Original Instructions

QI441

Operator’s Manual

QI441-en-290615

SANDVIK

QI441

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1 Safety

1.1 Safety principles

SANDVIK put safety first.

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

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

1.1.1 Signal words

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

DANGER

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

WARNING

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

NOTICE

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

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

1.1.2 General hazard symbol

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

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

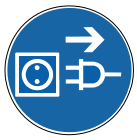
1.1.3 Essentials

DANGER	
 	**INHALATION, BREATHING HAZARD!** **Breathing or inhaling silica dust particles will cause death or serious injury.** **Make sure suitable breathing equipment is used throughout any procedures carried out. ALL necessary precautions MUST be taken to reduce the risk of breathing dust or particles.**

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

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

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



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

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

1.1.4 Safety hazards pertaining to the equipment

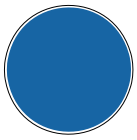
The following safety symbols may be posted on the equipment and contained in the manuals. You MUST observe all safety symbols, labels, and instructions at ALL times.

- Make sure safety instructions and safety labels attached to the equipment are always complete and legible.
- Keep safety instructions and safety labels clean and visible at all times.
- Replace any illegible or missing safety instructions and safety labels before operating the equipment.
- Make sure replacement parts include safety instructions and labels.

1.1.5 Colour coded safety signs

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

PROHIBITED - YOU CAN NOT DO.



MANDATORY - YOU MUST DO.

HAZARD - YOU MUST BE AWARE OF.

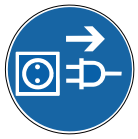
1.1.6 Symbols for prohibited actions

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

 **No climbing**	 **No smoking**	 **Do not touch**	 **No open flames**
 **Do not weld**	 **Do not remove safety guard**	 **Limited or restricted access**	 **Do not use hand to test for hydraulic leaks**

1.1.7 Symbols for mandatory actions

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

 **Wear safety gloves**	 **Wear eye protection**	 **Wear safety helmet**	 **Wear safety harness**	 **Wear ear protection**
 **Wear safety boots**	 **Wear close fitting overalls**	 **Wear respirator**	 **Wear high visibility vest**	 **Disconnect power source from supply**
 **Switch off and lockout equipment**	 **Read the manual**	 **Safe distance from hazard**	 **Use card for hydraulic leak testing**	

1.1.8 Symbols for hazards

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

 **Crushing hazard - hands**	 **Crushing hazard - feet**	 **Chemical burn hazard**	 **Electrical hazard**	 **Noise hazard**
 **Entanglement hazard**	 **Entanglement hazard**	 **Falling hazard**	 **Falling load hazard**	 **Ignition hazard**
 **Flying material hazard**	 **Lifting hazard**	 **Skin injection hazard**	 **Silica or other dust hazard**	 **Tripping hazard**
 **Magnet hazard**	 **Falling material hazard**	 **Crushing hazard**	 **Hanging load hazard**	 **Tipping hazard**
 **General hazard**	 **Explosion hazard**	 **High pressure hazard**	 **Environmental hazard**	 **Hot surface hazard**
 **Poison hazard**	 **Tipping hazard**	 **Tipping hazard**	 **Hot coolant under pressure**	

1.2 Features for operator safety

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

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

DO NOT use this equipment if any safety guards or devices have been removed or not installed properly. Safety guards have been installed to prevent death or serious injury. All safety guards must be fitted and secured in their correct positions.

Operating this equipment with any safety guards or devices which have been removed or installed improperly could result in death or serious injury.

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

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

1.3 Environmental safety

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

1.3.1 Hazardous materials

FIRE IGNITION HAZARD!

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

ONLY use fluids and lubrication products recommended in the maintenance schedule or OEM manuals.

Read and understand the instructions and information in the *Hazardous substances* section.

⚠ WARNING

POISON AND CONTAMINATION HAZARD!

Drinking from storage containers that have held equipment fluids or other harmful substances could cause serious injury or death. DO NOT store fuels, fluids and other materials used in the operation of this machine in food or beverage containers.

Fuels, fluids and other materials used in the operation of this machine may contain chemicals which could cause serious injury or death and or environmental damage if disposed of in an irresponsible manner.

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

ALWAYS dispose of fuels, fluids or other materials used in the operation of this machine in accordance with local and national legal regulations.

DO NOT pour waste onto the ground, down a drain or into any water source.

Observe local heath and safety data information and OEM data information detailed in the *Information and Data Sheets* section of this manual when working with components or substance that may contain chemicals.

Use leak proof containers when draining fluids.

1.3.2 Battery disposal

All batteries must be disposed of via a local re-cycling scheme.

Batteries must not be disposed of in normal waste which may go to landfill.

1.3.3 Machine disposal

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

1.4 Personal protective equipment (PPE)

Entanglement hazard

DANGER	
	**PERSONNEL HAZARD!** **DO NOT wear, loose clothing or jewellery of ANY kind.** **Long hair MUST BE tied back.** **ALWAYS wear (CE approved) minimum Personal Protective Equipment (PPE).**

Minimum required personal protective equipment

The following (CE approved P.P.E.) MUST BE WORN by everyone, as a minimum requirement when working on or around the machinery, within 10m (33ft): Additional PPE may be required for specific tasks, which will be detailed in the relevant section throughout the manual.

 **Safety gloves**	 **Eye protection**	 **Safety helmet**	 **Respirator**	 **Ear protection**
 **Safety boots**	 **Close fitting overalls**	 **High visibility vest**		

1.5 Organisational safety measures

The following safety measures MUST be observed at all times:

Understand the service procedure before commencing work.

Keep area clean and dry.

NEVER lubricate, clean, service, or adjust machinery while it is moving.

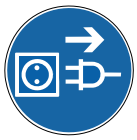
Allow machinery to cool before performing any maintenance or adjustments.

MAKE SURE all parts are properly installed and are in good condition. Replace worn and broken parts IMMEDIATELY.

Remove any build up of grease, oil and debris from equipment.

During maintenance, use ONLY the correct tool for the job.

NEVER make any modifications, additions, or conversions which may affect safety.



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

If clothing, tools, or any body parts become entangled in machinery, IMMEDIATELY press an emergency stop button to disengage all power. Operate controls to relieve pressure. Switch off engine and implement lockout procedures.

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

1.6 Personnel qualifications, requirements and responsibilities

⚠ WARNING

PERSONNEL HAZARD

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

ONLY trained, competent, reliable and authorized personnel should operate or maintain this machine.

If necessary seek clarification from your supervisor and or a Sandvik representative, before attempting ANY operations or maintenance. Failure to do so may also invalidate the manufacturers warranties.

Statutory minimum working age limits must be observed.

Work on electrical system and its equipment MUST ONLY be carried out by a skilled electrician or by personnel under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations. You MUST fully understand the electrical system, refer to the electrical and hydraulic section.

Work on the hydraulic system MUST ONLY be carried out by persons with training and authorisation to maintain the hydraulic equipment. You MUST fully understand the hydraulic system, refer to the electrical and hydraulic section.

1.7 Safety advice regarding specific operational phases

1.7.1 Standard Operation

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

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

Make sure local barriers are erected to stop unauthorised entry to the equipment or work area.

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

BEFORE starting the engine make sure it is safe to do so.

1.7.2 Blockage or malfunction

In the event of material blockage, any malfunction or operational difficulty, stop equipment and lockout immediately. Rectify problem immediately, refer to the operation section. Contact your dealer for advice and assistance if required.

1.7.3 Unguarded areas

Limit access to the equipment and its surroundings by erecting barrier guards, minimum distance 1.5m (5ft) away, to reduce the risk of other mechanical hazards, falling loads and ejected materials.

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

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

1.7.4 Fire risk control measures

Carry out a site specific risk assessment to identify any fire hazards present and the actions required to remove/reduce the risk.

Follow local and national regulations regarding fire safety training as identified in the risk assessment.

Fire extinguishing equipment must be available and easily accessible to the machine operator as identified in the risk assessment.

1.8 Special work, including maintenance, parts disposal and hazardous materials

Observe adjustment, maintenance and service intervals detailed throughout this manual, unless:

- - Failure of warning lights, horns, gauges, display screens or indicators calls for immediate action.
- - Adverse conditions require more frequent servicing.

USE ONLY Original Equipment Manufacturer's (OEM) recommended replacement parts and equipment.

Make sure only properly trained personnel undertake these tasks.

1.8.1 Securing equipment before performing maintenance

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

PERSONNEL HAZARD

Switch off engine and remove ignition key.

Switch off at isolation point, refer to the commissioning and shut down section.

Implement tag and lockout procedures, refer to the commissioning and shut down section.

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

1.8.2 Fire risk control measures

Carry out a site specific risk assessment to identify any fire hazards present and the actions required to remove/reduce the risk.

Follow local and national regulations regarding fire safety training as identified in the risk assessment.

Fire extinguishing equipment must be available and easily accessible to the machine operator as identified in the risk assessment.

1.8.3 Maintenance site conditions

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

1.8.4 Replacement & removal of components

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

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

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

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

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

NEVER work or stand under suspended loads.

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

1.8.5 Climbing and falling

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

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

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

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

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

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

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

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

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

1.8.6 Safety considerations during maintenance

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

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

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

NEVER work or stand under suspended loads.

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

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

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

Never work alone.

1.8.7 Safety considerations during cleaning

This machine MUST be isolated prior to cleaning.

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

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

1.8.8 Removal of safety devices, guards and decals

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

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

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

1.8.9 Surrounding structures

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

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

1.8.10 Safety when refuelling

⚠ WARNING

FIRE HAZARD

Smoking is PROHIBITED when refuelling or handling diesel fuel. Smoking and or using other naked flames in the vicinity of flammable materials and or fuels, could cause serious injury or death.

NEVER remove the filler cap or refuel with the engine running.

NEVER add gasoline or any other fuels mixed to diesel due to increased fire or explosion risks and damage to the engine.

DO NOT carry out maintenance on the fuel system near naked lights or sources of sparks, such as welding equipment.

IMMEDIATELY clean up spilt fuel and dispose of correctly to minimize any environmental impact. To avoid spillage use drip trays.

ONLY refuel with diesel from approved storage and supply equipment.

1.9 Specific hazards

1.9.1 Electrical energy

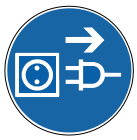
External considerations and hazards

When working with the machine, maintain a safe distance from overhead electric lines. Be aware that electricity can jump across gaps. If unsure, seek advise from a competent person or source. If overhead cables are in the vicinity, a risk assessment MUST be completed prior to operating the machine. Make sure you follow all local and national regulations.

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

Machine - Electrical

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



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

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

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

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

1.9.2 Automotive batteries

Automotive batteries contains sulphuric acid, an electrolyte which can cause severe burns and produce explosive gases when being charged.

Recharge batteries in a well ventilated area.

Do not short circuit batteries as this could cause a large spark and explosion.

Smoking is PROHIBITED when maintaining automotive batteries.

AVOID contact with the skin, eyes or clothing.

ALWAYS wear appropriate PPE, Refer to *1.4 Personal protective equipment (PPE)*

ALWAYS Isolate and disconnect the battery leads before carrying out any maintenance to the electrical system.

When disconnecting the batteries, disconnect the negative first and when connecting make sure the negative is connected last.

Batteries must not be disposed of in normal waste which may go to landfill.

All batteries must be disposed of via a local re-cycling scheme.

1.9.3 Gas, dust, steam, smoke and noise

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

ALWAYS operate internal combustion engines outside or in a well ventilated area.

If, during maintenance, the equipment must be operated in an enclosed area, MAKE SURE there is sufficient ventilation or provide forced ventilation.

Observe ALL local and national safety regulations. Contact your local authority for additional information.

1.9.4 Welding or Naked Flames

⚠ WARNING

FIRE HAZARD

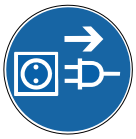
Welding or using other naked flames in the vicinity of the equipment creates the risk of an explosion or fire, which could result in serious injury or death from fire or explosion.

AVOID all naked flames in the vicinity of this equipment.

Welding, flame cutting and grinding work on the equipment MUST ONLY be carried out if this has been expressly authorized.

Before carrying out welding, flame cutting and grinding operations, clean equipment and its surroundings from dust and debris and other flammable substances and make sure the premises are adequately ventilated.

Before welding, the battery MUST be isolated and disconnected.



On machines and engines with electronic controls they must have these controls isolated and disconnected before welding. Disconnect at the plugs and sockets at machine control panel, engine control unit and input/output module. Refer also to the engine manufacturer's manual.

1.9.5 Hydraulic equipment

⚠ DANGER

SKIN PENETRATION HAZARD

Hydraulic fluid under pressure can penetrate the skin, which will result in serious injury or death.

If fluid is injected under the skin, it must be surgically removed or gangrene will result. GET MEDICAL HELP IMMEDIATELY.

ALWAYS use a piece of cardboard to check for leaks. DO NOT USE YOUR HAND.

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

⚠ WARNING

FIRE HAZARD

Splashed or spilled oil creates the risk of a fire, which could result in serious injury or death.

Check all lines, hoses and screwed connections regularly for leaks or other damage.

Repair damaged lines, hoses, or screwed connections IMMEDIATELY.

⚠ WARNING	
	**STORED ENERGY HAZARD** **Latent stored pressure energy may be contained in hydraulic systems when they are off.** **ALWAYS relieve pressure from the hydraulic system before carrying out any kind of maintenance or adjustment.**

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

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

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

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

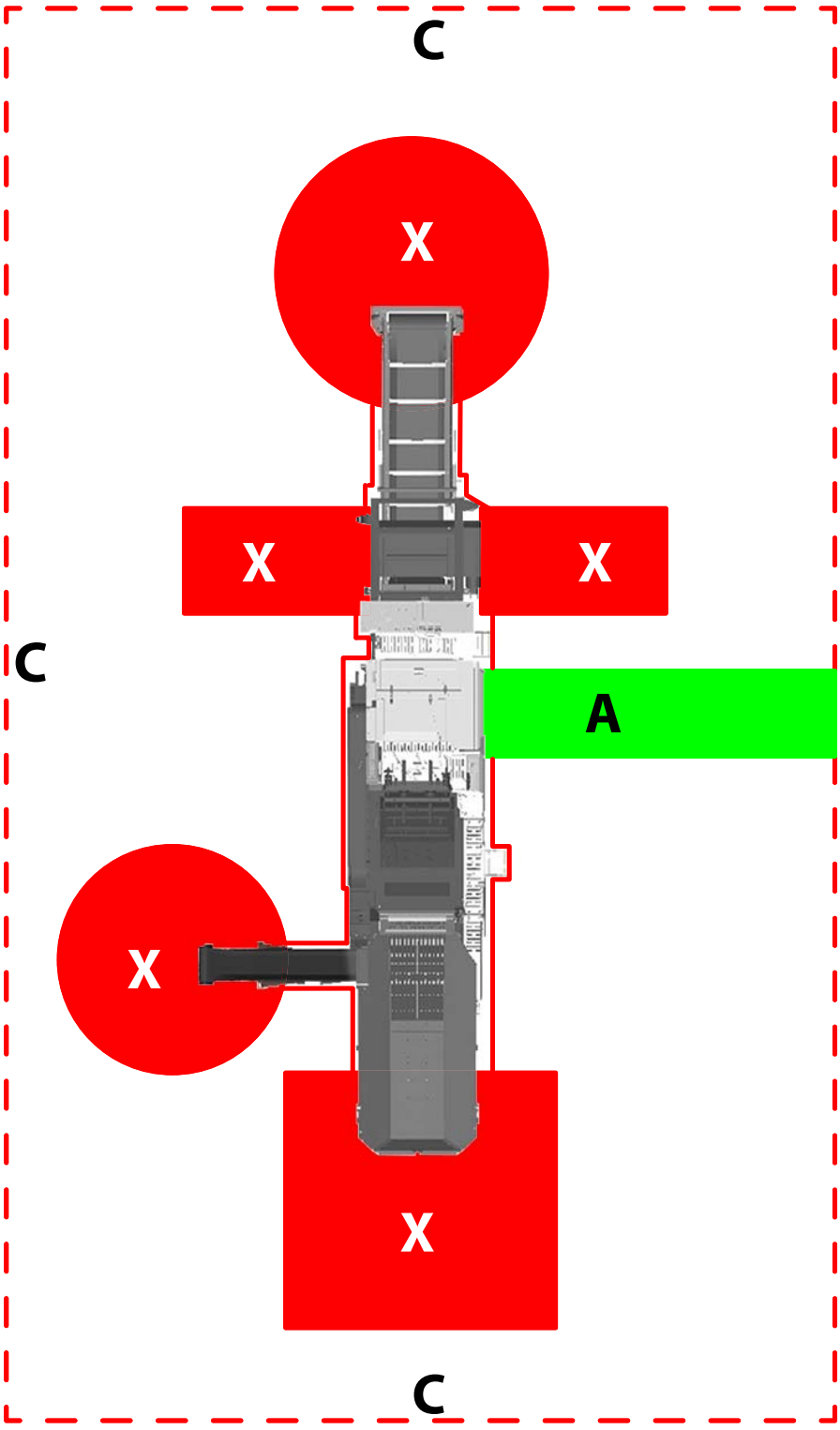
1.9.6 Hazardous substances

For more information, refer to ***1.3 Environmental safety*** and the ***Hazardous substances*** section.

1.10 Vibration levels

There are no circumstances where an operator needs to be on or holding the machine during the crushing operation or moving the machine.

1.11 Hazard exclusion zones



A = Access area to the machine controls, only when not loading material.

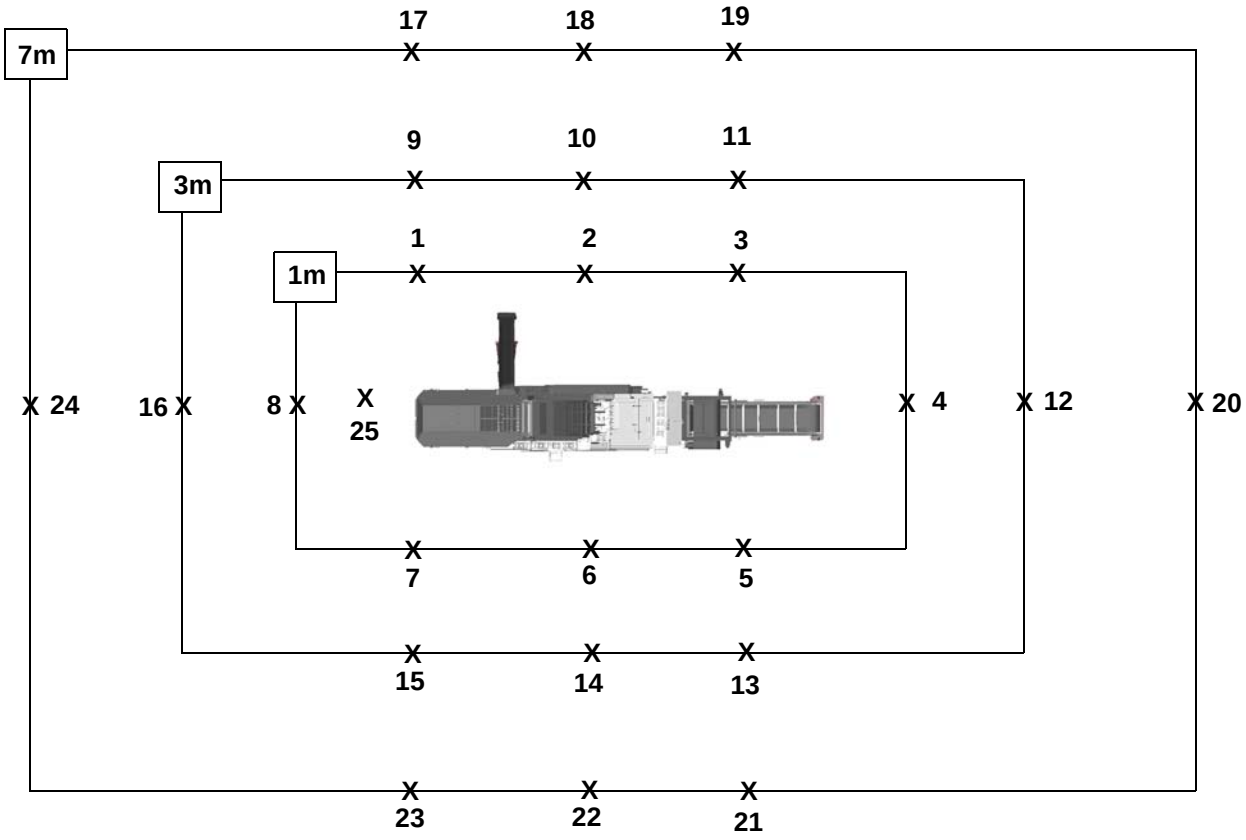
C = 20m (66ft) clearance to limit access to equipment and surroundings. Erect barriers around the perimeter of the machine. NO persons allowed within this exclusion zone unless operating machine.

X = 5m (17ft) hazard area at machine loading and material outlet areas. DO NOT ENTER when machine is operating.

1.12 Measured noise levels

NOISE HAZARD

Ear protection MUST be worn if you are within 10m (33ft) of the machine when the engine and other parts of the machine are running.

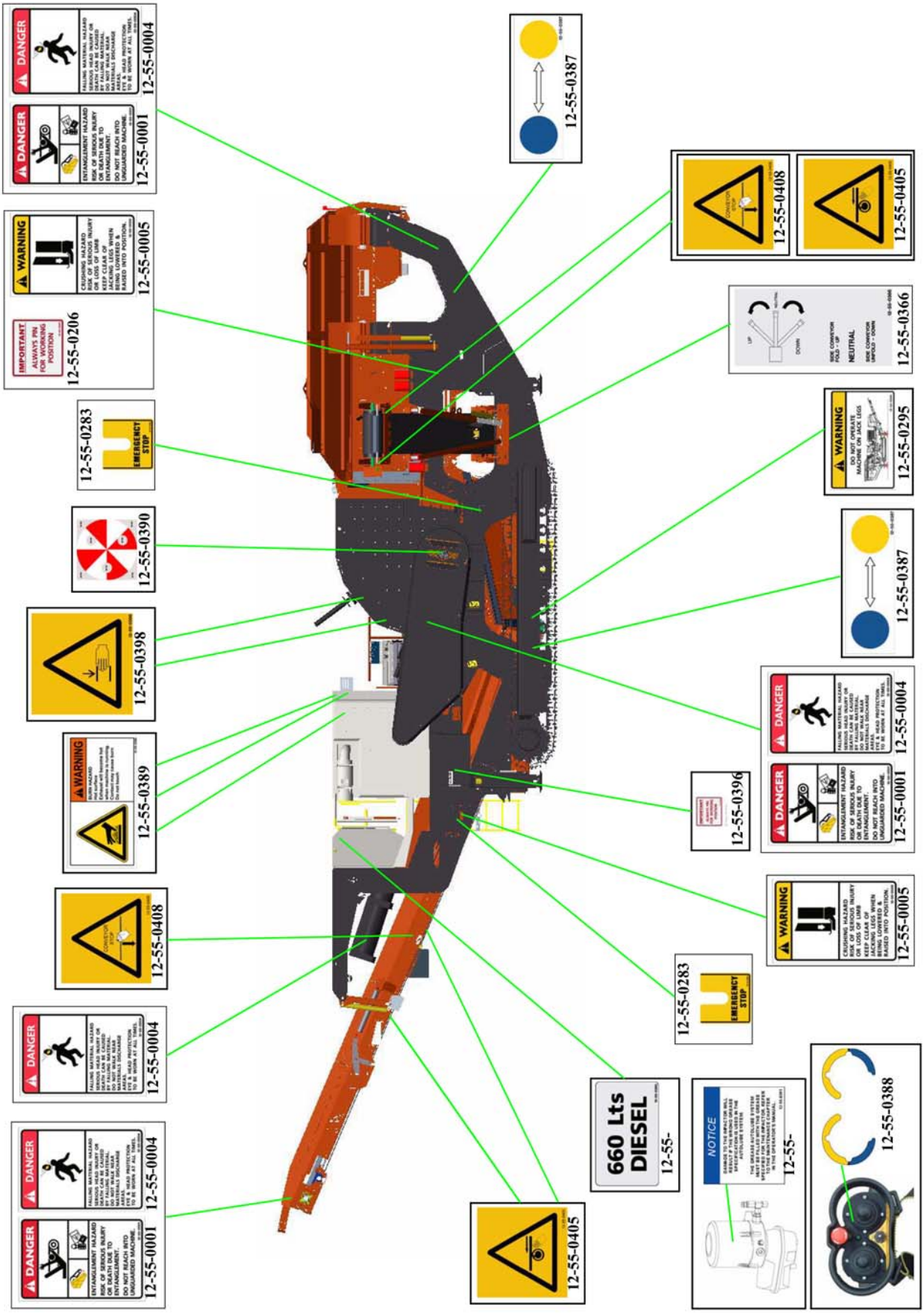


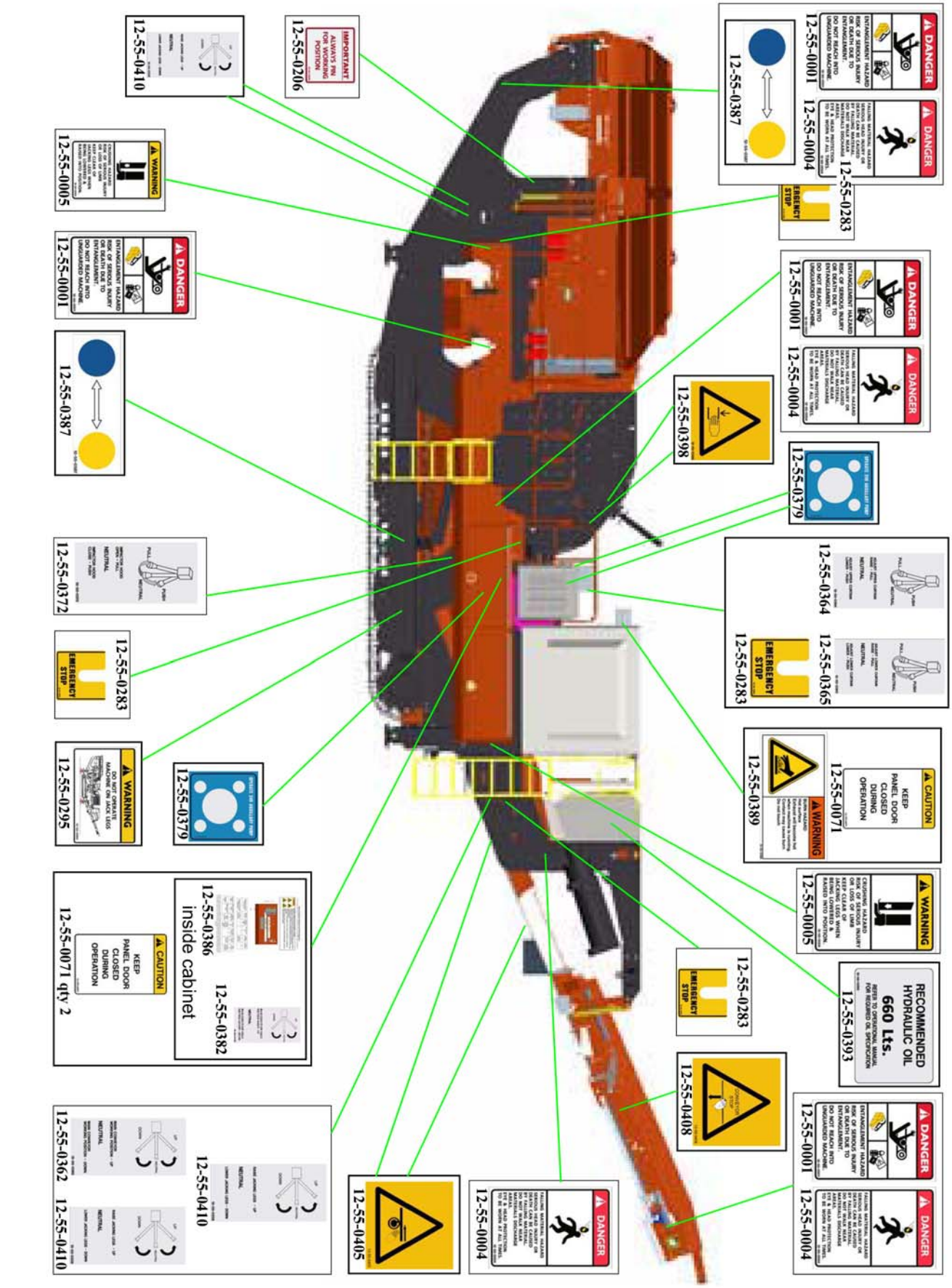
The indicated measured noise levels are at 1m (3.5ft), 3m (9.8ft) and 7m (23ft) using a Casella CEL-244 [Type 2] meter with an empty machine all systems running situated in an open area with minimum reflective surfaces and structures.

