MANIFOLD
HH9966	½" R2T	0.63	F	90S	(PCO) JAW ADJUSTER CONTROL BLOCK TO 6 LEVER
HH9967	½" R2T	0.41	90C	135	(P) DOUBLE LEVER TO JAW ADJUSTER CONTROL BLOCK
HH9968	½" R2T	1.16	90S	90S	JAW CONTROL BLOCK TO TEE ON 6 LEVER
HH9969	½" R2T	1.68	90S	135	DOUBLE LEVER TO 6 LEVER
HH9970	½" R2T	3.2	f	90S	PUMP TO 3 LEVER

Hose No	Pipe	Length (m)	Fitting (A)	Fitting (B)	Location
HH9971	1¼" R13	1	F	135	(V1) CRUSHER DRIVE MOTOR TO DISTIBRUTION BLOCK PORT 2
HH9972	1¼" R13	0.95	F	135	(T) CRUSHER DRIVE MOTOR TO DISTIBRUTION BLOCK PORT 4
HH9973	1¼" R13	0.95	F	135	(V2) CRUSHER DRIVE MOTOR TO DISTIBRUTION BLOCK PORT 3
HH9974	½" R2T	9.2	90S	90S	FEEDER MOTOR CASE DRAIN TO TEE ON TRACK CASE DRAIN
HH9975	3/8" R2T	3.3	F	90S	FRONT JACKING LEG CROSS PIPE
HH9976	¾" R2T	2.5	F	F	MAIN CON LOWER SPRAY BAR WATER HOSE
HH9977	¾" R2T	2.6	F	F	
HH9978	¾" R2T	1.6	F	F	
HH9979	¼" R2T	3.7	F	F	TEST POINT ON KAWASAKI PUMP TO MIDDLE PRESSURE SWITCH

AA.19 Deflector Door - Optional



7: VIEW ON DEFLECTOR DOOR

Part No.	Part Description	Quantity
1. FAN20N	NYLOC NUT	10
2. FAW20A	WASHER	20
3. FAS20X60(10.9)	HEX BOLT	6
4. FAS20X90(10.9)	HEX BOLT	4
5. J5580000	DEFLECTOR DOOR	1
6. J5590000	MOUNTING BRACKET	1
7. J5600000	MOUNTING BRACKET	1
8. J5610000	SUPPORT ARM	2

AA.20 Stickers - English

25

21

22

28

29

32

36

39

23

38

30

DANGER
SKIN INJECTION HAZARD
Use a piece of cardboard to check for hydraulic hose leaks.

DO NOT USE YOUR HAND
If fluid is injected under the skin seek medical help immediately

DE No. 5011INJ01

27

DANGER
CRUSHING HAZARD
Do not place hands or feet under jacking legs. Risk of serious injury.

KEEP HANDS AND FEET CLEAR before lowering or raising jacking legs.

DE No. 5008CR502

24

DANGER
FALLING HAZARD
Falling from and/or onto a machine can cause serious injury or even death.

DO NOT climb onto the machine whilst in operation.

ALWAYS use walkways/platforms provided or a safe and secure platform approved by the local regional safety enforcing authority.

ALWAYS use an E.N./A.N.S. approved safety harness when reaching any points 7ft (2m) or more above ground level.

DE No. 5004FH02

26

DANGER
ENTANGLEMENT HAZARD
In-running nip points can cause serious injury or death.

DO NOT reach into an unguarded machine. Your arm could be pulled in and amputated.

SWITCH OFF, LOCKOUT AND TAGOUT machine before opening or removing guards.

DE No. 5007ENT02

31

DANGER
SKIN INJECTION HAZARD
Hydraulic fluid under pressure can penetrate the skin causing serious injury.

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

ALWAYS use a piece of cardboard to check for leaks. DO NOT use your hand. If fluid is injected under the skin you must seek medical help immediately.

DE No. 5012INJ02

33

ATTENTION
LOOSE OR BAGGY CLOTHING CAN GET CAUGHT IN RUNNING MACHINERY.

ALWAYS wear correctly fitting (E.N./A.NS.I approved) personal protective equipment. Personal Protective Equipment includes Hard Hat, Safety Glasses, Hearing Protection, Dust Mask, Close Fitting Overalls, Safety Boots, Industrial Gloves and High Visibility Vest.

DE No. 5014CLO

35

WARNING
EXCEEDS 90 dB (A)

May cause loss or degradation of hearing over long periods of time.
Proper hearing protection must be worn.

DE No. 5018NOIEX

37

IMPORTANT
CHECK CONDITION OF FILTERS ON A REGULAR BASIS

CHANGE ELEMENTS WHEN INDICATORS SHOW RED

REFER TO OPERATOR'S MANUAL FOR CORRECT GRADES OF OIL

DE No. 5020FLTCON

34

CAUTION
PRIOR TO TRANSPORT

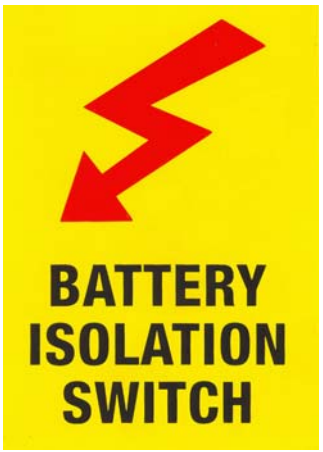
(1) Fasten all loose items securely.
(2) Check the plant for loose or damaged parts.
(3) Replace missing parts or make repairs as found necessary to ensure that all parts are safely secured during transport.

DE No. 5016TRANS

17

18

16



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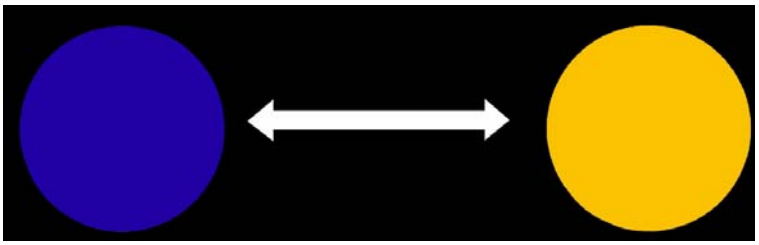

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2


IMPORTANT
CHECK ENGINE OIL AND
HYDRAULIC OIL LEVELS
DAILY.

4


IMPORTANT
CHECK ENGINE OIL AND
HYDRAULIC OIL LEVELS
DAILY.

5


DANGER
STOP THE EQUIPMENT & LOCKOUT
POWER SOURCE BEFORE PEFORMING
LUBRICATION MAINTENANCE OR
ADJUSTMENTS

1


DANGER
DRIVE GUARDS MUST BE FITTED
BEFORE UNIT IS STARTED

3


IMPORTANTE
SIDE CONVEYOR MUST BE UNFOLDED
WHILST MACHINE IS WORKING

8


EMERGENCY
STOP

6


CAUTION
MAX. ENGINE REVS
1900 RPM

10


DANGER
UNDER NO CIRCUMSTANCES PUT
YOUR HAND INTO MACHINE
WHILST FITTING TOGGLE PACKER

14

TRACKING PROCEDURE

1. START ENGINE-ENGINE REVS MUST NOT EXCEED 1100 R.P.M.!
2. PRESS INTERLOCK ON
3. PRESS MAIN CONVEYOR RAISE
4. RAISE JACK LEGS FULLY
5. CHECK ALL AROUND MACHINE FOR OBSTACLES
6. PRESS TRACK, THEN USING THE REMOTE HAND SET OR HARD WIRE DRIVE, SET OFF-DO NOT RIDE ON MACHINE WHILST TRACKING!

N.B. THE REMOTE HAND SET MUST BE FULLY RECHARGED AT REGULAR INTERVALS!

CRUSHER STARTING PROCEDURE

1. CHECK THE HYDRAULIC OIL, ENGINE OIL AND WATER- THIS MUST BE DONE EVERY DAY
2. START ENGINE ON IDLE
3. BOTH CRUSHER TRACKS MUST BE IN CONTACT WITH FIRM LEVEL GROUND TO AVOID EXCESS VIBRATION & ROCKING
4. BOTH JACKING LEGS MUST BE LOWERED AND IN CONTACT WITH THE GROUND AT ALL TIMES WHILST THE MACHINE IS BEING OPERATED
5. MAIN CONVEYOR MUST BE LOWERED AND THE SIDE CONVEYOR UNFOLDED BEFORE OPERATING
6. GRADUALLY ADJUST ENGINE REVS TO 1900 R.P.M. THEN BEGIN IN THIS SEQUENCE:- SIDE CONVEYOR-MAGNET-MAIN CONVEYOR-CRUSHER-FEEDER ALLOWING TIME FOR EACH MOVING SECTION TO REACH FULL SPEED
7. THE JACK LEGS MAY NEED TO BE RAISED OR LOWERED DEPENDING ON MACHINE VIBRATION

TO STOP THE MACHINE, REVERSE THE SEQUENCE ALLOWING TIME FOR EACH MOVING SECTION TO COME TO A COMPLETE STOP, MAKING SURE ALL MATERIAL HAS BEEN DISCHARGED
LOWER ENGINE R.P.M. AND ALLOW TO IDLE BRIEFLY. THEN STOP ENGINE.
IMPORTANT! ENGINE R.P.M. MUST NOT EXCEED 1900 R.P.M.

15

DAILY CHECKS

CLEAN AIR FILTER
CHECK ENGINE OIL LEVEL
CHECK HYDRAULIC OIL LEVEL
CHECK WATER LEVEL
CHECK FOR LEAKS

WEEKLY CHECKS

CHECK CONDITION OF CONVEYOR BELTS AND OTHER MOVING PARTS
CHECK OIL LEVEL IN FEEDER (SEE OPERATOR MANUAL)
CLEAR ANY OBSTRUCTIONS IN THE GRIZZLY BARS AND JAWS
CHECK TENSION ON THE FLY WHEEL DRIVE BELTS
GREASE ALL BEARINGS (SEE OPERATOR MANUAL)
CLEAR ANY BUILD UP OF DUST FROM THE OIL COOLER AND THE RADIATOR USING COMPRESSED AIR
CHECK ALL BOLTS AND PANELS ARE SECURE AND IN PLACE

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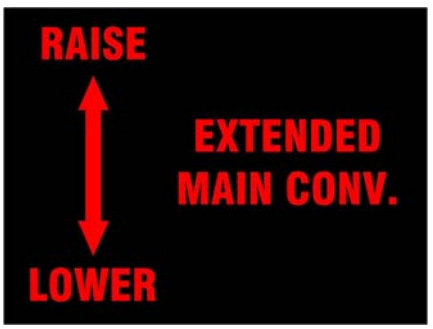

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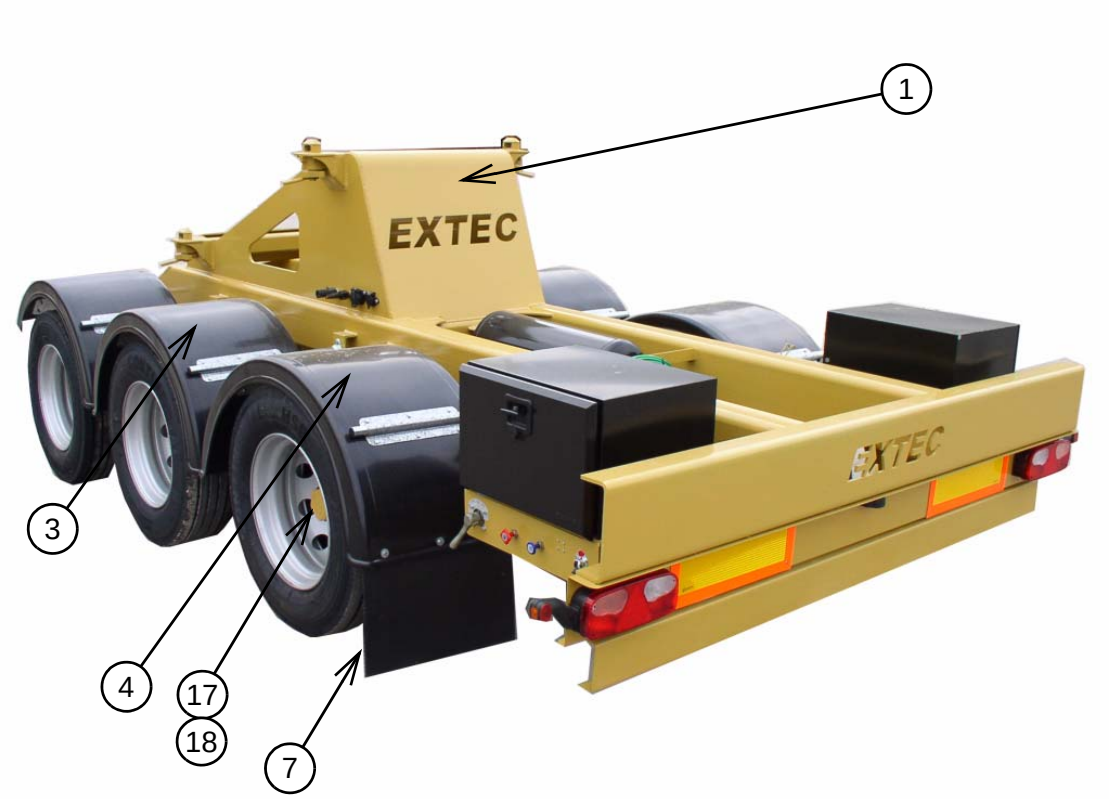
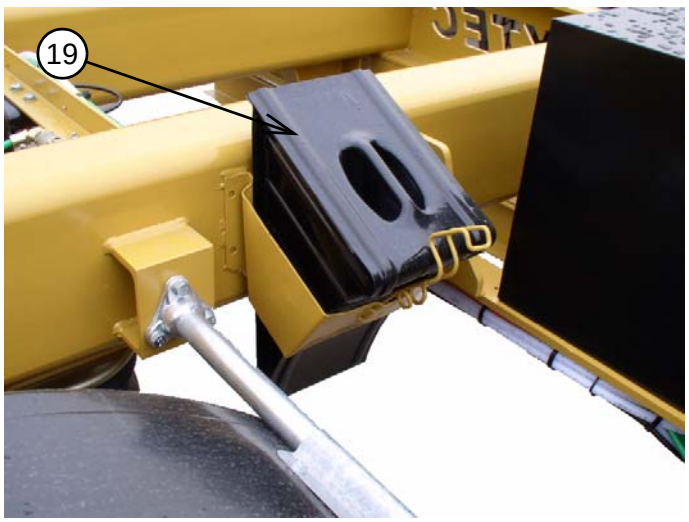
Part No.	Part Description	Quantity
1. DE0005	DANGER DRIVE GUARDS	4
2. DE0020	IMPORTANT CHECK OIL LEVELS DAILY	4
3. DE0021	IMPORTANT SIDE CONVEYOR	2
4. DE0022	IMPORTANT CHECK OIL LEVELS DAILY	1
5. DE0023	DANGER STOP EQUIPMENT	4
6. DE0024	CAUTION - MAX ENGINE REVS 1900 RPM	2
7. DE0026	IMPORTANT MAX TRACKING SPEED	2

Part No.	Part Description	Quantity
8. DE0027	EMERGENCY STOP	4
9. DE0033	DANGER -HEAD,EAR,EYE PROTECTION	2
10. DE0036	DANGER TOGGLE PACKER	1
11. DE0039	WARNING - AUTOMATIC MACHINE MAY START WITHOUT WARNING	4
12. DE1005	CE YEAR DATE DECAL	2
13. DE1007	FORWARD/REVERSE DECAL BLUE YELLOW DOTS	4
14. DE1013	TRACKING STARTING PROCEDURE	1
15. DE1014	DAILY WEEKLY CHECKS DECAL	1
16. DE1043	BATTERY ISOLATION SWITCH	1
17. DE1044	ANCHOR POINT (LEFT)	1
18. DE1045	ANCHOR POINT (RIGHT)	1
19. DE1060	RAISE/ LOWER MAIN CONVEYOR C12+	1
20. DE2059	EXTEC C12+ STICKER	1
21. DE5001	DANGER - FALLING MATERIAL HAZARD (HARD HAT)	4
22. DE5023	DANGER - FALLING HAZARD/ SWITCH OFF, LOCKOUT & TAGOUT	2
23. DE5003	DANGER -STRONG MAGNETIC HAZARD	2
24. DE5004	DANGER - FALLING HAZARD	1
25. DE5006	DANGER - CRUSHING / SHEARING HAZARD	2
26. DE5007	DANGER ENTANGLEMENT HAZARD	2
27. DE5008	DANGER - CRUSHING HAZARD	5
28. DE5009	DANGER -FLYING MATERIAL HAZARD DO NOT USE PLATFORM	1
29. DE5010	DANGER - ENTANGLEMENT HAZARD SWITCH OFF, LOCKOUT	2
30. DE5011	DANGER - SKIN INJECTION HAZARD DO NOT USE HANDS	2
31. DE5012	DANGER - SKIN INJECTION HAZARD	2
32. DE5013	DANGER - IMPACT HAZARD	2
33. DE5014	DANGER - LOOSE OR BAGGY CLOTHING	1
34. DE5016	DANGER - PRIOR TO TRANSPORT	1
35. DE5018	DANGER - EXCEEDS 90dB (A)	1
36. DE5019	DANGER - LOCKOUT PROCEDURE	1
37. DE5020	DANGER - CHECK FILTERS ON REGULAR BASIS	1
38. DE5021	DANGER - READ OPERATORS MANUAL BEFORE MAINTANING MC	1
39. DE5022	DANGER - STOP & LOCKOUT PLANT BEFORE MAINTENANCE	1

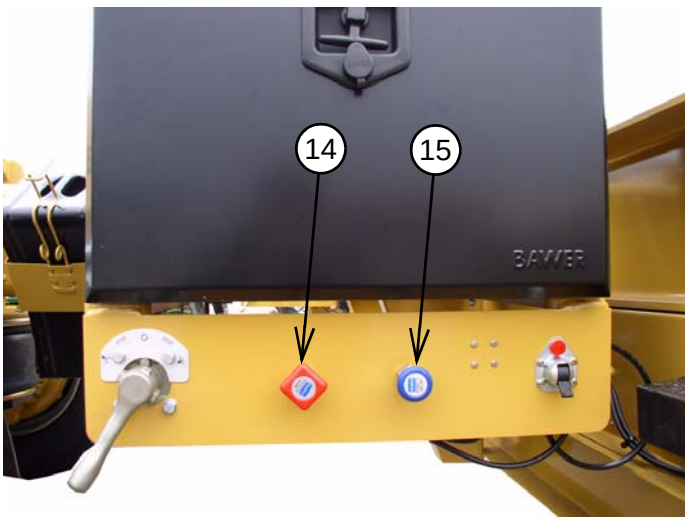
AA.21 Transport Bogie and Fifth Wheel - Optional



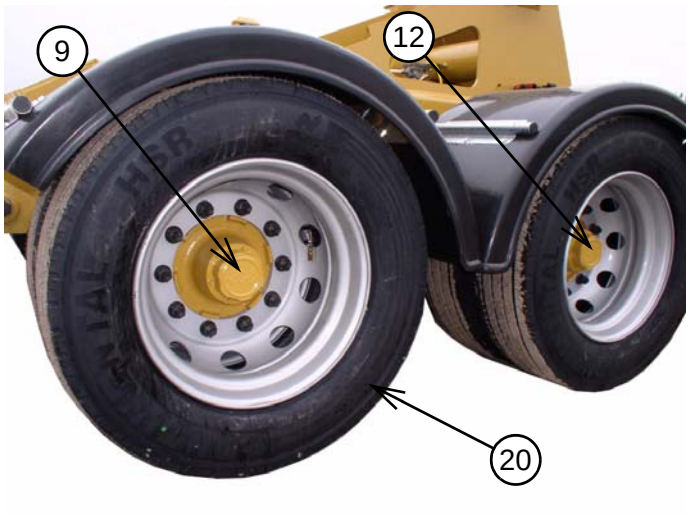
8: VIEW ON TRANSPORTATION BOGIE



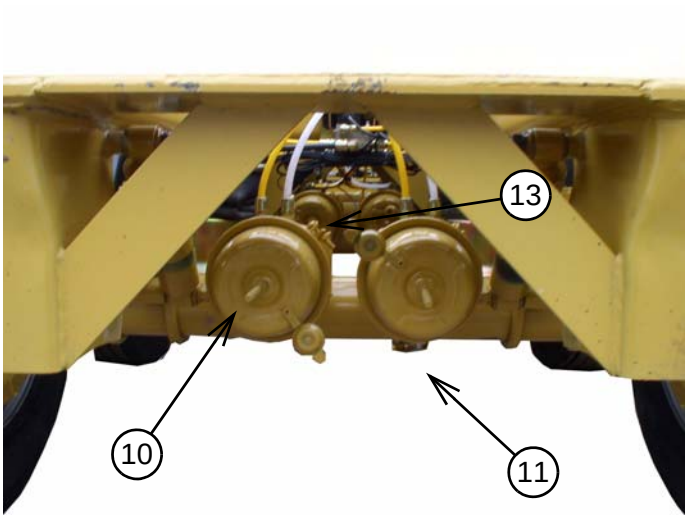
9: WHEEL CHOCK



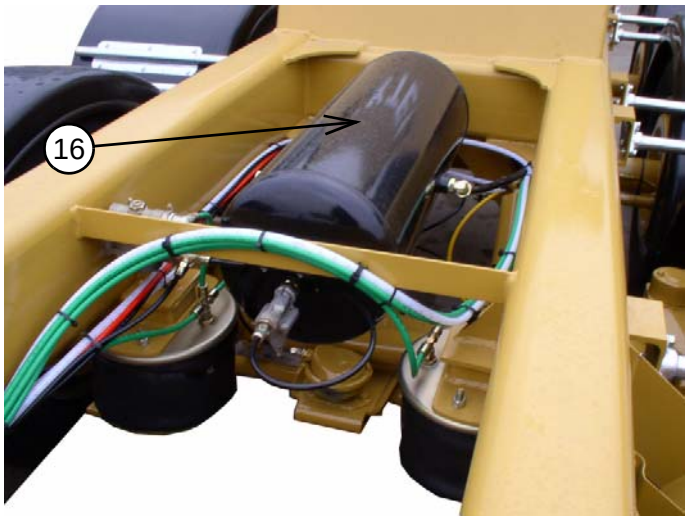
10: VIEW ON SHUNT & PARK VALVES



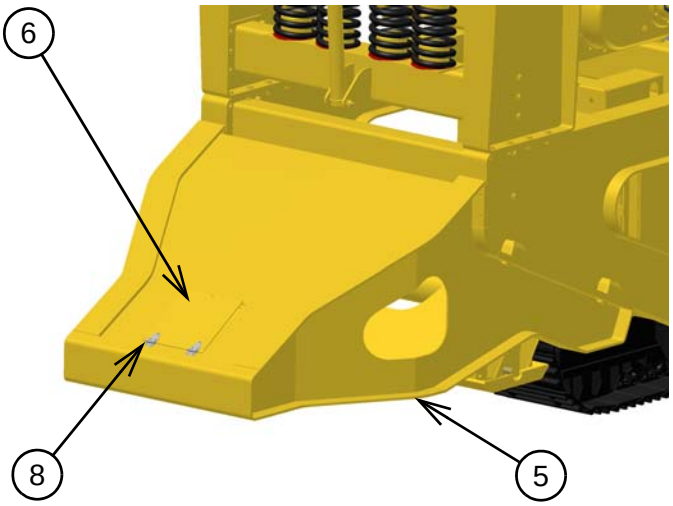
11: SIDE VIEW OF BOGIE



12: FRONT AXLE AIR CHAMBERS



13: VIEW ON TOP OF BOGIE

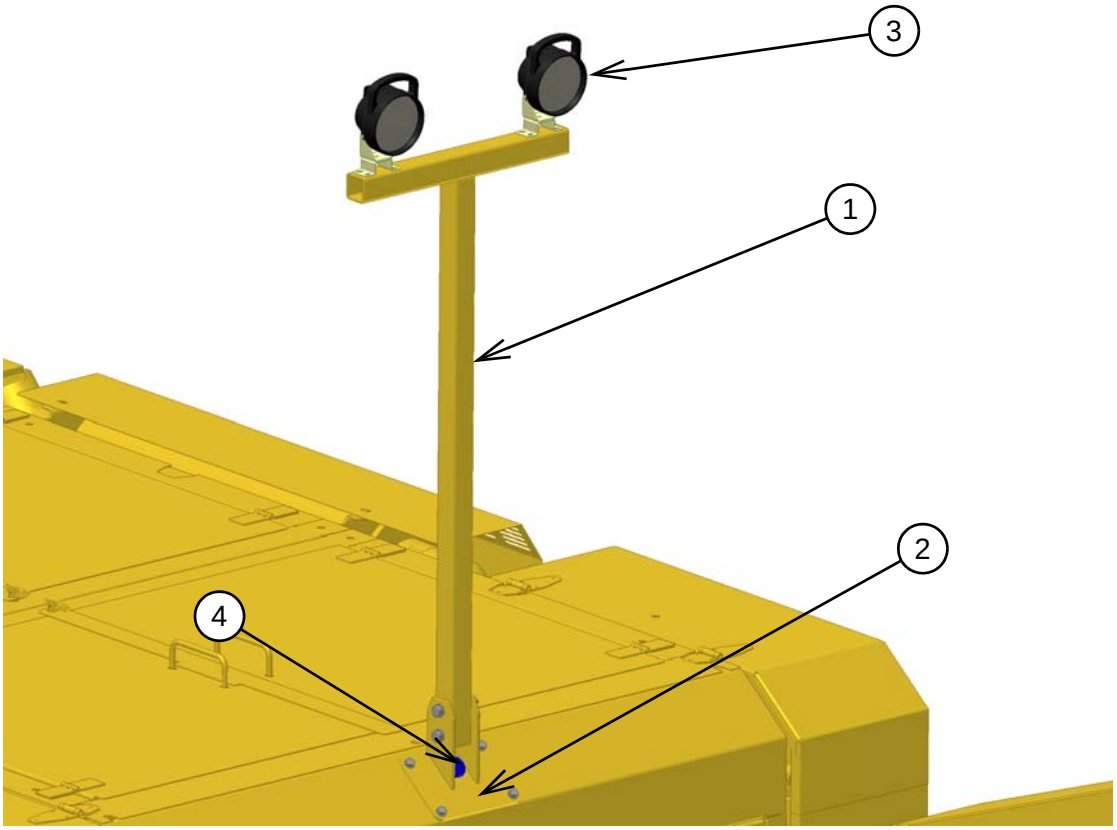


14: VIEW ON FIFTH WHEEL NECK

15: CHEVRON BOARD

Part No.	Part Description	Quantity
1. A6270000	BOGIE ASSEMBLY COMPLETE	1
2. A6340000	MOUNTING PLATE	2
3. A6360000	MUDGUARD	4
4. A6370000	MUDGUARD	2
5. A14440000	FIFTH WHEEL RUBBING NECK	1
6. A15490000	ACCESS PANEL	1
7. AX3503	MUDFLAP	6
8. FD2105	HINGE	2
9. TR519436	FRONT AXLE COMPLETE	
10. TR519441	AXLE AIR BRAKE	
11. TR519442	FRONT AXLE AUTO SLACK ADJUSTER	
12. TR519451	CENTRE AXLE COMPLETE	
13. TR519456	CENTRE AXLE AUTO SLACK ADJUSTER	
14. TR519480	PARK VALVE	
15. TR519481	SHUNT VALVE	
16. TR519482	60 L AIR RESERVOIR	
17. TR519486	PARK VALVE	
18. TR519487	SELF STEER AXLE AUTO SLACK ADJUSTER (L/H)	
19. UC5503	WHEEL CHOCK & MOUNTING ASSEMBLY	2
20. WT1016	WHEEL	12