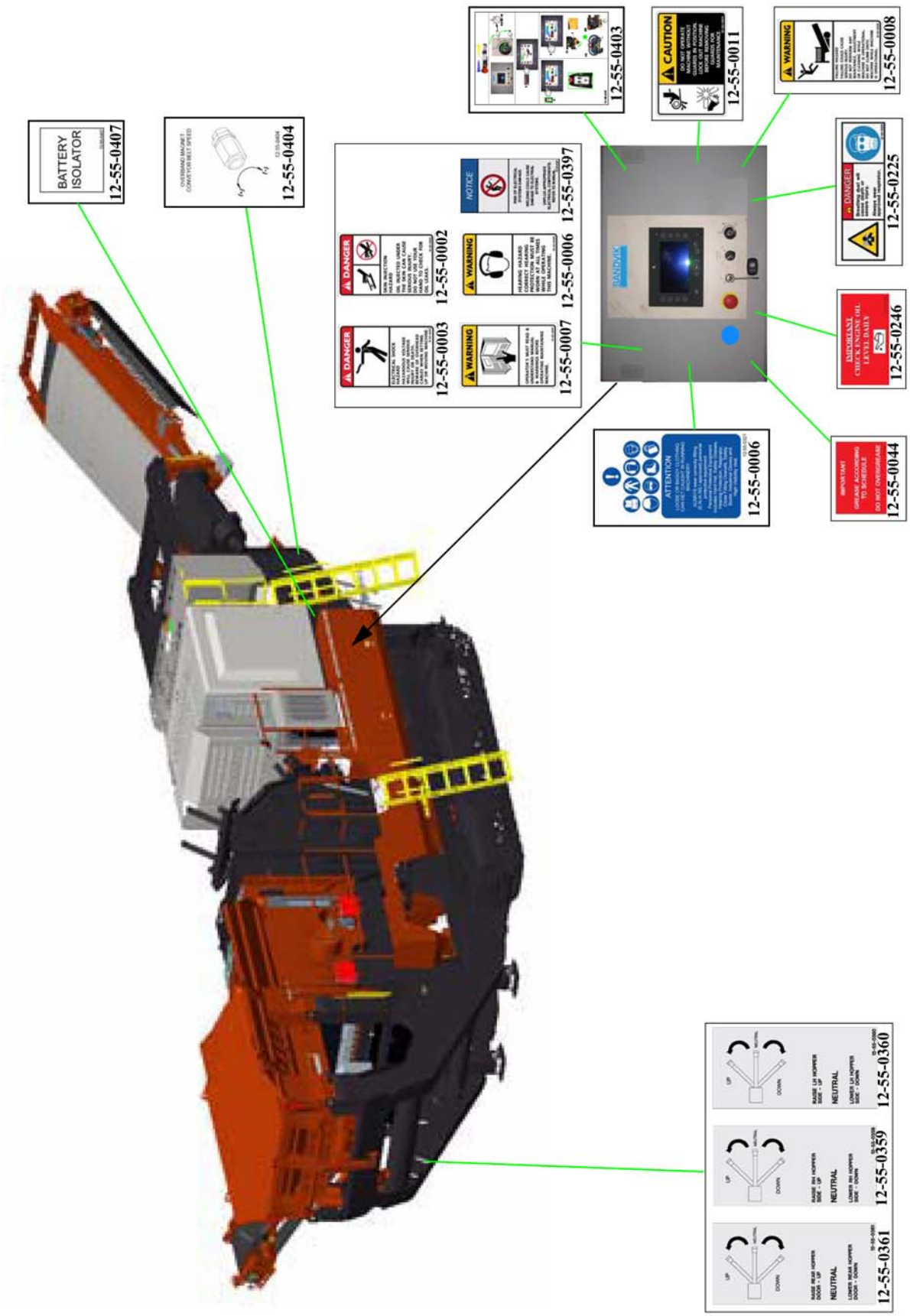
Note that product processing and local conditions will have an affect on the noise levels experienced.

Ref	Background Average Noise Level (Laeq) [dB]	Machine Running Average Noise Level (Laeq) [dB]
1	53.5	89.6
2	55.2	94.5
3	54.8	90.7
4	54.5	82.5
5	54.7	89.1
6	56.7	97.6
7	51.4	90.6
8	56.9	90.7
9	56.4	86.8
10	55.8	89.9
11	55.2	86.8
12	57.1	80.4
13	57.3	88.4
14	53.9	92.1
15	54.4	88.4
16	50.2	87.3
17	50.1	83.3
18	56	84.9
19	53.7	83.2
20	56.4	77.8
21	54.1	85.4
22	55.3	88.5
23	52.1	84.1
24	54.2	82.2
25	49.8	90.6

1.13 Safety decals - Locations







2 Transportation & technical data

2.1 Special considerations for transport

⚠ WARNING

TRANSPORT HAZARD

Transport the machine utilizing a vehicle capable of hauling at least the listed gross weight of the machine, refer to the identification plate on the machine. Failure may result in damage to the machine, haulage vehicle, and may result in serious personal injury or death.

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

2.1.1 Machine preparation for transport

⚠ WARNING

PERSONNEL HAZARD

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

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

⚠ WARNING

PERSONNEL HAZARD

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

Stop machine, isolate, remove ignition key and tag out, before continuing. Refer to *4.8 Lockout and tag procedure*

Make sure all guards are in place and secure.

Visually check machine to make sure there is no component damage. Make sure all personnel are away from the machine, drives, tracks and auxiliary equipment.

Make sure the crusher, feeder and conveyor belts are free of material, remove if necessary.

Make sure engine pre-start checks are carried out in accordance with engine manufacturer's instruction manual and the daily machine checks are made, refer to ***6.4.1 Daily maintenance schedule***.

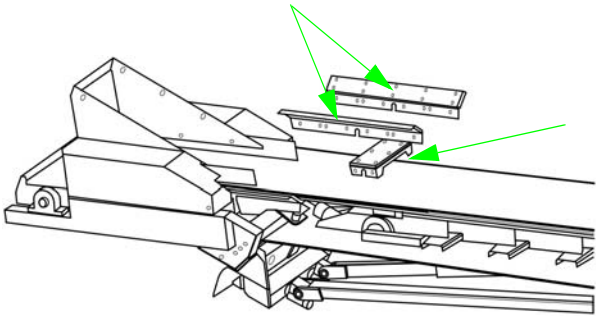
⚠ WARNING	
	**FALLING HAZARD** **Falling from heights could cause serious injury or death.** **Some of the steps in this procedure requires working at height, make sure the following applies when working off the ground:** **Maintenance platforms are in place.** **All hand rails are fixed in position.**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

2.2 Preparation for transport

2.2.1 Natural fines side conveyor

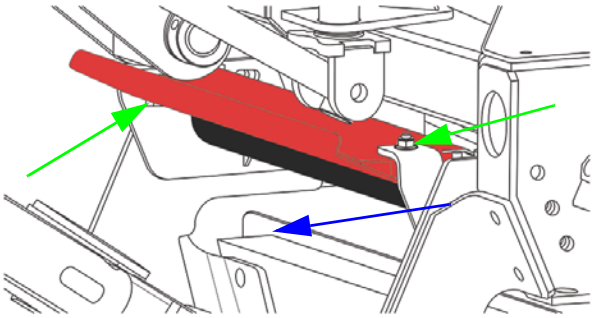
⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Remove the mid section belt troughs and stow in a safe place.



3. Remove the idler roller assembly.

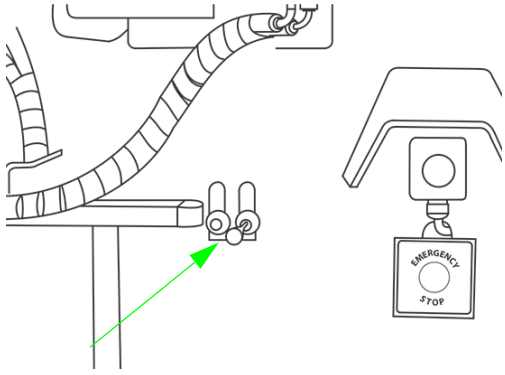
   Note: This must be removed to fold the conveyor.



4. Start the engine refer to ***4.3 Engine starting procedure***.

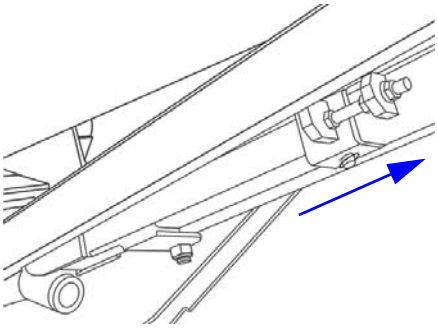
5. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

6. Location of the hydraulic control lever for natural fines side conveyor.

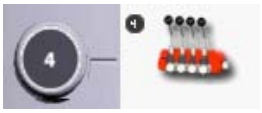


7. Raise the natural fines side conveyor off the slide stop using the fold unfold control lever.

Note: Make sure the belt does not become trapped, as this will damage the belt.



8. Press button 4 again to de-select machine set up mode.

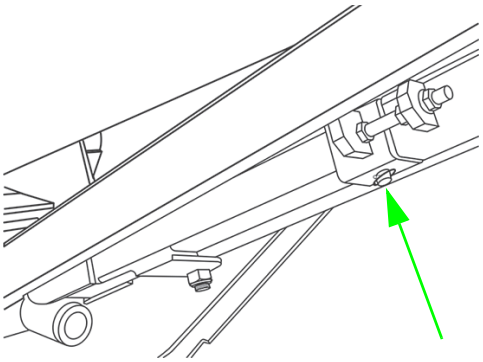


⚠ WARNING

	9. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

10. Remove the locating pin.

11. Relocate the slide stop to the bottom position, and refit the locating pin.

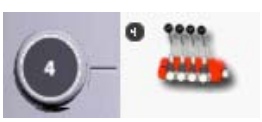


12. Start the engine refer to ***4.3 Engine starting procedure***.

13. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

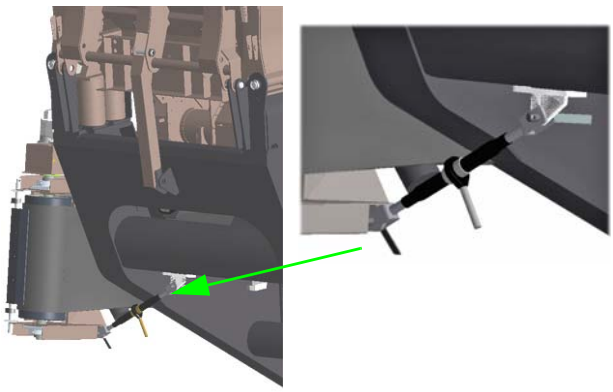
14. Fold the natural fines side conveyor to its transport position, using the fold unfold control lever.

15. When finished, press button 4 again to de-select machine set up mode.



⚠ WARNING	
	16. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

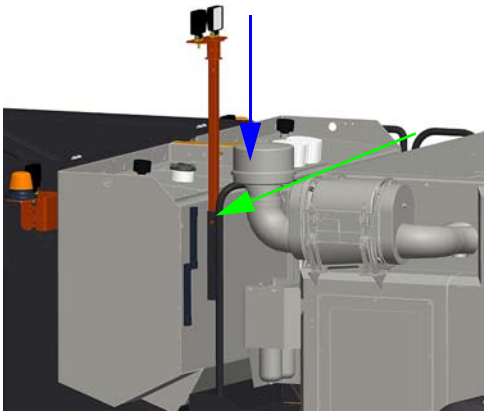
17. Fit the torque arm using the two locating pins.Tighten torque arm to remove slack and secure natural fines side conveyor.



2.2.2 Lighting masts (if fitted)

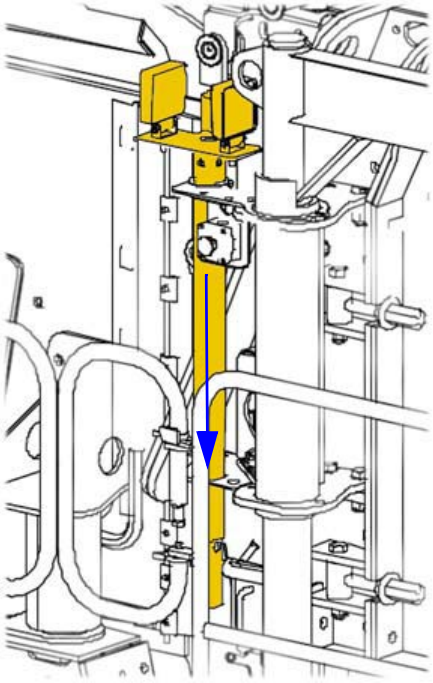
Engine canopy

1. If the lighting mast is fitted, remove the clip and locking pin and lower the mast in to the transport position. Refit the pin and clip in the new position.



Crusher

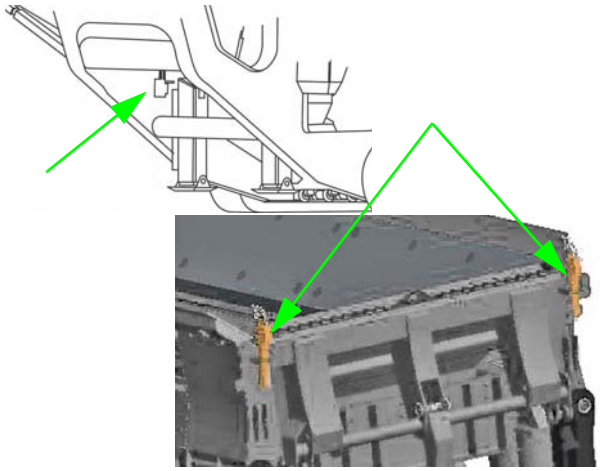
2. Remove the clip and pin then lower the lighting mast into the transport position. Refit the pin and clip in the new position.



2.2.3 Lowering hopper (Manual)

1. Start the engine refer to ***4.3 Engine starting procedure***.
2. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

3. Using the hydraulic control. Raise the hopper sides slightly to release the weight off the wedges.

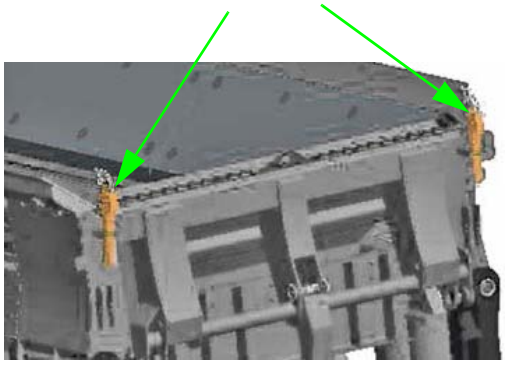


4. Press button 4 again to de-select machine set up mode.

⚠ WARNING

5. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

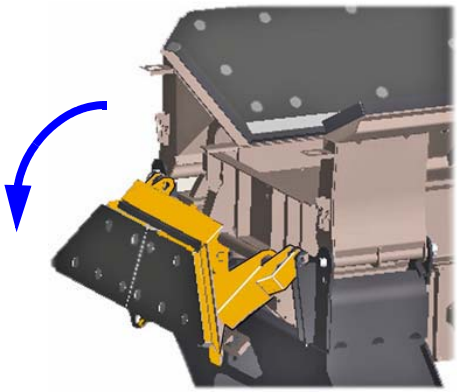
6. Using a suitable access platform as defined in a site specific risk assessment, remove the 2 locking wedges



7. Start the engine refer to ***4.3 Engine starting procedure***.

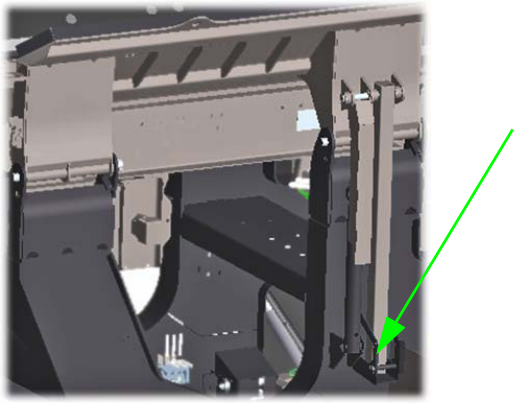
8. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

9. Fold down the rear hopper, using the hydraulic control lever.

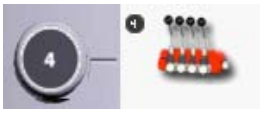


10. Raise the left and right hopper sides until the weight is off the prop support plates.

Note: If a recirculating conveyor is fitted, the conveyor must be lifted off the chute, and rotated away to allow the hopper side to be lowered.



11. Press button 4 again to de-select machine set up mode.

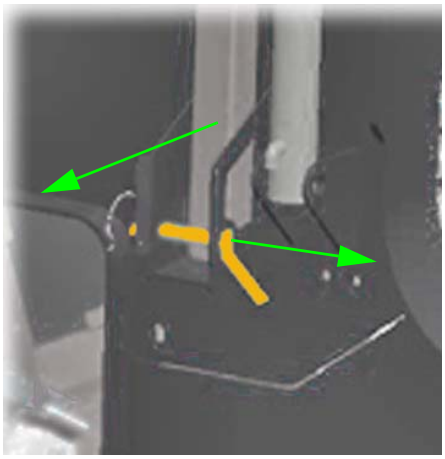


⚠ WARNING

12. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

13. Using a suitable access platform as defined in a site specific risk assessment. Remove the locating pins, and move the prop outwards to clear the support plate.

Note: Stow locating pins in a secure place on the machine.

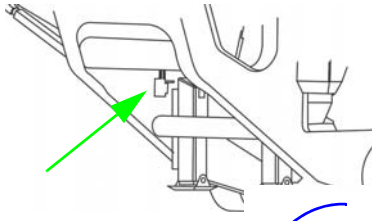


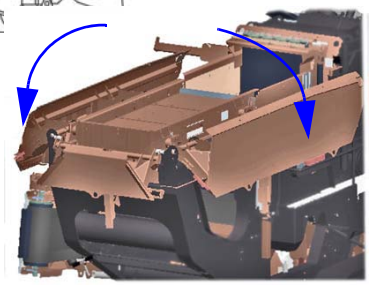
14. Start the engine refer to ***4.3 Engine starting procedure***.

15. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

16. Fold the hopper sides down in to the transport position, using the fold unfold control lever.

Note: If a hanging screen and recirculating conveyor is fitted, the recirculation chute moves with the hopper side.





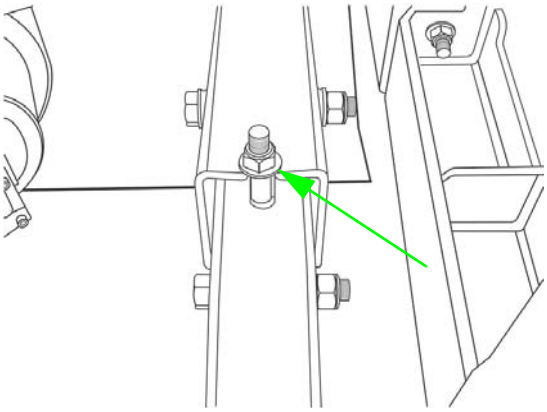
17. Press button 4 again to de-select machine set up mode.

⚠ WARNING	
	18. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2.2.4 Lowering hopper (Hydraulic)

1. Loosen the locking bolts.

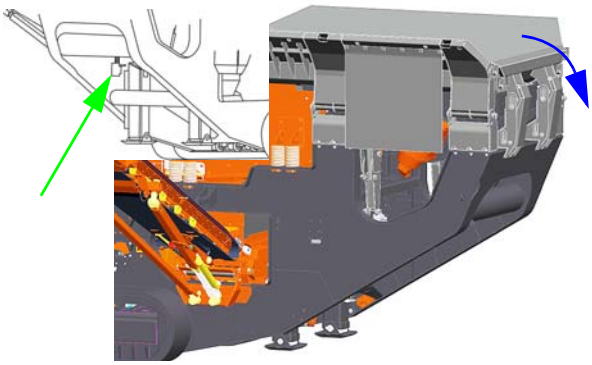
   Note: Underneath hopper both sides.



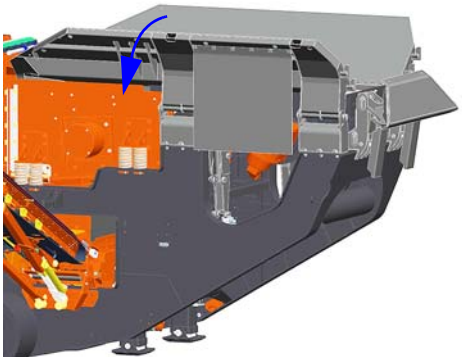
2. Start the engine refer to ***4.3 Engine starting procedure***.

3. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

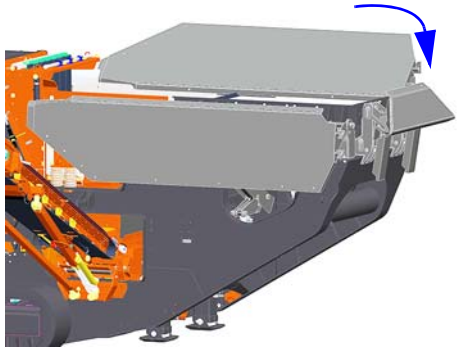
4. Using the hydraulic controls, lower the rear hopper.



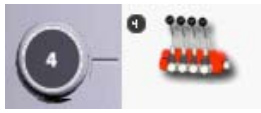
5. Lower the left hand hopper side.



6. Lower the right hand hopper side.



7. Press button 4 again to de-select machine set up mode.

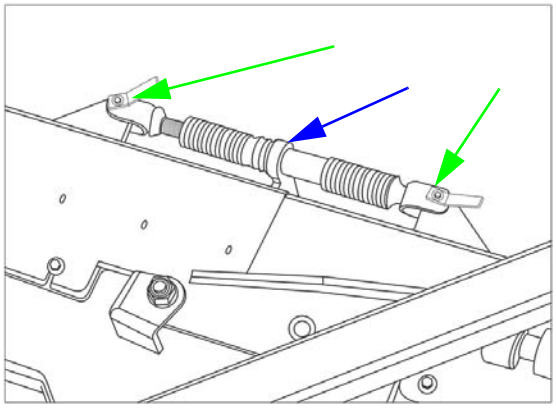


⚠ WARNING	
	8. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

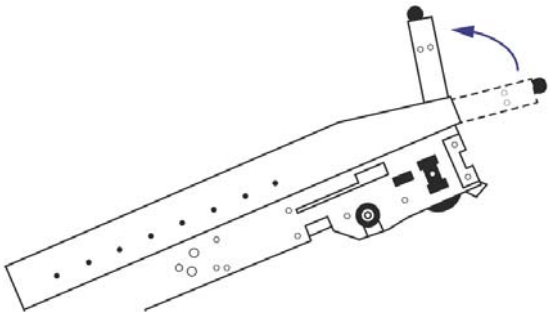
2.2.5 Main conveyor

1. Using a suitable access platform as defined in a site specific risk assessment. Loosen the rachet and remove locating pins (both sides).

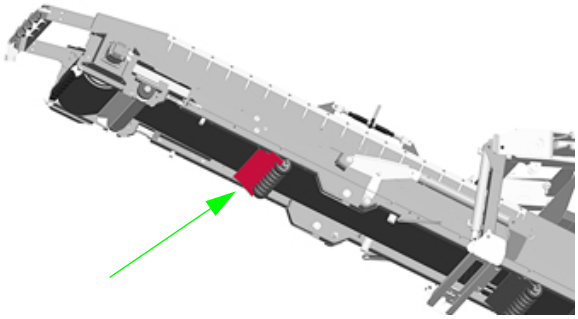
   Note: Stow the rachets and pins in a safe and secure place on the machine.



2. Fold the spray bar up in to the transport position.



3. Remove the return roller from the underside of the main conveyor. Stow the roller in a safe secure place on the machine.



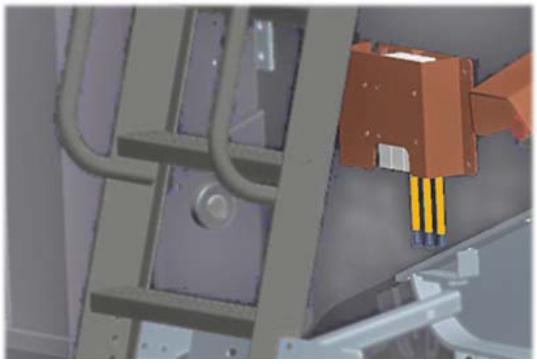
NOTICE

Remove all access equipment away from the main conveyor. Failure to do so will result in damage to the machine and also the access equipment.

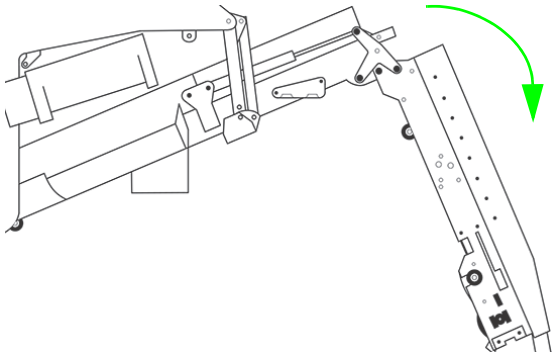
4. Start the engine refer to ***4.3 Engine starting procedure***.

5. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

6. Location of the hydraulic control lever for conveyor position operations.



7. Using the hydraulic control lever, lower the main conveyor in to the transport position.



8. Press button 4 again to de-select machine set up mode.

⚠ WARNING	
	9. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

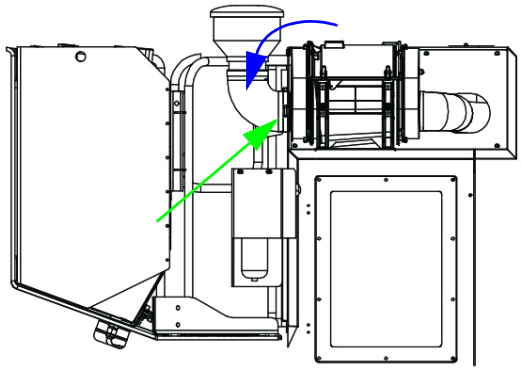
2.2.6 Air cleaner (transport position)

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

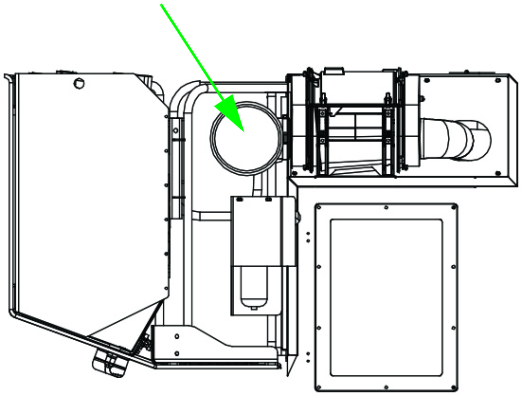
There are two types of air cleaner fitted to this machine both of which are shown.

Type 1 (Donaldson)

2. Using a suitable access platform as defined in a site specific risk assessment. Loosen the clamp, and rotate the air cleaner inlet clockwise.

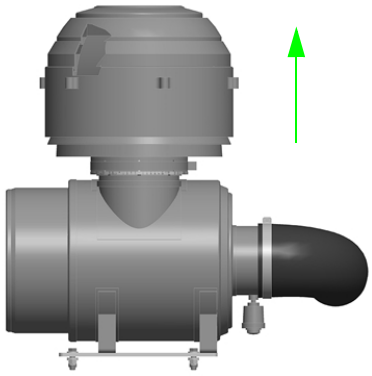


3. When the air cleaner inlet is in the transport position tighten the clamp.

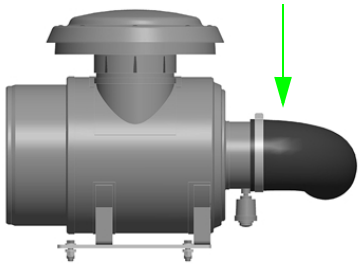


Type 2 (Caterpillar)

1. Using a suitable access platform as defined by a site specific risk assessment. Remove the pre-cleaner from the main filter.



2. Fit the transport cover on to the air filter, stow the pre-cleaner in a safe secure place on the machine.



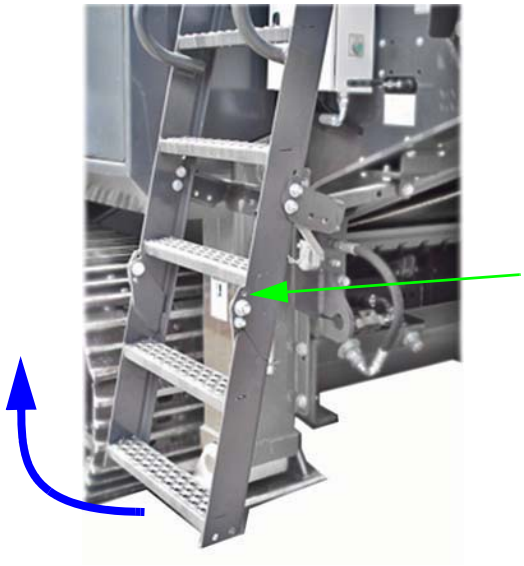
Note: The transport cover must be fitted when transporting the machine to prevent water and debris entering the air cleaner.

2.2.7 Folding the ladders

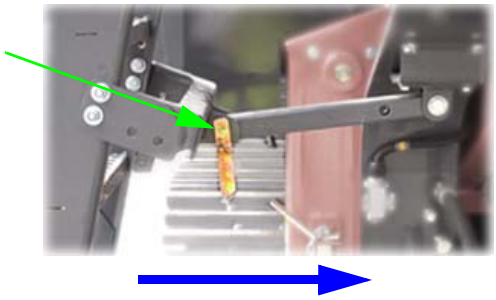
CRUSHING HAZARD

Care should be taken when folding and unfolding the ladders.

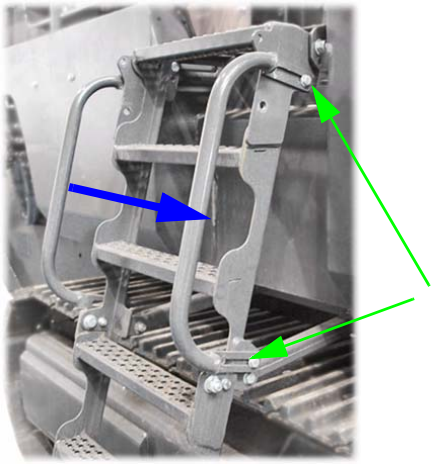
1. Remove the bolts and fold up the ladder lower section. Refit the bolts to secure in the transport position.



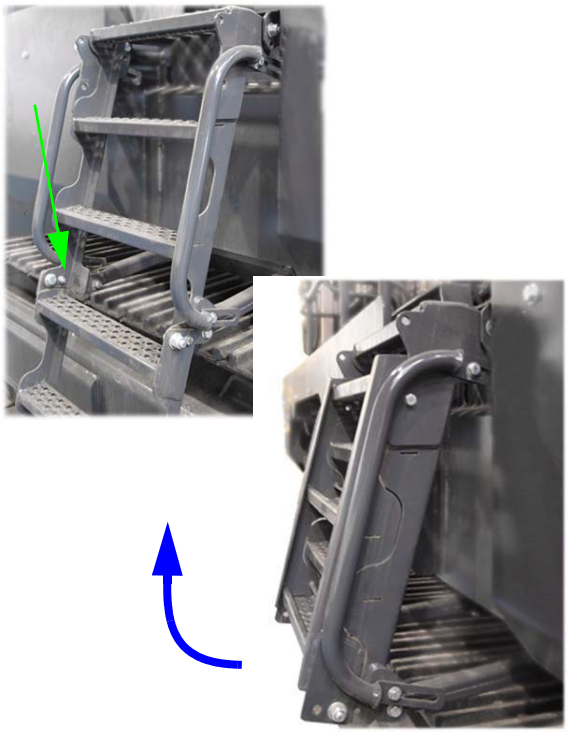
2. Remove the clip and pin then slide back the ladder. Refit the locking pin and clip to secure the ladder in the transport position.



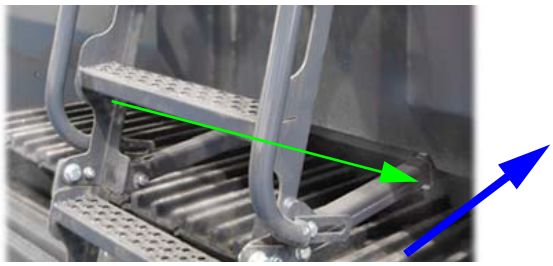
3. Loosen the four handle fixings and slide back the two handles. Re-tighten the fixings.



4. Remove the bolts and fold up the ladder lower section. Refit the bolts to secure in the transport position.



5. Remove the two fixings and slide the steps back.



6. Slide the top of the ladder back in to the transport position. Secure ladder back in the transport position.

2.2.8 Raising the hydraulic legs (if fitted)

⚠ WARNING	
	**CRUSHING HAZARD** **Carry out a through site inspection prior to commencing ANY work operations.** **DO NOT UNDER ANY CIRCUMSTANCES operate the hydraulic legs when ANY personnel or objects are on or near the machine. Personnel near or on the machine are at risk of serious injury or death.** **A MINIMUM of two persons are required for the following procedures, one to carry out the procedure and one to view for potential hazards.**

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

Note: Front leg shown, rear leg similar

If the legs have been used to assist with machine maintenance with the retention pins fitted, proceed as follows.

2. Remove clips then remove the retention pins from holes in the lowered legs.

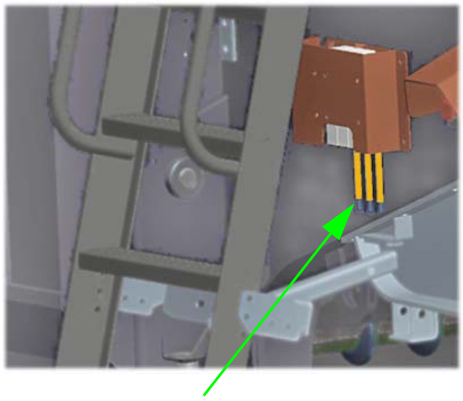
3. Place retention pins in to their storage holders and fit the clips.

4. Start the engine refer to ***4.3 Engine starting procedure***.

5. Press button 4 to select machine set up mode and enable the auxilliary hydraulic system. An alarm will sound, the icon will show a green border when ready.

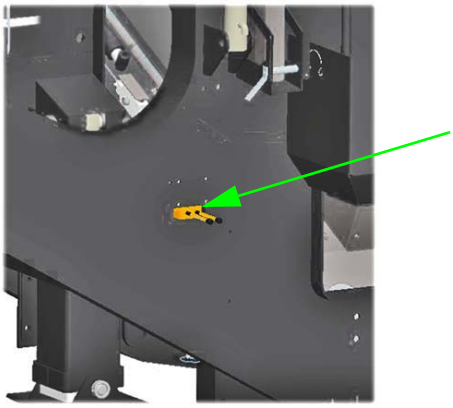
6. Operate the lever to raise the rear legs. The rear of the machine is indicated by the blue direction marker.

   Note: Operate the legs uniformly.



7. Operate the lever to raise the front legs. The front of the machine is indicated by the yellow direction marker.

   Note: Operate the legs uniformly.



8. Press button 4 again to de-select machine set up mode.

⚠ WARNING	
	9. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2.2.9 Ladder

1. The ladder must be stowed on its transport lugs on the left hand side of the machine.

2.2.10 Moving the machine on or off transport vehicle

DANGER

CRUSHING HAZARD

Personnel on the machine or in exclusion zones when machine is operational, are at risk of serious injury or death.

DO NOT UNDER ANY CIRCUMSTANCES operate machine when ANY personnel or objects are on the machine or personnel are in the exclusion zones of 10m (33ft).

Carry out a thorough site inspection prior to commencing ANY machine moving operations.

Follow start up and tracking procedure, refer to ***4.5.2 Moving the machine***.

The machine should be driven on or off the transport vehicle at slow speed.

NOTICE

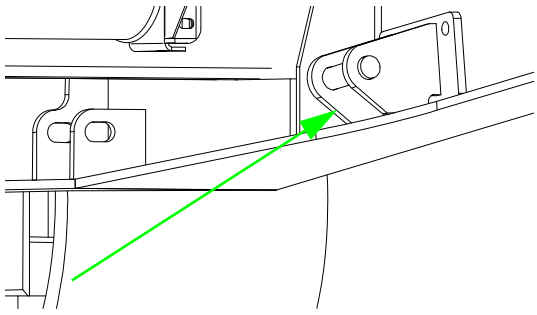
If the machine is fitted with recirculation system, take care not to damage the lower guard on the recirculation conveyor.

2.2.11 Securing

Before moving the machine off transport vehicle make sure all temporary sealing and transport straps
and chains are removed.

After tracking machine onto the transport vehicle make sure all temporary sealing, transport straps and chains are installed.

1. Lashing down the machine is the responsibility of the driver of the transport vehicle. DO NOT secure machine by the tracks, use the lashing brackets fitted inside the chassis.



Lower all four jacking legs sufficiently just to support the weight of the machine and spread the load, refer to ***4.6.3 Lowering the hydraulic legs (if fitted)***

Note: Always check the travelling height before starting the journey.

2.3 Applications & limitations

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

2.3.1 Common applications

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

- Slate
- Bricks
- Limestone

2.4 Technical specification

2.4.1 Feed hopper

Hopper capacity	6m³ (7.85yd³)
Hopper width	2540mm (8ft 4in)
Hopper length	4290mm (14ft 1in)
3 piece hydraulic folding wing plates	

2.4.2 Impactor

Sandvik C1421 impact crusher	
Feed opening	1360mm (54in) x 800mm (31.5in)
4 bar rotor	1150mm (45in) diameter
Rotor speed (variable)	502rpm - 620rpm
Tip speed (variable)	30M/S (98Ft/S) to 37M/S (121Ft/S)
2 aprons	Hydraulic assist

2.4.3 Primary feeder

Wear resistant lined feeder	1274mm x 2397mm (4ft 2in x 7ft 9in)
Speed	550 - 1000 rpm

2.4.4 Pre-screen

Hardox top deck grizzly / punch plate	1360mm x 2160mm (4ft 6in x 7ft 1in)
Bottom deck mesh	1360mm x 1730mm (4ft 6in x 5ft 8in)
Punch plate	40mm (1 1/2in)
Under screen mesh	20mm (3/4in)

2.4.5 Main conveyor

Belt specification	EP500 3ply 8+2 grade X
Discharge height	4210mm (13ft 9in)

2.4.6 Natural fines conveyor

Belt specification	EP400 3 ply 3+1.5mm
Discharge height	3095mm (10ft 1in)

2.4.7 Power unit

Engine	Cat C13
Engine power	328Kw (439Hp)

Speed	1700rpm to 2100rpm
Fuel tank	660 Litres (174 USG)
Hydraulic oil tank	660 Litres (174 USG)

2.4.8 Tracks

Length (centres)	4170mm (13ft 8in)
Track shoe width	500mm (19ft. 3/4in)
Tracking speed	1.4 kph (0.87 mph)

2.4.9 Underpan feeder

Hardox lined stepped underpan	1022mm x 2400mm (40ft x 94.1/2in)
Speed	960 rpm
Amplitude	9mm (3/8in)

2.4.10 Dimensions

For transport dimensions, refer to ***2.5 Transport dimensions***.

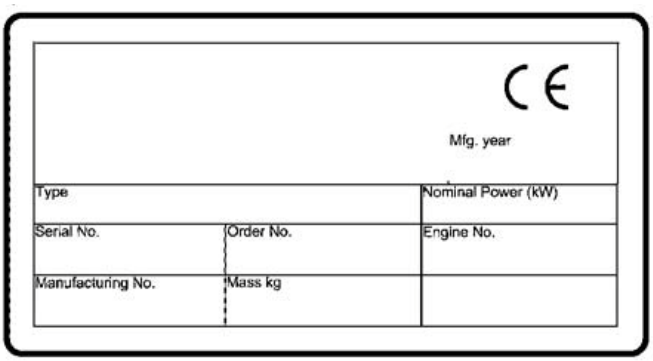
For working dimensions, refer to ***3.5 Working dimensions***.

2.4.11 Electrical system

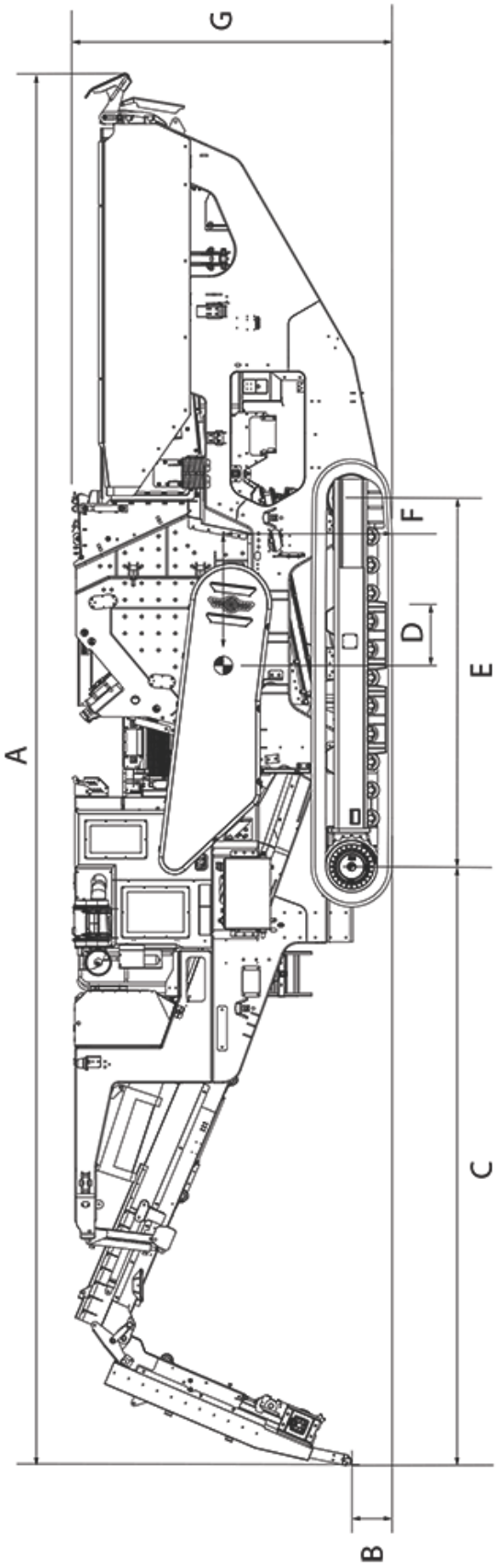
Electrical control system 24V DC negative earth.

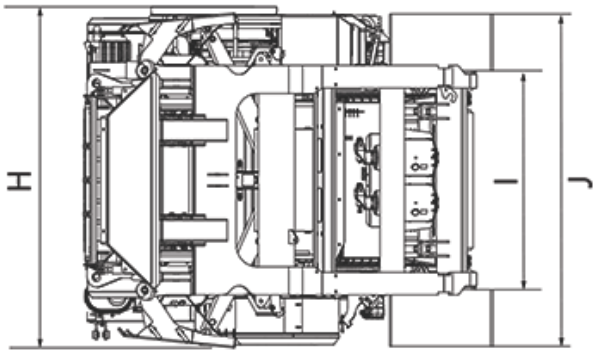
2.4.12 Weight

The weight of the machine varies with each option fitted, refer to specification plate on machine for more information.



2.5 Transport dimensions





A	15740mm (51ft 8in)
B	455mm (1ft 6in)
C	6770mm (22ft 3in)
D	690mm (2ft 3in)
E	4170mm (13ft 8in)
F	1910mm (6ft 3in)
G	3620mm (11ft 11in)
H	3015mm (9ft 11in)
I	1940mm (6ft 4in)
J	2940mm (9ft 8in)

3 Product overview

3.1 Features

3.1.1 Machine overview

This is a tracked, self contained impact crusher driven by a diesel engine and features the following:

- Primary Impact Crusher, designed by Sandvik, utilising the very latest in finite crushing analysis with rigid one piece welded crusher frame, which has been heat-treated after welding for internal stress relief.
- Sandvik Feeder is controlled with a load monitoring system in the machine.
- Heavy duty, hydraulically positioned feed conveyor.
- Diesel engine with direct belt drive ensuring maximum power delivery and fuel efficiency.
- Machine is designed for ease of mobility, rapid set up time and transportation.

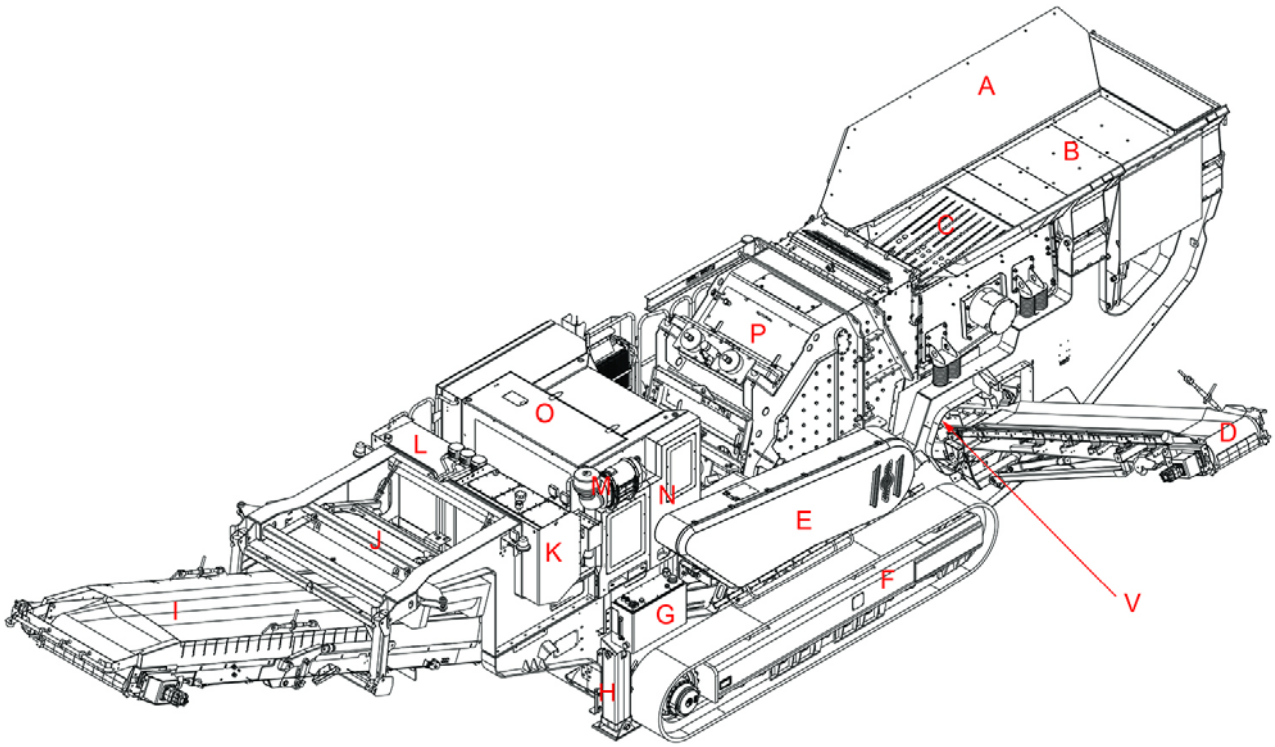
3.1.2 Machine machines, variations and options

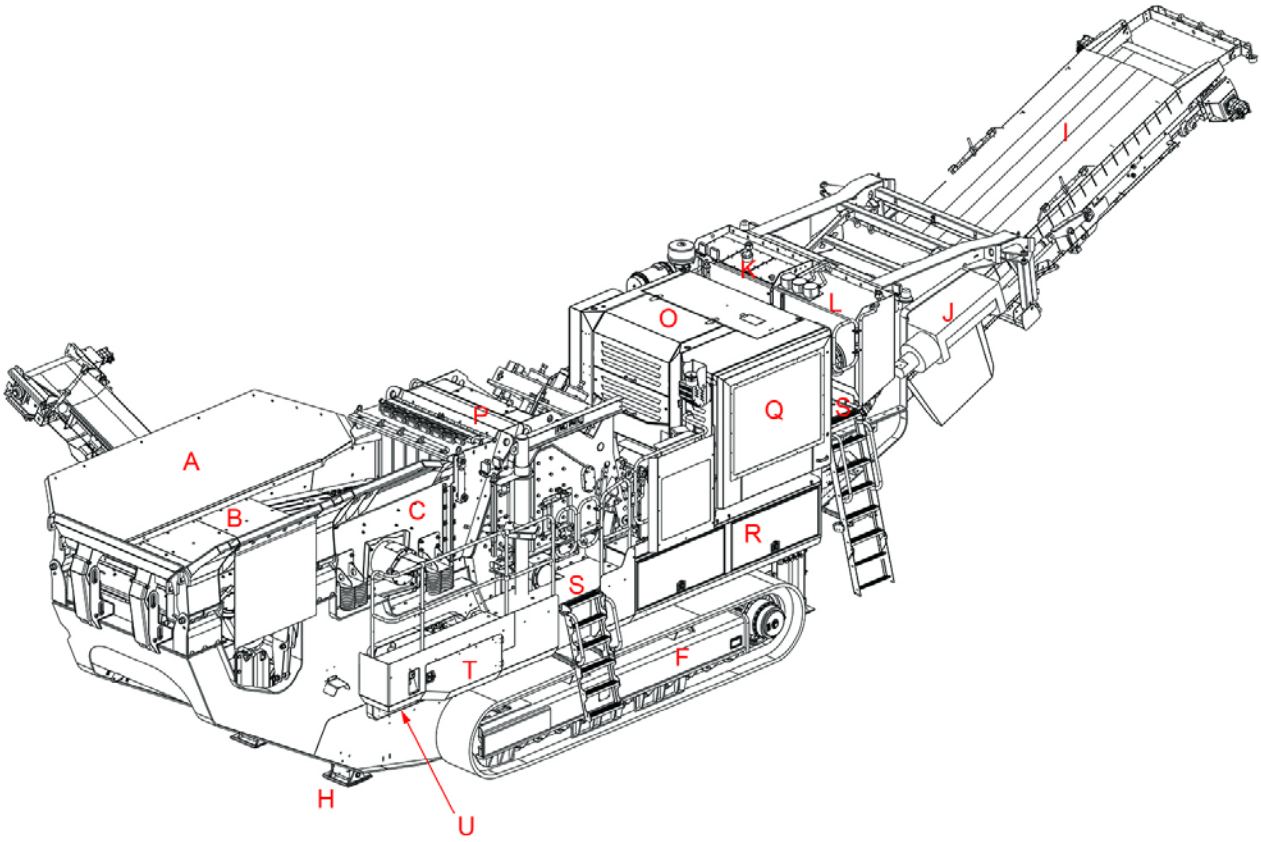
The machine can be supplied with a variety of options which are available.