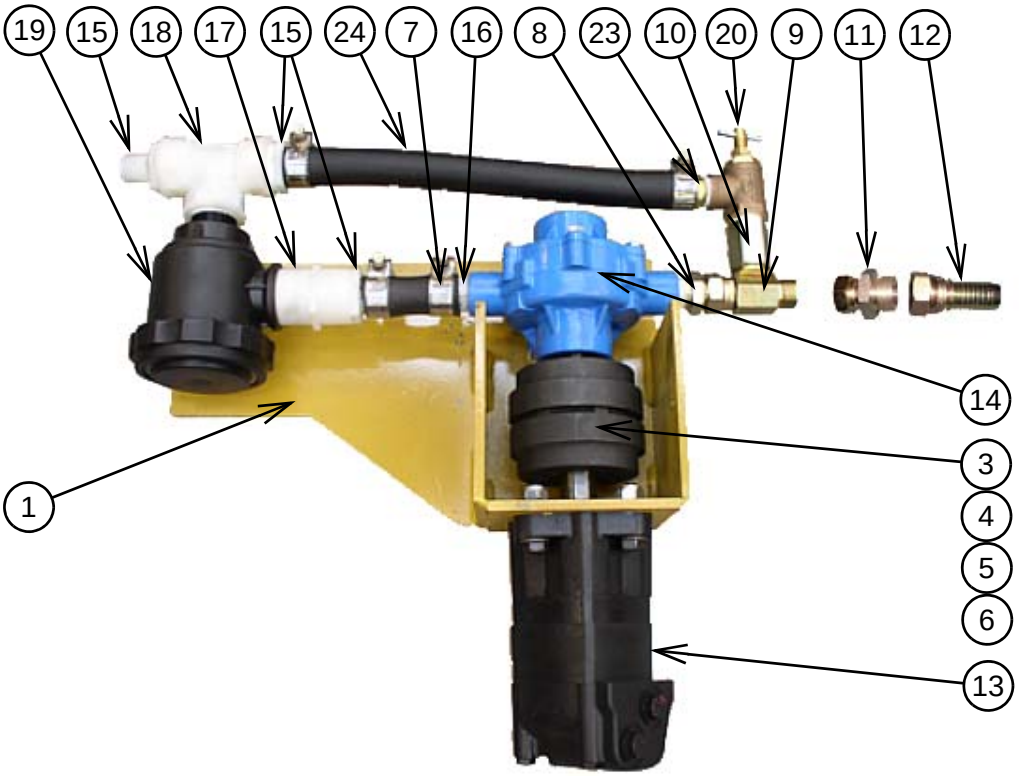
AA.22 Light Stand - Optional



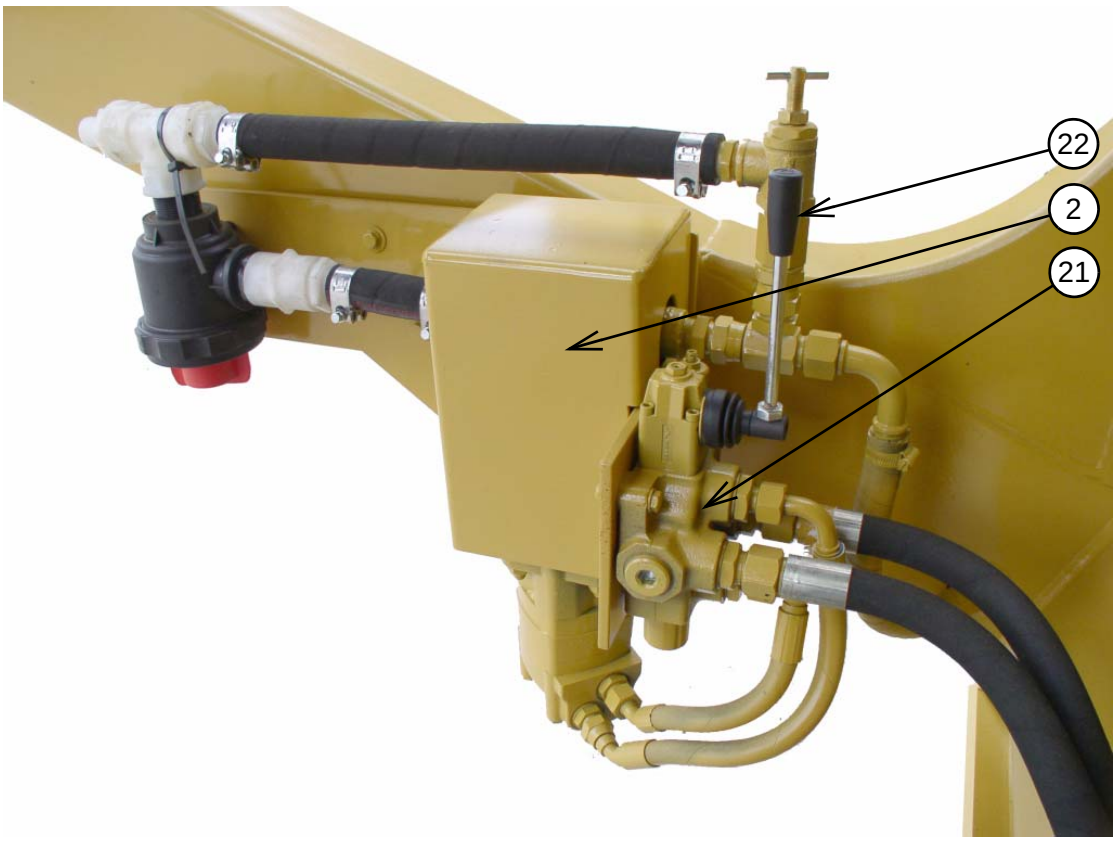
16:

Part No.	Part Description	Quantity
1. B2690000	CRUSHER LIGHT SUPPORT STAND	1
2. B3130000	FLOOD LIGHT BASE BRACKET	1
3. EL1052	12/24 VOLT WORK LAMP	2
4. EL1053	24 V WORK LIGHT WIRING LOOM	1

AA.23 Water Pump - Optional



1: WATER PUMP



2: WATER PUMP FITTED

Part No.	Part Description	Quantity
1. A10860000	BASE PLATE ASSY	1
2. A10870000	DRIVE COVER	1
3. BT5001	TAPER LOCK BUSH	1
4. BT6543	COUPLING	2
5. BT6545	TAPER LOCK BUSH	1
6. BT6546	COUPLING INSERT	1
7. FAHC1031	CLAMP	6
8. HA03400044	¾" M/M ADAPTOR	1
9. HA03400049	¾" M/M/F TEE	1
10. HA03400058	¾" BARREL NUT	1
11. HA1000021	1X¾" M/F SWIVEL ADAPTOR	1
12. HA1000039	1" FEMALE INSERT	1
13. HM1005	HYDRAULIC MOTOR	1
14. HP2004	WATER PUMP	1
15. HP2006	HOSE TAIL	3
16. HP2009	HOSE TAIL	1
17. HP2010	HOSE TAIL	1
18. HP2011	TEE	1
19. HP2012	SUCTION FILTER	1
20. HP2013	WATER REGULATING VALVE	1
21. HV1011	1 LEVER SPOOL VALVE	1
22. HV1502	SPOOL LEVER	1
23. HP2014	HOSE BARB	1
24. RU6039	1" DELIVERY HOSE	A/R

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Appendix B Drawing Pack

	Drawing Number	Title	Issue No	Date
1.	C12 CRUSHER JAW ADJUST LOOM	TED6300	sht2	26/04/04
2.	C12 CRUSHER RECEIVER AND LOOM	TED6300	sht3	26/04/04
3.	C12 SOLENOID CONTROL PANEL	TED6300	sht4	26/04/04
4.	C12 CRUSHER AUX LOOMS	TED6300	sht6	26/04/04
5.	C12 CRUSHER CONTROLLER CONN	TED6300	sht7	26/04/04
6.	C12 CRUSHER CONTROLLER CONN	TED6300	sht8	26/04/04
7.	C12 CRUSHER CONTROLLER CONN	TED6300	sht10	26/04/04
8.	CRUSHER JAW CONTROL		REV1	
9.	C12+ HYDRAULIC DIAGRAM			
10.	LAMP DIAGNOSTICS		REV 1	