Some instructions and components mentioned in this manual may not be applicable as the option has not been fitted.

3.2 Main components of machine

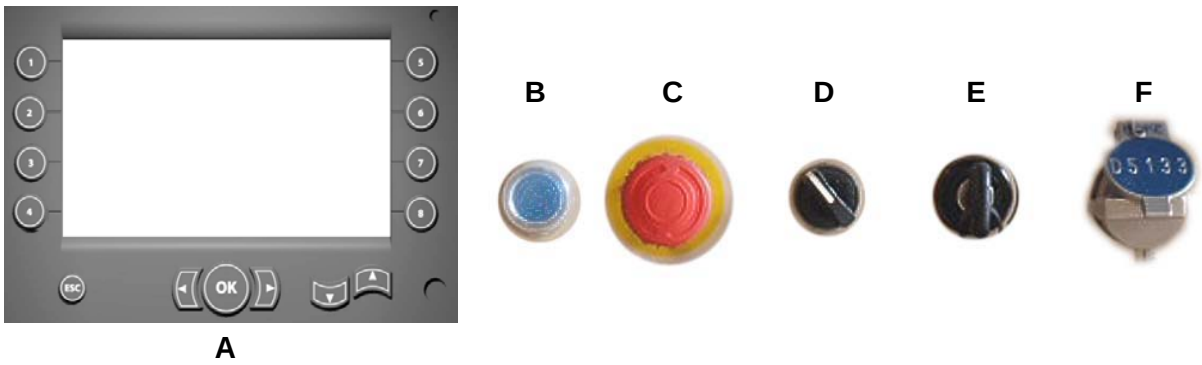
A. Feed hopper
B. Vibrating feeder
C. Pre-screen
D. Natural fines side conveyor
E. Impactor drive belts
F. Chassis with tracks
G. Clutch oil tank.
H. Hydraulic legs
I. Main conveyor
J. Magnet and discharge chute
K. Diesel fuel tank
L. Hydraulic fluid tank
M. Air filter
N. Clutch
O. Power pack
P. Impact chamber
Q. Engine radiator
R. Control cabinets
S. Maintenance platforms
T. AUS 32 (adblue) tank
U. Pan feeder (under impactor)
V. Diverter chute





3.3 Main control devices

3.3.1 Electrical controls



A. Display and soft keys.

B. Reset button - emergency stops prior to engine start.

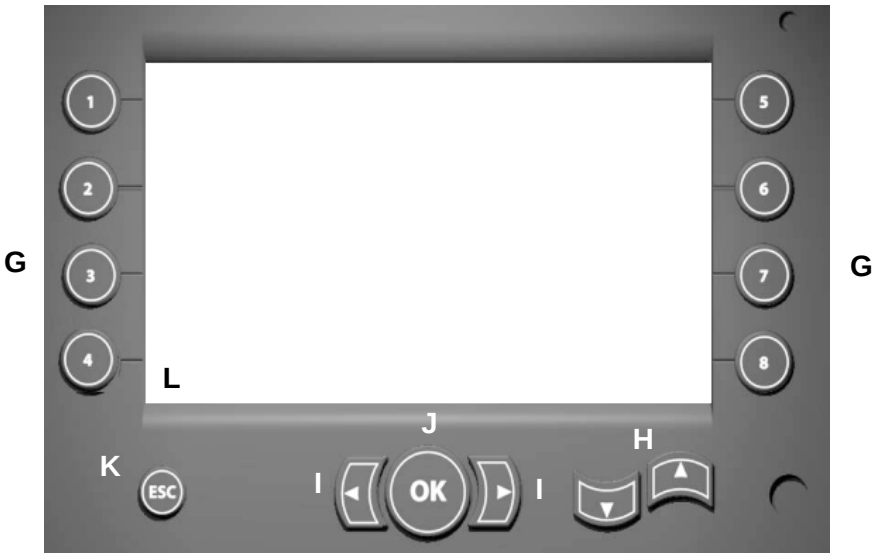
C. Emergency stop.

D. Light switch.

E. Engine ignition switch.

F. Impactor chamber safety switch.

3.3.2 Display and soft keys



Navigation through menus is achieved using relevant 'soft keys' as follows:

G. Numbered keys (1 to 8) to select and deselect item displayed as an icon on display next to relevant numbered key.

H. When up and down arrows displayed to adjust settings of current selected item.

I. When left or right page number arrows are displayed to navigate to other display pages.

J. OK - For diagnostic use and accepting changes to configuration.

K. ESC - Escape - Return to a previous display.

L. Display page number and sequence reference.

3.3.3 Icon highlighting

Icons are highlighted as follows:

- Green when active.
- Flashing amber prior to starting and when shutting down.

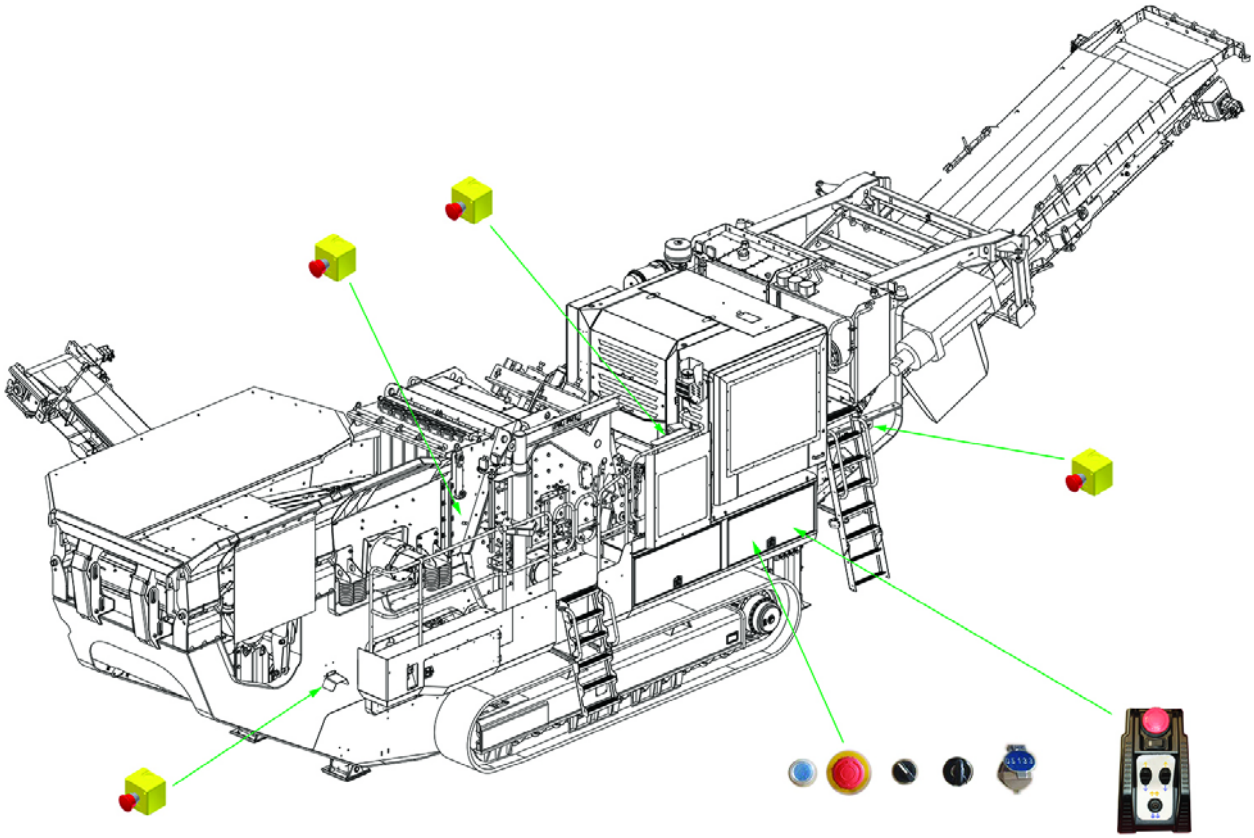
3.3.4 Stopping the machine in an emergency

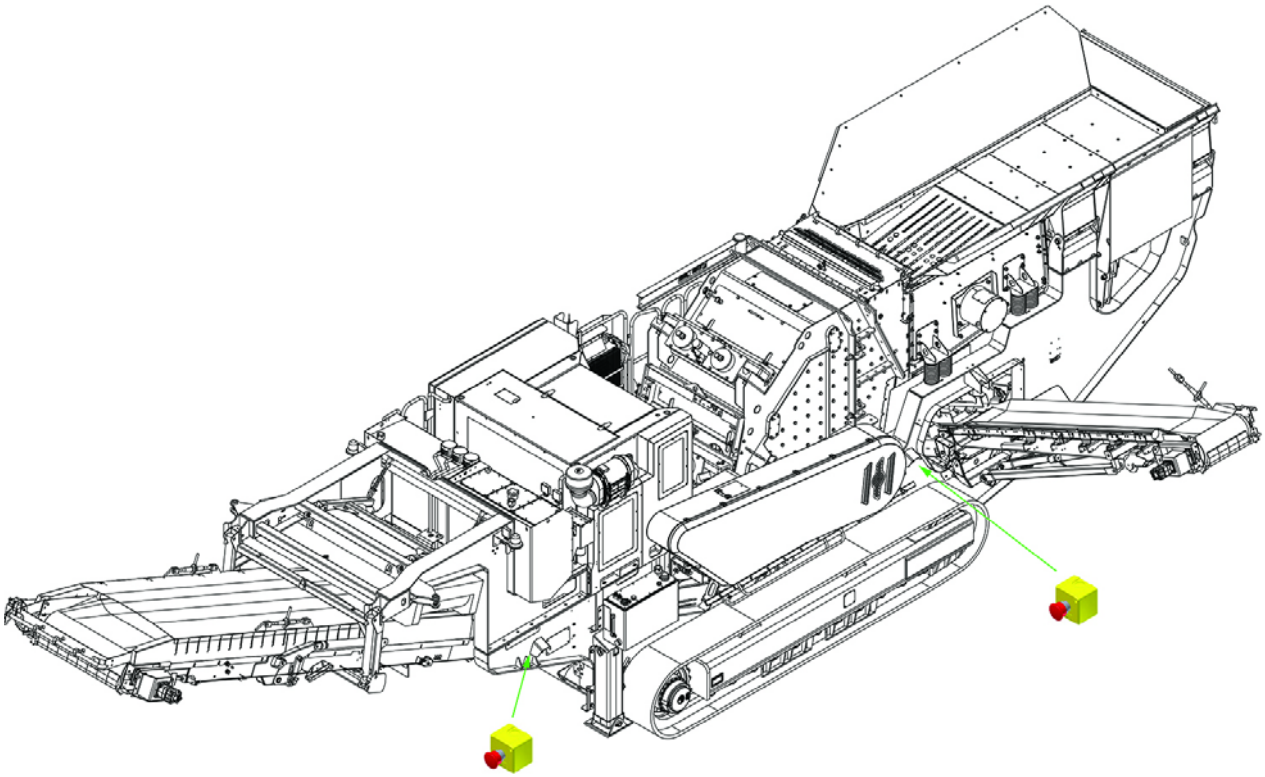
The machine can be stopped in an emergency by pressing ANY stop button located on the electrical control panel, along each side of the machine or on the wired umbilical control.

WARNING PERSONNEL HAZARD

Make sure all persons in the area of the machine are fully trained in how to use the emergency stops and there locations.

3.3.5 Emergency stop locations

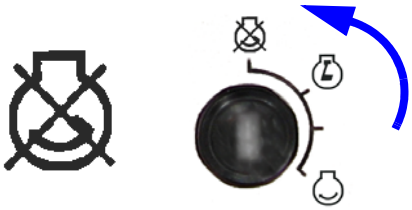




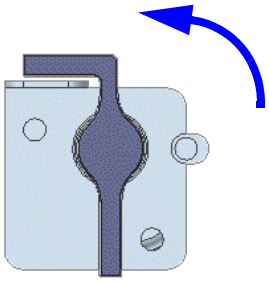
3.3.6 Operation of an emergency stop

1. Push the emergency stop button to stop machine

2. Turn the ignition key to the OFF position as soon as possible.



3. Turn battery isolator switch to '0' the OFF position as soon as possible.



4. Lockout and tag refer to ***4.8 Lockout and tag procedure***.

3.3.7 To reset an emergency stop

Make sure the reason for the use of the emergency stop has been cleared or rectified before the emergency stop is reset.

Turn emergency stop clockwise and release.

3.3.8 Set language, date and time

1. At initial display, press and hold ESC until the machine setting information display shows.

2. To select the language, press button 3 until the required language is displayed. Repeat to cycle through the languages available.

3. To adjust the date and time, press and hold button 8 until the hour time on the left changes to red. The data being changed is displayed in red.

4. To adjust the hour time, press up or down arrows as required.

I H

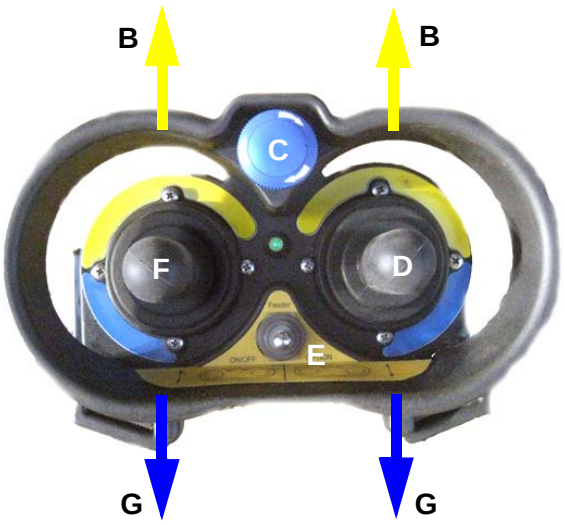
5. Press right arrow to move to next setting minutes, then seconds, day, month, year and adjust as required using the up or down arrows.

6. Use the left arrow to move back if required.

7. To store the data, when the time and date have been set, finally press the right arrow until no red numbers are displayed and the seconds time runs.

8. Press ESC to return to previous display.

3.3.9 Radio remote control (if fitted)



A. Radio remote control switch, turn ON/OFF [1/0].

B. Yellow forward direction marker, main conveyor at front.

C. Stop engine button, when radio control is operational.

D. Track mode: Lever forward or back to control a single track.

E. Mode option selection toggle switch:

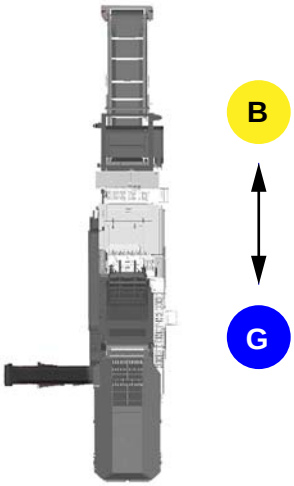
- Track control.
- Feeder option - Feeder on/off.
- Auxiliary control.

F. Track mode: Lever forward or back to control a single track.

G. Blue direction marker, feed hopper at rear.

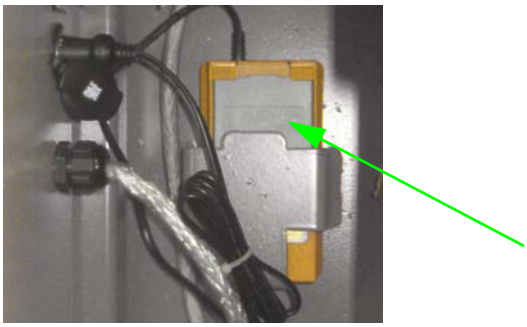
H. Synchronize radio control to machine [green button].

I. Set auxiliary function in crushing mode [black button].



3.3.10 Remote control battery recharging (if fitted)

1. Open the control box cabinet door and remove the charging unit from the holder.

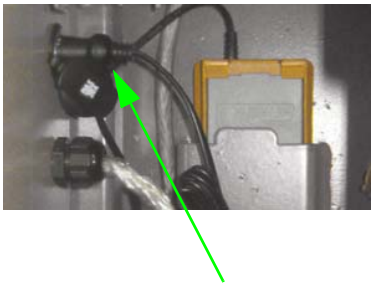


2. Remove the battery from the radio remote control.

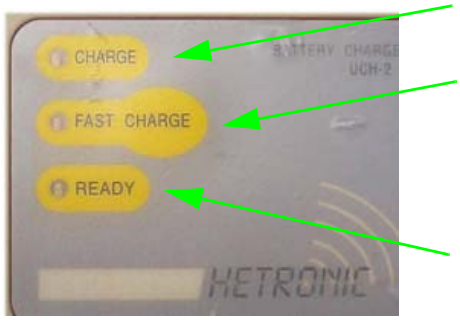
3. Fit the battery into the charge unit.

4. Connect charge unit plug into socket.

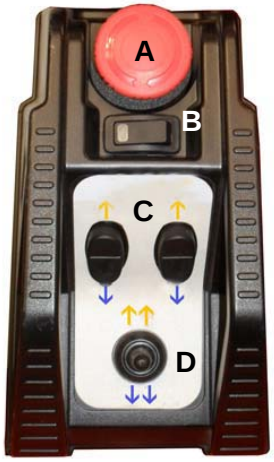
Note: Place charge unit into holder whilst it is charging.

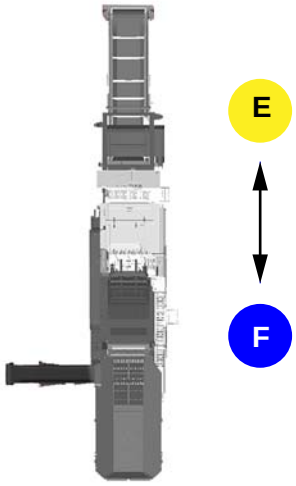


5. To charge the battery, press 'CHARGE'.
6. For quick recharge of the battery, press 'FAST CHARGE'
7. When battery charge cycle is complete, 'READY' illuminates green.



3.3.11 Wired umbilical track control





A. Emergency stop button.

B. Umbilical control ON/OFF switch.

C. Individual track controls.

D. Double track control for moving in straight line.

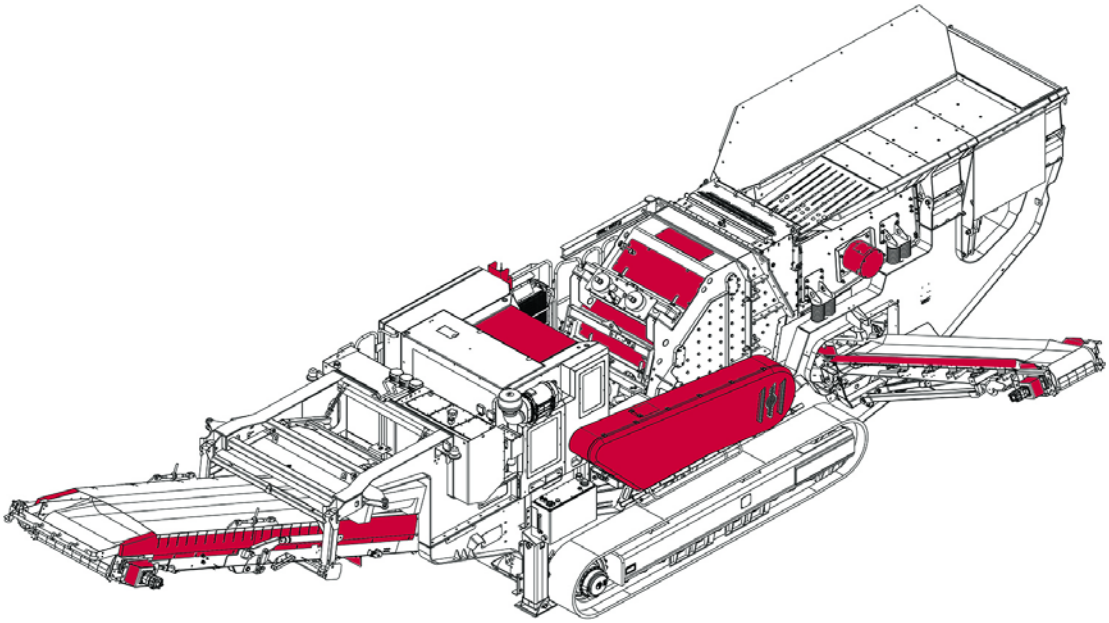
E. Yellow forward direction marker, main conveyor at front.

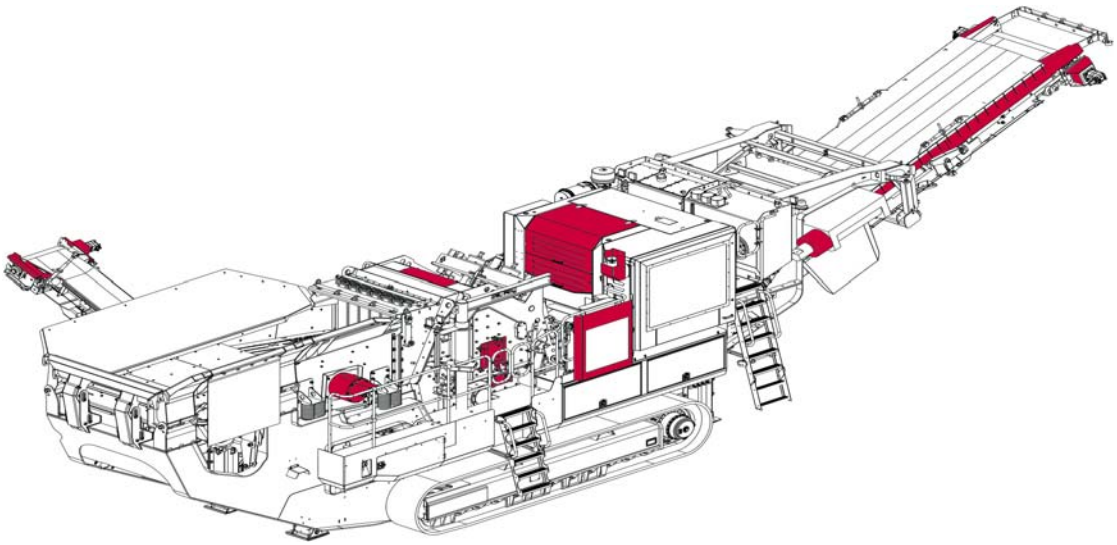
F. Blue back direction marker, feed hopper at rear.

3.4 Machine guarding

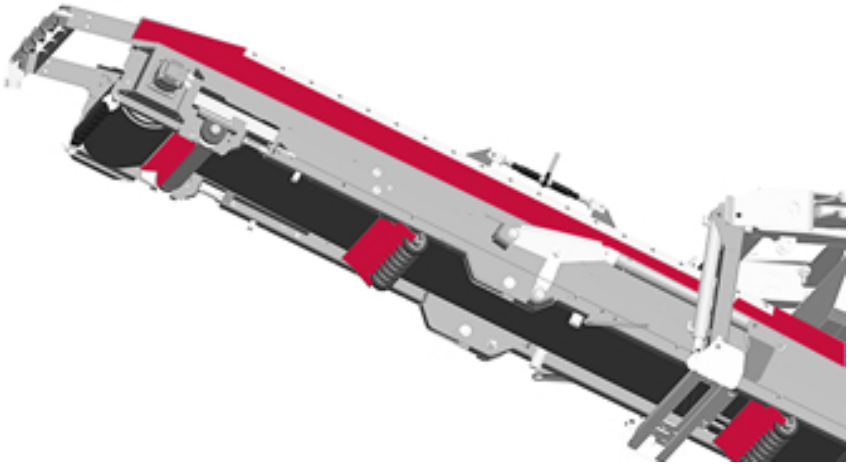
Guards shown in red,

Note: All guards must be fitted prior to operating the machine.



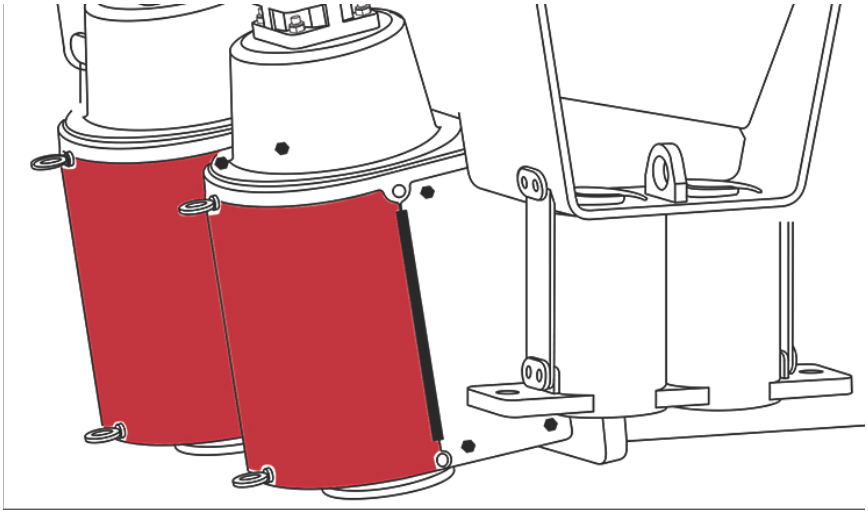


Main conveyor

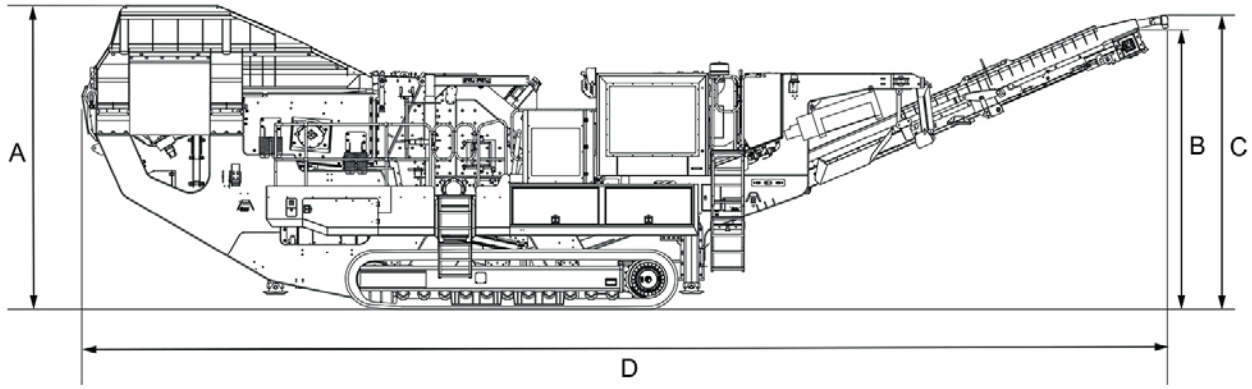


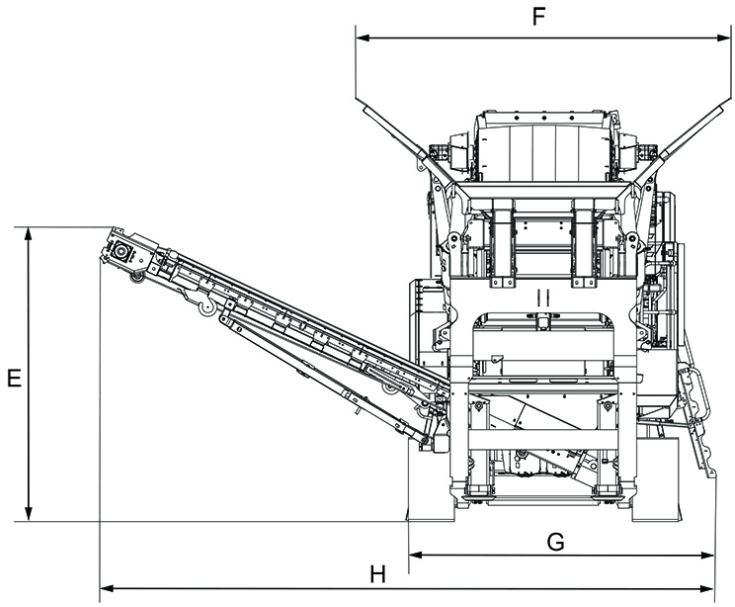
Natural Fines Conveyor

Pan feeder



3.5 Working dimensions





A	3975mm (13ft 1in) standard 4610mm (15ft 2in) hopper extensions
B	4210mm (13ft 10in)
C	4470mm (14ft 8in)
D	16520mm (54ft 2in)
E	3095mm (10ft 2in)
F	4080mm (13ft 5in) hopper extensions
G	3355mm (11ft)
H	6715mm (22ft)

4 Commissioning and shut down

4.1 General safety

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

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

⚠ WARNING	
	**PERSONNEL HAZARD** **Not using the minimum Personnel Protective Equipment (PPE) could cause serious injury or death, refer to *1.4 Personal protective equipment (PPE)*.** **Make sure that the minimum Personnel Protective Equipment (PPE) is used when working on or within 20m (66ft) of the machine, refer to *1.11 Hazard exclusion zones*.**

4.2 Pre-Commissioning

4.2.1 Pre-start instructions

⚠ WARNING

PERSONNEL HAZARD

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

Stop machine, isolate, remove ignition key and tag out, before carrying out these pre-start checks. Refer to *4.8 Lockout and tag procedure*.

⚠ WARNING

FALLING HAZARD

Falling from heights could cause serious injury or death.

Some of the steps in this procedure require working at height, if this is the case, make sure of the following:

- **Maintenance platforms are in place.**
- **All hand rails are fixed in position.**
- **All ladders are lowered and fixed in position.**
- **A safety harness is worn.**

NOTICE

RISK OF PROPERTY DAMAGE

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

NOTICE

RISK OF PROPERTY DAMAGE

The following instructions assumes transportation of the machine using a low loader type vehicle, delivering in close proximity to the site. If a machine is to be transported in any other way, contact the manufacturer for additional instructions.

1. Make sure 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. Visually inspect machine for the following:
   - There are no signs of impact damage.
   - All safety guards / safety devices are in place and secure.

- All machine components are in place and secure.
- There are no signs of ANY fluid or oil leaks including hydraulic hoses.

5. Check machine is in good mechanical condition and there is no component damage or loss.
6. Make sure all bolts and fixings are tight and all guards are in place with all safety devices operating correctly.
7. Make sure crusher chamber, feeder and conveyor belts are free of material.
8. Before starting the machine, make sure the aprons are not positioned low where they may collide with the rotor, refer to ***NOTICE***.
9. Carry out a full daily maintenance routine, Refer to ***6.4.1 Daily maintenance schedule***.
10. Remove all tools and equipment from the operational area.
11. Make sure all personnel are away from the machine, drives, tracks and auxiliary equipment.
12. Make sure pre-start checks outlined in the engine instruction manual are completed.
13. Make sure skirting rubbers and scrapers are in good condition and will work properly.
14. Remove any lockout tags from the machine if safe to do so, refer to ***4.8 Lockout and tag procedure***.

4.3 Engine starting procedure

4.3.1 Before starting engine

Make sure all emergency stops are reset, providing it is safe to do so, refer to ***3.3.7 To reset an emergency stop***.

DANGER

PERSONNEL HAZARD

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

DO NOT UNDER ANY CIRCUMSTANCES start the machine when ANY persons are standing on the machine or in the exclusion zones.

Make sure machine is NOT tagged out. DO NOT start machine if it is tagged out. Refer to *1.11 Hazard exclusion zones*.

WARNING

TIPPING HAZARD

Operating machine on unsuitable ground could cause serious injury or death. Both tracks must be in contact with firm level ground, suitable for carrying the machine weight.

The machine must never be moved on gradients more than 10° left to right.

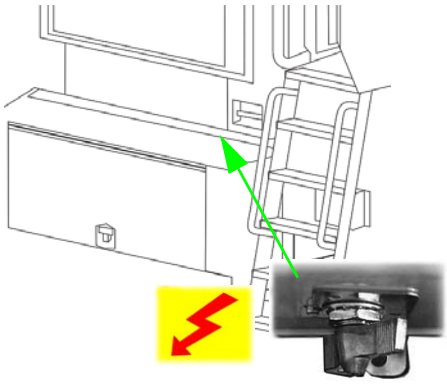
The standard machine must never be moved on gradients more than 20º front to back.

The hanging screen recirculation conveyor machine must never be moved on gradients more than 9° front to back.

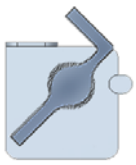
4.3.2 Engine start

Note: Make sure all scheduled maintenance checks are carried out. Refer to 6.4 Maintenance schedules.

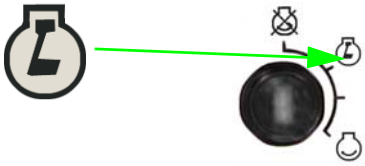
1. Locate the battery isolation switch.



2. Turn the battery isolator switch to the ON position.



3. Open the right hand cabinet door and turn ignition key clockwise to the first 'RUN' position.



4. Press the blue emergency stop reset button.

5. Turn ignition key fully clockwise to the 'START' position and hold until engine starts. The pre-start alarm will sound prior to the engine starting.

6. Release key slowly, which will return to 'RUN' position, when the engine starts. Engine will run at idling speed.

Note: If the key is released before the engine starts, repeat the procedure as above.

7. When the engine is running, the initial display will be shown.

NOTICE

RISK OF PROPERTY DAMAGE

Engine speed is pre-set at the factory and must not be tampered with.

When machine is switched off wait a minimum of 60 seconds before the start sequence is run again. An error code may show if started before this time has elapsed.

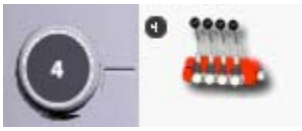
4.4 Initial screen display button icons

1. Use the machine for crushing, refer to ***5.3.1 Crushing operation***.

2. Move the machine on the tracks, refer to ***4.5 Moving the machine using the tracks***.

3. View the fault log, machine hours, hours to next service.

4. Set up the machine for crushing mode refer to ***4.6 Preparing the machine for operation*** or for transport mode, refer to ***2.1 Special considerations for transport***.



5. Engine information.

6. Adjust machine settings (via pass code).

4.5 Moving the machine using the tracks

4.5.1 Before moving the machine

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

- Make sure the loading or unloading site is clear of non-essential personnel. Erect barriers around the area and post warning signs where site conditions warrant this and perform necessary risk assessments.
- Loading or unloading must only be carried out on firm flat ground.
- For the weight of the machine, refer to the specification plate fixed to the machine.
- When moving the machine on the tracks, the operator must be in a position to have an all round view of the operation.
- Operator must be fully trained in the use of this equipment.
- An observer must warn of any potential hazards or dangers.
- Tracking must only be carried out on firm ground.
- For safety reasons, it is essential to check all around machine prior to and during tracking, for obstacles or personnel which may be endangered by moving the machine.

⚠ DANGER

MOVING MACHINE HAZARD

No persons should be on the machine or in the exclusion zone whilst the machine is being moved as this may cause injury or death.

DO NOT UNDER ANY CIRCUMSTANCES move the machine when ANY persons are standing on the machine or in the exclusion zones.

NOTICE

RISK OF PROPERTY DAMAGE

Raise the legs (if fitted) off the ground before machine is moved, refer to *2.2.8 Raising the hydraulic legs (if fitted)*. If the legs are not raised, damage may occur to the machine and surrounding area.

⚠ WARNING

RADIO INTERFERENCE HAZARD

There is a small possibility the radio frequency on the remote controllers may operate other machinery. Please use the wired connected umbilical controller if this is a problem.

4.5.2 Moving the machine

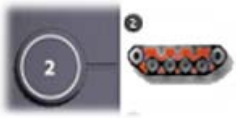
TIPPING HAZARD

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

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

1. Start the engine, refer to ***4.3 Engine starting procedure***

2. Select tracking mode button 2, on the initial screen.



3. Select track control option either the umbilical, button 1 or the radio remote button 2.

4. For the umbilical track control option. Refer to ***4.5.5 Moving using wired umbilical control***.

5. For the radio remote track control option. Refer to ***4.5.4 Moving using the radio remote control (if fitted)***.

4.5.3 Coloured direction indicators

The direction of travel is shown by the yellow and blue direction markers on the machine and on the control.

4.5.4 Moving using the radio remote control (if fitted)

For more information, also refer to ***3.3.9 Radio remote control (if fitted)***.

Note: In areas where interference is a particular problem use the umbilical wired control.

NOTICE

RISK OF PROPERTY DAMAGE.

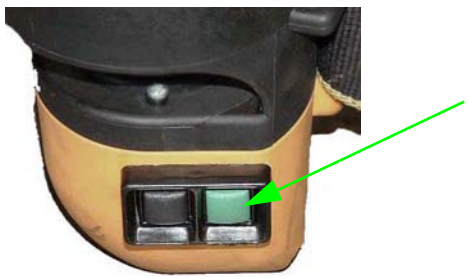
1. Check that the engine stop button is released by turning it clockwise.

2. Switch the radio remote control I (ON).

3. Wait until the green light flashes consistently.

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

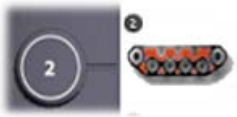
Note: Siren will sound and the beacon will flash it takes approximately 7 seconds for the radio system to become operational.



5. Moving the machine using the tracks is now possible using the two levers together to move in a straight line or individually to turn.

The direction of travel is shown by the yellow and blue direction markers on the machine and on the control.

6. Turn off tracking, press button 2.



7. To switch off the radio remote control turn knob to O (off).

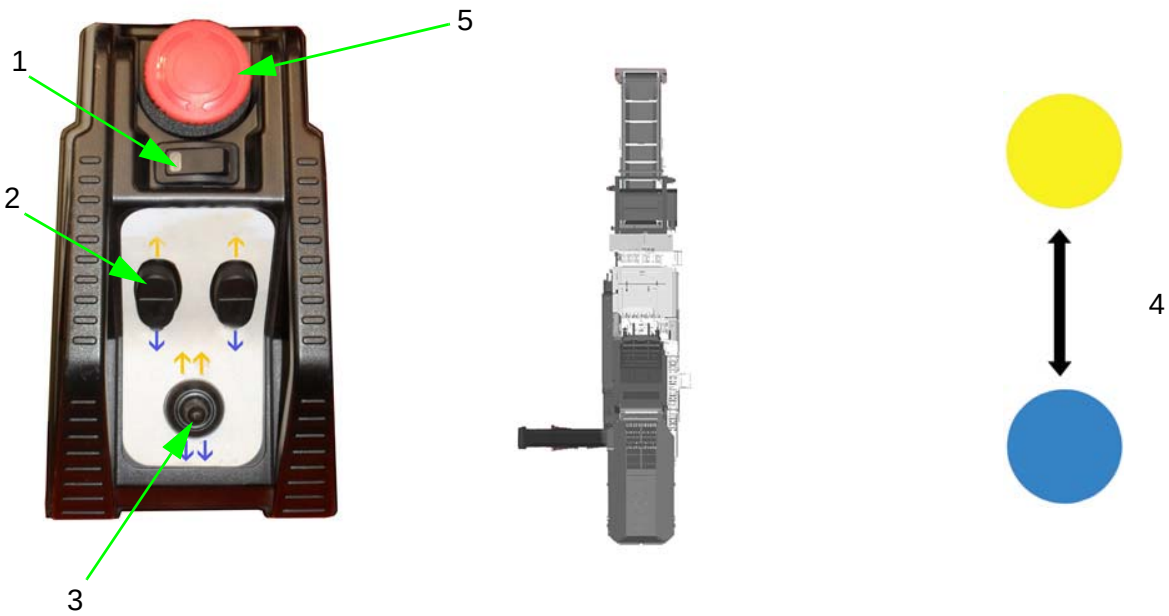
8. To return to previous screen, press escape.

⚠ WARNING	
	9. Switch off the engine and lockout refer to ***4.8 Lockout and tag procedure***.

The radio remote control must be fully recharged at regular intervals. Use the correct instructions for the controller, refer to ***3.3.10 Remote control battery recharging (if fitted)***.

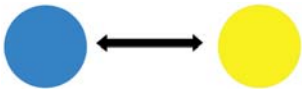
4.5.5 Moving using wired umbilical control

For more information, also refer to ***3.3.11 Wired umbilical track control***.



1. Switch the control ON.
2. Use the switches with a single arrow to control individual tracks.
3. Use the double arrow switch to control both tracks at the same speed to travel straight.

4. The direction of travel is shown by the yellow and blue direction markers on the machine and on the control.



5. In the event of an emergency press an emergency stop.

6. Turn off tracking, press button 2.

7. To return to previous screen, press escape.

4.6 Preparing the machine for operation

Note: Make sure Sandvik service personnel are available at the initial set up the machine.

⚠ WARNING

FALLING HAZARD

Falling from heights could cause serious injury or death.

Some parts of this procedure require working at height, therefore make sure maintenance platforms are in place, all hand rails are fixed in raised working position, all ladders are lowered and fixed in position and a safety harness is worn.

⚠ WARNING

PERSONNEL HAZARD

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

Stop machine, isolate, remove ignition key and tag out as required, before preparing crusher for operation. Refer to *4.8 Lockout and tag procedure*.

NEVER work or stand under suspended loads.

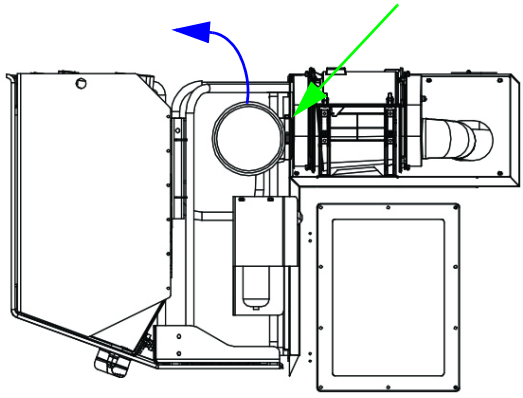
4.6.1 Air cleaner (working position)

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

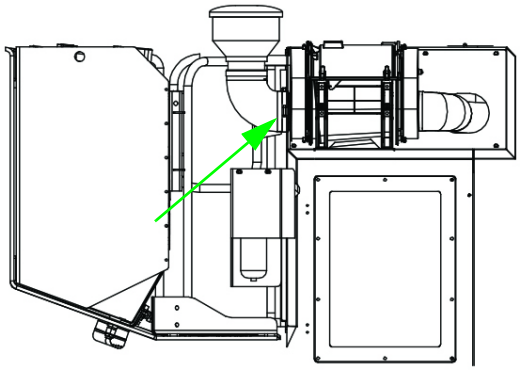
There are two types of air cleaner fitted to this machine both of which are shown.

Type 1 (Donaldson)

2. Using a suitable access platform as defined in a site specific risk assessment. Loosen the clamp, and rotate the air cleaner inlet counter clockwise.

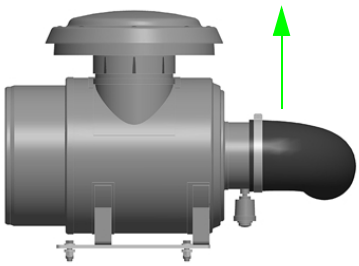


3. When the air cleaner inlet is in the working position tighten the clamp.

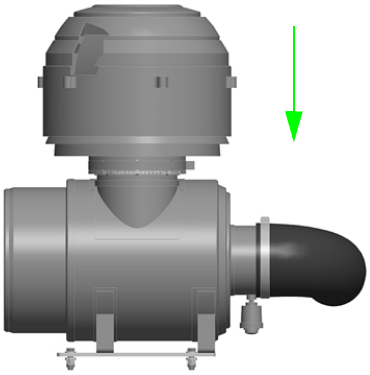


Type 2 (Caterpillar)

1. Using a suitable access platform as defined by a site specific risk assessment. Remove the transport cover from the main filter.



2. Fit the pre-cleaner on to the air filter, stow the transport cover in a safe secure place on the machine.



NOTICE

The pre-cleaner must be fitted when operating the machine failure to do so will restrict the air flow to the engine, and will result in damage to the engine. Also this will invalidate any manufacturers warranty.

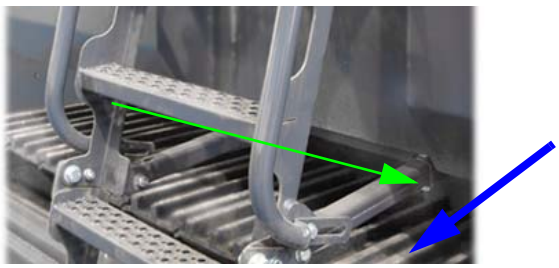
4.6.2 Set ladders for use

Care should be taken when folding and unfolding the ladders.

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***

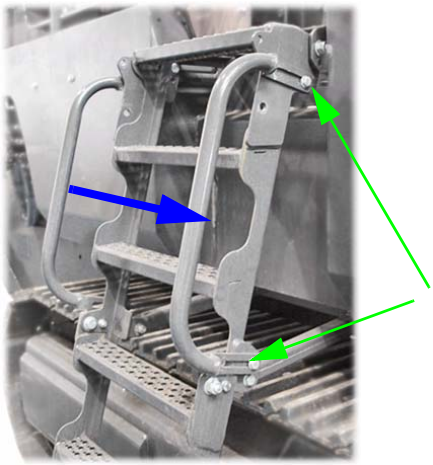
2. Remove the fixings at the top of the rear ladder. Slide out top of ladder.

3. Remove the fixings on the rear ladder and slide the ladder out then secure with the fixing.

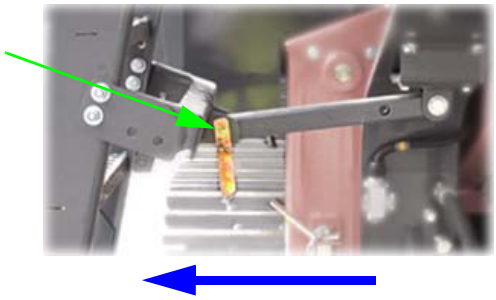


4. Remove the fixings and lower the ladder lower section. Refit the fixings to secure ladder in position for use.

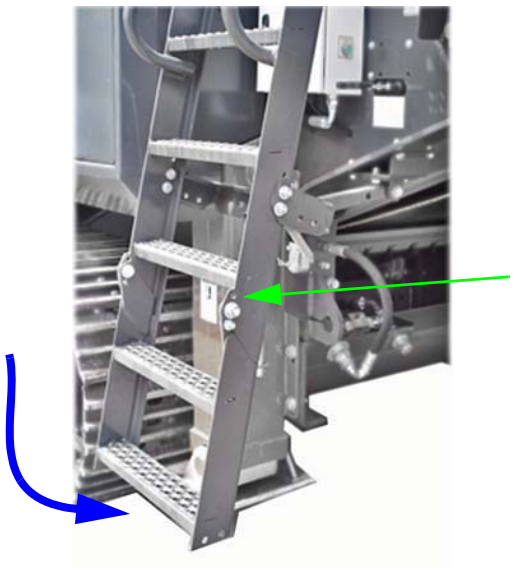
5. Loosen the four fixings on the handles (two either side) and slide out. Tighten the four fixings.



6. Remove the clip and pin on the front ladder and slide out. Refit the pin and clip to secure the ladder.



7. Remove the fixings and swing the lower section down. Refit the fixings to secure the ladder in place for use.



4.6.3 Lowering the hydraulic legs (if fitted)

⚠ WARNING

CRUSHING HAZARD

Carry out a site specific risk assessment prior to commencing ANY work operations.

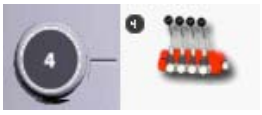
DO NOT UNDER ANY CIRCUMSTANCES operate the hydraulic legs when any personnel or objects are on or near the machine. Personnel near or on the machine are at risk of serious injury or death.

A MINIMUM of two persons are required for the following procedure, one to carry out the procedure and one to observe for potential hazards.

The legs are used only to stabilise the machine in addition to the tracks when crushing.

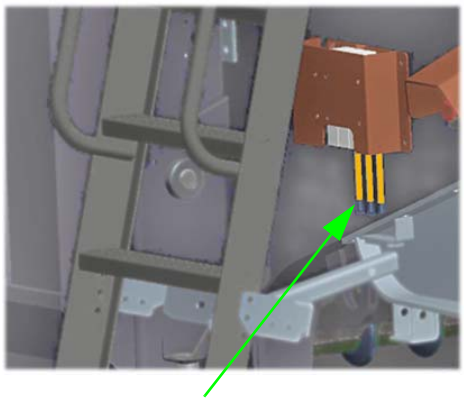
1. Start the engine, refer to ***4.3 Engine starting procedure***.
2. Press button 4 to select machine set up mode and enable the auxilliary hydraulic system. An alarm will sound, the icon will show a green border when ready.

   Note: The siren will sound continuously whilst in this mode.

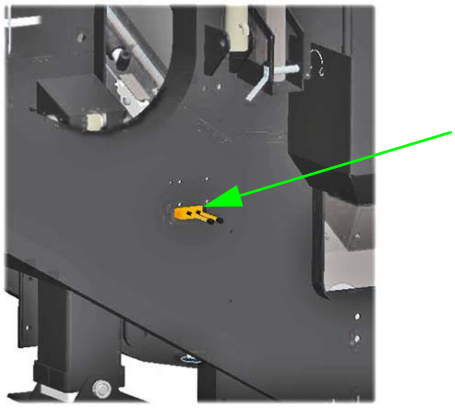


3. Operate the lever to lower the rear legs to stabilise the machine. The rear of the machine is indicated by the blue direction marker.

   Note: Operate the legs uniformly. The machine must be on a level surface before lowering the legs.



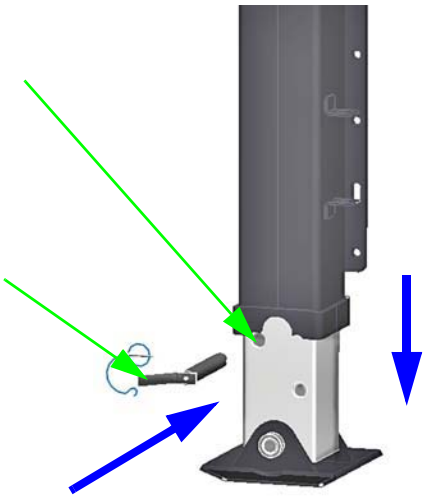
4. Operate the lever to lower the front legs. The the front of the machine is indicated by the yellow direction marker.



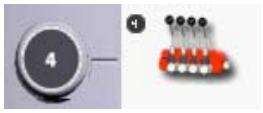
5. If the legs are to be used to assist with machine maintenance, remove the 'R' clips and retention pins from their storage holders.