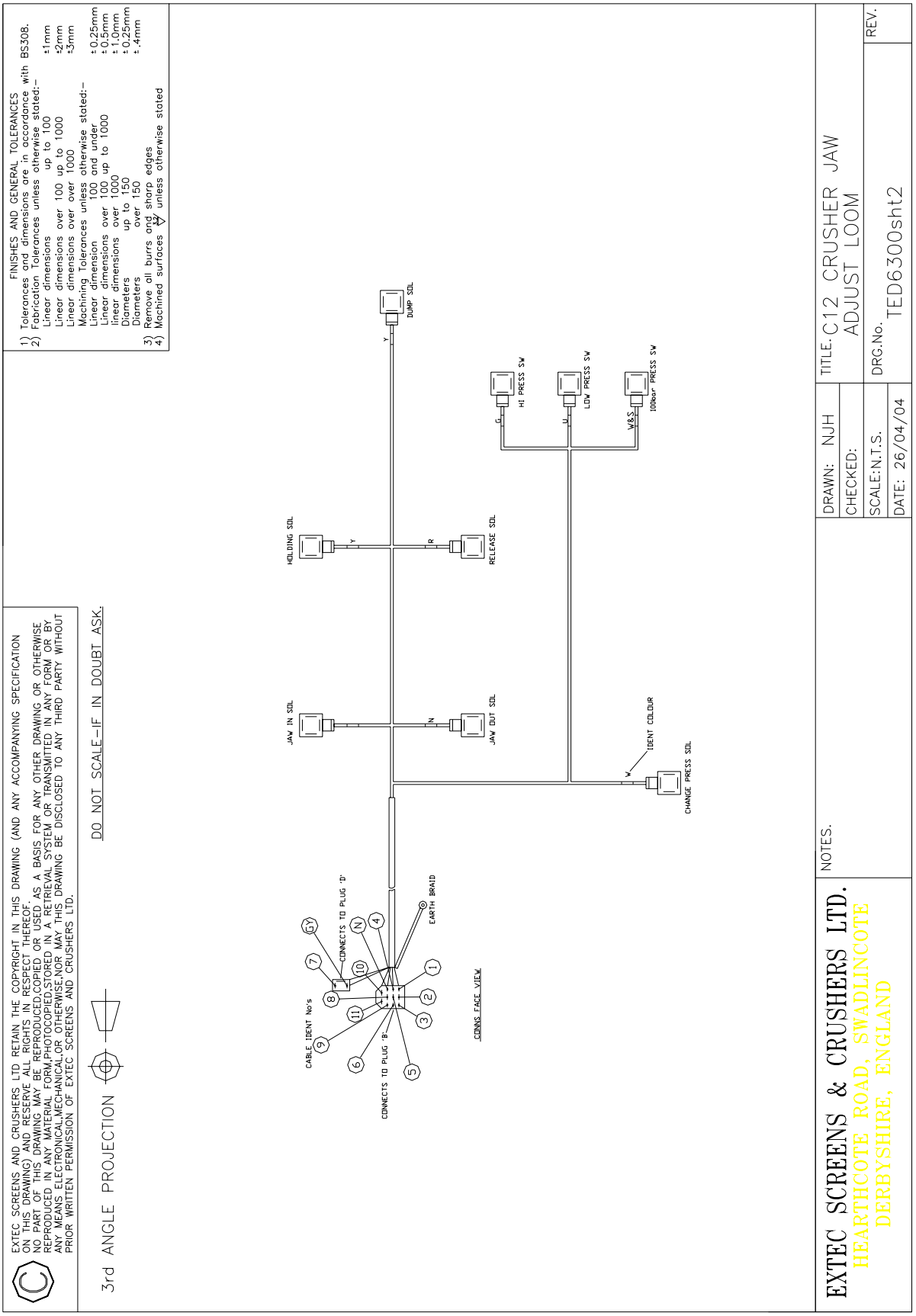

Figure B-1: ADJUST LOOM

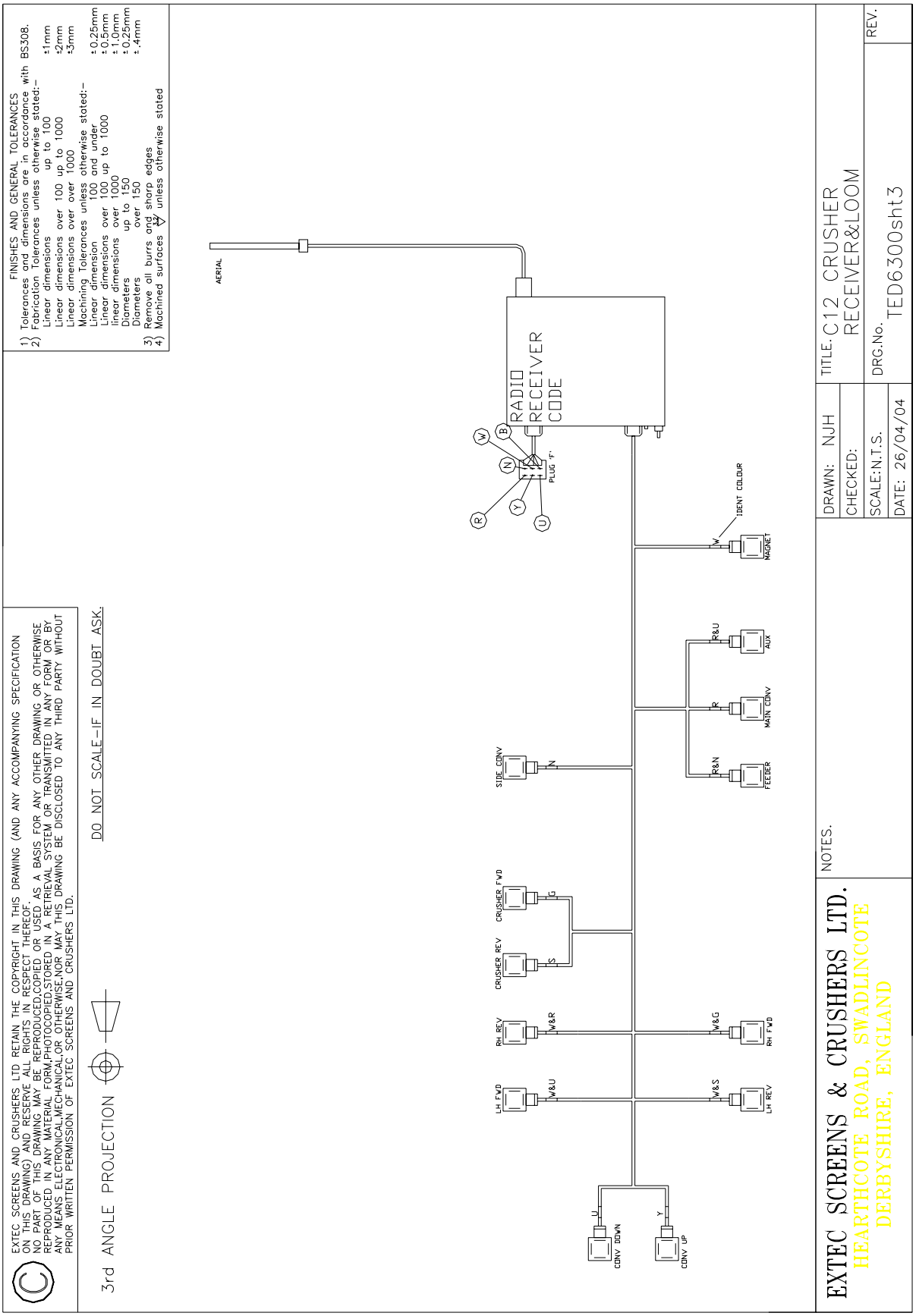

Figure B-2: RECEIVER AND LOOM

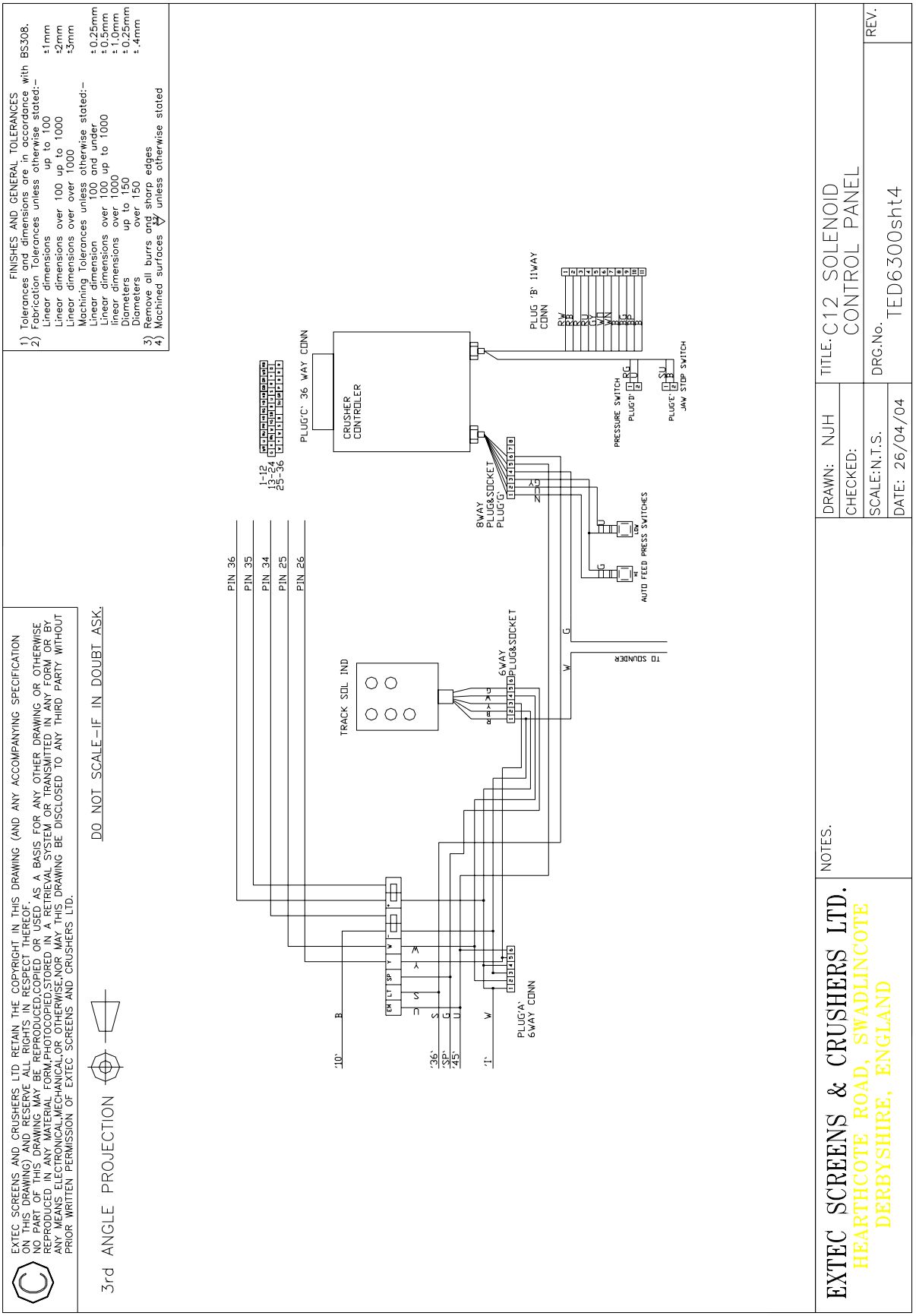

Figure B-3: SOLENOID CONTROL PANEL

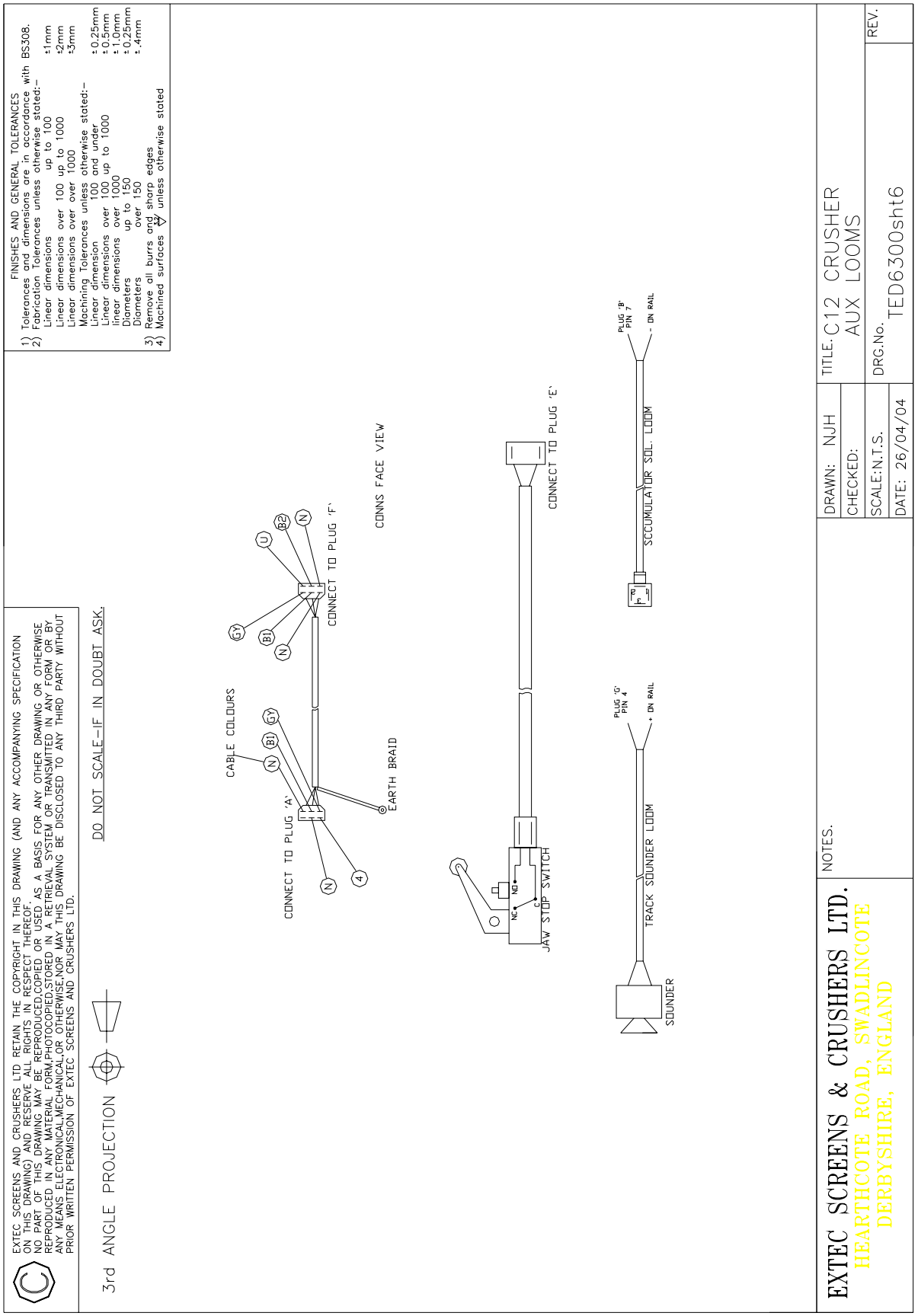

Figure B-4: AUXILARY LOOMS

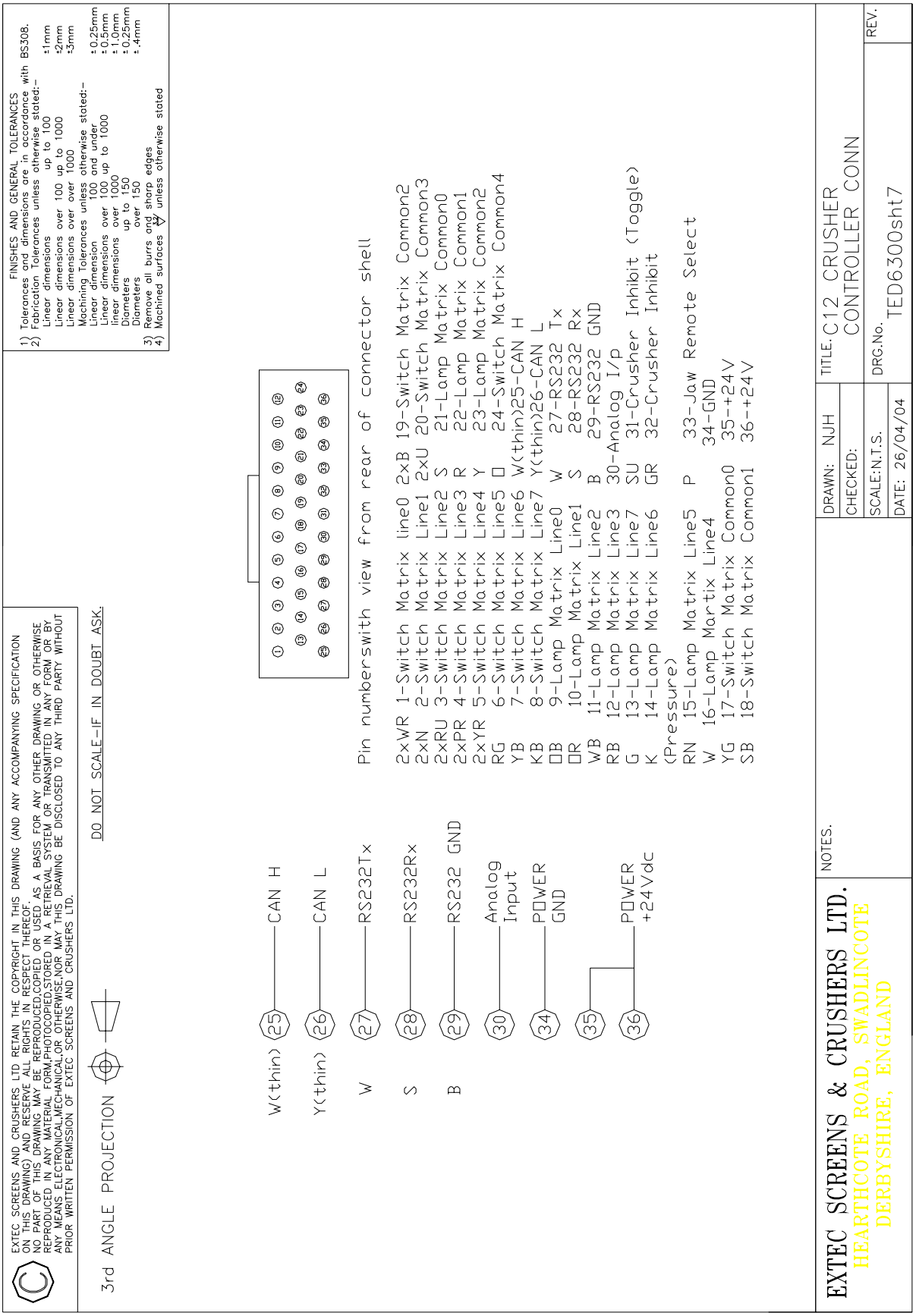

Figure B-5: CONTROLLER CONNECTOR

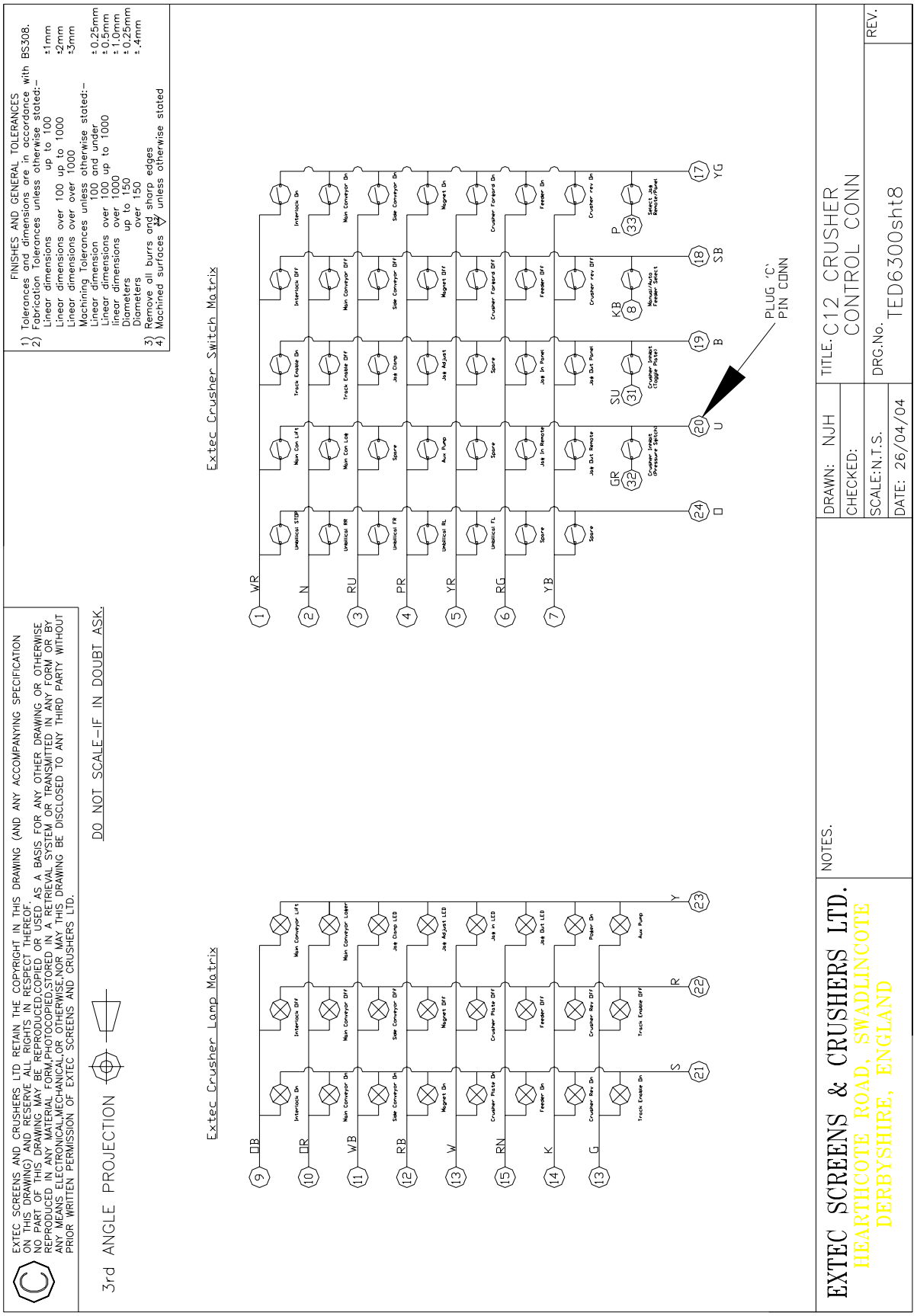

Figure B-6: CONTROL CONNECTOR

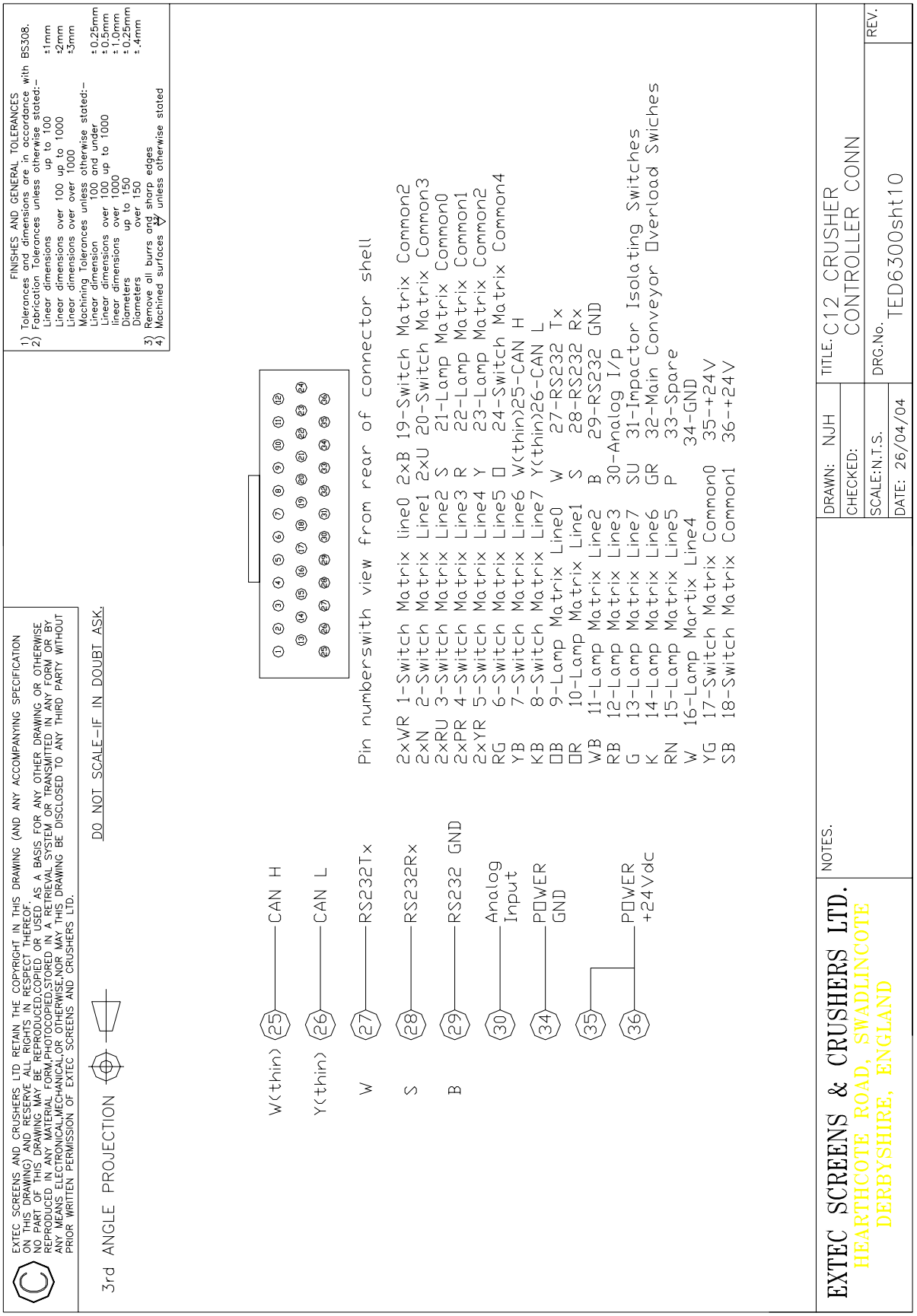

Figure B-7: CONTROLLER CONNECTOR

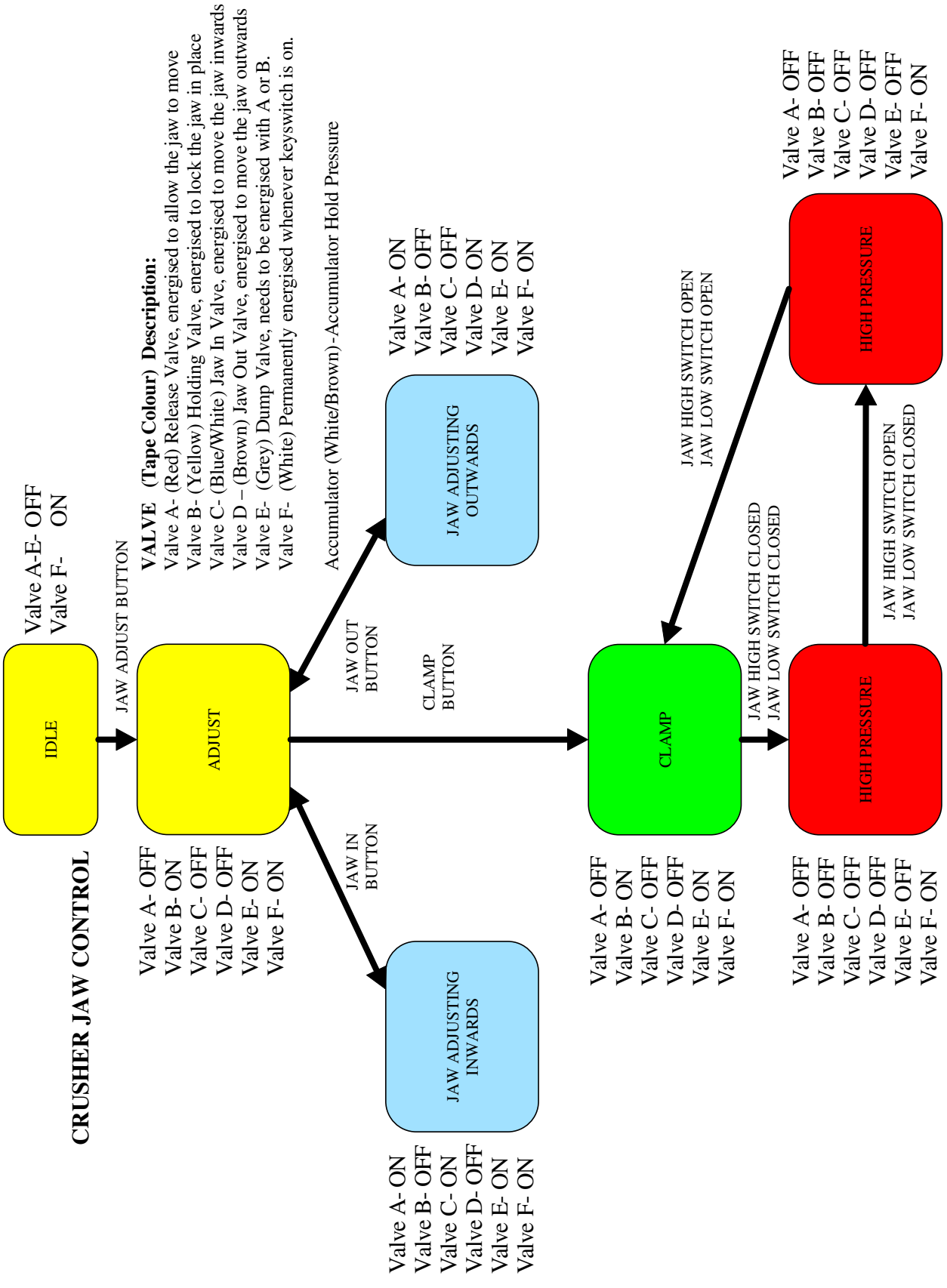

Figure B-8: CRUSHER JAW CONTROL

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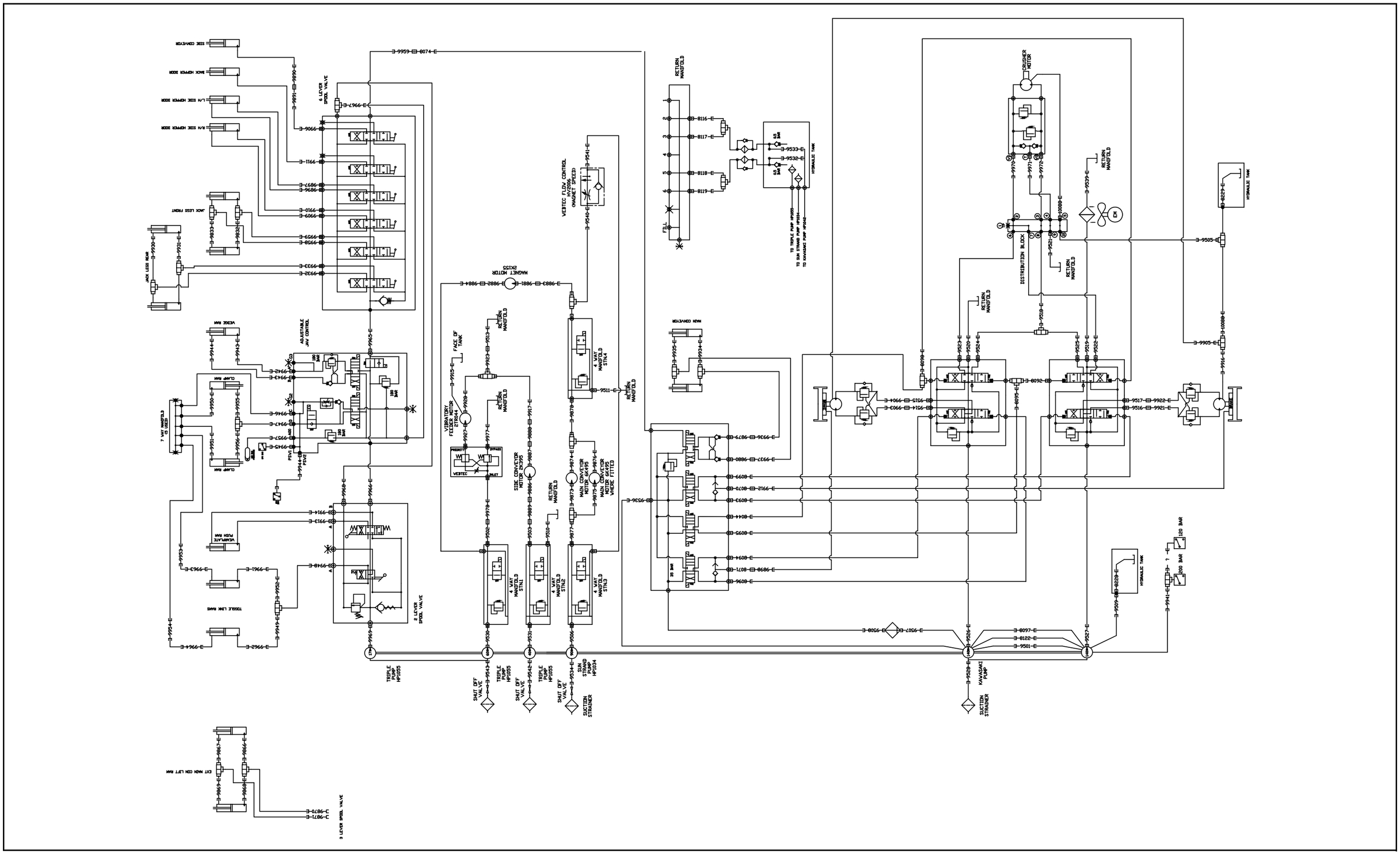
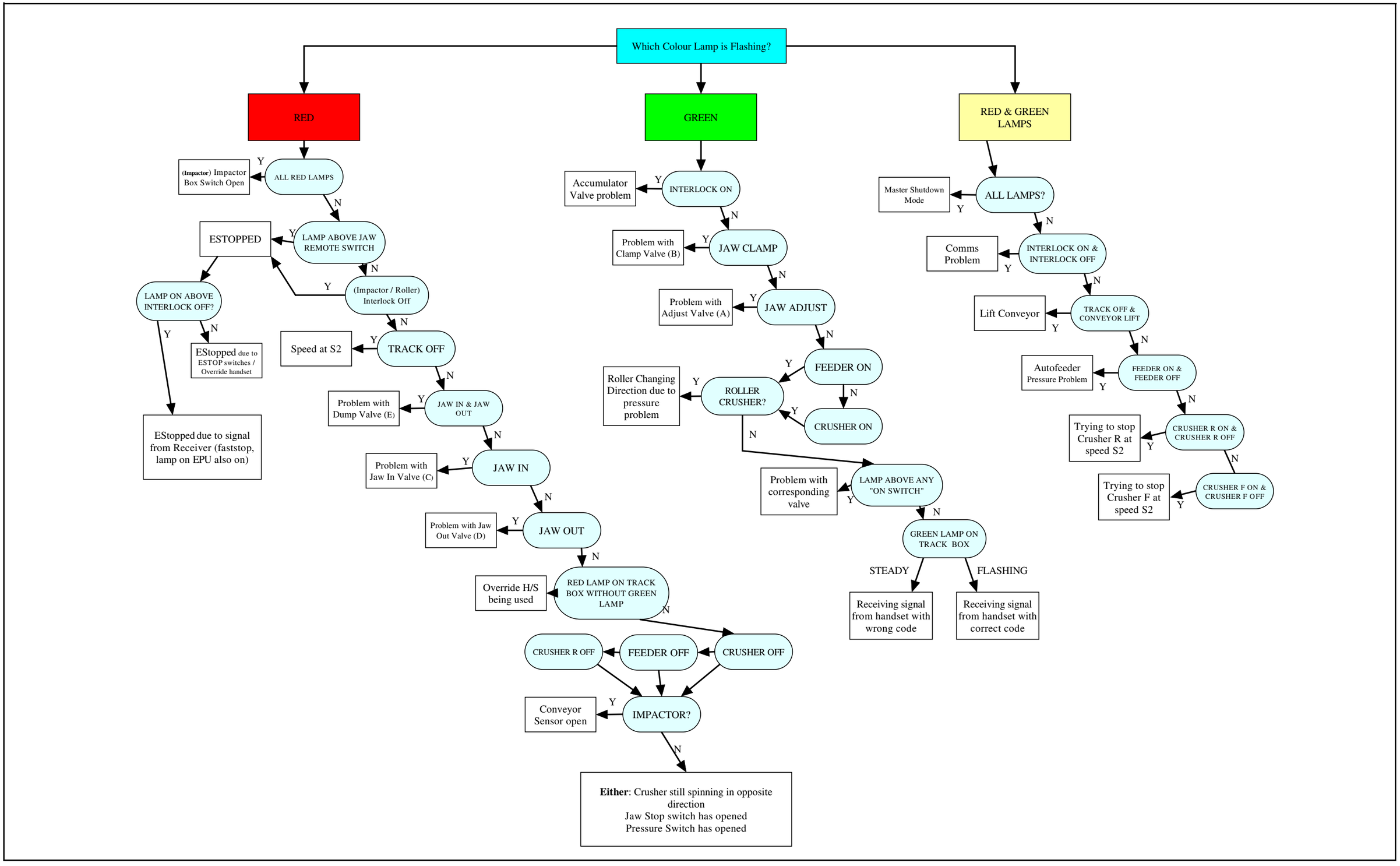

6 LEVER SPOOL VALVE
2 LEVER SPOOL VALVE
3 LEVER SPOOL VALVE
VEETEC FLOW CONTROL HY2006 GMAGNET SPEED
MAGNET MOTOR EH35S
RETURN MANIFOLD
FILL
TO TRIPLE PUMP HP1055
TO SUN STRAND PUMP HP1054
TO KAWASAKI PUMP HP540
CRUSHER MOTOR
DISTRIBUTION BLOCK
HYDRAULIC TANK
4 WAY MANIFOLD STN1
4 WAY MANIFOLD STN2
4 WAY MANIFOLD STN3
4 WAY MANIFOLD STN4
TRIPLE PUMP HP1055
SUN STRAND PUMP HP1054
KAWASAKI PUMP
SUCTION STRAINER
SHUT OFF VALVE
VIBRATORY FEEDER MOTOR EH18-4
SIDE CONVEYOR MOTOR EH35S
MAIN CONVEYOR MOTOR EH35S
MAIN CONVEYOR MOTOR 6K49S WHERE FITTED
ADJUSTABLE JAW CONTROL
JACK LEGS REAR
JACK LEGS FRONT
VEHICLE RAM
CLAMP RAM
TOGGLE LINK RAMS
7 VALVE MANIFOLD
SIDE CONVEYOR
BACK HOPPER DOOR
L/H SIDE HOPPER DOOR
R/H SIDE HOPPER DOOR
EXT MAIN CON LEFT RAM
FACE OF TANK
120 BAR
200 BAR
35 BAR


Which Colour Lamp is Flashing?
RED
GREEN
RED & GREEN LAMPS
(Impactor) Impactor Box Switch Open
ALL RED LAMPS
ESTOPPED
LAMP ABOVE JAW REMOTE SWITCH
LAMP ON ABOVE INTERLOCK OFF?
(Impactor / Roller) Interlock Off
EStopped due to ESTOP switches / Override handset
EStopped due to signal from Receiver (faststop, lamp on EPU also on)
Speed at S2
TRACK OFF
Problem with Dump Valve (E)
JAW IN & JAW OUT
Problem with Jaw In Valve (C)
JAW IN
Problem with Jaw Out Valve (D)
JAW OUT
Override H/S being used
RED LAMP ON TRACK BOX WITHOUT GREEN LAMP
CRUSHER R OFF
FEEDER OFF
CRUSHER OFF
Conveyor Sensor open
IMPACTOR?
Either: Crusher still spinning in opposite direction
Jaw Stop switch has opened
Pressure Switch has opened
Accumulator Valve problem
INTERLOCK ON
Problem with Clamp Valve (B)
JAW CLAMP
Problem with Adjust Valve (A)
JAW ADJUST
FEEDER ON
CRUSHER ON
Roller Changing Direction due to pressure problem
ROLLER CRUSHER?
Problem with corresponding valve
LAMP ABOVE ANY "ON SWITCH"
GREEN LAMP ON TRACK BOX
STEADY
FLASHING
Receiving signal from handset with wrong code
Receiving signal from handset with correct code
Master Shutdown Mode
ALL LAMPS?
Comms Problem
INTERLOCK ON & INTERLOCK OFF
Lift Conveyor
TRACK OFF & CONVEYOR LIFT
Autofeeder Pressure Problem
FEEDER ON & FEEDER OFF
Trying to stop Crusher R at speed S2
CRUSHER R ON & CRUSHER R OFF
Trying to stop Crusher F at speed S2
CRUSHER F ON & CRUSHER F OFF
Y
N

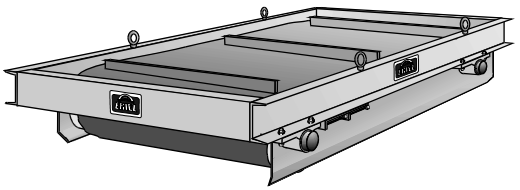
Appendix C OEM Manuals supplied with this machine

	Title	Issue No	Date
1.	CATERPILLAR C-9 ENGINE OPERATION AND MAINTENANCE MANUAL		
2.	ERIEZ MAGNET MODELS CP & OP INSTRUCTIONS		IM-108GB-(F.01)
3.	Vogel Pump Unit Operating Instructions		

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

SUSPENDED PERMANENT MAGNETIC SEPARATORS

MODELS CP & OP



ERIEZ MAGNETICS EUROPE LIMITED
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Bedwas,
Caerphilly. CF83 8YG
United Kingdom

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Fax: 029 20 851314 Intl +44 29 20 851314

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SUSPENDED PERMANENT MAGNETIC SEPARATORS

MODELS CP & OP

INTRODUCTION

Suspended, permanent magnet heavy-duty separators are designed for use over a moving bed of material from which iron is to be removed. Basically, they are box-shaped units containing blocks of permanent magnet material, arranged to produce a powerful magnetic field. The block arrangement determines the magnetic circuit configuration, designated CP or OP.

Two simple methods of cleaning the extracted ferrous material from the surface of the magnet are available; ***manual cleaning*** (Fig. 1) or ***self cleaning*** (Fig. 2). There is a wide range of sizes available for either style and separators can be mounted in-line with the conveyor belt ***(Position 1)*** or across the conveyor belt ***(Position 2)*** to suit customer requirements.

Manual cleaned magnets are designed for use when tramp iron contamination levels are small. Periodically, it is necessary to remove the accumulation of tramp iron, either by hand or with a moveable stripper plate.