6. Lower the inner legs as required, using the levers, until the suitable holes are visible.
7. Install retention pin into hole in the lowered leg and secure the bars with the 'R' clips.

Note: Do NOT operate machine for crushing whilst ONLY supported by the legs.



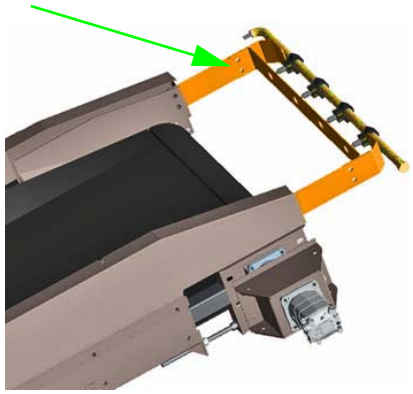
8. When finished, press button 4 again to deselect machine set up mode.



⚠ WARNING	
	9. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

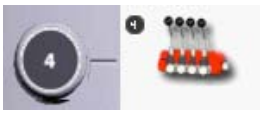
4.6.4 Main conveyor

1. Using a suitable access platform as defined in a site specific risk assessment unfold the water spray bar assembly.



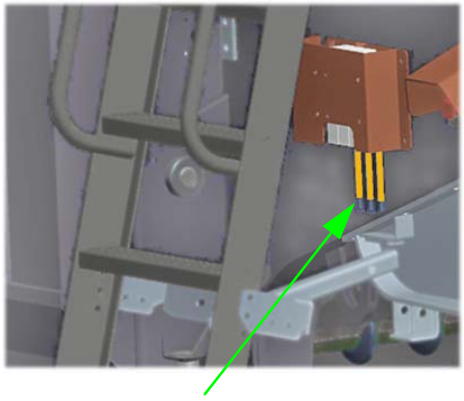
2. Start the engine, refer to ***4.3 Engine starting procedure***.

3. Press button 4 to select machine set up mode and enable the auxilliary hydraulic system. An alarm will sound, the icon will show a green border when ready.

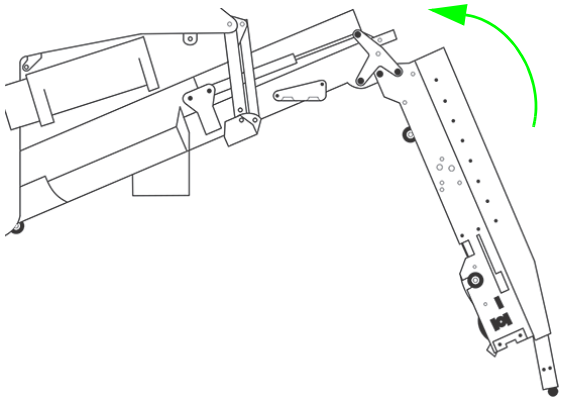


Note: The siren will sound continuously whilst in this mode.

4. Location of the hydraulic control lever for conveyor position operations.



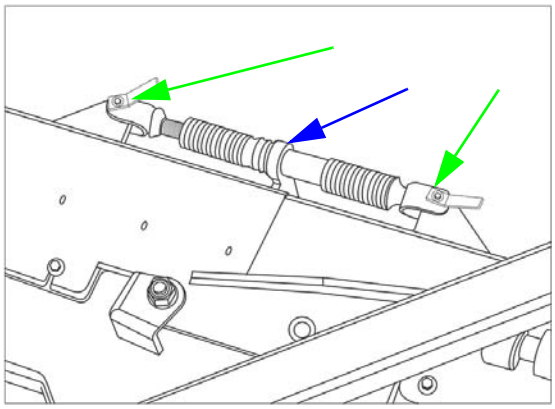
5. Use the control lever to raise the end of the main conveyor into the working position.



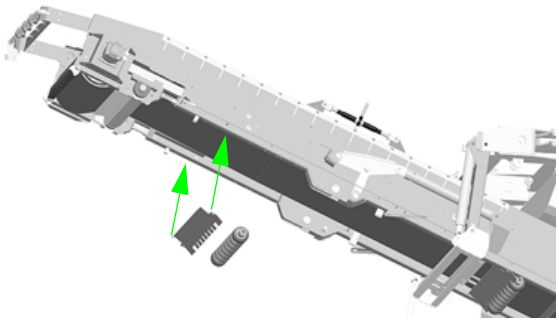
6. Press button 4 again to de-select machine set up mode.

⚠ WARNING	
	7. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

8. Using a suitable access platform as defined in a site specific risk assessment, refit the rachets and tighten (both sides).



9. Refit the return roller to the main conveyor.



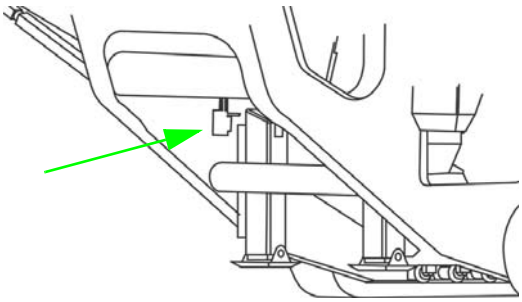
10.

4.6.5 Raising the hopper (manual lock)

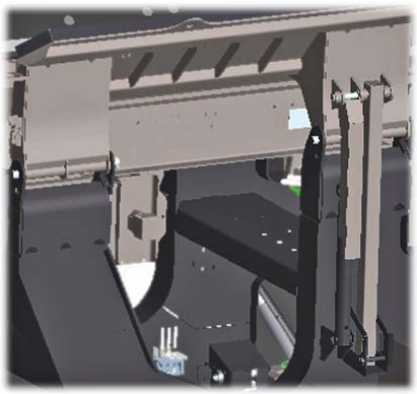
1. Start the engine, refer to ***4.3 Engine starting procedure***.
2. Press button 4 to select machine set up mode and enable the auxilliary hydraulic system. An alarm will sound, the icon will show a green border when ready.

Note: The siren will sound continuously whilst in this mode.

3. Location of the hopper hydraulic control levers.



4. Raise one hopper side using the hydraulic control levers.
5. Using a suitable access platform as defined by a site specific risk assessment, guide the side hopper prop onto the support plate.



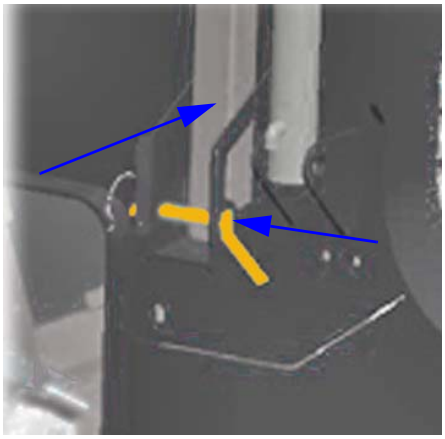
Note: An additional person is required to complete this action.

6. Press button 4 again to de-select machine set up mode.

⚠ WARNING

7. Switch off the engine and lockout refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***

8. Using a suitable access platform as defined by a site specific risk assessment, fit the locating pin and clip to secure prop in position.



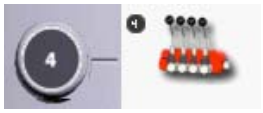
Repeat hopper side raising procedure for the other side.

4.6.6 Raise the hopper end

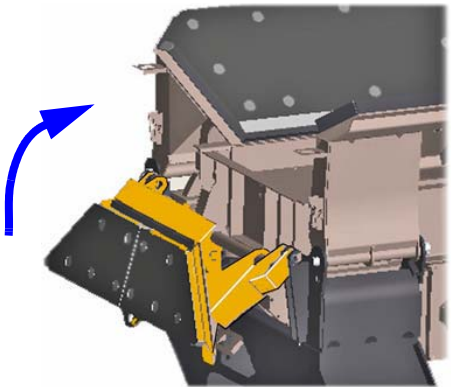
9. Start the engine, refer to ***4.3 Engine starting procedure***.

10. Press button 4 to select machine set up mode and enable the auxilliary hydraulic system. An alarm will sound, the icon will show a green border when ready.

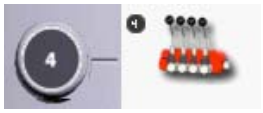
Note: The siren will sound continuously whilst in this mode.



11. Raise the hopper rear using the hydraulic control lever.



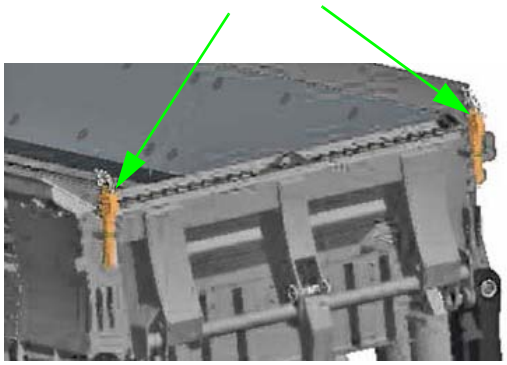
12. Press button 4 again to de-select machine set up mode.



⚠ WARNING

13. Switch off the engine and lockout refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

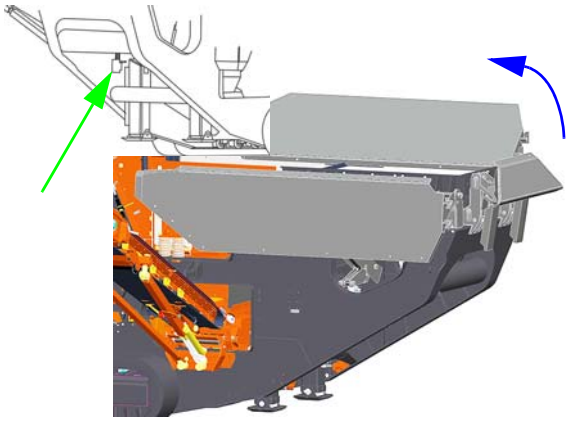
14. Using a suitable access platform as defined by a site specific risk assessment, fit the locating wedges and clips.



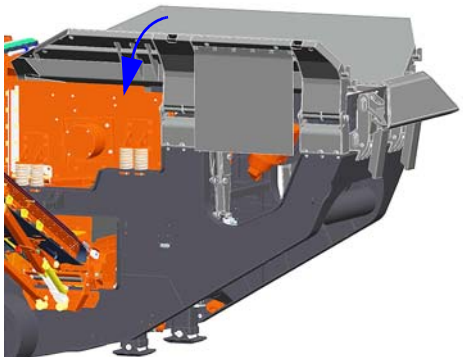
4.6.7 Hopper (automatic lock)

1. Start the engine refer to ***4.3 Engine starting procedure***.
2. At initial display, press button 4 to select machine set up mode and enable the auxiliary hydraulic system. An alarm will sound.

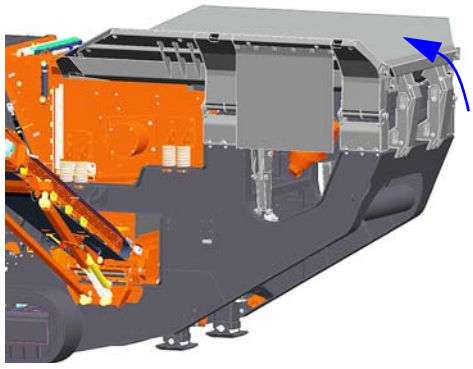
3. Using the hydraulic controls, raise the right hopper side.



4. Raise the left hopper side.



5. Raise the hopper rear

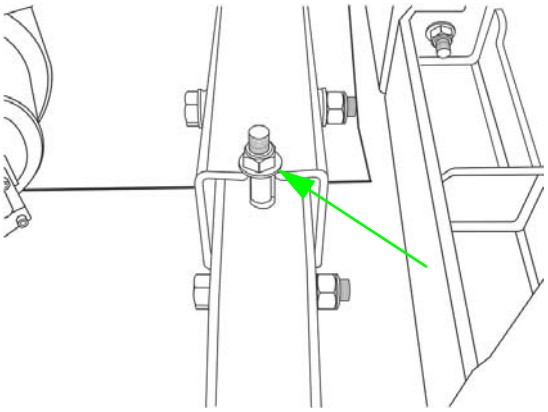


6. Press button 4 again to de-select machine set up mode.

⚠ WARNING	
	7. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

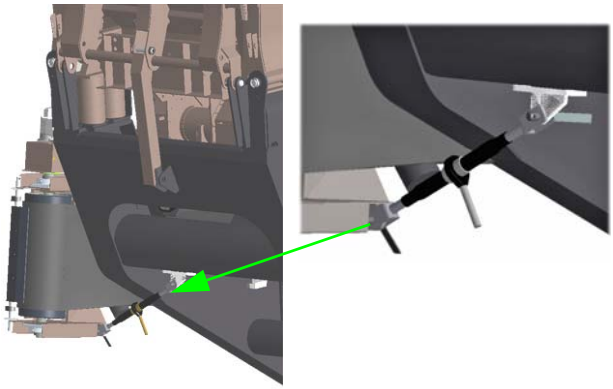
8. Tighten the locking bolts.

   Note: Underneath hopper both sides.



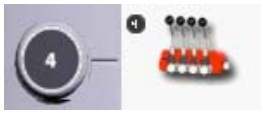
4.6.8 Natural fines side conveyor (if fitted)

1. Slacken the torque arm and remove the two locating pins. Remove the torque arm and stow in a safe place.



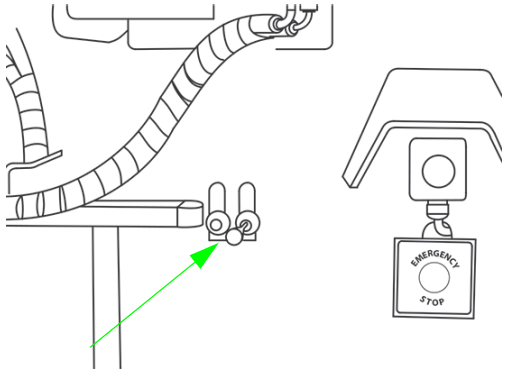
2. Start the engine, refer to ***4.3 Engine starting procedure***.

3. Press button 4 to select machine set up mode and enable the auxilliary hydraulic system. An alarm will sound, the icon will show a green border when ready.

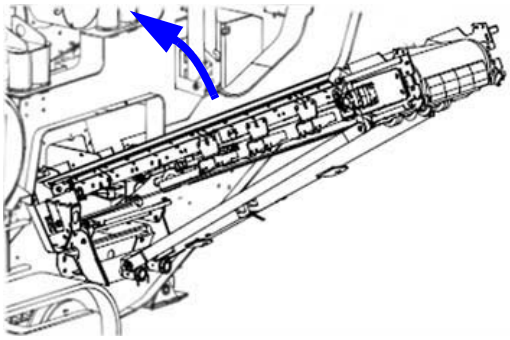


Note: The siren will sound continuously whilst in this mode.

4. Location of the hydraulic control lever for natural fines side conveyor.



5. Raise the natural fines conveyor fully in to the working position.

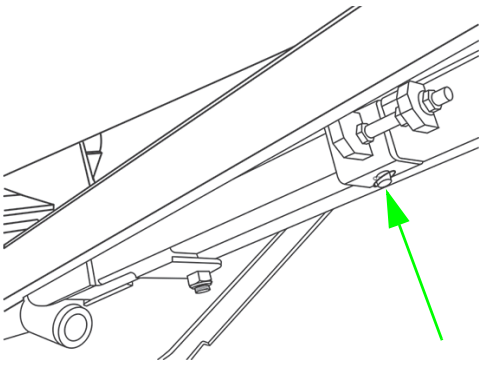


Note: Take care when unfolding the conveyor the speed wheel does not become trapped.

6. Press button 4 again to de-select machine set up mode.

⚠ WARNING	
	7. Switch off the engine and lockout refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

8. Remove the clip and locating pin from the slide stop and slide it to the upper position and refit the locating pin.

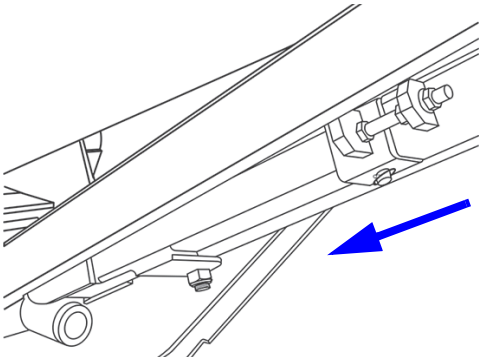


9. Start the engine, refer to ***4.3 Engine starting procedure***.

10. Press button 4 to select machine set up mode and enable the auxilliary hydraulic system. An alarm will sound, the icon will show a green border when ready.

Note: The siren will sound continuously whilst in this mode.

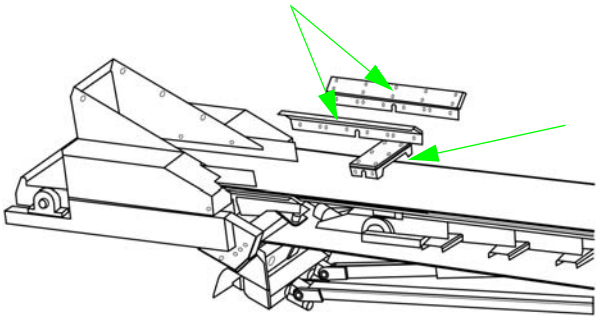
11. Lower the natural fines conveyor on to the slide stop.



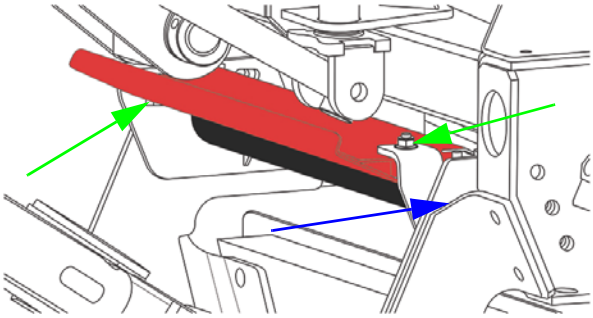
12. Press button 4 again to de-select machine set up mode.

⚠ WARNING	
	13. Switch off the engine and lockout refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

14. Attach the lower belt support underneath and the belt troughs sides to the mid section.



15. Refit the idler roller assembly.

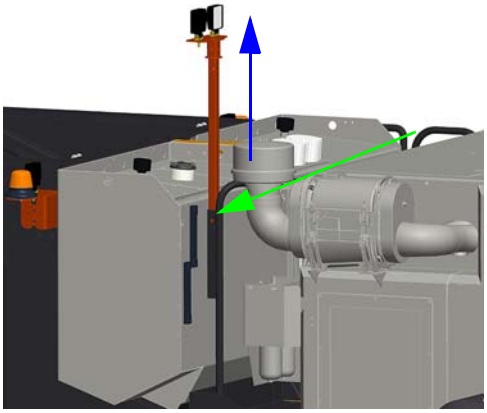


4.6.9 Lighting masts (if fitted)

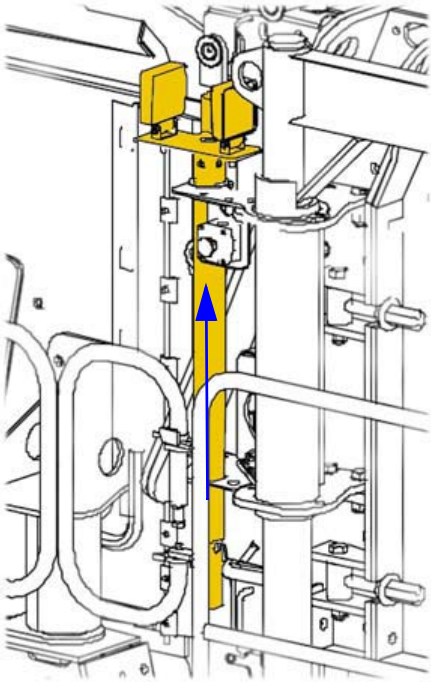
If lighting masts are fitted, they will require raising in to there working positions.

Engine canopy

1. If the lighting mast is fitted, remove the clip and locking pin and raise the mast in to the working position. Refit the locking pin and clip in the new position.



2. Remove the clip and pin then raise the lighting mast into the working position. Refit the pin and clip in the new position.



4.7 Shut down the machine

4.7.1 Automatic mode shut down

If the machine is operating in automatic mode, proceed as follows:

Stop loading material into the feeder and wait until there is no more material on or in the machine.

Wait for all material to be fully discharged from the feeder, crusher chamber and all conveyors.

To stop the automatic operation and shut down the machine, press stop button. The stop icon will be highlighted. The alarm will sound prior to the automatic shut down.

The components will stop in the following sequence:

- Feeder
- Prescreen
- Natural fines side conveyor
- Pan feeder
- Main conveyor
- Crusher
- Engine speed reduced

There is a time delay sequence before each component stops.

Wait for the crusher to stop completely before switching off the engine, lockout and tag out, refer to ***4.8 Lockout and tag procedure***/

4.7.2 Manual mode shut down

If the machine is operating in manual mode, proceed as follows:

Stop loading material into the feeder and wait until there is no more material on or in the machine.

Wait for all material to be fully discharged from the feeder, crusher chamber and all conveyors.

NOTICE

RISK OF PROPERTY DAMAGE.

When shutting down the machine in manual mode it is ESSENTIAL that the following steps are followed in the order shown, to prevent damage to the machine. The controls will only allow the correct sequence to be followed and there is a delay between sequence stops.

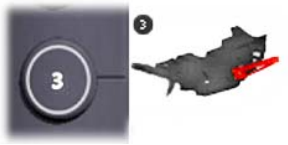
To stop the operation and shut down the machine, press stop button. The stop icon will be highlighted. The alarm will sound prior to the automatic shut down.

The components must be stopped in the following sequence:

1. Feeder

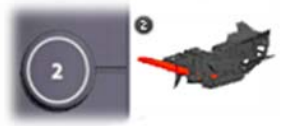
2. Pre-screen

3. Natural fines side conveyor

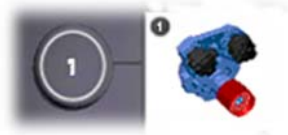


4. Pan feeder

5. Main conveyor



6. Crusher



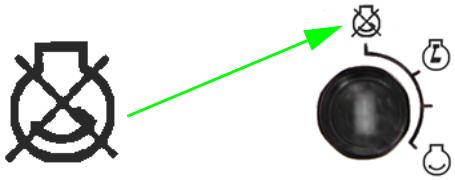
7. Reduce engine speed

Wait for the crusher to stop completely before switching off the engine, lockout and tag out, refer to ***4.8 Lockout and tag procedure***.

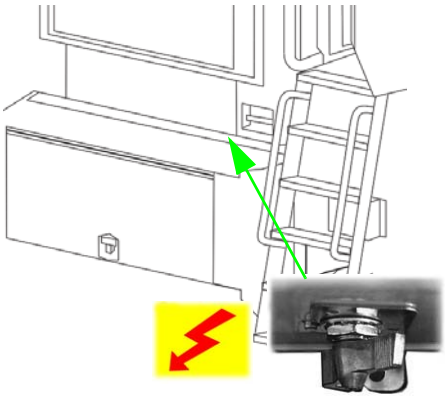
4.8 Lockout and tag procedure

4.8.1 How to fit a single lock or tag

1. Make sure the ignition key is in the 'OFF' position. Remove the ignition key and keep it with you.



2. Locate the battery isolation switch.



3. Turn battery isolator switch to the OFF position.

4. Attach your lock or tag across isolation switch holes to show you are working on the machine.

Note: The lock or tag must have a 7.9mm (5/16in) diameter shackle, so the isolation switch cannot be turned ON.

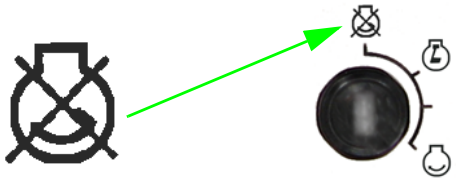
Note: Use a gang tag if more than one person is at work on the machine, refer to 4.8.4 To remove a gang tag.

4.8.2 To remove a single tag

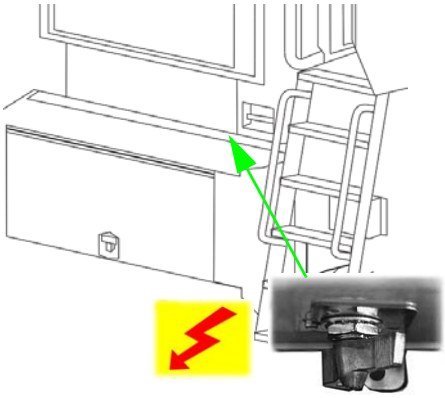
1. Make sure ALL maintenance and work has been completed, and no persons are on or near the machine.
2. Fit and secure ALL guards. Check ALL guards are operational.
3. Unlock and remove your single lock or tag from isolation switch.
4. Replace the ignition key.
5. If a gang tag for multiple locks or tags has been used, refer to ***4.8.4 To remove a gang tag***.

4.8.3 How to fit a gang tag

1. Make sure the ignition key is in the 'OFF' position. Remove key and keep it secure until all personnel working on the machine have finished and are clear from it.



2. Locate the battery isolation switch.



3. Turn battery isolator switch to the OFF position.

4. Attach the gang tag as shown.
5. Each person attaches there lock to the gang tag BEFORE they start work and keeps there key with them at all times.

Note: The lock or tag must have a 7.9mm (5/16in) diameter shackle, so the isolation switch cannot be turned ON.

4.8.4 To remove a gang tag

1. Once each person finishes their work they remove ONLY their own lock from the gang tag.
2. When the last person has finished their work and the last lock is removed, the gang tag may also be removed.
3. Replace the ignition key, if all personnel have finished and are clear of the machine

5 Operations

5.1 Operations - minimum safety requirements

The following safety instructions apply throughout the operation section, additional and or variations in safety measures that are specific to the relevant operations procedure will be detailed in the body of the text.

⚠ DANGER

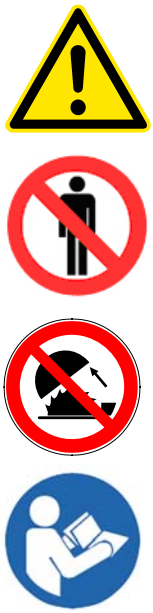
INHALATION, BREATHING HAZARD

Operating this machine generates dust. Breathing or inhaling silica dust particles will cause death or serious injury.

Make sure suitable breathing equipment is used throughout ANY operational activities. ALL necessary precautions MUST be taken to reduce the risk of breathing dust particles.

ALWAYS wear at least the minimum (CE approved) Personal Protective Equipment (PPE). Refer to *1.4 Personal protective equipment (PPE)*.

⚠ WARNING



PERSONNEL HAZARD

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

DO NOT stand on machine whilst it is in operation.

Limit access to equipment and surroundings throughout operational activities, refer to *1.11 Hazard exclusion zones* in the safety section.

Always make sure that all safety guards are installed and in correct working order before operating this machine. Failure to do so could cause serious injury or death.

Do not start any operational activity until you have read and fully understand this manual, including the safety section.

If there is a operational procedure that is not fully understood contact Sandvik before commencing with the operation.

For general information and the safe operating principles of the impact crusher, refer also to the separate Sandvik crusher manual. The instructions supplied with the impact crusher are intended for a crusher installed and operated in a static position with different controls but are included for information and reference.

5.2 Operation display page icons

The display will show a standard machine

Standard machine

Common icons

Stop crushing operation

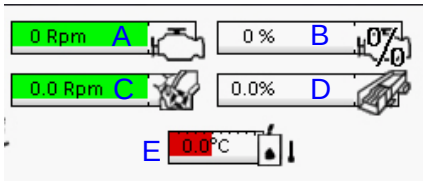
Next display page

Previous display page

ESC - Return to initial display

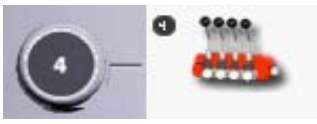
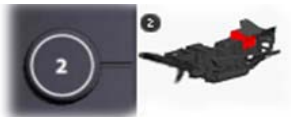
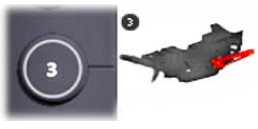
General information display

A. Engine speed
B. Engine load
C. Crusher speed
D. Feeder load
E. Oil temperature



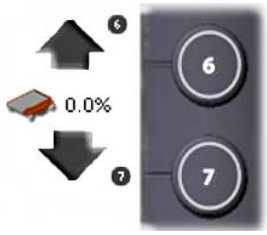
Initial display

Crushing mode

Track mode	
Machine log	
Auxilliary hydraulic mode	
Engine information	
Adjust machine settings (via pass code)	
Display 1 Automatic start up	
Manual start up	
Display 2 Pre- screen start/stop	
Natural fines conveyor (if fitted) start/stop	
Feeder radio control (if fitted) On/Off	
Feeder Start/Stop	

Feeder speed increase

Feeder speed decrease

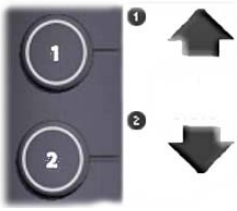


Rotor speed (engine speed)

Display 3

Increase feeder high load setting

Decrease feeder high load setting



Automatic feeder load control ON/OFF

Increase feeder low load setting

Decrease feeder low load setting

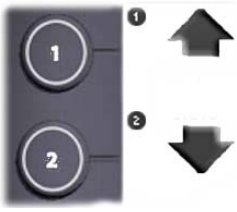
View the fault log

Engineer adjustments (via pass code)

Display 4

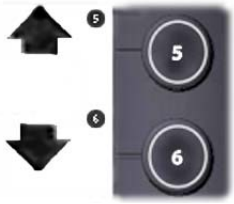
Increase effective time for high load feeder control

Decrease effective time for high load feeder control



Increase effective time for low load feeder control

Decrease effective time for low load feeder control



Display 5

Open crusher inlet temporarily to allow larger size material in to the crusher

Close crusher inlet

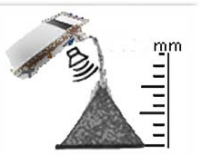
Engine information

5.2.1 Option displays

Additional displays are available when options are fitted.

Display 6

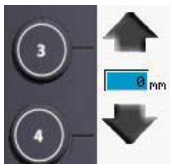
Stockpile sensor (if fitted)



Increase distance to stockpile

Decrease distance to stockpile

- Distance of 200mm will switch sensor OFF



Feeder conveyor re-start

- Red indicates manual re-start required
- Green indicates automatic re-start

24v hydraulic pump motor switch

- Highlighted green ON
- Not highlighted OFF

Display 7 If a machine is feeding this machine or this machine is feeding another, the following display will be available:	
Upstream	**Downstream**
Button 1 Stop delay (Seconds) xx-->	<-- Stop delay (Seconds) xxButton 5
Button 2 Restart delay (Seconds) xx-->	<-- Restart delay (Seconds) xx Button 6

To amend the times, press the appropriate button.

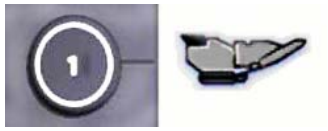
5.3 Machine crushing modes

5.3.1 Crushing operation

NOTICE

DO NOT ATTEMPT TO START THE CRUSHER UNLESS IT IS EMPTY OF MATERIAL.

1. Follow at least the minimum safety requirements during all operational activities. Refer to ***5.1 Operations - minimum safety requirements***.
2. Check that the machine is fully set up for operation. Refer to ***4.6 Preparing the machine for operation***.
3. Do any outstanding schedule maintenance checks and work. Refer to ***6.4 Maintenance schedules***.
4. Start the engine, refer to ***4.3 Engine starting procedure***.
5. At the initial display, select plant crushing mode press button 1.



5.3.2 Methods of operation

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

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

DO not start the machine if it is full of material.

Clear any material away before starting.

PERSONNEL HAZARD

The following tasks must be completed before starting the crushing operation.

Identify potential hazards that could impact you, your colleagues, the environment, your equipment and or work method while you are performing the task.

Assess the hazards to determine what scale of control is required apply the controls to manage the risk.

Use the correct PPE, refer to *1.4 Personal protective equipment (PPE)*

5.4 Automatic mode

1. At operation display press button1

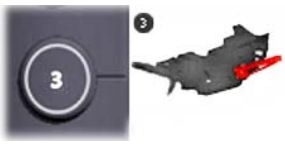
Each sequence of the operation will be highlighted as it starts. A warning is activated prior to each function starting in the following sequence:

- Automatic operation display 1 will be displayed.
- Engine speed will increase from idle speed.
- Clutch engages to start the Impact crusher and when fully engaged the speed will increase to operational speed.
- Pan feeder starts.
- Main conveyor starts.
- Fines conveyor starts, if applicable.

2. Press button 2 to start the pre-screen.

3. Press button 3 to start the natural fines side conveyor, if required.

Note: Check position of conveyor and natural fines bypass chute.



4. Press button 5 to start the feeder.

5.5 Manual start mode

Each operation will not be enabled until the parameters of the previous operation are satisfactory.

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

Note: A siren will sound and a beacon will flash prior to each system starting, there is also a ten second delay.

1. Start the engine, refer to ***4.3 Engine starting procedure***.

2. At the initial display, press button 1 to select plant crushing operation mode.

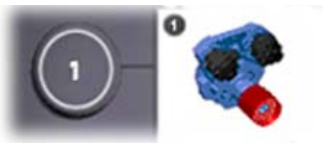
3. Select manual start menu, press button 2.

Each operation will not be enabled until the parameters of the previous operation are satisfactory.

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

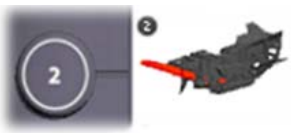
Note: A siren will sound and a beacon will flash prior to each system starting, there is also a time delay.

4. At the initial display, press button 1 to engage the clutch to start the crusher.

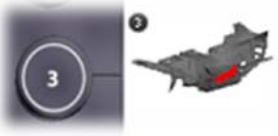


5. Press arrow up button to increase the engine speed to at least 1700rpm.

6. Press button 2 to start the main conveyor.

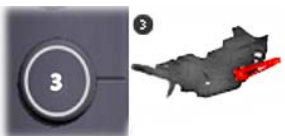


7. Press button 3 to start the pan feeder.



8. Press button 3 to start the natural fines conveyor, if required.

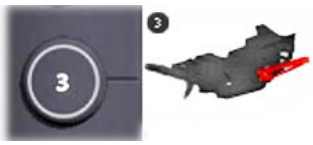
Note: Check position of conveyor and natural fines bypass chute.



9. Press button 2 to start the pre-screen.

10. Press button 3 to start the pan feeder under the crusher.

Note: The next display will then be shown.



NOTICE

It is recommended that the natural fines side conveyor is in the operating position and running in all conditions.

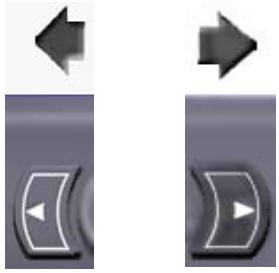
11. Adjust the engine and speed if required, press Up button to increase or Down button to decrease.

5.6 Feeder controls

The feeder can be operated manually, by radio remote control or regulated by the engine load sensor.

5.6.1 Manual start and stop

1. Use the left or right arrows to scroll to operation display 2.

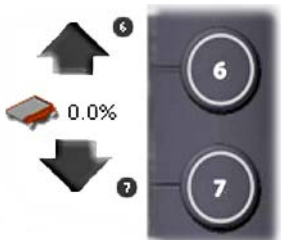


2. Press button 5 to start and stop the feeder.

5.6.2 Manual speed control of feeder

1. Adjust the speed of the feeder to suit the application using the Up and Down arrow buttons.

Note: The speed range is adjustable within a fixed range.



5.6.3 Radio control of feeder

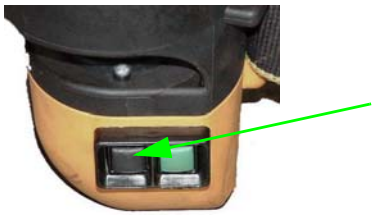
1. Turn the radio control On

2. Press button 4 to activate the radio remote to control the feeder.

3. Press green button on the radio to synchronise it to the machine. The green light will flash.

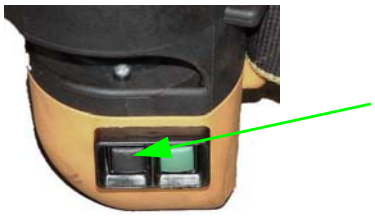
4. Push switch to the left to switch the feeder On and Off.

5. To enable the speed of the feeder to be controlled, press the black button.



6. The feeder speed can be increased by pushing the left hand lever forward, decreased by pulling back.

7. Press black button again to disable the speed adjustment.

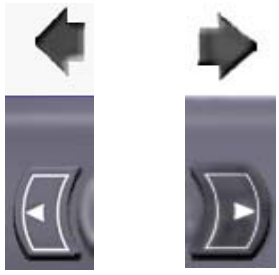


5.6.4 Engine load feeder control

⚠ WARNING	
	**PERSONNEL HAZARD** **Make sue the level sensor is correctly set.** **If it is not correctly set feed material may be ejected from the feed chute box.**

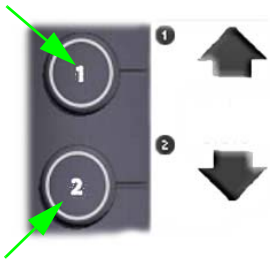
The feeder speed can be regulated via the engine speed maintaining a regular feed in to the crusher.

1. Press left or right arrow buttons to scroll to display 3 of the crushing operation display.

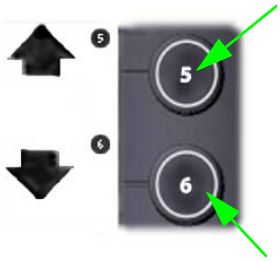


2. At the operation display, press button 3 to activate the engine load feeder control, highlighted green when active. Press button again to deactivate.

3. Press button1 to increase the high engine load value.
4. Press button 2 to decrease the high engine load value.



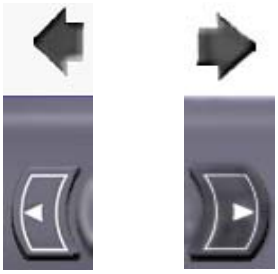
5. Press button 5 to increase the low engine load value.
6. Press button 6 to decrease the low engine load value.



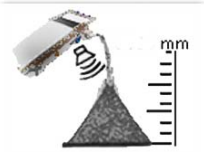
5.7 Stockpile sensor (if fitted)

If a sensor is fitted to the end of the conveyor delivering to a stockpile, it will stop the feeder when the material reaches a set distance below the end of the sensor.

1. Press the left or right arrow buttons and scroll to display 6 of the crushing operation displays.



2. Dimension setting for stockpile sensor to control the feeder.



3. Press button 3 to increase the distance from the sensor to the stockpile, to make the stockpile lower before stopping the feeder.

   Note: See notice below.

4. Press button 4 to decrease the distance from the sensor to the stockpile, to make the stockpile higher before stopping the feeder.

5. Press button 8 to turn ON/OFF the automatic feeder restart.

Red arrows = Manual restart feeder.

Green arrows = Automatic restart feeder.

NOTICE

RISK OF PROPERTY DAMAGE

The stockpile should never be allowed above the conveyor as this may cause damage to the conveyor and its drive system.

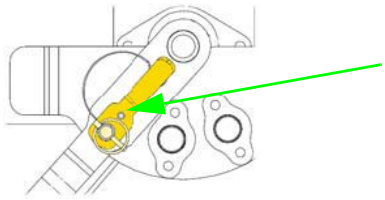
5.8 Diverter plate

The pre-screen separates the smaller fines size material in the feed into the diverter chute, which the diverter plate position then controls how this graded material is directed. It can deliver either all, half or none of this smaller, fines material to the natural fines side conveyor.

NOTICE

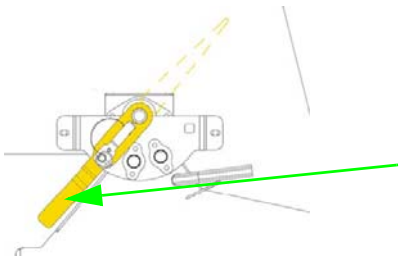
It is recommended that the natural fines side conveyor is in the operating position and running in all conditions.

1. Remove the clip and pin then move the handle to the position required.



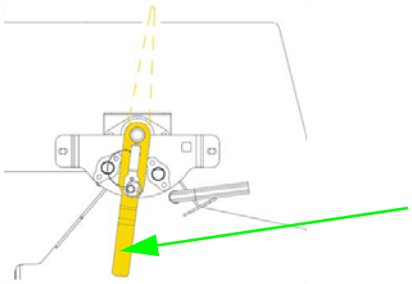
2. With handle in this position all graded material is diverted onto the natural fines side conveyor to a separate stockpile.

   Note: This is the normal operating position. The natural fines side conveyor must be operating.



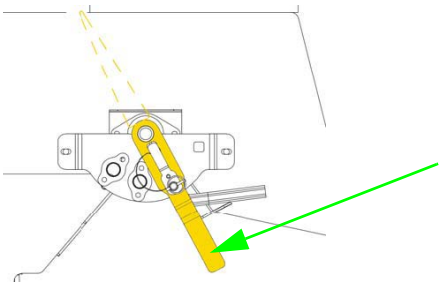
3. With handle in this position half of the graded material is diverted on to the natural fines side conveyor and half to the crusher.

   Note: The natural fines side conveyor must be operating.

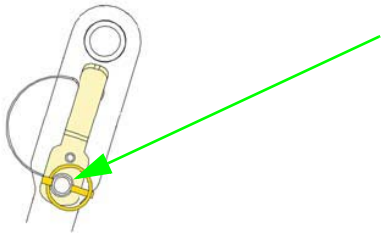


4. With handle in this position, none of the graded material is delivered to the natural fines side conveyor but is mixed with the crushed material.

   Note: It is recommended that the natural fines side conveyor is operating.



5. Fit the pin and clip to secure the handle in position before starting the machine.



5.9 Feeding material in to the machine

5.9.1 Before starting

Follow at least the minimum safety requirements during all operational activities, refer to***5.1 Operations - minimum safety requirements***.

Set machine for operation, refer to ***4.6 Preparing the machine for operation***.

Make sure any outstanding scheduled maintenance checks and operations are completed, refer to ***6.4 Maintenance schedules***.

Make sure the crusher, all conveyors and feeders are operating correctly, refer to ***5.3 Machine crushing modes***.

5.9.2 Loading hopper with material

⚠ WARNING

FLYING MATERIAL HAZARD

Risk of injury to personnel. The impactor may eject material to the rear of the machine. It is recommended to load the feeder from the sides only.

The following applies when loading material into the hopper:

- Load the hopper at regular intervals at a steady flow. Always fill up the hopper before it is empty. Supply material into hopper steadily and constantly to give maximum output and minimum wear. Avoid start and stop operations of the feeder.
- Never drop the material from height into the hopper. Always lower the bucket close to the hopper when loading. Place material carefully into the hopper no greater height than 300mm (12in) above the hopper.
- Do not over fill hopper.
- Never feed combustible process material into the crusher.
- Remove the stockpile of crushed material before it reaches discharge conveyor.
- Never use the bucket to force too large material into the crusher.
- Accidental contact between bucket and feeder may cause vibrations that can damage the feeder.
- Never load on the pre-screen section of the feeder or directly into the crusher.

Adjust the speed of the 'CI' crusher and feeder to suit the material being processed.

For general information and the safe operating principles of the 'CI' crusher, refer also to the impact crusher manuals. The instructions supplied with the impact crusher are intended for a crusher installed and operated in a static position with some different controls but are included for information and reference.

5.10 Crusher blockages

5.10.1 Safety

DANGER	
	**RISK OF CRUSHING** **Never stand inside the crusher when a blockage is being removed. You might be pulled forcefully and suddenly downwards together with the material in the crushing chamber and be crushed.**

WARNING	
	**FLYING FRAGMENTS** **Never use wedges etc, to clear blockages in the feed opening. Stones and fragments can be thrown out at high speed from the crushing chamber.**

WARNING	
	**EXPLOSIVES** **Never remove a blockage from the crusher by explosive blasting. Blasting may cause personal injury and seriously damage bearings or other parts. Sandvik takes no responsibility for injury to personnel or damage to the equipment when blasting is used.**

5.10.2 Blocked crusher

If the crusher becomes blocked and is stopped, do not attempt to start when full of material. Refer to ***6.8 Impactor chamber access*** to open crusher chamber and clear a blockage.

5.10.3 Open upper curtain to clear the obstruction

In some cases it may be possible to clear the blockage by raising the upper curtain temporarily.

If the machine is operating and an object is obstructing the material flow, the upper curtain can be raised which may release the object and clear the chamber.

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements* before attempting to clear a blockage.

1. Press right arrow to scroll to display 3.

2. Press button 3 to raise the curtain.

3. Press button 4 to lower the curtain.

5.10.4 Open crusher inlet to clear obstruction

In some cases it may be possible to clear the blockage by opening the crusher inlet temporarily.

If the machine is operating and an object is obstructing the material flow, the crusher inlet can be raised which may release the object and clear the chamber.

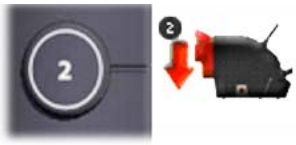
⚠ WARNING	
	**FLYING MATERIAL HAZARD** **Risk of injury to personnel. The impactor may eject material with the inlet aperture larger. Only open the inlet temporarily to allow a larger piece of material into the crusher.**

1. Press right arrow to scroll to display 3.

2. Press and hold button 1 to temporarily increase the crusher inlet size. When this button is released, the inlet will return to the normal position after a short delay.

Note: The impactor may eject material with the inlet aperture larger. Only open the inlet temporarily to allow a larger piece of material in to the crusher.

3. Press button 2 to close crusher inlet to the normal position without delay.



5.10.5 Unblocking the machine using the radio remote

1. Enable the radio remote by pressing button 4 on the display screen.

2. Switch the radio remote handset ON.

3. Press the green button on the radio remote to sync the radio and machine.

There are 2 modes on the radio system RC1 and RC2:

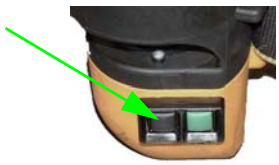
- In RC1 mode the left joystick adjusts the feeder speed, as if pressing 6 and 7 on the display. The right joystick moves the top curtain / apron in and out, as if pressing the buttons on the display. If the curtain / apron is moved out it automatically returns to its preset position when released.
- In RC2 mode the left joystick raises and lowers the inlet chute, as on the display.

4. To activate RC1 mode press the green button.

The left joystick will now control the feeder speed.

The right joystick will now control the top curtain / apron.

5. To activate RC2 mode press the black button.



The left joystick will now control the inlet chute.

5.10.6 Re-starting the machine

NOTICE

RISK OF PROPERTY, EQUIPMENT OR MACHINE DAMAGE

Before starting the machine, make sure the aprons are not positioned low where they may collide with the rotor.

If the crusher is still blocked with material:

- Make sure the feeder is OFF and has stopped.
- Make sure the crusher is OFF and has stopped.
- Make sure the main conveyor is OFF and has no material on it.

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

6 Routine maintenance

6.1 Maintenance - minimum safety requirements

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

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

For maintenance schedules and procedures relating to Original Equipment Manufacturers, refer also to section ***10 OEM Information and Data Sheets***.

⚠ WARNING

PERSONNEL HAZARD

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

DO NOT stand on the machine whilst it is in operation.

Stop machine, isolate remove ignition key and tag out before carrying out any maintenance procedures. Refer to *4.7 Shut down the machine*.

Make sure at least the minimum Personal Protective Equipment (PPE) is worn during maintenance and repair. Refer to *1.4 Personal protective equipment (PPE)*.

⚠ WARNING

FALLING HAZARD

Some maintenance requires working from height. Falling from heights could cause serious injury or death

When working at height, make sure of the following:

Maintenance platforms are in place.

All hand rails are fixed in position.

All ladders are lowered and fixed in position.

A safety harness is worn.

⚠ WARNING

HOT SURFACE HAZARD

The engine could still be hot after operation and cause severe burns if touched.

Make sure that the engine is cool before maintenance is started.

⚠ WARNING

HYDRAULIC FLUID INJECTION HAZARD

High pressure hydraulic system. Fluid could penetrate the skin and cause serious injury or death.

DO NOT use your hand to test for leaks.

ALWAYS use a piece of cardboard or similar.

NOTICE

RISK OF EQUIPMENT DAMAGE.

Do all maintenance procedures as a minimum requirement.

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

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

Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the fluid is filled correctly.

DO NOT start any maintenance until you have read and fully understand this manual, in particular section *1 Safety*.

If there is a maintenance procedure that is not fully understood contact Sandvik before commencing with the maintenance.

Any adjustments must ONLY be carried out by trained personnel.

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

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

Batteries must not be disposed of in normal waste which may go in to land fill.

6.2 Reference information

For information, maintenance schedules and procedures relating to components fitted on the machine but from other Original Equipment Manufacturers, refer to ***10 OEM Information and Data Sheets***.

For information relating to recommended lubricant and fluids used in the machine, refer to ***6.6 Lubricants and fluids***.

For information on electrical diagrams, refer to diagrams in ***9.1.1 Electrical information***.

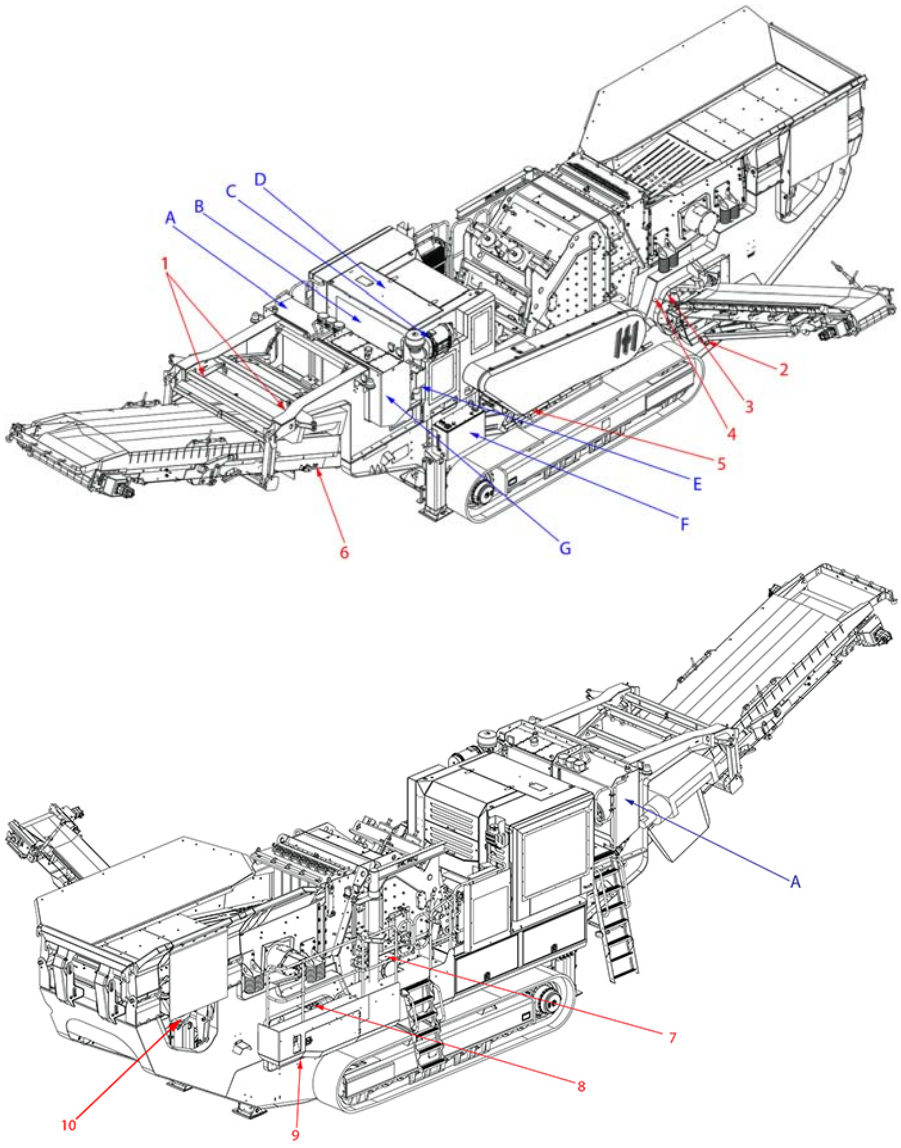
6.3 Key items for maintenance

⚠ WARNING

PERSONNEL HAZARD

Follow the instructions of section *6.1 Maintenance - minimum safety requirements*, before any maintenance procedure is started.