Where large amounts of tramp iron require separation, self-cleaning magnets are more practical. The construction of the magnet box is the same as for the manual cleaning magnet, with the addition of a short belt conveyor built around the assembly to provide an automatic discharge for the tramp iron.

WARNING

THIS EQUIPMENT CONTAINS MAGNETISED MATERIAL AND MUST BE TREATED WITH UTMOST CAUTION TO SAFEGUARD AGAINST INJURY.

- Do not allow the pole faces to face each other. Opposite polarity poles will come together with considerable force.

- Before handling this equipment personnel with pacemakers should confirm that their pacemaker is not affected by magnetism.

- Take care when using ferrous tools or ferrous parts near the pole faces.

- Do not place pre-recorded tapes, computer disks, or credit cards near the magnet box since this could cause erasure.

- Keep all delicate mechanisms, such as mechanical watches, away from the magnet.

- Do not drill or weld near the magnetic unit without first seeking the advice of: ERIEZ MAGNETICS EUROPE LIMITED

INSTALLATION

General

When unpacking, take care to avoid damage to the equipment and possible personnel injury - ***the magnet assembly is very powerful and permanently charged***. Remove loose ferrous material closer than 600 mm to the magnet box. Spanners and other tools within the vicinity where the equipment is to be installed could become magnetically induced and be attracted to the magnet box with considerable force. Also, when installing OP magnets check that the unit is in the correct orientation, with the heavy steel end poles at right angles to the direction of material flow.

Magnet Position

Position 1 (*In-Line installation)*
The preferred installation of a suspended magnet is over the trajectory of the product material where it discharges from the belt conveyor. This position is referred to as ***Position 1,*** (Figs. 1 and 2). For optimum separation in ***Position 1*** there must be provision to adjust the location of the magnet in relation to the material trajectory.

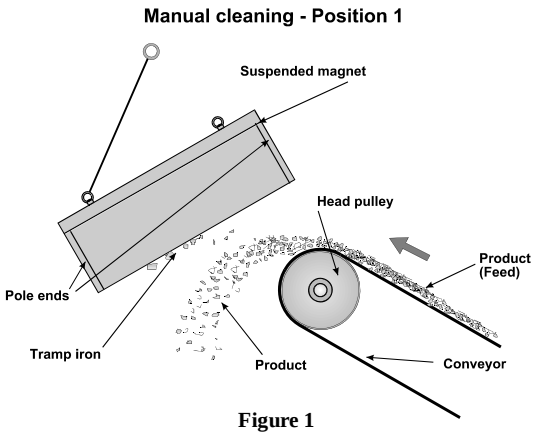

Figure 1

- For low feed conveyor belt speeds, typically less than 100m/min, greater separation efficiency will be achieved by using a non-magnetic head pulley. ***Note: It is preferable if a non-magnetic head pulley is installed, regardless of the speed of the conveyor***

- When installing a self-cleaning unit, examine the area to ensure there is adequate clearance for the belt to run and that provision has been made to collect discharged tramp iron. A hinged ***non-magnetic splitter***, adjustable in length, will be required to prevent extracted tramp from re-entering the non-magnetics.

- At the working suspension height the centreline of the magnet should be approximately perpendicular to the trajectory of the material and

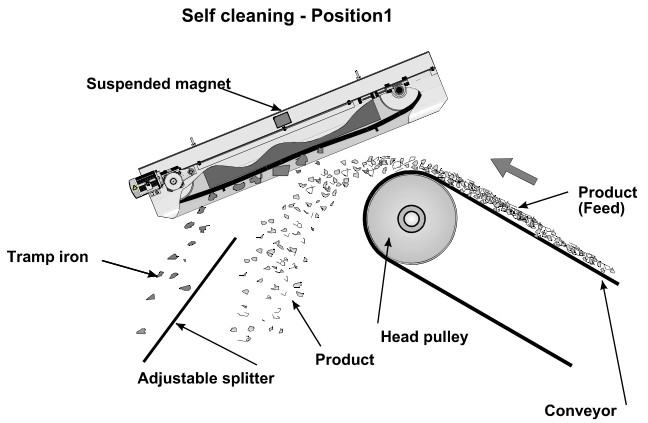

Figure 2

Position 2 (*Cross Belt installation)*

A separator mounted over a moving bed of material at right angles to the conveyor is referred to as ***Position 2*** (Figs. 3 and 4). This installation usually requires a stronger magnet than ***Position 1*** since tramp iron at the bottom of the burden is more difficult to extract.

- The efficiency of magnetic separators in ***Position 2*** is dependent upon the speed of the conveyor carrying the feed. As conveyor speed increases above 100m/min separation efficiency may fall.
- Conveyor idlers beneath the separator in ***Position 2*** must be ***non-magnetic.***
- Manually cleaning suspended magnets should be installed on the centreline of the material conveyor, Fig. 3. Self-cleaning suspended magnets should be installed with the trailing edge of the magnet box immediately above the outer edge of the conveyor idler. Refer to Fig. 4.

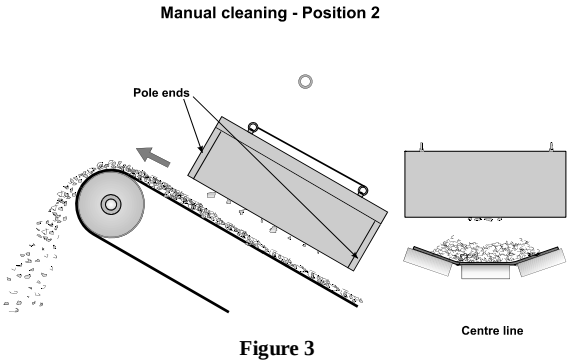

Figure 3

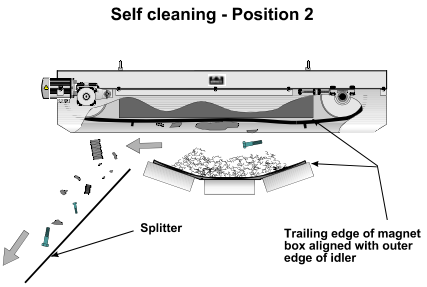

Figure 4

Suspension Height

The magnetic strength and configuration of an OP/CP separator is selected for a specific suspension height and application. The suspension height quoted should be considered a maximum.

When setting the suspension height, Fig. 5, lower the magnet as close as possible to the top of the burden, without interfering with the material flow. If the unit is self-cleaning, ensure that the separator belt is clear to operate freely whilst carrying tramp iron. Failing to do this could result in tramp iron being knocked back into the non-magnetics.

A clearance of 75 mm between the magnet face and the top of the product burden / trajectory should be maintained for self-cleaning units; this clearance can be reduced to 50 mm for manually cleaned units.

WARNING: ***Do not over-tighten the self-cleaning belt as this could damage the bearings. The equipment is designed to operate with belt sag of approximately 25 mm.***

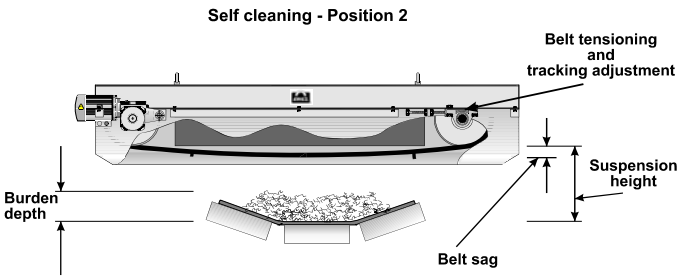

Figure 5

Burden Depth

One factor in achieving optimum separator performance is to control the burden depth.

- **Position 1 installation.** The installation location is calculated on product throughput. Any variation from this will change the trajectory of the product material with respect to the working surface of the magnet and could result in poor separation.

- **Position 2 installation.** A plough or leveller installed before the magnet will remove high spots or surges in material flow.

COMMISSIONING

Self-Cleaning Separators

After installation, examine for any obvious visual damage; in particular check that the frame is square and has not been twisted.

Momentarily close the power supply switch to the belt drive and check that the belt is tracking properly and is not wandering laterally. ***Never start the belt drive and allow it to run continuously until the belt is properly trained***. If the belt wanders, note the direction and adjust as follows:

Self-cleaning magnet belts run on two pulleys, one fixed and the other adjustable. The adjustable tail pulley has approximately 10 mm of take up available for both belt stretch and tracking. To track the belt, the tail pulley should be adjusted to tighten the belt on the ***same side*** to which the belt is seen to wanders.

MAINTENANCE

Manual Cleaning Separators No maintenance is required.

Self-Cleaning Separators

- Belt tracking should be checked frequently and adjusted as necessary. Refer to COMMISSIONING
- Lubricate the bearings on a schedule consistent with other equipment in use at the site for the product and environment.
- If the unit is installed within a separate enclosure, provision must be made to the construction of the enclosure to gain easy access to moving parts.
- Check the self-cleaning belt for damage and, if necessary, replace as follows:

Vulcanised Belt

Replacing a vulcanised belt requires the self-cleaning gear to be dismantled after the separator has been removed from its installation. This is a major operation and is not always practical. An alternative method is to replace the belt in situ.

- Slacken the bolts securing the non-drive pulley.
- Slacken the belt tensioning screws.
- Cut through the damaged belt and remove it.
- Wrap the new belt and vulcanise.
- Re-tension the belt; allowing for belt sag, refer to INSTALLATION.
- Re-track; refer to COMMISSIONING.
- Tighten the bearing securing bolts.

Laced Belt

To replace a laced belt proceed as follows:

- Slacken the bolts securing the non-drive pulley.
- Slacken the belt tensioning screws.
- Remove the braided stainless steel wire.
- Re-tension the belt, allowing for belt sag; refer to INSTALLATION.
- Re-track; refer to COMMISSIONING.
- Tighten the bearing securing bolts.

TROUBLE SHOOTING & RECOMMENDED SPARES

Manual Cleaning Units

PROBLEM	PROBABLE CAUSE	SOLUTION
1. Magnet will not attract iron	a) Magnet face is overloaded with extracted iron.	a) Examine the face of the magnet for excessive quantities of extracted tramp iron. Discharge more frequently as required.
	b) Magnet set too far from the burden.	b) Check the clearance between the magnet face and the burden. Refer to SUSPENSION HEIGHT and set accordingly.
	c) Magnet set too close to the burden.	c). If the magnet is set too close, material surges can act as a wiper and remove iron from the magnet surface. Check clearance and adjust. Refer to SUSPENSION HEIGHT.

Self Cleaning Units

PROBLEM	PROBABLE CAUSE	SOLUTION
1. Tramp iron entering the product	a) Not sufficient clearance for the iron to be discharged.	a) Position 2 installation: Check the clearance between the bottom of the magnet box and the edge of the conveyor belt for maximum iron size to clear. Adjust as necessary.
	b) Splitter improperly positioned.	b) Position 1 installations: Adjust the splitter angle and length to suit.

Recommended Spares

- 1 set Bearings
- 1 Drive motor and gearbox
- 1 Belt

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Appendix D Hazardous Substances associated with this machine

	Title	COSHH Sheet Reference
1.	Exxon Unirex N 3 Grease	570317-00 UNIREX N 3
2.	Shell Albida Grease EP2	ACIYK GB/eng/C 19/03/2005
3.	Shell Rimula Super 15W-40	ACK9D GB/eng/C 26/11/2003
4.	Shell Naturelle Fluid HF-M 46	ACKXR GB/eng/C 09/06/2004
5.	Shell Tellus Oil 46	ACKQ6 GB/eng/C 29/04/2004
6.	Shell Omala 220 Gear Oil	ACH75 GB/eng/C 29/01/2003
7.	Shell Safe Anti Freeze	L84042 Revision 23 08 2004
8.	Shell Agricultural Gas Oil	F32002 Revision 02 10 2002
9.	Exol Ethena EP90 Gear Oil	2nd October 2002

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ExxonMobil

570317-00 UNIREX N 3
MATERIAL SAFETY DATA BULLETIN

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1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: UNIREX N 3
20/10/2003

SUPPLIER: Esso Petroleum Company
ExxonMobil House
Ermyn Way, Leatherhead
Surrey, KT22 8UX
UK

Environmental/Health Emergency telephone: 01372 222 000 (UK)
44 1372 222 000 (Ireland)

INTENDED USE: GREASE

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: SEVERE TREAT MIN. OILS & ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

Substance Name	Approx. Wt%	EU Classification
HYDROXYALKYL LONG-CHAIN ALKENYL IMIDAZOLINE (CAS 27136-73-8)	<1	C;R34 Xn;R22 N;R50/53
N-OLEYLSARCOSINE (CAS 110-25-8)	<1	Xi;R36/38 N;R50/53

3. HAZARDS IDENTIFICATION

This product is considered hazardous according to EU regulatory guidelines (see Section 15).

Symbol: Not applicable.

Risk Phrase(s): R52/53.

POTENTIAL HEALTH EFFECTS: Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation.

POTENTIAL ENVIRONMENTAL EFFECTSHarmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

For further health effects/toxicological data, see Section 11.

NOTE: This product should not be used for any other purpose without expert advice.

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4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a doctor.
SKIN CONTACT: Wash contact areas with soap and water. Remove and clean oil soaked clothing daily and wash affected area.
INJECTION INJURY WARNING: If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.
INHALATION: Remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with mechanical device or use mouth-to-mouth resuscitation.
INGESTION: Not expected to be a problem. Seek medical attention if discomfort occurs. Do not induce vomiting.

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5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical and water fog.
SPECIAL FIRE FIGHTING PROCEDURES: Water or foam may cause frothing. Use water to keep fire exposed containers cool. Water spray may be used to flush spills away from exposures. Prevent runoff from fire control or dilution from entering waterways or drinking water supply.
SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, firefighters MUST use self-contained breathing apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS: None.
COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.
Flash Point C(F): > 204(400) (ESTIMATED FOR OIL, ASTM D-92 (COC)).
Flammable Limits (approx.% vol.in air) - LELNE, UEL: NE
NFPA HAZARD ID: Health: 0 , Flammability: 1 , Reactivity: 0

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6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to appropriate authorities. In case of accident or road spill, contact the Police and Fire Brigade and, if appropriate, the Area Water Authority.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:
LAND SPILL: Shut off source taking normal safety precautions.

Take measures to minimize the effects on ground water. Recover by pumping or contain spilled material with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.
WATER SPILL: Confine the spill immediately with booms. Warn other ships in the vicinity. Notify port and other relevant authorities. Remove from the surface by skimming or with suitable absorbents. If permitted by regulatory authorities the use of suitable dispersants should be considered where recommended in local oil spill procedures.
ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.
PERSONAL PRECAUTIONS: See Section 8

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7. HANDLING AND STORAGE

SPECIFIC USES: GREASE

HANDLING: High pressure injection under the skin may occur due to the rupture of pressurized lines. Always seek medical attention. No special precautions are necessary beyond normal good hygiene practices. See Section 8 for additional personal protection advice when handling this product.
STORAGE: Keep containers closed when not in use. Do not store in open or unlabelled containers. Store away from strong oxidizing agents and combustible materials. Do not store near heat, sparks, flame or strong oxidants.
SPECIAL PRECAUTIONS: Prevent small spills and leakages to avoid slip hazard.
EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapour) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD BRAZE, SOLDER,DRILL,GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

This product does not contain any components which have recognized exposure limits.

VENTILATION: Use adequate ventilation.
RESPIRATORY PROTECTION: No special requirements under ordinary conditions of use and with adequate ventilation.
EYE PROTECTION: Generally eye contact is unlikely with this type material. If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn.
SKIN PROTECTION: If prolonged or repeated skin contact is likely, oil impervious gloves MUST be worn. Good personal hygiene practices should always be followed.

ENVIRONMENTAL CONTROLS: SEE SECTION 7

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.

GENERAL:
PHYSICAL STATE: Grease
COLOUR: Green
ODOUR: Mild
ODOUR THRESHOLD-ppm: NE

IMPORTANT HEALTH, SAFETY AND ENVIRONMENTAL INFORMATION:
pH: NA
BOILING POINT C(F): NE
FLASH POINT C(F): > 204(400) (ESTIMATED FOR OIL, ASTM D-92 (COC))
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NA
EXPLOSIVE PROPERTIES: NA
OXIDIZING PROPERTIES: NA
VAPOUR PRESSURE-mmHg 20 C: < 0.1
RELATIVE DENSITY, 15/4 C: 0.93
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 3.5
VISCOSITY AT 40 C, cSt: 150.0
VISCOSITY AT 100 C, cSt: 13.0
VAPOUR DENSITY: NE
EVAPORATION RATE: NE

OTHER INFORMATION:
DROP POINT C(F): > 219(426)
POUR POINT C(F): NA
FREEZING POINT C(F): NE
NOTE: MOST PHYSICAL PROPERTIES FOR OIL COMPONENT.
DMSO EXTRACT, IP-346 (WT.%): <3, for mineral oil only
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidisers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERISATION: Will not occur.

11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---
ORAL TOXICITY: Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY: Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the

components.
INHALATION TOXICITY: Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.
EYE IRRITATION: Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar products and/or the components.
SKIN IRRITATION: Practically non-irritating. (Primary Irritation Index: greater than 0.5 but less than 3). ---Based on testing of similar products and/or the components.
OTHER ACUTE TOXICITY DATA: Although an acute inhalation study was not performed with this product, a variety of mineral oils and synthetic base oils, such as those in this product have been tested. These samples had virtually no effect other than a nonspecific inflammatory response in the lung to the aerosolized mineral oil. The presence of additives in other tested formulations (in approximately the same amounts as in the present formulation) did not alter the observed effects.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---
No significant adverse effects were found in studies using repeated dermal applications of similar formulations to the skin of laboratory animals for 13 weeks at doses significantly higher than those expected during normal industrial exposure. The animals were evaluated extensively for effects of exposure (hematology, serum chemistry, urinalysis, organ weights, microscopic examination of tissues etc.).

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---
No teratogenic effects would be expected from dermal exposure, based on laboratory developmental toxicity studies of major components in this formulation and/or materials of similar composition.

---CHRONIC TOXICOLOGY (SUMMARY)---
Repeated and/or prolonged exposure may cause irritation to the skin, eyes or respiratory tract. For mineral base oils: Base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of severely treated oils showed no evidence of carcinogenic effects. These results are confirmed on a continuing basis using various screening methods such as Modified Ames Test, IP-346, and/or other analytical methods. Synthetic base oils representative of those in this producthave been tested in the Ames assay and other tests of mutagenicity with negative results. These base oils are not expected to be carcinogenic with chronic dermal exposures.

---SENSITIZATION (SUMMARY)---
Not expected to be sensitizing based on tests of this product, components, or similar products.

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12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:

This environmental assessment was conducted using information on the individual components as no test data was available for this specific formulation.

ECOTOXICITY: This product is expected to be harmful to aquatic

organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY: Not established.

PERSISTENCE AND DEGRADABILITY: This product is expected to be inherently biodegradable, as the principal components have been shown to degrade at slow to moderate rates.

BIOACCUMULATIVE POTENTIAL: Not established.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning in an enclosed, controlled burner for fuel value. Such burning may be limited pursuant to the Resource Conservation and Recovery Act. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at any licensed waste disposal site. Use of these methods is subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

14. TRANSPORT INFORMATION

USA DOT: NOT REGULATED BY USA DOT.

RID/ADR: NOT REGULATED BY RID/ADR.

IMO: NOT REGULATED BY IMO.

IATA: NOT REGULATED BY IATA.

15. REGULATORY INFORMATION

EU Labelling: Product is dangerous as defined by the European Union Dangerous Substances/Preparations Directives.

Symbol: Not applicable.

Risk Phrase(s): R52/53.
Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrase(s): S61.
Avoid release to the environment. Refer to special instructions/Safety data sheets.

THE FOLLOWING PRODUCT INGREDIENTS ARE CITED ON THE LISTS BELOW:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS
*** NO REPORTABLE INGREDIENTS ***		

--- REGULATORY LISTS SEARCHED ---

1=IARC 1	6=NO ALLERGI	11=DE TERAT B	16=DE CARC B	21=CH CARC
2=IARC 2A	7=SE ALLERGY	12=DE TERAT C	17=AT TERAT A	
3=IARC 2B	8=SE CARC	13=DE TERAT D	18=AT TERAT B	

4=NTP CARC 9=DK CARC 14=DE CARC A1 19=AT TERAT C
5=NTP SUS 10=DE TERAT A 15=DE CARC A2 20=AT TERAT D

CARC=CARCINOGEN; SUS=SUSPECTED CARCINOGEN; TERAT=TERATOGENIC

AT = Austria DE = Germany NO = Norway
CH = Switzerland DK = Denmark SE = Sweden

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16. OTHER INFORMATION

LIBRARY OF RISK PHRASES LISTED IN SECTION 2 OF THIS DOCUMENT:

R22 Harmful if swallowed.
R34 Causes burns.
R36/38 Irritating to eyes and skin.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

NOTE: EXXONMOBIL PRODUCTS ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be considered:

INDUSTRIAL LABEL

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. First Aid: Wash skin with soap and water. Flush eyes with water. If overcome by fumes or vapor, remove to fresh air. If ingested, do not induce vomiting. If symptoms persist seek medical assistance. Read and understand the MSDS before using this product.

COSHH Regulations: Product reviewed and considered to be potentially hazardous to health. The Regulations must be followed and measures to control exposure may be necessary.

Any sections of this Material Safety Data Sheet which are printed in bold text highlights recent significant changes which have been made to the advice or information given.

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For Internal Use Only: MHC: 1* 1* 1* 1* 1*, MPPEC: A, TRN: 570317-00, ELIS: 407975, CMCS97: 97Q677
EHS Approval Date: 20OCT2003

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Safety Data Sheet

Shell Albida Grease EP 2

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product Code	001A0091
Infosafe No.	ACIYK GB/eng/C
Issued Date	19/03/2005
Product Type/Use	Automotive and industrial grease.

Other Names	**Name**	**Code**
	Shell Albida Grease EP 2	140000006899

Supplier

SHELL UK PRODUCTS LTD
Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port CH65 4HB
Technical Contact: Product HSE Department
United Kingdom

Telephone Numbers

Emergency Tel.
0151-350-4595
Telephone/Fax Number
Tel: 0151-350-4000

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description
A lubricating grease containing highly-refined mineral oils and additives. The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

Dangerous Components / Constituents
Exposure limits apply to the following components: Highly refined mineral oil.

Name	CAS	EINECS	Proportion		
Zinc naphthenate	12001-85-3	234-409-2	1-2.4 %		

Other Information
See Section 16 'Other Information' for full text of each relevant Risk Phrase.

3. HAZARDS IDENTIFICATION

EC Classification	Not classified as Dangerous under EC criteria.

Human Health Hazards
No specific hazards under normal use conditions. Prolonged or repeated exposure to skin may give rise to

dermatitis. Used grease may contain harmful impurities.

Safety Hazards
Not classified as flammable, but will burn.

4. FIRST AID MEASURES

Symptoms and Effects
Not expected to give rise to an acute hazard under normal conditions of use.

Inhalation
In the unlikely event of dizziness or nausea, remove casualty to fresh air. If symptoms persist, obtain medical attention.

Skin
Remove contaminated clothing and wash affected skin with soap and water. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop.

Eye
Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion
Wash out mouth with water and obtain medical attention. Do not induce vomiting.

Advice to Doctor
Treat symptomatically. Aspiration into the lungs may result in chemical pneumonitis. Dermatitis may result from prolonged or repeated exposure. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function.
High pressure injection injuries require surgical intervention and possibly steroid therapy to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.
There may be a risk to health where low viscosity products are aspirated into the lungs following vomiting, although this is uncommon in adults. Such aspiration would cause intense local irritation and chemical pneumonitis. Children, and those in whom consciousness is impaired, will be more at risk. Emesis of lubricants is not usually necessary, unless a large amount has been ingested, or some other compound has been dissolved in the product. If this is indicated, for example, when there is rapid onset of central nervous system depression from large ingested volume - gastric lavage under controlled hospital conditions, with full protection of the airway is required. Supportive care may include oxygen, arterial blood gas monitoring, respiratory support, and, if aspiration has occurred, treatment with corticosteriods and antibiotics. Seizures should be controlled with Diazepam, or appropriate equivalent drug.

5. FIRE FIGHTING MEASURES

Specific Hazards
Combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds.

Extinguishing Media
Foam and dry chemical powder. Carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media
Water in jet. Use of halon extinguishers should be avoided for environmental reasons.

Protective Equipment
Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Avoid contact with skin and eyes. Wear PVC, Neoprene or nitrile rubber gloves. Wear rubber knee length safety boots and PVC Jacket and Trousers. Wear safety glasses or full face shield if splashes are likely to occur.

Environmental Precautions
Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Inform local authorities if this cannot be prevented.

Clean-up Methods - Small Spillages
Dispose into a suitable, clearly marked container for disposal or reclamation in accordance with local regulations.

Clean-up Methods - Large Spillages
As for small spills.

7. HANDLING AND STORAGE

Handling
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Avoid prolonged or repeated contact with skin. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Prevent spillages. Cloth, paper and other materials that are used to absorb spills present a fire hazard. Avoid their accumulation by disposing of them safely and immediately. In addition to any specific recommendations given for controls of risks to health, safety and the environment, an assessment of risks must be made to help determine controls appropriate to local circumstances. Exposure to this product should be reduced as low as reasonably practicable. Reference should be made to the Health and Safety Executive's publication 'COSHH Essentials'.

Storage
Keep in a cool, dry, well-ventilated place. Use properly labelled and closeable containers. Avoid direct sunlight, heat sources, and strong oxidizing agents. The storage of this product maybe subject to the Control of Pollution (Oil Storage) (England) Regulations. Further guidance maybe obtained from the local environmental agency office.

Storage Temperatures
0ºC Minimum. 50ºC Maximum.

Recommended Materials
For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials
For containers or container linings, avoid PVC.

Other Information
Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits

Substance	Regulations	Exposure Duration	Exposure Limit	Units	Notes
Oil mist, mineral	Health and Safety Executive. EH40; Occupational Exposure Limits.	TWA	5	mg/m3	
	Health and Safety Executive. EH40; Occupational Exposure Limits.	STEL	10	mg/m3	

Other Exposure Information

Due to the product's semi-solid consistency, generation of mists and dusts is unlikely to occur.

Exposure Controls

The use of personal protective equipment is only one aspect of an integrated approach to the Control Of Substances Hazardous to Health.
The management of Health and Safety at Work Regulations 1992 require employers to identify and evaluate the risks to health and to implement appropriate measures to eliminate or minimise those risks. The choice of personal protective equipment is highly dependent upon local conditions, e.g. exposure to other chemical substances and micro-organisms, thermal hazards (protection from extremes of cold and heat), electrical hazards, mechanical hazards and appropriate degree of manual dexterity required to undertake an activity.
Whilst the content of this section may inform the choice of personal protective equipment used, the limitations of any information which can be provided must be fully understood, e.g. personal protective equipment chosen to protect employees from occasional splashes maybe entirely inadequate for activities involving partial or complete immersion.If the levels of oil mist or vapour in air are likely to exceed the occupational exposure standards then consideration should be given to the use of local exhaust ventilation to reduce personal exposure.
The choice of personal protective equipment should only be undertaken in the light of a full risk assessment by a suitably qualified competent person (e.g. a professionally qualified occupational hygienist).
Effective protection is only achieved by correctly fitting and well maintained equipment and employers should ensure that appropriate training is given. All personal protective equipment should be regularly inspected and replaced if defective. Reference should be made to HSE's publication Methods for the Determination of Hazardous Substances (MDHS) 84 - Measurement of oil mist from mineral oil-based metalworking fluids. Measurement of an employee's exposure to oil vapour maybe supplemented through the use of stain tubes. In the first instance, further guidance maybe obtained through HSE's publication 'COSHH - a brief guide to the regulations' (INDG 136(rev1)).

Respiratory Protection

At standard temperature and pressure, the Occupational Exposure Standard for oil vapour is unlikely to be exceeded. Care should be taken to keep exposures below applicable occupational exposure limits. If this cannot be achieved, use of a respirator fitted with an organic vapour cartridge combined with a particulate pre-filter should be considered. Half masks (EN 149) or valved half masks (EN 405) in combination with type A2 (EN 141) and P2/3 (EN 143) pre-filters maybe considered.
If product is subjected to elevated temperatures, half masks (EN 149) or valved half masks (EN 405) in combination with type AX (EN 371) and P2/3 (EN 143) prefilters maybe considered.

Hand Protection

Chemical protective gloves are made from a wide range of materials, but there is no single glove material (or combination of materials) which gives unlimited resistance to any individual or combination of substances or preparations. The extent of the breakthrough time will be affected by a combination of factors which include permeation, penetration, degradation, use pattern (full immersion, occasional contacts) and how the glove is stored when not in use.
Theoretical maximum levels of protection are seldom achieved in practice and the actual level of protection can be difficult to assess. Effective breakthrough time should be used with care and a margin of safety should be applied. HSE guidance on protective gloves recommends a 75% safety factor to be applied to any figures obtained in a laboratory test. Nitrile gloves may offer relatively long breakthrough times and slow permeation rates. Test data, e.g breakthrough data obtained through test standard EN374-3:1994 are available from reputable equipment suppliers.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using

gloves, hands should be washed and dried thoroughly. A non perfumed moisturiser should be applied.

Eye Protection
Goggles conforming to a minimum standard of EN 166 345B should be considered if there is a possibility of eye contact with the product through splashing. Higher rated eye protection must be considered for highly hazardous operations or work areas. For example, employees involved in metalworking operations such as chipping, grinding or cutting may require additional protection to avert injury from fast moving particles or broken tools.

Body Protection
Minimise all forms of skin contact. Overalls and shoes with oil resistant soles should be worn. Launder overalls and undergarments regularly.

Environmental Exposure Controls
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	Light brown.
Physical State	Semi-solid at ambient temperature.
Odour	Characteristic mineral oil.
pH Value	Data not available.
Vapour Pressure	Expected to be less than 0.5 Pa at 20°C.
Initial Boiling Point	Data not available.
Solubility in Water	Negligible.
Density	circa 900 kg/m3 at 15ºC.
Flash Point	>250ºC (COC) (based on mineral oil).
Flammable Limits - Upper	10% V/V (typical) (based on mineral oil).
Flammable Limits - Lower	1% V/V (typical) (based on mineral oil).
Auto-Ignition Temperature	Expected to be above 320ºC.
Kinematic Viscosity	Data not available.
Vapour Density (Air=1)	Greater than 1.
Partition co-efficient, n-octanol/water	Log Pow expected to be greater than 6.
Dropping Point	>250ºC (ASTM D-566).

10. STABILITY AND REACTIVITY

Stability
Stable.

Conditions to Avoid
Extremes of temperature and direct sunlight.

Materials to Avoid
Strong oxidizing agents.

Hazardous Decomposition Products
Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment
Toxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the toxicology of similar products.

Acute Toxicity - Oral
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Dermal
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Inhalation
Not considered to be an inhalation hazard under normal conditions of use.

Eye Irritation
Expected to be slightly irritating.

Skin Irritation
Expected to be slightly irritating.

Respiratory Irritation
If vapours are inhaled, slight irritation of the respiratory tract may occur.

Skin Sensitisation
Not expected to be a skin sensitizer.

Carcinogenicity
Product is based on mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Other components are not known to be associated with carcinogenic effects.

Mutagenicity
Not considered to be a mutagenic hazard.

Reproductive Toxicity
Not considered to be toxic to reproduction.

Other Information
Prolonged and/or repeated contact with products containing mineral oils can result in defatting of the skin, particularly at elevated temperatures. This can lead to irritation and possibly dermatitis, especially under conditions of poor personal hygiene. Skin contact should be minimised. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed. Used grease may contain harmful impurities that have accumulated during use.The concentration of such harmful impurities will depend on use and they may present risks to health and the environment on disposal. ALL used grease should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Basis for Assessment
Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Mobility
Semi-solid under most environmental conditions. Floats on water. If it comes into contact with soil, it will strongly adsorb to soil particles.

Persistence / Degradability
Not expected to be readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation
Contains components with the potential to bioaccumulate.

Ecotoxicity
Data not available. Poorly soluble mixture. May cause physical fouling of aquatic organisms.

Other Adverse Effects
Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.
Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
Dispose into a suitable, clearly marked container for disposal or reclamation in accordance with local regulations. The competence of the contractor to deal satisfactorily with this type of product should be established beforehand. Do not pollute the soil, water or environment with the waste product.

Product Disposal
As for waste disposal.

Container Disposal
Recycle or dispose of in accordance with the legislation in force with a recognised collector or contractor.

14. TRANSPORT INFORMATION

Transport Information
Not dangerous for transport under ADR/RID, IMO and IATA/ICAO regulations.

15. REGULATORY INFORMATION

EC Symbols	None.
EC Risk Phrase	Not classified.
EC Safety Phrase	Not classified.

EINECS	All components listed or polymer exempt.
TSCA (USA)	All components listed.

National Legislation
Environmental Protection Act 1990 (as amended).
Health and Safety at Work Act 1974
Consumers Protection Act 1987
Control of Pollution Act 1974
Environmental Act 1995
Factories Act 1961
Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations
Chemicals (Hazard Information and Packaging for Supply) Regulations 2002.
Control of Substances Hazardous to Health Regulations 1994 (as amended).
Road Traffic (Carriage of Dangerous Substances in Packages) Regulations
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers in Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations

Reporting of Injuries, Diseases and Dangerous Occurences Regulations
Health and Safety (First Aid) Regulations 1981
Personal Protective Equipment (EC Directive) Regulations 1992
Personal Protective Equipment at Work Regulations 1992

Packaging & Labelling
Safety data sheet available for professional user on request.

16. OTHER INFORMATION

Revisions Highlighted
To assist harmonisation of sds authoring practices, a version number has been introduced.

References
GUIDANCE NOTES
UK Chemicals Regulatory Atlas, An Overview of how to guide your chemical through to regulatory compliance (DTI).
HSG71 The storage of packaged dangerous substances.
EH/40 Occupational Exposure Limits.
EH/58 The Carcinogenicity of Mineral Oils.
MS24 Health surveillance of occupational skin disease.
HSG 53 The selection, use and maintenance of respiratory protective equipment: A practical guide.
HSG 206 Cost and effectiveness of chemical protective gloves for the workplace: Guidance for employers and health and safety specialists.
L74 First Aid at work: Approved Code of Practice and Guidance.
HSG 136 Workplace transport safety : guidance for employers.
INDG234 (rev) Are you Involved in the Carriage of Dangerous Goods by Road or Rail
OTHER LITERATURE
Concawe Report 3/82 Precautionary Advice on the Handling of Used Engine Oils
Concawe Report 86/69 Health Aspects of Worker Exposure to Oil Mists
Concawe Report 01/97 Petroleum Products - First Aid Emergency and Medical Advice
Concawe Report 01/53 Classification and labelling of petroleum substances according to the EU dangerous substances directive (Concawe recommendations August 2001)
Concawe Report 01/54 environmental classification of petroleum substances summary data and rationale
Concawe Report 5/02 amended safety data sheet directive (2001/58/EC)
Department of the Environment - Waste Management - The Duty of Care - A Code of Practice
Concawe, Boulevard du souverain 165 B - 1160 Brussels, Belgium
www.concawe.be

Restrictions
This product must not be used in applications other than recommended without first seeking the advice of the SHELL technical department.

List of R Phrases in Section 2
R36/38 Irritating to eyes and skin.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Technical Contact Numbers
0151-350-4000.

Further Information
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It does not constitute a guarantee for any specific property of the product.

... End Of SDS ...

Shell Albida Grease EP 2

Safety Data Sheet

Shell Rimula Super 15W-40

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product Code 001B0415
Infosafe No. ACK9D GB/eng/C
Issued Date 26/11/2003
Product Type/Use Engine oil.

Other Names	Name	Code
	Shell Rimula Super 15W-40	140001010602

Supplier

SHELL UK PRODUCTS LTD
Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port
CH65 4HB
Technical Contact: Product HSE Department
United Kingdom

Telephone Numbers

Emergency Tel.
0151-350-4595
Telephone/Fax Number
Tel: 0151-350-4000

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description
Highly refined mineral oils and additives. The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

Dangerous Components / Constituents
Exposure limits apply to the following components: Highly refined mineral oil.

Name	CAS	EINECS	Proportion	Hazard	R Phrase
Zinc alkyl dithiophosphate	-	-	1-2.49 %	Xi, N	R38, R41, R51/53

Other Information
See Section 16 'Other Information' for full text of each relevant Risk Phrase.

3. HAZARDS IDENTIFICATION

EC Classification	Not classified as Dangerous under EC criteria.

Human Health Hazards
No specific hazards under normal use conditions. Prolonged or repeated exposure may give rise to dermatitis. Used oil may contain harmful impurities.

Safety Hazards
Not classified as flammable, but will burn.

Environmental Hazards
Not classified as dangerous to the environment.

4. FIRST AID MEASURES

Symptoms and Effects
Not expected to give rise to an acute hazard under normal conditions of use.

Inhalation
In the unlikely event of dizziness or nausea, remove casualty to fresh air. If symptoms persist, obtain medical attention.

Skin
Remove contaminated clothing and wash affected skin with soap and water. If persistent irritation occurs, obtain medical attention. If high pressure injection injuries occur, obtain medical attention immediately.

Eye
Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion
Wash out mouth with water and obtain medical attention. Do not induce vomiting.

Advice to Doctor
Treat symptomatically. Aspiration into the lungs may cause chemical pneumonitis. Dermatitis may result from prolonged or repeated exposure.
High pressure injection injuries require surgical intervention and possibly steroid therapy to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.
There may be a risk to health where low viscosity products are aspirated into the lungs following vomiting, although this is uncommon in adults. Such aspiration would cause intense local irritation and chemical pneumonitis. Children, and those in whom consciousness is impaired, will be more at risk. Emesis of lubricants is not usually necessary, unless a large amount has been ingested, or some other compound has been dissolved in the product. If this is indicated, for example, when there is rapid onset of central nervous system depression from large ingested volume - gastric lavage under controlled hospital conditions, with full protection of the airway is required. Supportive care may include oxygen, arterial blood gas monitoring, respiratory support, and, if aspiration has occurred, treatment with corticosteriods and antibiotics. Seizures should be controlled with Diazepam, or appropriate equivalent drug.

5. FIRE FIGHTING MEASURES

Specific Hazards
Combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds.

Extinguishing Media
Foam and dry chemical powder. Carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media
Water in jet. Use of halon extinguishers should be avoided for environmental reasons.

Protective Equipment
Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Avoid contact with skin and eyes. Wear PVC, Neoprene or nitrile rubber gloves. Wear rubber knee length safety boots and PVC Jacket and Trousers. Wear safety glasses or full face shield if splashes are likely to occur.

Environmental Precautions
Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Inform local authorities if this cannot be prevented.

Clean-up Methods - Small Spillages
Absorb liquid with sand or earth. Sweep up and remove to a suitable, clearly marked container for disposal in accordance with local regulations.

Clean-up Methods - Large Spillages
Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Dispose of as for small spills.

7. HANDLING AND STORAGE

Handling
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Avoid prolonged or repeated contact with skin. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Prevent spillages. Cloth, paper and other materials that are used to absorb spills present a fire hazard. Avoid their accumulation by disposing of them safely and immediately. In addition to any specific recommendations given for controls of risks to health, safety and the environment, an assessment of risks must be made to help determine controls appropriate to local circumstances. Exposure to this product should be reduced as low as reasonably practicable. Reference should be made to the Health and Safety Executive's publication 'COSHH Essentials'.

Storage
Keep in a cool, dry, well-ventilated place. Use properly labelled and closeable containers. Avoid direct sunlight, heat sources, and strong oxidizing agents. The storage of this product maybe subject to the Control of Pollution (Oil Storage) (England) Regulations. Further guidance maybe obtained from the local environmental agency office.

Storage Temperatures
0°C Minimum. 50°C Maximum.

Recommended Materials
For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials
For containers or container linings, avoid PVC.

Other Information
Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits

Substance	Regulations	Exposure Duration	Exposure Limit	Units	Notes
Oil mist, mineral	Health and Safety Executive. EH40; Occupational Exposure Limits.	TWA	5	mg/m3	
	Health and Safety Executive. EH40; Occupational Exposure Limits.	STEL	10	mg/m3	

Exposure Controls

The use of personal protective equipment is only one aspect of an integrated approach to the Control Of Substances Hazardous to Health.
The management of Health and Safety at Work Regulations 1992 require employers to identify and evaluate the risks to health and to implement appropriate measures to eliminate or minimise those risks. The choice of personal protective equipment is highly dependent upon local conditions, e.g. exposure to other chemical substances and micro-organisms, thermal hazards (protection from extremes of cold and heat), electrical hazards, mechanical hazards and appropriate degree of manual dexterity required to undertake an activity.
Whilst the content of this section may inform the choice of personal protective equipment used, the limitations of any information which can be provided must be fully understood, e.g. personal protective equipment chosen to protect employees from occasional splashes maybe entirely inadequate for activities involving partial or complete immersion.If the levels of oil mist or vapour in air are likely to exceed the occupational exposure standards then consideration should be given to the use of local exhaust ventilation to reduce personal exposure.
The choice of personal protective equipment should only be undertaken in the light of a full risk assessment by a suitably qualified competent person (e.g. a professionally qualified occupational hygienist).
Effective protection is only achieved by correctly fitting and well maintained equipment and employers should ensure that appropriate training is given. All personal protective equipment should be regularly inspected and replaced if defective. Reference should be made to HSE's publication Methods for the Determination of Hazardous Substances (MDHS) 84 - Measurement of oil mist from mineral oil-based metalworking fluids.
Measurement of an employee's exposure to oil vapour maybe supplemented through the use of stain tubes. In the first instance, further guidance maybe obtained through HSE's publication 'COSHH - a brief guide to the regulations' (INDG 136(rev1)).

Respiratory Protection

At standard temperature and pressure, the Occupational Exposure Standard for oil vapour is unlikely to be exceeded. Care should be taken to keep exposures below applicable occupational exposure limits. If this cannot be achieved, use of a respirator fitted with an organic vapour cartridge combined with a particulate pre-filter should be considered. Half masks (EN 149) or valved half masks (EN 405) in combination with type A2 (EN 141) and P2/3 (EN 143) pre-filters maybe considered.
If product is subjected to elevated temperatures, half masks (EN 149) or valved half masks (EN 405) in combination with type AX (EN 371) and P2/3 (EN 143) prefilters maybe considered.

Hand Protection

Chemical protective gloves are made from a wide range of materials, but there is no single glove material (or combination of materials) which gives unlimited resistance to any individual or combination of substances or preparations. The extent of the breakthrough time will be affected by a combination of factors which include permeation, penetration, degradation, use pattern (full immersion, occasional contacts) and how the glove is stored when not in use.
Theoretical maximum levels of protection are seldom achieved in practice and the actual level of protection can be difficult to assess. Effective breakthrough time should be used with care and a margin of safety should be applied. HSE guidance on protective gloves recommends a 75% safety factor to be applied to any figures obtained in a laboratory test. Nitrile gloves may offer relatively long breakthrough times and slow permeation rates. Test data, e.g breakthrough data obtained through test standard EN374-3:1994 are available from

reputable equipment suppliers.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. A non perfumed moisturiser should be applied.

Eye Protection
Goggles conforming to a minimum standard of EN 166 345B should be considered if there is a possibility of eye contact with the product through splashing. Higher rated eye protection must be considered for highly hazardous operations or work areas. For example, employees involved in metalworking operations such as chipping, grinding or cutting may require additional protection to avert injury from fast moving particles or broken tools.

Body Protection
Minimise all forms of skin contact. Overalls and shoes with oil resistant soles should be worn. Launder overalls and undergarments regularly.

Environmental Exposure Controls
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	Amber.
Physical State	Liquid at ambient temperature.
Odour	Characteristic mineral oil.
pH Value	Data not available.
Vapour Pressure	Expected to be less than 0.5 Pa at 20°C.
Initial Boiling Point	Expected to be above 280°C.
Solubility in Water	Negligible.
Density	888 kg/m3 at 15ºC.
Flash Point	230ºC. PMCC ASTM D93.
Flammable Limits - Upper	10%(V/V).
Flammable Limits - Lower	1%(V/V).
Auto-Ignition Temperature	Expected to be above 320ºC.
Kinematic Viscosity	110 mm2/s at 40ºC.
Vapour Density (Air=1)	Greater than 1.
Partition co-efficient, n-octanol/water	Log Pow expected to be greater than 6.
Pour Point	-30ºC maximum.

10. STABILITY AND REACTIVITY

Stability
Stable.

Conditions to Avoid
Extremes of temperature and direct sunlight.

Materials to Avoid
Strong oxidizing agents.

Hazardous Decomposition Products
Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment
Toxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the toxicology of similar products.

Acute Toxicity - Oral
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Dermal
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Inhalation
Not considered to be an inhalation hazard under normal conditions of use.

Eye Irritation
Expected to be slightly irritating.

Skin Irritation
Expected to be slightly irritating.

Respiratory Irritation
If mists are inhaled, slight irritation of the respiratory tract may occur.

Skin Sensitisation
Not expected to be a skin sensitizer.

Carcinogenicity
Product is based on mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Other components are not known to be associated with carcinogenic effects.

Mutagenicity
Not considered to be a mutagenic hazard.

Reproductive Toxicity
Not considered to be toxic to reproduction.

Other Information
Prolonged and/or repeated contact with this product can result in defatting of the skin, particularly at elevated temperatures. This can lead to irritation and possibly dermatitis, especially under conditions of poor personal hygiene. Skin contact should be minimised. Used engine oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. It is prudent to assume that prolonged or repeated exposure to used engine oils may cause skin cancer.

12. ECOLOGICAL INFORMATION

Basis for Assessment
Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Mobility
Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.

Persistence / Degradability
Not expected to be readily biodegradable. Major constituents are expected to be inherently biodegradable, but

the product contains components that may persist in the environment.

Bioaccumulation
Contains components with the potential to bioaccumulate.

Ecotoxicity
Poorly soluble mixture. May cause physical fouling of aquatic organisms. Product is expected to be practically non-toxic to aquatic organisms, LL/EL50 >100 mg/l. (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Other Adverse Effects
Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.
Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
Recycle or dispose of in accordance with prevailing regulations, with a recognised collector or contractor. The competence of the contractor to deal satisfactorily with this type of product should be established beforehand. Do not pollute the soil, water or environment with the waste product.

Product Disposal
As for waste disposal.

Container Disposal
Recycle or dispose of in accordance with the legislation in force with a recognised collector or contractor.

14. TRANSPORT INFORMATION

Transport Information
Not dangerous for transport under ADR/RID, IMO and IATA/ICAO regulations.

15. REGULATORY INFORMATION

EC Symbols	None.
EC Risk Phrase	Not classified.
EC Safety Phrase	Not classified.

EINECS	All components listed or polymer exempt.
TSCA (USA)	Not established.

National Legislation
Environmental Protection Act 1990 (as amended).
Health and Safety at Work Act 1974
Consumers Protection Act 1987
Control of Pollution Act 1974
Environmental Act 1995
Factories Act 1961
Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations

Chemicals (Hazard Information and Packaging for Supply) Regulations 2002.
Control of Substances Hazardous to Health Regulations 1994 (as amended).
Road Traffic (Carriage of Dangerous Substances in Packages) Regulations
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers in Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations
Reporting of Injuries, Diseases and Dangerous Occurences Regulations
Health and Safety (First Aid) Regulations 1981
Personal Protective Equipment (EC Directive) Regulations 1992
Personal Protective Equipment at Work Regulations 1992

Packaging & Labelling
Safety data sheet available for professional user on request.

16. OTHER INFORMATION

Revisions Highlighted
No amendments made to information. To assist harmonisation of sds authoring practices, a version number has been introduced.

References
GUIDANCE NOTES
UK Chemicals Regulatory Atlas, An Overview of how to guide your chemical through to regulatory compliance (DTI).
HSG71 The storage of packaged dangerous substances.
EH/40 Occupational Exposure Limits.
EH/58 The Carcinogenicity of Mineral Oils.
MS24 Health surveillance of occupational skin disease.
HSG 53 The selection, use and maintenance of respiratory protective equipment: A practical guide.
HSG 206 Cost and effectiveness of chemical protective gloves for the workplace: Guidance for employers and health and safety specialists.
L74 First Aid at work: Approved Code of Practice and Guidance.
HSG 136 Workplace transport safety : guidance for employers.
INDG234 (rev) Are you Involved in the Carriage of Dangerous Goods by Road or Rail
OTHER LITERATURE
Concawe Report 3/82 Precautionary Advice on the Handling of Used Engine Oils
Concawe Report 86/69 Health Aspects of Worker Exposure to Oil Mists
Concawe Report 01/97 Petroleum Products - First Aid Emergency and Medical Advice
Concawe Report 01/53 Classification and labelling of petroleum substances according to the EU dangerous substances directive (Concawe recommendations August 2001)
Concawe Report 01/54 environmental classification of petroleum substances summary data and rationale
Concawe Report 5/02 amended safety data sheet directive (2001/58/EC)
Department of the Environment - Waste Management - The Duty of Care - A Code of Practice
Concawe, Boulevard du souverain 165 B - 1160 Brussels, Belgium
www.concawe.be

Restrictions
This product must not be used in applications other than recommended without first seeking the advice of the SHELL technical department.

List of R Phrases in Section 2
R38 Irritating to skin.
R41 Risk of serious damage to eyes.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Technical Contact Numbers
0151-350-4000.

Further Information

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It does not constitute a guarantee for any specific property of the product.

... End Of SDS ...

Safety Data Sheet

Shell Tellus Oil 46

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product Code	001B0669
Infosafe No.	ACKQ6 GB/eng/C
Issued Date	29/04/2004
Product Type/Use	Hydraulic oil.

Other Names	**Name**	**Code**
	Shell Tellus Oil 46	140001010640

Supplier

SHELL UK PRODUCTS LTD
Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port
CH65 4HB
Technical Contact: Product HSE Department
United Kingdom

Telephone Numbers

Emergency Tel.

0151-350-4595

Telephone/Fax Number

Tel: 0151-350-4000

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description

Highly refined mineral oils and additives. The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

Dangerous Components / Constituents

Exposure limits apply to the following components: Highly refined mineral oil.

3. HAZARDS IDENTIFICATION

EC Classification	Not classified as Dangerous under EC criteria.

Human Health Hazards

No specific hazards under normal use conditions. Prolonged or repeated exposure may give rise to dermatitis. Used oil may contain harmful impurities.

Safety Hazards

Not classified as flammable, but will burn.

Environmental Hazards

Not classified as dangerous for the environment.

4. FIRST AID MEASURES

Symptoms and Effects
Not expected to give rise to an acute hazard under normal conditions of use.

Inhalation
In the unlikely event of dizziness or nausea, remove casualty to fresh air. If symptoms persist, obtain medical attention.

Skin
Remove contaminated clothing and wash affected skin with soap and water. If persistent irritation occurs, obtain medical attention. If high pressure injection injuries occur, obtain medical attention immediately.

Eye
Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion
Wash out mouth with water and obtain medical attention. Do not induce vomiting.

Advice to Doctor
Treat symptomatically. Aspiration into the lungs may result in chemical pneumonitis. Dermatitis may result from prolonged or repeated exposure.
High pressure injection injuries require surgical intervention and possibly steroid therapy to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.
There may be a risk to health where low viscosity products are aspirated into the lungs following vomiting, although this is uncommon in adults. Such aspiration would cause intense local irritation and chemical pneumonitis. Children, and those in whom consciousness is impaired, will be more at risk. Emesis of lubricants is not usually necessary, unless a large amount has been ingested, or some other compound has been dissolved in the product. If this is indicated, for example, when there is rapid onset of central nervous system depression from large ingested volume - gastric lavage under controlled hospital conditions, with full protection of the airway is required. Supportive care may include oxygen, arterial blood gas monitoring, respiratory support, and, if aspiration has occurred, treatment with corticosteriods and antibiotics. Seizures should be controlled with Diazepam, or appropriate equivalent drug.

5. FIRE FIGHTING MEASURES

Specific Hazards
Combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide, oxides of sulphur, and unidentified organic and inorganic compounds.

Extinguishing Media
Foam and dry chemical powder. Carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media
Water in jet. Use of halon extinguishers should be avoided for environmental reasons.

Protective Equipment
Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Avoid contact with skin and eyes. Wear PVC, Neoprene or nitrile rubber gloves. Wear rubber knee length safety boots and PVC Jacket and Trousers. Wear safety glasses or full face shield if splashes are likely to occur.

Environmental Precautions
Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Inform local authorities if this cannot be prevented.

Clean-up Methods - Small Spillages
Absorb liquid with sand or earth. Sweep up and remove to a suitable, clearly marked container for disposal in accordance with local regulations.

Clean-up Methods - Large Spillages
Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Dispose of as for small spills.

7. HANDLING AND STORAGE

Handling
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Avoid prolonged or repeated contact with skin. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Prevent spillages. Cloth, paper and other materials that are used to absorb spills present a fire hazard. Avoid their accumulation by disposing of them safely and immediately. In addition to any specific recommendations given for controls of risks to health, safety and the environment, an assessment of risks must be made to help determine controls appropriate to local circumstances. Exposure to this product should be reduced as low as reasonably practicable. Reference should be made to the Health and Safety Executive's publication 'COSHH Essentials'.

Storage
Keep in a cool, dry, well-ventilated place. Use properly labelled and closeable containers. Avoid direct sunlight, heat sources, and strong oxidizing agents. The storage of this product maybe subject to the Control of Pollution (Oil Storage) (England) Regulations. Further guidance maybe obtained from the local environmental agency office.

Storage Temperatures
0°C Minimum. 50°C Maximum.

Recommended Materials
For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials
For containers or container linings, avoid PVC.

Other Information
Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits

Substance	Regulations	Exposure Duration	Exposure Limit	Units	Notes
Oil mist, mineral	Health and Safety Executive. EH40; Occupational Exposure Limits.	TWA	5	mg/m3	

	Health and Safety Executive. EH40; Occupational Exposure Limits.	STEL	10	mg/m3	

Exposure Controls

The use of personal protective equipment is only one aspect of an integrated approach to the Control Of Substances Hazardous to Health.
The management of Health and Safety at Work Regulations 1992 require employers to identify and evaluate the risks to health and to implement appropriate measures to eliminate or minimise those risks. The choice of personal protective equipment is highly dependent upon local conditions, e.g. exposure to other chemical substances and micro-organisms, thermal hazards (protection from extremes of cold and heat), electrical hazards, mechanical hazards and appropriate degree of manual dexterity required to undertake an activity.
Whilst the content of this section may inform the choice of personal protective equipment used, the limitations of any information which can be provided must be fully understood, e.g. personal protective equipment chosen to protect employees from occasional splashes maybe entirely inadequate for activities involving partial or complete immersion.If the levels of oil mist or vapour in air are likely to exceed the occupational exposure standards then consideration should be given to the use of local exhaust ventilation to reduce personal exposure.
The choice of personal protective equipment should only be undertaken in the light of a full risk assessment by a suitably qualified competent person (e.g. a professionally qualified occupational hygienist).
Effective protection is only achieved by correctly fitting and well maintained equipment and employers should ensure that appropriate training is given. All personal protective equipment should be regularly inspected and replaced if defective. Reference should be made to HSE's publication Methods for the Determination of Hazardous Substances (MDHS) 84 - Measurement of oil mist from mineral oil-based metalworking fluids.
Measurement of an employee's exposure to oil vapour maybe supplemented through the use of stain tubes. In the first instance, further guidance maybe obtained through HSE's publication 'COSHH - a brief guide to the regulations' (INDG 136(rev1)).

Respiratory Protection

At standard temperature and pressure, the Occupational Exposure Standard for oil vapour is unlikely to be exceeded. Care should be taken to keep exposures below applicable occupational exposure limits. If this cannot be achieved, use of a respirator fitted with an organic vapour cartridge combined with a particulate pre-filter should be considered. Half masks (EN 149) or valved half masks (EN 405) in combination with type A2 (EN 141) and P2/3 (EN 143) pre-filters maybe considered.
If product is subjected to elevated temperatures, half masks (EN 149) or valved half masks (EN 405) in combination with type AX (EN 371) and P2/3 (EN 143) prefilters maybe considered.

Hand Protection

Chemical protective gloves are made from a wide range of materials, but there is no single glove material (or combination of materials) which gives unlimited resistance to any individual or combination of substances or preparations. The extent of the breakthrough time will be affected by a combination of factors which include permeation, penetration, degradation, use pattern (full immersion, occasional contacts) and how the glove is stored when not in use.
Theoretical maximum levels of protection are seldom achieved in practice and the actual level of protection can be difficult to assess. Effective breakthrough time should be used with care and a margin of safety should be applied. HSE guidance on protective gloves recommends a 75% safety factor to be applied to any figures obtained in a laboratory test. Nitrile gloves may offer relatively long breakthrough times and slow permeation rates. Test data, e.g breakthrough data obtained through test standard EN374-3:1994 are available from reputable equipment suppliers.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. A non perfumed moisturiser should be applied.

Eye Protection

Goggles conforming to a minimum standard of EN 166 345B should be considered if there is a possibility of eye contact with the product through splashing. Higher rated eye protection must be considered for highly hazardous operations or work areas. For example, employees involved in metalworking operations such as chipping, grinding or cutting may require additional protection to avert injury from fast moving particles or broken

tools.

Body Protection
Minimise all forms of skin contact. Overalls and shoes with oil resistant soles should be worn. Launder overalls and undergarments regularly.

Environmental Exposure Controls
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	Light brown.
Physical State	Liquid at ambient temperature.
Odour	Characteristic mineral oil.
pH Value	Not applicable.
Vapour Pressure	Expected to be less than 0.5 Pa at 20°C.
Initial Boiling Point	Expected to be above 280°C.
Solubility in Water	Negligible.
Density	879 kg/m3 at 15ºC.
Flash Point	218ºC. (PMCC).
Flammable Limits - Upper	10%(V/V) (typical).
Flammable Limits - Lower	1%(V/V) (typical).
Auto-Ignition Temperature	Expected to be above 320ºC.
Kinematic Viscosity	46 mm2/s at 40°C.
Vapour Density (Air=1)	Greater than 1.
Partition co-efficient, n-octanol/water	Log Pow expected to be greater than 6.
Pour Point	-30ºC.

10. STABILITY AND REACTIVITY

Stability
Stable.

Conditions to Avoid
Extremes of temperature and direct sunlight.

Materials to Avoid
Strong oxidizing agents.

Hazardous Decomposition Products
Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment
Toxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the toxicology of similar products.

Acute Toxicity - Oral
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Dermal
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Inhalation
Not considered to be an inhalation hazard under normal conditions of use.

Eye Irritation
Expected to be slightly irritating.

Skin Irritation
Expected to be slightly irritating.

Respiratory Irritation
If mists are inhaled, slight irritation of the respiratory tract may occur.

Skin Sensitisation
Not expected to be a skin sensitizer.

Carcinogenicity
Product is based on mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Other components are not known to be associated with carcinogenic effects.

Mutagenicity
Not considered to be a mutagenic hazard.

Reproductive Toxicity
Not considered to be toxic to reproduction.

Other Information
Prolonged and/or repeated contact with products containing mineral oils may result in defatting of the skin, particularly at elevated temperatures. This may lead to irritation and possibly dermatitis, especially under conditions of poor personal hygiene. Skin contact should be minimised. Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Basis for Assessment
Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Mobility
Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.

Persistence / Degradability
Not expected to be readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation
Contains components with the potential to bioaccumulate.

Ecotoxicity
Poorly soluble mixture. May cause physical fouling of aquatic organisms. Product is expected to be practically non-toxic to aquatic organisms, LL/EL50 >100 mg/l. (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Other Adverse Effects
Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.
Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
Recycle or dispose of in accordance with prevailing regulations, with a recognised collector or contractor. The competence of the contractor to deal satisfactorily with this type of product should be established beforehand. Do not pollute the soil, water or environment with the waste product.

Product Disposal
As for waste disposal.

Container Disposal
Recycle or dispose of in accordance with the legislation in force with a recognised collector or contractor.

14. TRANSPORT INFORMATION

Transport Information
Not dangerous for transport under ADR/RID, IMO and IATA/ICAO regulations.

15. REGULATORY INFORMATION

EC Symbols	None.
EC Risk Phrase	Not classified.
EC Safety Phrase	Not classified.

EINECS	All components listed or polymer exempt.
TSCA (USA)	All components in compliance.

National Legislation
Environmental Protection Act 1990 (as amended).
Health and Safety at Work Act 1974
Consumers Protection Act 1987
Control of Pollution Act 1974
Environmental Act 1995
Factories Act 1961
Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations
Chemicals (Hazard Information and Packaging for Supply) Regulations 2002.
Control of Substances Hazardous to Health Regulations 1994 (as amended).
Road Traffic (Carriage of Dangerous Substances in Packages) Regulations
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers in Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations
Reporting of Injuries, Diseases and Dangerous Occurences Regulations
Health and Safety (First Aid) Regulations 1981
Personal Protective Equipment (EC Directive) Regulations 1992

Personal Protective Equipment at Work Regulations 1992

Packaging & Labelling
Safety data sheet available for professional user on request.

16. OTHER INFORMATION

Revisions Highlighted
No amendments made to information. To assist harmonisation of sds authoring practices, a version number has been introduced.

References
GUIDANCE NOTES
UK Chemicals Regulatory Atlas, An Overview of how to guide your chemical through to regulatory compliance (DTI).
HSG71 The storage of packaged dangerous substances.
EH/40 Occupational Exposure Limits.
EH/58 The Carcinogenicity of Mineral Oils.
MS24 Health surveillance of occupational skin disease.
HSG 53 The selection, use and maintenance of respiratory protective equipment: A practical guide.
HSG 206 Cost and effectiveness of chemical protective gloves for the workplace: Guidance for employers and health and safety specialists.
L74 First Aid at work: Approved Code of Practice and Guidance.
HSG 136 Workplace transport safety : guidance for employers.
INDG234 (rev) Are you Involved in the Carriage of Dangerous Goods by Road or Rail
OTHER LITERATURE
Concawe Report 3/82 Precautionary Advice on the Handling of Used Engine Oils
Concawe Report 86/69 Health Aspects of Worker Exposure to Oil Mists
Concawe Report 01/97 Petroleum Products - First Aid Emergency and Medical Advice
Concawe Report 01/53 Classification and labelling of petroleum substances according to the EU dangerous substances directive (Concawe recommendations August 2001)
Concawe Report 01/54 environmental classification of petroleum substances summary data and rationale
Concawe Report 5/02 amended safety data sheet directive (2001/58/EC)
Department of the Environment - Waste Management - The Duty of Care - A Code of Practice
Concawe, Boulevard du souverain 165 B - 1160 Brussels, Belgium
www.concawe.be

Restrictions
This product must not be used in applications other than recommended without first seeking the advice of the SHELL technical department.

Technical Contact Numbers
0151-350-4000.

Further Information
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It does not constitute a guarantee for any specific property of the product.

... End Of SDS ...

Safety Data Sheet

Shell Naturelle Fluid HF-M 46

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product Code	001A0871
Infosafe No.	ACKXR GB/eng/C
Issued Date	09/06/2004
Product Type/Use	Hydraulic oil.

Other Names	**Name**	**Code**
	Shell Naturelle Fluid HF-M 46	140000000988

Supplier

SHELL UK PRODUCTS LTD
Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port
CH65 4HB
Technical Contact: Product HSE Department
United Kingdom

Telephone Numbers

Emergency Tel.
0151-350-4595
Telephone/Fax Number
Tel: 0151-350-4000

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description
Blend of vegetable oils, esters and additives.

3. HAZARDS IDENTIFICATION

EC Classification	Not classified as Dangerous under EC criteria.

Human Health Hazards
No specific hazards under normal use conditions. Prolonged or repeated exposure may give rise to dermatitis. Used oil may contain harmful impurities.

Safety Hazards
Not classified as flammable, but will burn.

Environmental Hazards
Not classified as dangerous for the environment.

4. FIRST AID MEASURES

Symptoms and Effects
Not expected to give rise to an acute hazard under normal conditions of use.

Inhalation
In the unlikely event of dizziness or nausea, remove casualty to fresh air. If symptoms persist, obtain medical attention.

Skin
Remove contaminated clothing and wash affected skin with soap and water. If persistent irritation occurs, obtain medical attention. If high pressure injection injuries occur, obtain medical attention immediately.

Eye
Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion
Do not induce vomiting. Wash out mouth with water and obtain medical attention.

Advice to Doctor
Treat symptomatically. Aspiration into the lungs may result in chemical pneumonitis. Dermatitis may result from prolonged or repeated exposure.
High pressure injection injuries may require surgical intervention and possibly steroid therapy to minimise tissue damage and loss of function. Because entry wounds are small and may not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary.
Emesis of lubricants is not usually necessary, unless a large amount has been ingested, or some other compound has been dissolved in the product. If this is indicated, for example, when there is rapid onset of central nervous system depression from large ingested volume - gastric lavage under controlled hospital conditions, with full protection of the airway is required. Supportive care may include oxygen, arterial blood gas monitoring, respiratory support, and, if aspiration has occurred, treatment with corticosteriods and antibiotics. Seizures should be controlled with Diazepam, or appropriate equivalent drug.

5. FIRE FIGHTING MEASURES

Specific Hazards
Combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds.

Extinguishing Media
Foam and dry chemical powder. Carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media
Water in jet. Use of halon extinguishers should be avoided for environmental reasons.

Protective Equipment
Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Avoid contact with skin and eyes. Wear PVC, Neoprene or nitrile rubber gloves. Wear rubber knee length safety boots and PVC Jacket and Trousers. Wear safety glasses or full face shield if splashes are likely to occur.

Environmental Precautions
Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Inform local authorities if this cannot be prevented.

Clean-up Methods - Small Spillages

Absorb liquid with sand or earth. Sweep up and remove to a suitable, clearly marked container for disposal in accordance with local regulations.

Clean-up Methods - Large Spillages
Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Dispose of as for small spills.

7. HANDLING AND STORAGE

Handling
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Avoid prolonged or repeated contact with skin. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Prevent spillages. Cloth, paper and other materials that are used to absorb spills present a fire hazard. Avoid their accumulation by disposing of them safely and immediately. In addition to any specific recommendations given for controls of risks to health, safety and the environment, an assessment of risks must be made to help determine controls appropriate to local circumstances. Exposure to this product should be reduced as low as reasonably practicable. Reference should be made to the Health and Safety Executive's publication 'COSHH Essentials'.

Storage
Keep in a cool, dry, well-ventilated place. Use properly labelled and closeable containers. Avoid direct sunlight, heat sources, and strong oxidizing agents.

Storage Temperatures
0°C Minimum. 50°C Maximum.

Recommended Materials
For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials
For containers or container linings, avoid PVC.

Other Information
Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits
No Exposure Limit Established

Exposure Controls
The use of personal protective equipment is only one aspect of an integrated approach to the Control Of Substances Hazardous to Health.
The management of Health and Safety at Work Regulations 1992 require employers to identify and evaluate the risks to health and to implement appropriate measures to eliminate or minimise those risks. The choice of personal protective equipment is highly dependent upon local conditions, e.g. exposure to other chemical substances and micro-organisms, thermal hazards (protection from extremes of cold and heat), electrical hazards, mechanical hazards and appropriate degree of manual dexterity required to undertake an activity.
Whilst the content of this section may inform the choice of personal protective equipment used, the limitations of any information which can be provided must be fully understood, e.g. personal protective equipment chosen to protect employees from occasional splashes maybe entirely inadequate for activities involving partial or complete immersion.If the levels of oil mist or vapour in air are likely to exceed the occupational exposure standards then consideration should be given to the use of local exhaust ventilation to reduce personal exposure.
The choice of personal protective equipment should only be undertaken in the light of a full risk assessment by a suitably qualified competent person (e.g. a professionally qualified occupational hygienist).

Effective protection is only achieved by correctly fitting and well maintained equipment and employers should ensure that appropriate training is given. All personal protective equipment should be regularly inspected and replaced if defective.

Respiratory Protection

Care should be taken to keep exposures below applicable occupational exposure limits. If this cannot be achieved, use of a respirator fitted with an organic vapour cartridge combined with a particulate pre-filter should be considered. Half masks (EN 149) or valved half masks (EN 405) in combination with type A2 (EN 141) and P2/3 (EN 143) pre-filters maybe considered.
If product is subjected to elevated temperatures, half masks (EN 149) or valved half masks (EN 405) in combination with type AX (EN 371) and P2/3 (EN 143) prefilters maybe considered.

Hand Protection

Chemical protective gloves are made from a wide range of materials, but there is no single glove material (or combination of materials) which gives unlimited resistance to any individual or combination of substances or preparations. The extent of the breakthrough time will be affected by a combination of factors which include permeation, penetration, degradation, use pattern (full immersion, occasional contacts) and how the glove is stored when not in use.
Theoretical maximum levels of protection are seldom achieved in practice and the actual level of protection can be difficult to assess. Effective breakthrough time should be used with care and a margin of safety should be applied. HSE guidance on protective gloves recommends a 75% safety factor to be applied to any figures obtained in a laboratory test. Nitrile gloves may offer relatively long breakthrough times and slow permeation rates. Test data, e.g breakthrough data obtained through test standard EN374-3:1994 are available from reputable equipment suppliers.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. A non perfumed moisturiser should be applied.

Eye Protection

Goggles conforming to a minimum standard of EN 166 345B should be considered if there is a possibility of eye contact with the product through splashing. Higher rated eye protection must be considered for highly hazardous operations or work areas. For example, employees involved in metalworking operations such as chipping, grinding or cutting may require additional protection to avert injury from fast moving particles or broken tools.

Body Protection

Minimise all forms of skin contact. Overalls and shoes with oil resistant soles should be worn. Launder overalls and undergarments regularly.

Environmental Exposure Controls

Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	Red.
Physical State	Liquid at ambient temperature.
Odour	Slight.
pH Value	Data not available.
Vapour Pressure	Expected to be less than 0.5 Pa at 20°C.
Initial Boiling Point	Expected to be above 280°C.
Solubility in Water	Negligible.
Density	circa 920 kg/m3 at 15ºC.
Flash Point	214ºC (COC).
Flammable Limits - Upper	Data not available.

Flammable Limits - Lower	Data not available.
Auto-Ignition Temperature	Data not available.
Kinematic Viscosity	circa 42 mm2/s at 40ºC.
Evaporation Rate	Data not available.
Vapour Density (Air=1)	Greater than 1.
Partition co-efficient, n-octanol/water	Data not available.
Pour Point	circa -42ºC.

10. STABILITY AND REACTIVITY

Stability
Stable.

Conditions to Avoid
Extremes of temperature and direct sunlight.

Materials to Avoid
Strong oxidizing agents.

Hazardous Decomposition Products
Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment
Toxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the toxicology of similar products.

Acute Toxicity - Oral
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Dermal
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Inhalation
Not considered to be an inhalation hazard under normal conditions of use.

Eye Irritation
Expected to be slightly irritating.

Skin Irritation
Expected to be slightly irritating.

Respiratory Irritation
If mists are inhaled, slight irritation of the respiratory tract may occur.

Skin Sensitisation
Not expected to be a skin sensitizer.

Carcinogenicity
Components are not known to be associated with carcinogenic effects.

Mutagenicity
Not considered to be a mutagenic hazard.

Reproductive Toxicity
Not considered to be toxic to reproduction.

Other Information
Prolonged and/or repeated contact with this product can result in defatting of the skin, particularly at elevated temperatures. This can lead to irritation and possibly dermatitis, especially under conditions of poor personal hygiene. Skin contact should be minimised. Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Basis for Assessment
Ecotoxicity/biodegradability studies have been performed on this product. Other information given is based on the knowledge of similar products.

Mobility
Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.

Persistence / Degradability
Readily biodegradable.

Bioaccumulation
Not expected to bioaccumulate significantly.

Ecotoxicity
Poorly soluble mixture. May cause physical fouling of aquatic organisms. Product is expected to be practically non-toxic to aquatic organisms, LL/EL50 >100 mg/l. (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract).

Other Adverse Effects
Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.
Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
Recycle or dispose of in accordance with prevailing regulations, with a recognised collector or contractor. The competence of the contractor to deal satisfactorily with this type of product should be established beforehand. Do not pollute the soil, water or environment with the waste product.

Product Disposal
As for waste disposal.

Container Disposal
Recycle or dispose of in accordance with the legislation in force with a recognised collector or contractor.

14. TRANSPORT INFORMATION

Transport Information
Not dangerous for transport under ADR/RID, IMO and IATA/ICAO regulations.

15. REGULATORY INFORMATION

EC Symbols	None.
EC Risk Phrase	Not classified.
EC Safety Phrase	Not classified.

EINECS	All components listed or polymer exempt.
TSCA (USA)	All components in compliance.

National Legislation
Environmental Protection Act 1990 (as amended).
Health and Safety at Work Act 1974
Consumers Protection Act 1987
Control of Pollution Act 1974
Environmental Act 1995
Factories Act 1961
Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations
Chemicals (Hazard Information and Packaging for Supply) Regulations 2002.
Control of Substances Hazardous to Health Regulations 1994 (as amended).
Road Traffic (Carriage of Dangerous Substances in Packages) Regulations
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers in Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations
Reporting of Injuries, Diseases and Dangerous Occurences Regulations
Health and Safety (First Aid) Regulations 1981
Personal Protective Equipment (EC Directive) Regulations 1992
Personal Protective Equipment at Work Regulations 1992

Packaging & Labelling
Safety data sheet available for professional user on request.

16. OTHER INFORMATION

Revisions Highlighted
No amendments made to information. To assist harmonisation of sds authoring practices, a version number has been introduced.

References
European Model Code of Safe Practice in the Storage and Handling of Petroleum Products. EN 374-2:1994 Protective gloves against chemicals and micro-organisms
EN 149:2001 Respiratory protective devices - filtering half masks to protect against particles - requirements, testing, marking
EN 405:1992 Respiratory protective devices - valved filtering half masks to protect against gases or gases and particles - requirements, testing, marking.
EN 141:2000 Respiratory protective devices - gas filters and combined filters - requirements, testing, marking
EN 143:2000 Respiratory protective devices - particle filters - requirements, testing, marking
EN 166:1995 Personal eye-protection - specification.

Restrictions
This product must not be used in applications other than recommended without first seeking the advice of the SHELL technical department.

Technical Contact Numbers
0151-350-4000.

Further Information
This information is based on our current knowledge and is intended to describe the product for the purposes of

health, safety and environmental requirements only. It does not constitute a guarantee for any specific property of the product.

... End Of SDS ...

Safety Data Sheet

Shell Omala Oil 220

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product Code	001A0776
Infosafe No.	ACH75 GB/eng/C
Issued Date	29/01/2003
Product Type/Use	Gear lubricant.

Other Names	**Name**	**Code**
	Shell Omala Oil 220	140000006378

Supplier

SHELL UK PRODUCTS LTD
Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port
CH65 4HB
Technical Contact: Product HSE Department
United Kingdom

Telephone Numbers

Emergency Tel.

0151-350-4595

Telephone/Fax Number

Tel: 0151-350-4000

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description

Highly refined mineral oils and additives. The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

Dangerous Components / Constituents

Exposure limits apply to the following components: Highly refined mineral oil.

3. HAZARDS IDENTIFICATION

EC Classification	Not classified as Dangerous under EC criteria.

Human Health Hazards

No specific hazards under normal use conditions. Prolonged or repeated exposure may give rise to dermatitis. Used oil may contain harmful impurities.

Safety Hazards

Not classified as flammable, but will burn.

Environmental Hazards

Not classified as dangerous for the environment.

4. FIRST AID MEASURES

Symptoms and Effects
Not expected to give rise to an acute hazard under normal conditions of use.

Inhalation
In the unlikely event of dizziness or nausea, remove casualty to fresh air. If symptoms persist, obtain medical attention.

Skin
Remove contaminated clothing and wash affected skin with soap and water. If persistent irritation occurs, obtain medical attention. If high pressure injection injuries occur, obtain medical attention immediately.

Eye
Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion
Do not induce vomiting. Wash out mouth with water and obtain medical attention.

Advice to Doctor
Treat symptomatically. Aspiration into the lungs may result in chemical pneumonitis. Dermatitis may result from prolonged or repeated exposure.
High pressure injection injuries require surgical intervention and possibly steroid therapy to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.
There may be a risk to health where low viscosity products are aspirated into the lungs following vomiting, although this is uncommon in adults. Such aspiration would cause intense local irritation and chemical pneumonitis. Children, and those in whom consciousness is impaired, will be more at risk. Emesis of lubricants is not usually necessary, unless a large amount has been ingested, or some other compound has been dissolved in the product. If this is indicated, for example, when there is rapid onset of central nervous system depression from large ingested volume - gastric lavage under controlled hospital conditions, with full protection of the airway is required. Supportive care may include oxygen, arterial blood gas monitoring, respiratory support, and, if aspiration has occurred, treatment with corticosteriods and antibiotics. Seizures should be controlled with Diazepam, or appropriate equivalent drug.

5. FIRE FIGHTING MEASURES

Specific Hazards
Combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds.

Extinguishing Media
Foam and dry chemical powder. Carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media
Water in jet. Use of halon extinguishers should be avoided for environmental reasons.

Protective Equipment
Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Avoid contact with skin and eyes. Wear PVC, Neoprene or nitrile rubber gloves. Wear rubber knee length safety boots and PVC Jacket and Trousers. Wear safety glasses or full face shield if splashes are likely to occur.

Environmental Precautions
Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Inform local authorities if this cannot be prevented.

Clean-up Methods - Small Spillages
Absorb liquid with sand or earth. Sweep up and remove to a suitable, clearly marked container for disposal in accordance with local regulations.

Clean-up Methods - Large Spillages
Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Dispose of as for small spills.

7. HANDLING AND STORAGE

Handling
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Avoid prolonged or repeated contact with skin. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Prevent spillages. Cloth, paper and other materials that are used to absorb spills present a fire hazard. Avoid their accumulation by disposing of them safely and immediately. In addition to any specific recommendations given for controls of risks to health, safety and the environment, an assessment of risks must be made to help determine controls appropriate to local circumstances. Exposure to this product should be reduced as low as reasonably practicable. Reference should be made to the Health and Safety Executive's publication 'COSHH Essentials'.

Storage
Keep in a cool, dry, well-ventilated place. Use properly labelled and closeable containers. Avoid direct sunlight, heat sources, and strong oxidizing agents. The storage of this product maybe subject to the Control of Pollution (Oil Storage) (England) Regulations. Further guidance maybe obtained from the local environmental agency office.

Storage Temperatures
0°C Minimum. 50°C Maximum.

Recommended Materials
For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials
For containers or container linings, avoid PVC.

Other Information
Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits

Substance	Regulations	Exposure Duration	Exposure Limit	Units	Notes
Oil mist, mineral	Health and Safety Executive. EH40; Occupational Exposure Limits.	TWA	5	mg/m3	

	Health and Safety Executive. EH40; Occupational Exposure Limits.	STEL	10	mg/m3	

Exposure Controls

The use of personal protective equipment is only one aspect of an integrated approach to the Control Of Substances Hazardous to Health.
The management of Health and Safety at Work Regulations 1992 require employers to identify and evaluate the risks to health and to implement appropriate measures to eliminate or minimise those risks. The choice of personal protective equipment is highly dependent upon local conditions, e.g. exposure to other chemical substances and micro-organisms, thermal hazards (protection from extremes of cold and heat), electrical hazards, mechanical hazards and appropriate degree of manual dexterity required to undertake an activity.
Whilst the content of this section may inform the choice of personal protective equipment used, the limitations of any information which can be provided must be fully understood, e.g. personal protective equipment chosen to protect employees from occasional splashes maybe entirely inadequate for activities involving partial or complete immersion.If the levels of oil mist or vapour in air are likely to exceed the occupational exposure standards then consideration should be given to the use of local exhaust ventilation to reduce personal exposure.
The choice of personal protective equipment should only be undertaken in the light of a full risk assessment by a suitably qualified competent person (e.g. a professionally qualified occupational hygienist).
Effective protection is only achieved by correctly fitting and well maintained equipment and employers should ensure that appropriate training is given. All personal protective equipment should be regularly inspected and replaced if defective. Reference should be made to HSE's publication Methods for the Determination of Hazardous Substances (MDHS) 84 - Measurement of oil mist from mineral oil-based metalworking fluids.
Measurement of an employee's exposure to oil vapour maybe supplemented through the use of stain tubes. In the first instance, further guidance maybe obtained through HSE's publication 'COSHH - a brief guide to the regulations' (INDG 136(rev1)).

Respiratory Protection

At standard temperature and pressure, the Occupational Exposure Standard for oil vapour is unlikely to be exceeded. Care should be taken to keep exposures below applicable occupational exposure limits. If this cannot be achieved, use of a respirator fitted with an organic vapour cartridge combined with a particulate pre-filter should be considered. Half masks (EN 149) or valved half masks (EN 405) in combination with type A2 (EN 141) and P2/3 (EN 143) pre-filters maybe considered.
If product is subjected to elevated temperatures, half masks (EN 149) or valved half masks (EN 405) in combination with type AX (EN 371) and P2/3 (EN 143) prefilters maybe considered.

Hand Protection

Chemical protective gloves are made from a wide range of materials, but there is no single glove material (or combination of materials) which gives unlimited resistance to any individual or combination of substances or preparations. The extent of the breakthrough time will be affected by a combination of factors which include permeation, penetration, degradation, use pattern (full immersion, occasional contacts) and how the glove is stored when not in use.
Theoretical maximum levels of protection are seldom achieved in practice and the actual level of protection can be difficult to assess. Effective breakthrough time should be used with care and a margin of safety should be applied. HSE guidance on protective gloves recommends a 75% safety factor to be applied to any figures obtained in a laboratory test. Nitrile gloves may offer relatively long breakthrough times and slow permeation rates. Test data, e.g breakthrough data obtained through test standard EN374-3:1994 are available from reputable equipment suppliers.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. A non perfumed moisturiser should be applied.

Eye Protection

Goggles conforming to a minimum standard of EN 166 345B should be considered if there is a possibility of eye contact with the product through splashing. Higher rated eye protection must be considered for highly hazardous operations or work areas. For example, employees involved in metalworking operations such as chipping, grinding or cutting may require additional protection to avert injury from fast moving particles or broken

tools.

Body Protection
Minimise all forms of skin contact. Overalls and shoes with oil resistant soles should be worn. Launder overalls and undergarments regularly.

Environmental Exposure Controls
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	Brown.
Physical State	Liquid at ambient temperature.
Odour	Characteristic mineral oil.
pH Value	Data not available.
Vapour Pressure	<0.5 Pa at 20ºC.
Initial Boiling Point	>280ºC.
Solubility in Water	Negligible.
Density	899 kg/m3 at 15ºC.
Flash Point	199ºC (PMCC).
Flammable Limits - Upper	10%(V/V) (typical).
Flammable Limits - Lower	1%(V/V) (typical).
Auto-Ignition Temperature	>320º (typical).
Kinematic Viscosity	220 mm2/s at 40ºC.
Evaporation Rate	Data not available.
Vapour Density (Air=1)	>1 at 20ºC.
Partition co-efficient, n-octanol/water	Log Pow >6 (typical).
Pour Point	-18ºC.

10. STABILITY AND REACTIVITY

Stability
Stable.

Conditions to Avoid
Extremes of temperature and direct sunlight.

Materials to Avoid
Strong oxidizing agents.

Hazardous Decomposition Products
Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment
Toxicological data have not been determined specifically for this product. Information given is based on a

knowledge of the components and the toxicology of similar products.

Acute Toxicity - Oral
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Dermal
LD50 expected to be > 2000 mg/kg.

Acute Toxicity - Inhalation
Not considered to be an inhalation hazard under normal conditions of use.

Eye Irritation
Expected to be slightly irritating.

Skin Irritation
Expected to be slightly irritating.

Respiratory Irritation
If mists are inhaled, slight irritation of the respiratory tract may occur.

Skin Sensitisation
Not expected to be a skin sensitizer.

Carcinogenicity
Product is based on mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Other components are not known to be associated with carcinogenic effects.

Mutagenicity
Not considered to be a mutagenic hazard.

Reproductive Toxicity
Not considered to be toxic to reproduction.

Other Information
Prolonged and/or repeated contact with products containing mineral oils may result in defatting of the skin, particularly at elevated temperatures. This may lead to irritation and possibly dermatitis, especially under conditions of poor personal hygiene. Skin contact should be minimised. Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Basis for Assessment
Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Mobility
Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.

Persistence / Degradability
Not expected to be readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation
Contains components with the potential to bioaccumulate.

Ecotoxicity
Poorly soluble mixture. May cause physical fouling of aquatic organisms. Product is expected to be practically non-toxic to aquatic organisms, LL/EL50 >100 mg/l. (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic

organisms at concentrations less than 1 mg/l.

Other Adverse Effects
Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.
Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
Recycle or dispose of in accordance with prevailing regulations, with a recognised collector or contractor. The competence of the contractor to deal satisfactorily with this type of product should be established beforehand. Do not pollute the soil, water or environment with the waste product.

Product Disposal
As for waste disposal.

Container Disposal
Recycle or dispose of in accordance with the legislation in force with a recognised collector or contractor.

14. TRANSPORT INFORMATION

Transport Information
Not dangerous for transport under ADR/RID, IMO and IATA/ICAO regulations.

15. REGULATORY INFORMATION

EC Symbols	None.
EC Risk Phrase	Not classified.
EC Safety Phrase	Not classified.

EINECS	All components listed or polymer exempt.
TSCA (USA)	All components in compliance.

National Legislation
Environmental Protection Act 1990 (as amended).
Health and Safety at Work Act 1974
Consumers Protection Act 1987
Control of Pollution Act 1974
Environmental Act 1995
Factories Act 1961
Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations
Chemicals (Hazard Information and Packaging for Supply) Regulations 2002.
Control of Substances Hazardous to Health Regulations 1994 (as amended).
Road Traffic (Carriage of Dangerous Substances in Packages) Regulations
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers in Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations
Reporting of Injuries, Diseases and Dangerous Occurences Regulations
Health and Safety (First Aid) Regulations 1981

Personal Protective Equipment (EC Directive) Regulations 1992
Personal Protective Equipment at Work Regulations 1992

Packaging & Labelling
Safety data sheet available for professional user on request.

16. OTHER INFORMATION

Revisions Highlighted
No amendments made to information. To assist harmonisation of sds authoring practices, a version number has been introduced.

References
GUIDANCE NOTES
UK Chemicals Regulatory Atlas, An Overview of how to guide your chemical through to regulatory compliance (DTI).
HSG71 The storage of packaged dangerous substances.
EH/40 Occupational Exposure Limits.
EH/58 The Carcinogenicity of Mineral Oils.
MS24 Health surveillance of occupational skin disease.
HSG 53 The selection, use and maintenance of respiratory protective equipment: A practical guide.
HSG 206 Cost and effectiveness of chemical protective gloves for the workplace: Guidance for employers and health and safety specialists.
L74 First Aid at work: Approved Code of Practice and Guidance.
HSG 136 Workplace transport safety : guidance for employers.
INDG234 (rev) Are you Involved in the Carriage of Dangerous Goods by Road or Rail
OTHER LITERATURE
Concawe Report 3/82 Precautionary Advice on the Handling of Used Engine Oils
Concawe Report 86/69 Health Aspects of Worker Exposure to Oil Mists
Concawe Report 01/97 Petroleum Products - First Aid Emergency and Medical Advice
Concawe Report 01/53 Classification and labelling of petroleum substances according to the EU dangerous substances directive (Concawe recommendations August 2001)
Concawe Report 01/54 environmental classification of petroleum substances summary data and rationale
Concawe Report 5/02 amended safety data sheet directive (2001/58/EC)
Department of the Environment - Waste Management - The Duty of Care - A Code of Practice
Concawe, Boulevard du souverain 165 B - 1160 Brussels, Belgium
www.concawe.be

Restrictions
This product must not be used in applications other than recommended without first seeking the advice of the SHELL technical department.

Technical Contact Numbers
0151-350-4000.

Further Information
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It does not constitute a guarantee for any specific property of the product.

... End Of SDS ...

ANTIFREEZE CONCENTRATE

Data Sheet No. L84042 Revision : 23 08 2004 REPLACES L84042 :

This data sheet has been prepared in accordance with the requirements of the Data Sheet Directive 91/155/EEC.

RECOMMENDED USES

Antifreeze Concentrate is recommended for use as :

an antifreeze

If Antifreeze Concentrate is used for a purpose not covered in this section, Shell UK Ltd would be grateful to receive information on the application.

KNOWN MISUSES/ABUSES

Antifreeze Concentrate is not to be used as :

The most common misuse is that of ingestion by children. For this reason, Antifreeze Concentrate contains an aversive agent. It is most important that Antifreeze Concentrate be kept safely out of reach or locked away.

The disposal of Antifreeze Concentrate to soil, watercourses and drains is a legal offence.

1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

PRODUCT :	**ANTIFREEZE CONCENTRATE**
COMPANY :	**SHELL UK OIL PRODUCTS LIMITED**
TECHNICAL CONTACT:	**PRODUCT HSE DEPARTMENT**
ADDRESS :	**STANLOW MANUFACTURING COMPLEX, PO BOX 3, ELLESMERE PORT, CH65 4HB**
TELEPHONE :	**0151-350-4000**
EMERGENCY TELEPHONE NUMBER :	**0151-350-4595**

2: COMPOSITION/INFORMATION ON INGREDIENTS

Antifreeze Concentrate is a preparation manufactured from ethanediol (ethylene glycol), additives and a taste aversive agent.

CONC.	COMPONENT	EINECS	CLASS	RISK PHRASES
>90%	Ethanediol	203-473-3	Xn	R22 Harmful if swallowed

Exposure limit values exist for the following constituents:

Ethanediol

3: HAZARD IDENTIFICATION

Antifreeze Concentrate is classified as dangerous for supply.

Antifreeze Concentrate is not classified as dangerous for conveyance.

It contains ethanediol to which exposure limits apply.

Ethanediol is readily biodegradable and poses a significant risk of oxygen deletion in aquatic systems.

4: FIRST AID MEASURES

INHALATION

Remove the person affected to fresh air. If rapid recovery does not occur, obtain medical attention.

SKIN

Wash contaminated skin with water. Use soap if available. Do not delay.

EYES

Flush the eye with copious quantities of water for up to 10 minutes. Refer for medical attention.

INGESTION

The normal advice given in the case of ingestion of hydrocarbon products is that vomiting should be avoided due to the risk of aspiration into the lungs, however, owing to the toxic effects and rapid absorption from the stomach, this advice is modified for Antifreeze Concentrate as follows :

SEEK QUALIFIED MEDICAL ASSISTANCE IMMEDIATELY.

IF THE PATIENT IS UNCONSCIOUS, DO NOT INDUCE VOMITING.

WITH A CONSCIOUS PATIENT, if hospital assistance is not likely to be immediately available, attempt to induce vomiting.

SHOW A COPY OF THIS DATA SHEET TO THE PHYSICIAN,
draw attention to "Notes for Doctors" in Section 11 below.

5: FIRE-FIGHTING MEASURES

Extinguishants	- Large Fire :	Alcohol Resistant Foam/Water Fog - NEVER USE WATER JET
	- Small Fire :	Alcohol Resistant Foam/Water Fog/Dry Powder/CO2/Sand/Earth

Special Protective Equipment for Firefighters

The choice of protective equipment must only be undertaken in the light of a dynamic risk assessment by the officer in charge of the incident. Whilst the content of this section may inform the choice of protective equipment used, the choice of protective equipment will be highly dependent on local conditions.

For large fires, the officer in charge may consider; self contained breathing apparatus (EN 137).

Further guidance on protective equipment for professional fire fighters can be obtained from the home office.

DECOMPOSITION PRODUCTS

Refer to section 10 - stability and reactivity.

6: ACCIDENTAL RELEASE MEASURES

Extinguish naked flames, avoid contact with skin, eyes, and clothing. Wear plastic or rubber gloves, goggles or face shield and boots. Make best endeavours to prevent entry to drains or watercourses.

LARGE SPILLS should be bunded by a suitable medium such as sand or earth. The liquid should be reclaimed directly or in an adsorbent medium and then transferred to suitable, clearly marked containers and disposed of in accordance with local byelaws and the requirements of the Environmental Protection Act 1990. Any containers used to collect the spilled material or absorbent should be labelled to indicate contents and hazards.

SMALL SPILLS should be soaked up with sand or earth and disposed of as for large spills.

7: HANDLING AND STORAGE

HANDLING

Antifreeze Concentrate does not require any special handling techniques, but it should be handled in suitable containers and spillage avoided. Avoid contact with skin, eyes and clothing. Do not breathe mists, aerosols or vapours. Maximum handling temperature 60 Deg. C.

STORAGE

The storage of Antifreeze Concentrate is not subject to any special controls or restrictions. It should be stored in properly designed, closable, labelled containers, eg mild steel or high density polyethylene (HDPE). Keep away from children, foodstuffs and animal feed.

8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

The following limits are taken from The Health and Safety Executive's Guidance Note EH40 Occupational Exposure Limits 2002.

UK Occupational Exposure Standards :

Ethanediol, particulate	10 mg/cubic metre 8-hour TWA value
Ethanediol, vapour	60 mg/cubic metre 8-hour TWA value 125 mg/cubic metre 15-min TWA value

RECOMMENDED MONITORING PROCEDURES

Reference should be made to HSE's publication Methods for the Determination of Hazardous Substances (MDHS) 14/3 and 88.

PERSONAL PROTECTIVE EQUIPMENT

The use of personal protective equipment is only one aspect of an integrated approach to the Control Of Substances Hazardous to Health.

The management of Health and Safety at Work Regulations 1992 require employers to identify and evaluate the risks to health and to implement appropriate measures to eliminate or minimise those risks.

The choice of personal protective equipment is highly dependent upon local conditions, e.g. exposure to other chemical substances and micro-organisms, thermal hazards (protection from extremes of cold and heat), electrical hazards, mechanical hazards and appropriate degree of manual dexterity required to undertake an activity.

Whilst the content of this section may inform the choice of personal protective equipment used, the limitations of any data which can be provided must be fully understood, e.g. personal protective equipment chosen to protect employees from occasional splashes maybe entirely inadequate for activities involving partial or complete immersion.

If the levels of vapour or particulate in air are likely to exceed the occupational exposure standards then consideration should be given to the use of local exhaust ventilation to reduce personal exposure. The choice of personal protective equipment should only be undertaken in the light of a full COSHH and risk assessment by a suitably qualified competent person (e.g. a professionally qualified occupational hygienist).

Effective protection is only achieved by correctly fitting and well maintained equipment and employers should ensure that appropriate training is given. All personal protective equipment should be regularly inspected and replaced if defective.

In the first instance, further guidance maybe obtained through HSE's publication "COSHH - a brief guide to the regulations" (INDG136(rev1)).

Hand Protection :-

Chemical protective gloves are made from a wide range of materials, but there is no single glove material (or combination of materials) which gives unlimited resistance to any individual or combination of substances or preparations. The extent of

the breakthrough time will be affected by a combination of factors which include permeation, penetration, degradation, use pattern (full immersion, occasional contacts) and how the glove is stored when not in use.

Theoretical maximum levels of protection are seldom achieved in practice and the actual level of protection can be difficult to assess.

Effective breakthrough time should be used with care and a margin of safety should be applied. HSE guidance on protective gloves recommends a 75% safety factor to be applied to any figures obtained in a laboratory test.

Nitrile gloves may offer relatively long breakthrough times and slow permeation rates. Test data, e.g breakthrough data obtained through test standard EN374-3:1994 are available from reputable equipment suppliers.

Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. A non perfumed moisturiser should be applied.

Respiratory Protection

At standard temperature and pressure, the Occupational Exposure Standards are unlikely to be exceeded.

Care should be taken to keep exposures below applicable occupational exposure limits. If this cannot be achieved, use of a respirator fitted with an organic vapour cartridge combined with a particulate prefilter should be considered.

Half masks (EN 149) or valved half masks(EN 405) in combination with type A2 (EN 141) and P2/3 (EN 143) prefilters maybe considered.

If Antifreeze Concentrate is subjected to elevated temperatures, say, half masks (EN 149) or valved half masks(EN 405) in combination with type AX (EN 371) and P2/3 (EN 143) prefilters maybe considered.

Eye Protection

Goggles conforming to a minimum standard of BS EN 166 345B should be considered if there is a possibility of eye contact with Antifreeze Concentrate through splashing.

Higher rated eye protection must be considered for highly hazardous operations or work areas, employees involved in metalworking operations such as chipping, grinding or cutting may require additional protection to avert injury from fast moving particles or broken tools.

9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State :		Liquid at ambient temperature
Appearance :		Dyed or colourless
Odour :		Characteristic
Acidity/Alkalinity :		pH 7-9 (solution in water at 50gms/100mls)
Initial Boiling Point :		>150 Deg. C.
Freezing Point :		<-30 Deg. C. (50% solution in water)
Flashpoint :		>100 Deg. C.
Flammability :		Not applicable
Autoflammability :		417 Deg. C. *
Flammability Limits	- Upper :	Not determined
	- Lower :	3.0 % vol. *
Explosive Properties :		Not applicable
Oxidising Properties :		Not applicable
Vapour Pressure @ 20 Deg. C. :		<10 Pa
Relative Density @ 20 Deg. C. :		1.12-1.14
Solubility :	Water Solubility :	Completely miscible
	Fat solubility/solvent :	Not determined
Partition Coefficient, n-octanol water :		>1.0 *
Vapour Density (Air =1) :		Not determined
Viscosity @ 20 Deg. C. :		Not determined

Values marked with a * refer to ethanediol

10: STABILITY AND REACTIVITY

CONDITIONS TO AVOID

Extremes of temperature. Store between 0 and 50 Deg. C.

MATERIALS TO AVOID

Strong oxidising agents, eg. chlorates which may be used in agriculture.

DECOMPOSITION PRODUCTS

The substances arising from the thermal decomposition of these products will largely depend upon the conditions bringing about decomposition. The following substances may be expected from normal combustion :

Carbon Dioxide	Unidentified Organic and Inorganic Compounds
Carbon Monoxide	Particulate Matter
Water	Nitrogen Oxides

11: TOXICOLOGICAL INFORMATION

Basis of Assessment

Toxicological data may not have been determined specifically for all end points (e.g. mutagenicity, carcinogenicity, reproductive toxicity, repeated dose and acute toxicity, corrosivity, irritation, sensitisation etc) for this substance/preparation. Assessment will be based on a combination of test data, human experience, toxicological data generated on similar components and the conventional method.

Antifreeze Concentrate is classified as harmful by ingestion (deaths have been reported on swallowing large quantities). The toxicity of ethanediol is principally due to it's metabolites. Renal damage has been observed in man with the deposition of oxalate crystals.

At very high doses in animal experiments, foetotoxicity has been observed, but it's relevance to man has still to be clarified.

Antifreeze Concentrate contains an aversive agent which has an extremely bitter taste.

ACUTE HEALTH HAZARDS AND ADVICE

INHALATION

Due to its low vapour pressure, Antifreeze Concentrate is not considered likely to present an inhalation hazard at ambient temperature. At elevated temperatures, the vapour may irritate the respiratory tract.

Precautions :

Inhalation of vapour, mists and aerosols should be avoided. If this cannot be achieved by safe working practices, suitable respiratory protection should be used.

First Aid :

Remove the person affected to fresh air. If rapid recovery does not occur, obtain medical attention.

SKIN

Antifreeze Concentrate is expected to be slightly irritating to the skin and is harmful by skin absorption on prolonged or repeated exposure.

Precautions :

All contact must be avoided by the use of suitable protective clothing Launder contaminated clothing before reusing.

First Aid :

Wash contaminated skin with water. Use soap if available.

EYES

Antifreeze Concentrate is expected to be moderately, possibly severely, irritating to the eye.

Precautions :

If there is a risk of splashing while handling the liquid, suitable eye protection should be used.

First Aid :

Do not delay. Flush the eye with copious quantities of water for up to 10 minutes. Refer for medical attention.

INGESTION

Ingestion of ethanediol may lead to serious intoxication, and possibly death. There may be effects on the central nervous system, on the cardio-pulmonary system, and on the kidneys, with renal failure. Ingestion of as little as 100 millilitres may be fatal for an adult. Antifreeze Concentrate is rapidly absorbed causing symptoms resembling alcohol intoxication, and cardio-vascular effects. Death may occur from renal or hepatic failure : survivors usually have complete recovery of renal function, although cerebral damage may be permanent.

Precautions :

Accidental ingestion is unlikely except in the case of children. Normal handling and hygiene precautions to avoid ingestion, especially by keeping out of reach of children.

First Aid :

The normal advice given in the case of ingestion of hydrocarbon products is that vomiting should be avoided owing to risks of aspiration into the lungs. Owing to the toxic effects and rapid absorption from the stomach, this advice is modified for Antifreeze Concentrate as follows :

SEEK QUALIFIED MEDICAL ASSISTANCE IMMEDIATELY.

IF THE PATIENT IS UNCONSCIOUS, DO NOT INDUCE VOMITING.

WITH A CONSCIOUS PATIENT, if hospital assistance is not likely to be immediately available, attempt to induce vomiting.

SHOW A COPY OF THIS DATA SHEET TO THE PHYSICIAN.

CHRONIC HEALTH HAZARD AND ADVICE

Continued exposure to vapour of Antifreeze Concentrate can induce unconsciousness, nystagmus and lymphocyosis. Death from ingestion of the liquid is due to renal or hepatic failure. Survivors usually have complete recovery of renal function. Cerebral damage may however be permanent. There is no human or animal evidence for carcinogenicity or mutagenicity.

HEALTH ADVICE TO PHYSICIANS

Treat by observation and supportive measures as indicated by the patient's condition.

The essentials of therapy are :

1. Supportive treatment of respiratory distress and shock.
2. Correction of metabolic acidosis and hypocalcemia.
3. Rapid and sustained diuresis when possible with the use of hypertonic mannitol.
4. Immediate peritoneal or haemodialysis.
5. Thiamine and pyridoxine supplements.
6. Intravenous administration of ethanol if the diagnosis is recognised within 6 hours after ingestion, and
7. Treatment for renal failure with dialysis as needed to keep patient free from signs and symptoms of uraemia.

12: ECOLOGICAL INFORMATION

Ecotoxicological data may not have been determined specifically for all end points for this substance/preparation. Assessment will be based on a combination of test data, other available evidence, ecotoxicological data generated on similar components and the conventional method.

Antifreeze Concentrate should be managed in the environment as a preparation at most slightly toxic but posing an indirect hazard to the aquatic environment because of ready biodegradation leading to oxygen depletion. Avoid gross contamination of the soil. Minimise contamination of water because of deoxygenation hazard. Spilled material should be contained and removed as completely as possible. Final traces can be dispersed with water.

AIR

Antifreeze Concentrate is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities.

WATER

If released to water, Antifreeze Concentrate will dissolve. In view of deoxygenation hazard, consider dilution or (artificial) reaeration. It will not bioaccumulate significantly.

SOIL

If released to soil Antifreeze Concentrate is highly mobile and will, in significant quantities, permeate to lower soil levels and may reach groundwater in which it will dissolve.

13: DISPOSAL CONSIDERATIONS

Antifreeze Concentrate should be disposed of to a licensed waste contractor.

Any disposal route must satisfy the requirements of the of the Environmental Protection Act, 1990, the Environment Act 1995, and should comply with any local byelaws. byelaws.

Antifreeze Concentrate is controlled by the Special Waste Regulations 1996.

Envirowise offers free advice through a national helpline. Initial contact by industry and commerce should be made to the Environment and Energy helpline (0800 585 794). The Envirowise programme is sponsored by Government and seeks to encourage good practice in environmental protection technology and techniques.

Further guidance can also obtained from the local environment agency agency office.

14: TRANSPORT INFORMATION

Not Dangerous for Conveyance

15: REGULATORY INFORMATION

Dangerous for Supply

Category of Danger :	Harmful
Symbols :	St Andrew's Cross
Risk Phrases :	Harmful if swallowed
Safety Phrases:	S2 Keep out of reach of Children S24/25 Avoid contact with skin and eyes S46 If swallowed, seek medical advice immediately and show this container or label
Contains :	Ethanediol

Additional Information

Safety data sheet available on request

LEGISLATION

Consumer Protection Act 1987
Control of Pollution Act 1974
Environmental Protection Act 1990
Environment Act 1995
Factories Act 1961
Health and Safety at Work Act 1974

Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations
Chemical (Hazards, Information, and Packaging for Supply) Regulations
Control of Substances Hazardous to Health Regulations
Dangerous Substances in Harbour Areas Regulations
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Road Traffic (Carriage of Dangerous Substances in Packages etc.) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
Special Waste Regulations 1996
Health and Safety (First Aid) Regulations 1981
Personal Protective Equipment (EC Directive) Regulations 1992
Personal Protective Equipment at Work Regulations 1992

16: OTHER INFORMATION

GUIDANCE NOTES

	UK Chemicals Regulatory Atlas, An Overview of how to guide your chemical through to regulatory compliance (DTI).
HSG71	The storage of packaged dangerous substances
EH/40	Occupational Exposure Limits
MS24	Health surveillance of occupational skin disease
HSG 53	The selection, use and maintenance of respiratory protective equipment: A practical guide
HSG 206	Cost and effectiveness of chemical protective gloves for the workplace: Guidance for employers and health and safety specialists.
HSG 136	Workplace transport safety : guidance for employers
INDG234 (rev)	Are you Involved in the Carriage of Dangerous Goods by Road or Rail.

OTHER LITERATURE

Department of the Environment - Waste Management - The Duty of Care - A Code of Practice

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Data Sheet No. F32002 Revision : 02 10 2002 REPLACES F32002 : 11 01 01

This data sheet has been prepared in accordance with the requirements of the Data Sheet Directive 91/155/EEC.

RECOMMENDED USES

Shell Agricultural Gas Oil is recommended for use as :

a fuel for small industrial boilers for horticultural and agricultural space heating applications, furnaces and dryers.

If Shell Agricultural Gas Oil is used for a purpose not covered in this section, Shell UK Ltd would be grateful to receive information on the application.

KNOWN MISUSES/ABUSES

Shell Agricultural Gas Oil is not to be used as :

a solvent or cleaning agent. It should never be siphoned by sucking the liquid up a tube by mouth, or stored near sources of heat or ignition.

The disposal of Shell Agricultural Gas Oil to soil, watercourses and drains is a legal offence.

1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

PRODUCT :	**SHELL AGRICULTURAL GAS OIL**
COMPANY :	**SHELL UK OIL PRODUCTS LIMITED**
TECHNICAL CONTACT:	**PRODUCT HSE DEPARTMENT**
ADDRESS :	**STANLOW MANUFACTURING COMPLEX, PO BOX 3, ELLESMERE PORT, CH65 4HB**
TELEPHONE :	**0151-350-4000**
EMERGENCY TELEPHONE NUMBER :	**0151-350-4595**

2: COMPOSITION/INFORMATION ON INGREDIENTS

Shell Agricultural Gas Oil is a preparation manufactured from gas oils, derived from crude petroleum, and additives, none of which impart any additional hazard to the finished product.

The hydrocarbon components will include straight-run gas oil, and may contain vacuum and/or cracked gas oil components.

It is a requirement of H.M. Customs and Excise that all reduced duty fuels contain Quinizarin and C.I. Solvent Red 24. Rebated fuels marketed within the European Union must also contain C.I. Solvent Yellow 124. Shell Agricultural Gas Oil contains C.I.Solvent Red 24, Quinizarin and C.I. Solvent Yellow 124 at 4 ppm, 1.75 ppm and 6 ppm respectively.

The following components, which have health effects, are present at significant concentrations.

CONC.	COMPONENT	EINECS	CLASS	RISK PHRASES
< 100%	Fuels, diesel	269-822-7	Xn	R40 Limited evidence of a carcinogenic effect
			Xn	R65 Harmful: may cause lung damage if swallowed
				R66 Repeated exposure may cause skin dryness and cracking
			N	R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limit values exist for the following constituents:

None.

3: HAZARD IDENTIFICATION

Shell Agricultural Gas Oil is classified for supply purposes as : Harmful (R40: Limited evidence of a carcinogenic effect and R65: Harmful: may cause lung damage if swallowed), and Dangerous for the Environment (R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

Shell Agricultural Gas Oil satisfies the criteria for the additional risk phrase - R66: Repeated exposure may cause skin dryness or cracking.

Shell Agricultural Gas Oil is a combustible liquid, which may explode under certain conditions, e.g. in the presence of electrostatic charges generated, for example, during pumping or tank cleaning or by other sources of ignition or flame impingement on containers.

Accidental ingestion can lead to vomiting and aspiration into the lungs, which can result in chemical pneumonitis, which can be fatal.

Prolonged and repeated skin contact can lead to defatting of the skin, drying, cracking, dermatitis, erythema, oil acne and oil folliculitis. Warty growths have occurred and these can become cancerous.

Exposure to high vapour concentrations can lead to nausea, headache and dizziness. Excessive and prolonged exposure to mists may cause a chronic inflammatory reaction of the lungs and a form of pulmonary fibrosis.

It should be assumed that the flashpoint of Shell Agricultural Gas Oil is equal to or less than 60.5 Deg. C. unless the carrier has obtained contrary test data. Consequently, Shell Agricultural Gas Oil is classified for conveyance purposes as a flammable liquid.

Shell Agricultural Gas Oil will not biodegrade in anaerobic conditions and, hence, can be persistent. It contains components which have a high potential to bioaccumulate.

4: FIRST AID MEASURES

INHALATION

Remove the affected person to fresh air. If breathing has stopped administer artificial respiration. Give cardiac massage if necessary. If the person is breathing, but unconscious, place in the recovery position. Obtain medical assistance immediately.

SKIN

Flush the contaminated skin with water. Use soap if available. Contaminated clothing should be soaked with water, removed, and laundered before reuse.

EYES

Flush the eye with copious quantities of water. If irritation persists refer for medical attention.

INGESTION

DO NOT INDUCE VOMITING. If ingestion is suspected, wash out the mouth with water, and send to hospital immediately. Show this Data Sheet to the physician drawing attention to "Notes for Doctors" in Section 11 below.

5: FIRE-FIGHTING MEASURES

Extinguishants	- Large Fire :	Foam/Water Fog - NEVER USE WATER JET
	- Small Fire :	Foam/Dry Powder/CO2/Sand/Earth

6: ACCIDENTAL RELEASE MEASURES

LAND SPILLAGES

IMMEDIATE EMERGENCY ACTION
Clear people away from the area to a safe place
Do not operate electrical equipment unless flameproof
Summon aid of emergency services if warranted
Treat or refer casualties if necessary

FURTHER ACTION - FIRE

IF SAFE : -
Stop product flow
Use foam, dry powder or carbon dioxide extinguishers
Containers exposed to fire can be cooled by water fog/spray
*** NEVER USE WATER JET ***

FURTHER ACTION - SPILLAGE
IF SAFE : -
Extinguish naked lights, eg cigarettes - AVOID MAKING SPARKS
Position fire fighting equipment
Try to stop the flow of liquid product
Prevent product entering waterways, drains etc. (Covering with wet sacking helps)
Use sand, earth or other suitable material
If product reaches waterways, drains etc. inform local and fire authorities
Reclaim product directly or absorb in suitable medium and transfer to suitable, clearly marked containers
See section 13 for disposal of contaminated product and waste

MARITIME SPILLAGES

Any spillage of Shell Agricultural Gas Oil which results in overside pollution must be treated in accordance with the guidelines laid down in the respective Vessel Oil Spill Response Contingency Plan, as required by MARPOL 73/78 Annex 1, Regulation 26. Where the vessel is not required to comply with such legislation, the Owner's and/or Charterer's instructions must be followed. In the absence of any other guidelines, any spillage in territorial/coastal waters must be immediately reported to the appropriate maritime authority, e.g. coast guard, the vessel's local agent if applicable, and the vessel's Owner/Charterer. In international waters, any spillage should be reported to the nearest coastal state, and additional guidance should sought immediately from the vessel's Owner/Charterer.

7: HANDLING AND STORAGE

HANDLING

Shell Agricultural Gas Oil is designed to be used in closed systems and in off-road vehicle fuel systems. No special handling precautions are necessary other than care to avoid skin contact with the product. Owing to its classification as a carcinogen, care should be taken to minimise contact. Electrical continuity is required between the transport and storage vessels during product transfer.

STORAGE

The main considerations relating to the storage of Shell Agricultural Gas Oil are the suitability of the storage vessel and the avoidance of sources of ignition.

8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

The following limits are taken from The Health and Safety Executive's Guidance Note EH40 Occupational Exposure Limits 2000.

None.

RECOMMENDED PROTECTIVE CLOTHING

Impervious gloves and overalls where regular contact is likely, and goggles if there is a risk of splashing

9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State :		Mobile liquid at ambient temperature
Appearance :		Clear Red/ Brown
Odour :		Characteristic
Acidity/Alkalinity :		Not applicable
Initial Boiling Point :		180 Deg. C.
Flashpoint :		> 56 Deg. C.
Flammability :		Not applicable
Autoflammability :		ca. 220 Deg. C.
Flammability Limits	- Upper :	6 % vol.
	- Lower :	1 % vol.
Explosive Properties :		Not applicable
Oxidising Properties :		Not applicable
Vapour Pressure @ 20 Deg. C. :		<0.1 k.Pa
Relative Density @ 15 Deg. C. :		0.82 to 0.87
Solubility :	Water Solubility :	Very Low
	Fat solubility/solvent :	Not available
Partition Coefficient, n-octanol water :		3 to >6
Vapour Density (Air =1) :		> 5
Viscosity @ 40 Deg. C. :		2 to 5 cSt.

10: STABILITY AND REACTIVITY

CONDITIONS TO AVOID

Sources of ignition. Extremes of temperature.

MATERIALS TO AVOID

Strong oxidising agents, eg. chlorates which may be used in agriculture.

DECOMPOSITION PRODUCTS

The substances arising from the thermal decomposition of these products will largely depend upon the conditions bringing about decomposition. The following substances may be expected from normal combustion :

Carbon Dioxide
Carbon Monoxide
Water
Particulate Matter
Polycyclic Aromatic Hydrocarbons
Unburnt Hydrocarbons
Unidentified Organic and Inorganic Compounds
Nitrogen Oxides
Sulphur Oxides

11: TOXICOLOGICAL INFORMATION

ACUTE HEALTH HAZARDS AND ADVICE

Shell Agricultural Gas Oil is classified as harmful owing to the aspiration hazard.

Shell Agricultural Gas Oil carries the additional risk phrase - repeated exposure may cause skin dryness or cracking.

The main hazards are: in the case of inhalation of higher vapour concentrations, of effects on the central nervous system ; in the case of skin contact of, defatting and irritation ; in the unlikely event of ingestion, of aspiration into the lungs with possible resultant chemically induced pneumonia.

Exposure to higher vapour concentrations can lead to nausea, headache, dizziness, loss of consciousness, and, in oxygen deficient environments, death. A person exposed to significant concentrations of vapour may display drunken behaviour, and his judgement can be impaired.

If the product is accidentally ingested, irritation to the gastric mucous membranes can lead to vomiting. If this occurs, there is a high probability of the product being aspirated into the lungs, which can lead to chemical pneumonitis which can be fatal.

INHALATION

Under normal conditions of use Shell Agricultural Gas Oil is not expected to present an inhalation hazard.

Precautions :

Inhalation of vapours should be avoided. Where, exceptionally, higher concentrations of the vapour may be encountered, e.g. in the event of a spillage in a badly ventilated area, persons should not be allowed to enter the area, even in an emergency, until the atmosphere has been checked and passed as safe for entry by a competent person.

First Aid :

Remove the affected person to fresh air. If breathing has stopped administer artificial respiration. Give cardiac massage if necessary. If the person is breathing, but unconscious, place in the recovery position. Obtain medical assistance immediately.

SKIN

Shell Agricultural Gas Oil is slightly irritating to the skin, and has a defatting action on the skin.

Precautions :

Avoid contact with the skin by the use of suitable protective clothing.

First Aid :

Flush the contaminated skin with water. Use soap if available. Contaminated clothing should be soaked with water, removed, and laundered before reuse.

EYES

Shell Agricultural Gas Oil may cause discomfort to the eye.

Precautions :

If there is a risk of splashing while handling the liquid, suitable eye protection should be used.

First Aid :

Flush the eye with copious quantities of water. If irritation persists refer for medical attention.

INGESTION

Shell Agricultural Gas Oil is classified as harmful owing to the aspiration hazard. Ingestion can lead to vomiting and aspiration into the lungs, which can result in chemical pneumonitis, which can be fatal.

Precautions :

Accidental ingestion is unlikely. Normal handling and hygiene precautions should be taken to avoid ingestion.

First Aid :

DO NOT INDUCE VOMITING Wash out the mouth with water, and, if ingestion is suspected, send to hospital immediately. Show this Data Sheet to the physician drawing attention to "Notes for Doctors" below.

CHRONIC HEALTH HAZARD AND ADVICE

Shell Agricultural Gas Oil is classified as a category 3 carcinogen.

The main hazards arise from skin contact and in the inhalation of mists.

Skin contact over prolonged and repeated periods can lead to defatting of the skin, dermatitis, erythema, oil acne and oil folliculitis. Where occupational and personal hygiene practices have been of a poor standard, warty growths have occurred and these can become cancerous.

Excessive and prolonged inhalation of mists may cause a chronic inflammatory reaction of the lungs and a form of pulmonary fibrosis.

NOTES FOR DOCTORS

HIGH PRESSURE INJECTION INJURIES

High pressure injection injuries require surgical intervention and possibly steroid therapy to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. PROMPT surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetic, and wide exploration is essential.

INGESTION AND ASPIRATION OF PETROLEUM PRODUCTS

There may be a risk to health where low viscosity products are aspirated into the lungs following vomiting, although this is uncommon in adults. Such aspiration would cause intense local irritation and chemical pneumonitis. Children, and those in whom consciousness is impaired, will be more at risk. Emesis of lubricants is not usually necessary, unless a large amount has been ingested, or some other compound has been dissolved in the product. If this is indicated - for example, when there is rapid onset of CNS depression from a large ingested volume - gastric lavage under controlled hospital conditions, with full protection of the airway is required. Supportive care may include oxygen, arterial blood gas monitoring, respiratory support and, if aspiration has occurred, treatment with corticosteroids and antibiotics. Seizures should be controlled with Diazepam, or appropriate equivalent drug.

12: ECOLOGICAL INFORMATION

Shell Agricultural Gas Oil contains fuels, diesel which is classified as toxic to aquatic organisms/ may cause long-term adverse effects in the aquatic environment.

AIR

Shell Agricultural Gas Oil is a mixture of mainly non-volatile components, which when released to air will react rapidly with hydroxyl radicals and ozone.

WATER

If released to water, Shell Agricultural Gas Oil will evaporate at a very slow rate. A small proportion will dissolve. Dissolved components will be either absorbed in sediments or evaporate to air. In aerobic water and sediments they will biodegrade, but in anaerobic conditions they will persist.

SOIL

Small volumes released on land will evaporate at a very slow rate, with a proportion of the product being absorbed in the upper soil layers and being subject to biodegradation. Larger volumes may penetrate into anaerobic soil layers in which the product will persist. The product may reach the water table on which it will form a floating layer, and move along with the groundwater flow. In this case the more soluble components, such as aromatics, will cause groundwater contamination.

13: DISPOSAL CONSIDERATIONS

Shell Agricultural Gas Oil is a special waste owing to its supply classification. It should be disposed of to a licensed waste contractor. Any disposal route should comply with local byelaws and the requirements of the Environmental Protection Act, 1990.

14: TRANSPORT INFORMATION

It should be assumed that the flashpoint of Shell Agricultural Gas Oil is equal to or less than 60.5 Deg. C. unless the carrier has obtained contrary test data.

UN Number :	1202
Proper Shipping Name :	Gas Oil
Symbol :	Flammable Liquid
Packing Group :	III
Marine Pollutant :	No
IATA/ICAO Hazard Class :	3
IMO Hazard Class :	3.3
Class :	3
Classification Code :	F1
Hazard Identification No. :	30
Hazchem Code :	3|Z

15: REGULATORY INFORMATION

This material has been classified according to the requirements of the Chemicals (Hazard Information and Packaging for Supply) Regulations.

Dangerous for Supply

Symbols :	St Andrew's Cross Dead Fish and Tree	
Categories of Danger :	Category 3 Carcinogen Harmful	
Risk Phrases :	R40	Limited evidence of a carcinogenic effect
	R65	Harmful: may cause lung damage if swallowed
	R66	Repeated exposure may cause skin dryness or cracking
	R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the
Safety Phrases :	S2	Keep out of the reach of children
	S24	Avoid contact with the skin.
	S36/37	Wear suitable protective clothing and gloves
	S61	Avoid release to the environment. Refer to special instructions / safety data sheets
	S62	If swallowed, do not induce vomiting : seek medical advice immediately and show this label or container
Contains :	Fuels, diesel	

16: OTHER INFORMATION

The references set out below give further information on specific aspects.

LEGISLATION

Consumer Protection Act 1987
Control of Pollution Act 1974
Environmental Protection Act 1990
Factories Act 1961
Health and Safety at Work Act 1974

Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations
Chemical (Hazards, Information, and Packaging for Supply) Regulations
Control of Substances Hazardous to Health Regulations
Dangerous Substances in Harbour Areas Regulations
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Road Traffic (Carriage of Dangerous Substances in Packages etc.) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
Special Waste Regulations

GUIDANCE NOTES

CS/15	The cleaning and gas freeing of tanks containing flammable residues
HS(G)22	Electrical apparatus for use in potentially explosive atmospheres
HS(G)50	The storage of flammable liquids in fixed tanks (up to 10000m3 total capacity)
HS(G)51	The storage of flammable liquids in containers
HS(G)50	The storage of flammable liquids in fixed tanks (exceeding 10000m3 total capacity)
HS(G)140	The safe use and handling of flammable liquids
HS(G)71	The storage of packaged dangerous substances
EH/40	Occupational Exposure Limits
EH/58	The Carcinogenicity of Mineral Oils
MS24	Health surveillance of occupational skin disease

BRITISH STANDARDS

BS 799	Specification for Oil Burning Equipment
BS 2000	Methods of Test for Petroleum and its Products
BS 2869	Fuel Oils for Oil Engines and Burners for Non-Marine Use
BS 5345	Selection, Installation and Maintenance of Electrical Apparatus for Use in Potentially Explosive Atmospheres
BS 5410	Oil Firing
BS 5958	Control of Undesirable Static Electricity
BS 6380	Low Temperature Properties and Cold Weather Use of Diesel Fuel and Gas Oils (Classes A1, A2 and D of BS 2869)

OTHER LITERATURE

Concawe Report 01/97 Petroleum Products - First Aid Emergency and Medical Advice

Department of the Environment - Waste Management - The Duty of Care - A Code of Practice

European Model Code of Safe Practice in the Storage and Handling of Petroleum Products
Institute of Petroleum Marketing Safety Code
Department of Trade - Code of Portable Tanks and Road Tank Vehicles for the Carriage of Liquid Dangerous Goods in Ships

ADDRESSES

Concawe, Boulevard du Souverain 165 B - 1160 Brussels, Belgium
Institute of Petroleum, 61 New Cavendish Street, London W1

SAFETY DATA SHEET

ATHENA EP 90 (Group 2)

Mineral oil based GL-4 gear oil
Product code: G010

Date of issue: 2nd October 2002

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Identification of substance/preparation
Athena EP 90

Application
Automotive gear lubricant
For specific application advice see appropriate Technical Data Sheet or consult your eXOL representative

Company Identification
eXOL Lubricants Limited
All Saints Road
Wednesbury
West Midlands
WS10 9TS

Emergency Telephone Number
+44 (0) 121 568 6800

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Composition
Highly refined mineral oil (IP 346 DMSO extract < 3%)
Proprietary performance additives.

Hazardous Components
No component is present at sufficient concentration to require a hazardous classification.

3. HAZARDS IDENTIFICATION

This material is not considered to be hazardous, but should be handled in accordance with good industrial hygiene and safety practices.

USED ENGINE OILS
Used engine oil may contain hazardous components which have the potential to cause skin cancer.
See Toxicological Information, section 11 of this Safety Data Sheet.

SAFETY DATA SHEET

4. FIRST-AID MEASURES

Eyes
Wash eye thoroughly with copious quantities of water, ensuring eyelids are held open. Obtain medical advice if any pain or redness develops or persists.

Skin
Wash skin thoroughly with soap and water as soon as reasonably practicable. Remove heavily contaminated clothing and wash underlying skin.

Ingestion
If contamination of the mouth occurs, wash out thoroughly with water.
Except as a deliberate act, the ingestion of large amounts of product is unlikely. If it should occur, do not induce vomiting; obtain medical advice.

Inhalation
If inhalation of mists, fumes or vapour causes irritation to the nose or throat, or coughing, remove to fresh air. If symptoms persist obtain medical advice.

Medical Advice
Treatment should in general be symptomatic and directed to relieving any effects.

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5. FIRE-FIGHTING MEASURES

Use foam, dry powder or water fog. DO NOT USE water jets.
Fires in confined spaces should be dealt with by trained personnel wearing approved breathing apparatus.
Water may be used to cool nearby heat exposed areas/objects/packages. Avoid spraying directly into storage containers because of the danger of boil-over.

Combustion Products
Toxic fumes may be evolved on burning or exposure to heat.
See Stability and Reactivity, Section 10 of this Safety Data Sheet.

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6. ACCIDENTAL RELEASE MEASURES

Contain and recover spilled material using sand or other suitable inert absorbent material.
It is advised that stocks of suitable absorbent material should be held in quantities sufficient to deal with any spillage which may be reasonably anticipated.
Spilled material may make surfaces slippery.
Protect drains from potential spills to minimise contamination. Do not wash product into drainage system.
In the case of large spills contact the appropriate authorities or telephone 0121-568-6800
In the case of spillage on water, prevent the spread of product by the use of suitable barrier equipment. Recover product from the surface. Protect environmentally sensitive areas and water supplies.

SAFETY DATA SHEET

7. HANDLING AND STORAGE

Handling Precautions

Avoid contact with eyes. If splashing is likely to occur wear a full face visor or chemical goggles as appropriate.
Avoid frequent or prolonged skin contact with fresh or used product.
Good working practices, high standards of personal hygiene and plant cleanliness must be maintained at all times.
Wash hands thoroughly after contact.
Use disposable cloths and discard when soiled. Do not put soiled cloths into pockets.

Fire Prevention

Product contaminated rags, paper or material used to absorb spillages, represent a fire hazard, and should not be allowed to accumulate. Dispose of safely immediately after use.

Storage Conditions

Store under cover away from heat and sources of ignition.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits

There is no appropriate occupational exposure limit for this material.
Ensure good ventilation.
Avoid, as far as reasonably practicable, inhalation of vapour, mists or fumes generated during use.
If vapour, mists or fumes are generated, their concentration in the workplace air should be controlled to the lowest reasonably practicable level.

Protective Clothing

Wear face visor or goggles in circumstances where eye contact can accidentally occur.
If skin contact is likely, wear impervious protective clothing and/or gloves.
Protective clothing should be regularly dry cleaned. Change heavily contaminated clothing as soon as reasonably practicable; dry clean, launder and preferably starch before re-use. Wash any contaminated underlying skin with soap and water.

Respiratory Protection

Respiratory protection is unnecessary, provided the concentration of vapour, mists or fumes is adequately controlled.
The use of respiratory equipment must be strictly in accordance with the manufacturers' instructions and any statutory requirements governing its selection and use.

SAFETY DATA SHEET

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical Values			
Grades:			**EP 90**
	Test Method	**Units**	
Physical state			
Colour			
Odour			
Density @ 15°C	ASTM D 1298	**kg/m³**	891
Kinematic viscosity @ 40°C	ASTM D 445	**mm²/s**	229.1
Kinematic viscosity @ 100°C	ASTM D 445	**mm²/s**	19.85
Flash point (COC)	ASTM D 93	**°C**	222
Pour point	ASTM D 97	**°C**	-11

10. STABILITY AND REACTIVITY

Products of this type are stable and unlikely to react in a hazardous manner under normal conditions of use.
Hazardous polymerisation reactions will not occur.
This material is combustible.

Materials to Avoid
Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products
Thermal decomposition products will vary with conditions.
Incomplete combustion will generate smoke, carbon dioxide and hazardous gases, including carbon monoxide, hydrogen sulphide and oxides of sulphur and phosphorus.

11. TOXICOLOGICAL INFORMATION

Eyes
Unlikely to cause more than transient stinging or redness if accidental eye contact occurs.

Skin
Unlikely to cause harm to the skin on brief or occasional contact but prolonged or repeated exposure may lead to dermatitis.

SAFETY DATA SHEET

USED ENGINE OILS
Combustion products resulting from the operation of internal combustion engines contaminate engine oils during use. Used engine oil may contain hazardous components which have the potential to cause skin cancer. Frequent or prolonged contact with all types and makes of used engine oil must therefore be avoided and a high standard of personal hygiene maintained.

Ingestion
Unlikely to cause harm if accidentally swallowed in small doses, though larger quantities may cause nausea and diarrhoea.

Inhalation
At normal ambient temperatures this product will be unlikely to present an inhalation hazard because of its low volatility.
May cause irritation to eyes, nose and throat due to exposure to vapour, mists or fumes.
May be harmful by inhalation if exposure to vapour, mists or fumes resulting from thermal decomposition products occurs.

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12. ECOLOGICAL INFORMATION

Mobility
Spillages may penetrate the soil causing ground water contamination.

Persistence and degradability
This product is inherently biodegradable.

Bioaccumulative potential
There is no evidence to suggest bioaccumulation will occur.

Aquatic toxicity
Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

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13. DISPOSAL CONSIDERATIONS

Where possible, arrange for product to be recycled.
Dispose of via an authorised person/ licensed waste disposal contractor in accordance with local regulations.
Incineration may be carried out under controlled conditions provided that local regulations for emissions are met.

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14. TRANSPORT INFORMATION

Not classified as hazardous for transport (ADR, RID, UN , IMO, IATA/ICAO).

SAFETY DATA SHEET

15. REGULATORY INFORMATION

Not classified as hazardous for supply.

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16. OTHER INFORMATION

Compiled by:

Technical Department
eXOL Lubricants Limited
All Saints Road
Wednesbury
West Midlands
WS10 9TS

This data sheet and the health, safety and environmental information it contains is considered to be accurate as of the date specified below. We have reviewed any information contained herein which we received from sources outside eXOL Lubricants Limited. However, no warranty or representation, express or implied is made as to the accuracy or completeness of the data and information contained in this data sheet.

Health and safety precautions and environmental advice noted in this data sheet may not be accurate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission, recommendation or authorization given or implied to practise any patented invention without a valid licence.

eXOL Lubricants Limited shall not be responsible for any damage or injury resulting from abnormal use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material.

Issue No. e1	Revision No: 0	Issued by: D Hall
October 2002	Date of Revision	Approved by:

Appendix E Heavy Component Weights

	Part Number & Description	Weight
1.	J4250000 FIXED WEAR PLATE TALL TOOTH	1500 kg
2.	J4260000 JAW STOCK WEAR PLATE TALL TOOTH	800 kg

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