6.3.1 Maintenance point locations



Compartments, refer also to *6.4 Maintenance schedules*

A. Hydraulic fluid tank

B. Radiator compartment

C. Engine air cleaner

D. Engine / clutch compartment

E. Power pack pressure filter compartment

F. Lubrication tank - Power take-off (clutch)

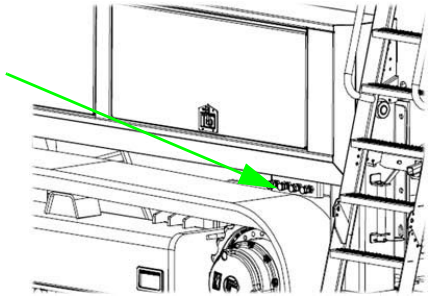
G. Fuel tank

Grease Points refer also to *6.5.1 Grease points*.

1. Magnet x 4
2. Natural fines side conveyor x 4
3. Diverter chute x 2
4. Pre-screen x 2
5. Drive belt pulley x 6
6. Main conveyor x 6
7. Impactor x 2
8. Diverter chute x 2
9. Pan feeder x 4
10. Primary feeder x 4

6.3.2 Drain points

1. Drain points for engine coolant, engine oil, hydraulic fluid and fuel tank.



6.4 Maintenance schedules

Refer to the appropriate engine manufacturer's manual and section ***8 Engine*** also. Refer to additional information if options are also fitted.

6.4.1 Daily maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Power unit (Engine)

1. Check the engine oil level.
2. Check the engine coolant level.
3. Check the radiator.
4. Check the air filter for blockages, leaks and damage.
5. Remove any build up of dust / debris.
6. Drain the water trap on the fuel system.
7. Check for water, fuel and oil leaks.
8. Check for damage to the power pack (engine) canopy.
9. Check the diesel fuel level.
10. For further information, refer to ***8.2 Engine maintenance schedules***.

Power unit (Hydraulics)

1. Check the hydraulic oil level.
2. Check the hydraulic oil temperature.
3. Check the hydraulic oil coolers.
4. Check for oil leaks.
5. Check for damage to the hydraulic oil tank.
6. Remove any build up of dust / debris.

Hpto clutch

1. Check oil level.
2. Check breather.
3. Remove any build up of dust / debris

For further information, refer to ***10.1.2 Clutch - PT Tech***

Crusher

1. Check the tightness of the hammer retaining bolts (daily during first 40 Hrs)
2. Check the V belt tension.

For further information, refer to ***10.1.5 Impact Crusher manual - Sandvik***.

Pre- screen

1. Check the screen mesh tension.
2. Check the screen mesh wear / condition.
3. Check transfer red rubber tension.

Conveyors

1. Check belt alignment and condition.
2. Check the belt tension.

General

1. Test the lubrication system (if fitted).
2. Test the electrical safety system / stops.
3. Check safety guards are fitted and secure.
4. Visually check for damage or chaffing to electrical cables and hydraulic hoses.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.4.2 Weekly maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Do the daily maintenance schedule, refer to ***6.4.1 Daily maintenance schedule***.

Power unit (Engine)

1. Check the battery fluid levels and condition. Refer to ***6.14 Battery maintenance***.
2. Remove any build up of dust / debris.

Power unit hydraulics

1. Check the hoses and hydraulic components for leaks and damage.
2. Remove any build up of dust / debris.

Hpto (clutch)

1. Check ventilation holes in the bell housing.
2. Remove any build up of dust / debris.

Crusher

1. Check crushing chamber wear.
2. Check crushing chamber condition.
3. Grease all tension device bearings.
4. Check tension device spring.

Crusher discharge chute

1. Check the wear on liner plates.
2. Check all bolts are tight.

Feeder

1. Check liner and wear plate condition.

Pre-screen

1. Check screen springs for damage.
2. Check top deck and hardox bolts for wear.
3. Check wear on the bottom deck rubbers.
4. Check the screen chute for wear and damage.
5. Check transfer red rubber tension.
6. Grease all screen bearings.

Pan feeder

1. Check wear on the liner plates.

Conveyors

1. Check skirting rubber condition.
2. Check belt scrapers tension and condition.
3. Check rollers.
4. Check magnet belt refer to ***10.1.9 Magnetic belt***.

Tracks

1. Check gear box oil levels, refer to ***6.11.1 Track gearbox oil - check top up***.
2. Check track tension, refer to ***6.11.4 Track tension - check***.
3. Track the machine 10m in each direction (to prevent track seizure), refer to ***4.5.2 Moving the machine***.

For further information, refer to ***10.1.1 Tracks - Strickland***.

General

1. Check wear rubbers.
2. Check hoses and clamps are secure.
3. Check electrical cables and sockets are secure and not rubbing.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.4.3 100 Hrs maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Do the daily maintenance schedule, refer to ***6.4.1 Daily maintenance schedule***.

Do the weekly maintenance schedule, refer to ***6.4.2 Weekly maintenance schedule***.

First 100 Hrs service change:

Tracks

1. Gearbox oil.

For further information, refer to ***6.11.1 Track gearbox oil - check top up***.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.4.4 250 Hrs maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Do the daily maintenance schedule, refer to ***6.4.1 Daily maintenance schedule***.

Do the weekly maintenance schedule, refer to ***6.4.2 Weekly maintenance schedule***.

Power unit (Engine)

1. Change engine oil and filter (3A engine only).
2. Change the engine air filter.
3. Change the engine fuel filters.

For further information, refer to ***10.1.4 Engine manual***.

Tracks

1. Check track tension.

For further information, refer to ***6.11.4 Track tension - check***.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.4.5 500 Hrs maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Do the daily maintenance schedule, refer to ***6.4.1 Daily maintenance schedule***.

Do the weekly maintenance schedule, refer to ***6.4.2 Weekly maintenance schedule***.

Do the 250 Hrs maintenance schedule, refer to ***6.4.4 250 Hrs maintenance schedule***.

Power unit (Engine)

1. Change engine oil and filter (3B and tier 4 engine).
2. Change engine crank case breather.
3. Change fuel tank breather.

For further information, refer to ***10.1.4 Engine manual***.

Power unit (hydraulics)

1. Change hydraulic tank breather.
2. Change hydraulic oil return filters.
3. Change hydraulic oil high pressure filters.

For further information, refer to ***6.13 Hydraulic tank***.

Hpto (clutch)

1. Change oil and oil filter.
2. Replace breather.

For further information, refer to ***6.15 Clutch (power take off)***.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.4.6 1000 Hrs maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Do the daily maintenance schedule, refer to ***6.4.1 Daily maintenance schedule***.

Do the weekly maintenance schedule, refer to ***6.4.2 Weekly maintenance schedule***.

Do the 250 Hrs maintenance schedule, refer to ***6.4.4 250 Hrs maintenance schedule***.

Do the 500hrs maintenance schedule, refer to ***6.4.5 500 Hrs maintenance schedule***.

Tracks

1. Change gearbox oil, refer to ***6.11.1 Track gearbox oil - check top up***.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.4.7 2000 Hrs maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Do the daily maintenance schedule, refer to ***6.4.1 Daily maintenance schedule***.

Do the weekly maintenance schedule, refer to ***6.4.2 Weekly maintenance schedule***.

Do the 250 Hrs maintenance schedule, refer to ***6.4.4 250 Hrs maintenance schedule***.

Do the 500hrs maintenance schedule, refer to ***6.4.5 500 Hrs maintenance schedule***.

Do the 1000 Hrs maintenance schedule, refer to ***6.4.6 1000 Hrs maintenance schedule***.

Power unit (Engine)

1. Change engine coolant.

For further information, refer to ***10.1.4 Engine manual***.

Power unit hydraulics

1. Change hydraulic oil.
2. Change hydraulic oil suction filters.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.4.8 5000 Hrs maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this procedure is done before the machine is started each day, a minimum requirement. Some service information may show on the display when the machine is on.

Do the daily maintenance schedule, refer to ***6.4.1 Daily maintenance schedule***.

Do the weekly maintenance schedule, refer to ***6.4.2 Weekly maintenance schedule***.

Do the 250 Hrs maintenance schedule, refer to ***6.4.4 250 Hrs maintenance schedule***.

Do the 500hrs maintenance schedule, refer to ***6.4.5 500 Hrs maintenance schedule***.

Do the 1000 Hrs maintenance schedule, refer to ***6.4.6 1000 Hrs maintenance schedule***.

Do the 2000 Hrs maintenance schedule, refer to ***6.4.7 2000 Hrs maintenance schedule***.

Hpto (clutch)

1. Fully service the Hpto (clutch).

For further information, refer to ***10.1.2 Clutch - PT Tech***.

NOTICE

ENVIRONMENTAL HAZARD

Dispose of all waste correctly, refer to *1.3 Environmental safety*.

6.5 Maintenance procedures

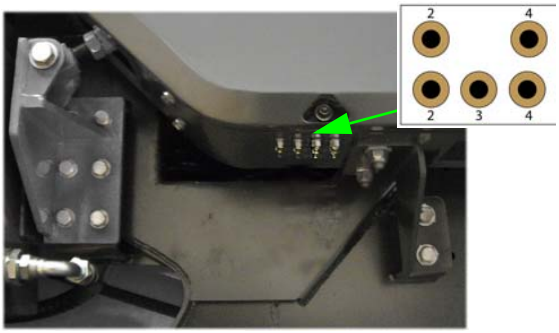
6.5.1 Grease points

Note: Only apply grease where indicated according to the maintenance schedule. Over greasing the machine can cause damage and will invalidate the manufacturers warranty.

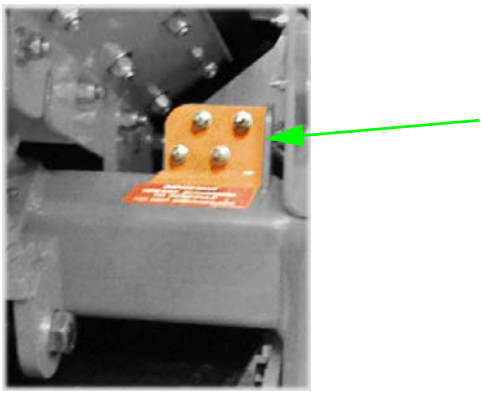
Refer to ***6.6 Lubricants and fluids*** for correct grease type.

1. Pre-screen - 2 x 16g (0.6oz).

2. Tension Pulley Drum - 2 x 3g (0.1oz).
3. Tension arm pivot - 1 x 3g (0.1oz).
4. Idler Pulley - 2 x 3g (0.1oz).

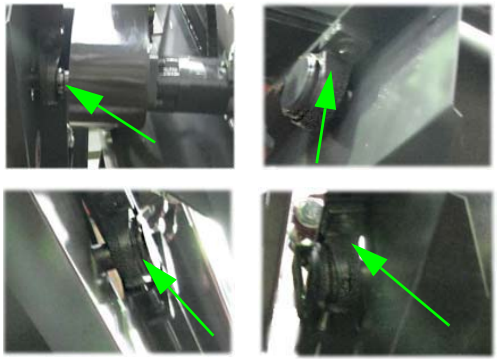


5. *Natural fines side conveyor - 4 x 7g (0.25oz).

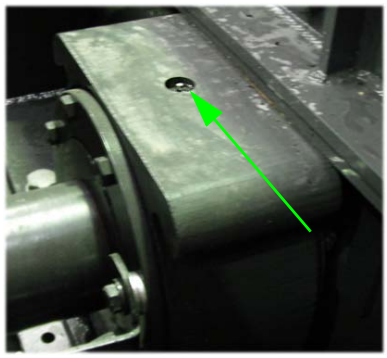


6. Main Conveyor - 6 x 7g (0.25oz).

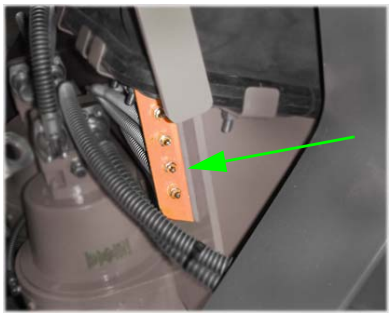
7. *Magnet separator - 4 x 7g (0.25oz).

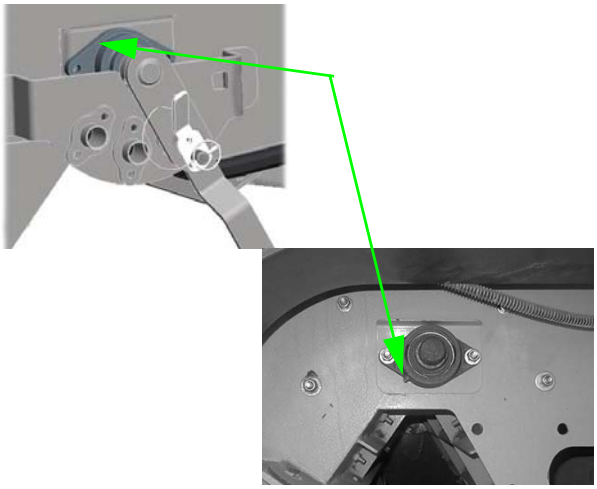


8. Impact crusher - 4 x 11g (0.4oz). Refer to ***10.1.5 Impact Crusher manual - Sandvik***.



9. Under crusher pan feeder - 4 x 7g (0.25oz).





10. Diverter chute pivot - 2 x 15g (oz).

Note: Either end of shaft.

6.6 Lubricants and fluids

NOTICE

RISK OF EQUIPMENT DAMAGE

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

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

ENVIRONMENTAL HAZARD

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

6.6.1 Machine lubricants and fluids used in manufacture

Standard machine - manual lubrication

Reference	Maximum volume	Temperature	Manufacturer - Equivalent specifications	Sandvik Part No
**Clutch lubrication oil	*80 Litres (21 US gallons)	-25 to 50°C (-13 to 122°F)	*Shell Spirax S3 TLV	*CN8000
		-35 to 15°C (31 to 59°F)	*CAT TDTO Artic Cold Weather 0W-20	*CN8003
Hydraulic system	660 Litres (174 US gallons)	-10 to 50°C (14 to 122°F)	Shell Tellus T46	10-80-1046
		-25 to 25°C (-13 to 77°F)	Shell Tellus T32	10-80-1032
		-35 to +15°C (-31 to 59°F)	Shell Tellus Artic 32	10-80-2032
Primary feeder gearbox	6.8 litres (1.8 US gal)		Shell Omala S2 GX220	10-82-220
General grease lubrication points and track tension			Shell Gadus S3 V220C 2	CN6073
Track gearbox	5 litres (1.3 US gallons) per track	-25 to 90°C (-13 to 194°F)	Shell Spirax S2 G 80W-90	CN6100
			Alternative: Exol Athena EP90 gear oil	
Under crusher pan feeder			Mobil Unirex N3 NLGI3	
Drive belt tension: Pulley drum, arm pivot, idler pulley				

** Clutch oil renewal, refer to PT Tech manual for there recommendations.

6.6.2 Impactor lubrication

For further information, refer to ***10.1.5 Impact Crusher manual - Sandvik***.

6.6.3 Engine lubricants and fluids

For engine lubrication and fluids, refer to section ***8 Engine*** manufacturers manual and ***6.6 Lubricants and fluids***.

AUS32

Fluid	Maximum volume	Specifications/ manufacturers specifications	Sandvik part no
AUS 32 (Adblue)	47 litres (12 US gallons)	ISO 22241	CN7835

6.6.4 Hazardous fluids

A list of substances hazardous to health associated with this equipment can be found in ***10 OEM Information and Data Sheets***.

6.6.5 Automatic lubrication systems

Refer to the appropriate manufacturers manuals.

6.7 Crusher belt drive system

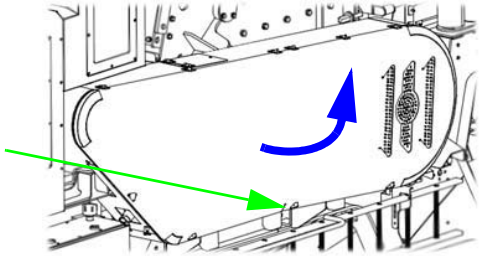
6.7.1 Belt drive inspection

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

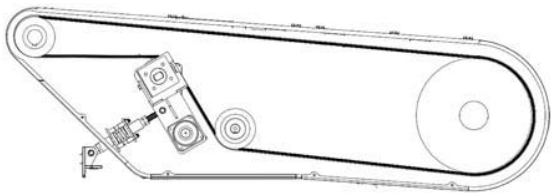
Always do a site specific risk assessment before doing all maintenance procedures

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

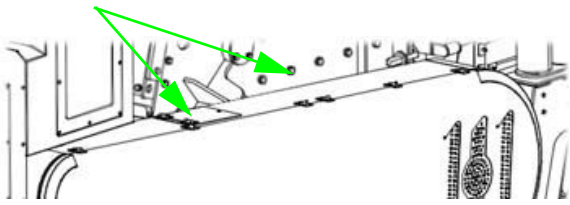
2. Open the drive belt guard door.



3. Visually inspect the following:
   - Condition of the V-belts.
   - Any slack on the belts.
   - V-belt tracking off the pulleys [alignment].



4. Inspection access points are provided in the rear and top of the drive belt guard.



5. Adjust drive belt tension as necessary. Refer to ***6.7.2 Adjusting the drive belts***.
6. Renew drive belts if necessary. Refer to ***6.7.3 Replacing the drive belts***.

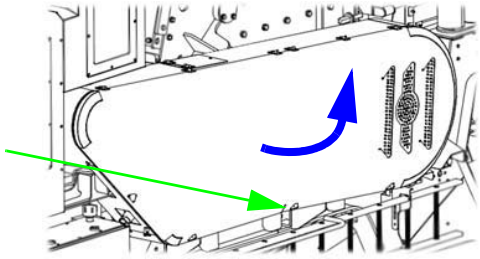
6.7.2 Adjusting the drive belts

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

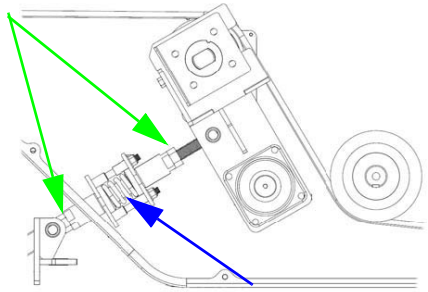
2. Open the drive belt guard door.



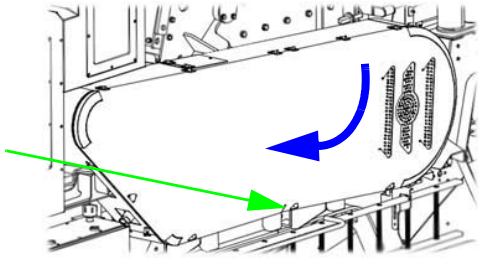
3. If the belts are slack, loosen the two lock nuts.

   Note: One is a left hand thread.

4. Turn the tension body to extend the length and take up any slack in the belts. Tighten the lock nuts when set.



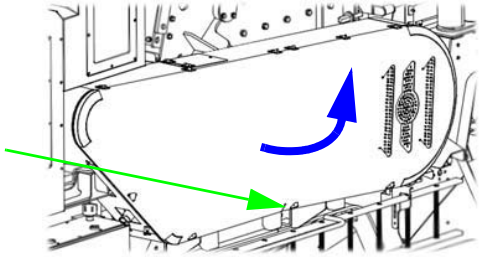
5. Close the drive belt guard door.



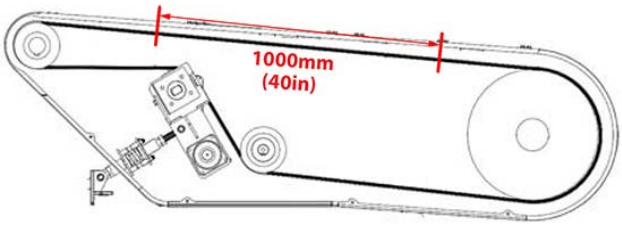
6. Start the engine refer to ***4.3 Engine starting procedure***.
7. Run the impactor only at low speed in manual mode for 1-2 minutes. Refer to ***5.5 Manual start mode***.

⚠ WARNING	
	8. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

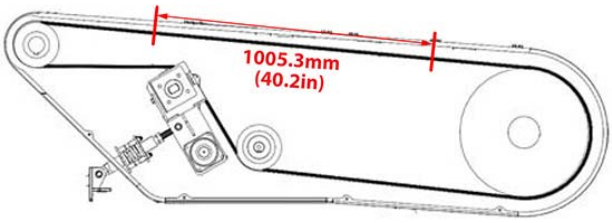
9. Wait for the pulleys to stop then open the drive belt guard door.



10. On the top span of the drive belt, mark two points 1000mm apart, (alternative 40 inches).



11. Tension the belts as described earlier until the distance between the marks has increased by 5.3mm, (alternative 0.2 inch).

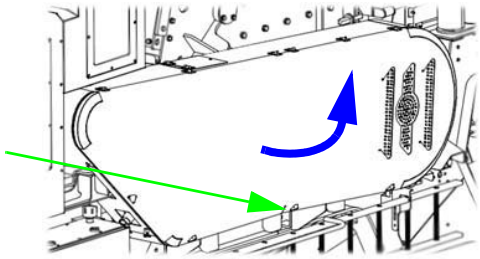


12. Start the engine refer to ***4.3 Engine starting procedure***.

13. Run the impactor only at low speed in manual mode for 1-2 minutes. Refer to ***5.5 Manual start mode***.

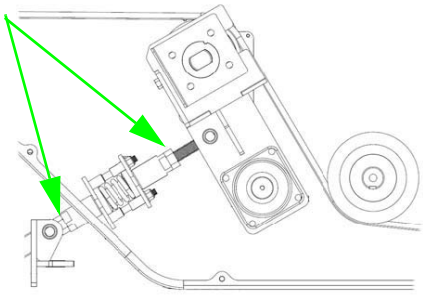
⚠ WARNING	
	14. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

15. Wait for the pulleys to stop then open the drive belt guard door.

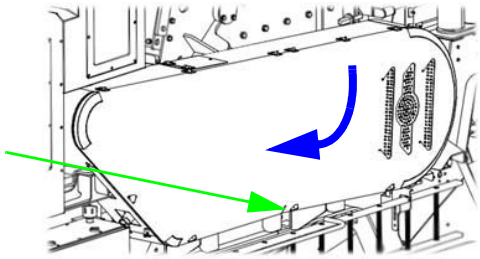


16. Re-measure between the marked points to check if the distance has changed. If the tension marks are not 1005.3mm (40.2in). Repeat tensioning procedure as above.

17. Make sure the lock nuts are tightened.



18. Close the drive belt guard door.



6.7.3 Replacing the drive belts

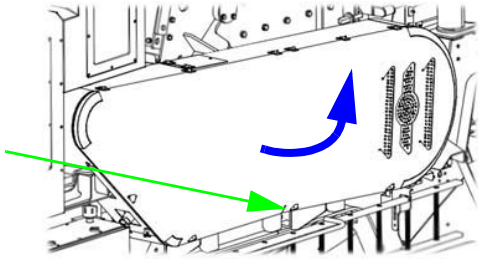
WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Note: Drive belts MUST always be replaced in matched pairs.

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

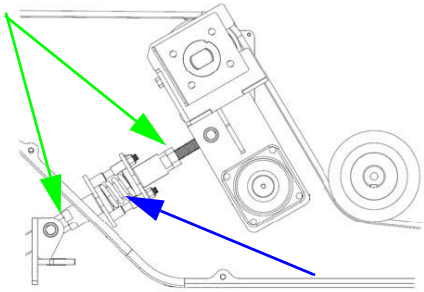
2. Open the drive belt guard door.



3. If the belts are slack, loosen the two lock nuts.

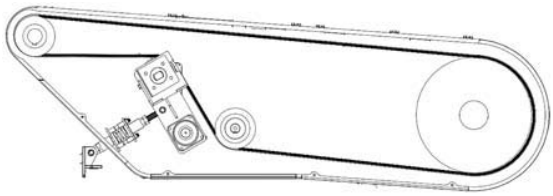
   Note: One is a left hand thread.

4. Turn the tension body to reduce the length and slacken the belts.



5. Remove the old belts and dispose of, refer to ***1.3 Environmental safety***.

6. Place the new belt around the pulleys.



7. Tension the belts, refer to ***6.7.2 Adjusting the drive belts***.

6.8 Impactor chamber access

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

6.8.1 Introduction

For more information on the maintenance of the impactor refer to ***10.1.5 Impact Crusher manual - Sandvik***.

The machine has a battery operated hydraulic pump system fitted to allow access and maintenance to the crusher-whilst the engine is OFF.

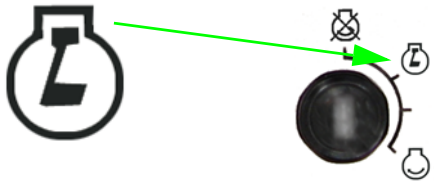
6.8.2 Release impactor access keys

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

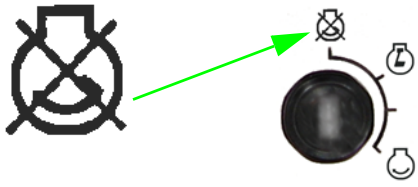
2. Open the right hand cabinet door and turn the ignition key clockwise to the first 'RUN' position.



3. Press the blue emergency stop reset button. Lights will flash for several seconds and an alarm will start.

4. Make sure all emergency stops are operating correctly. Refer to ***3.3.6 Operation of an emergency stop*** and ***3.3.7 To reset an emergency stop***.

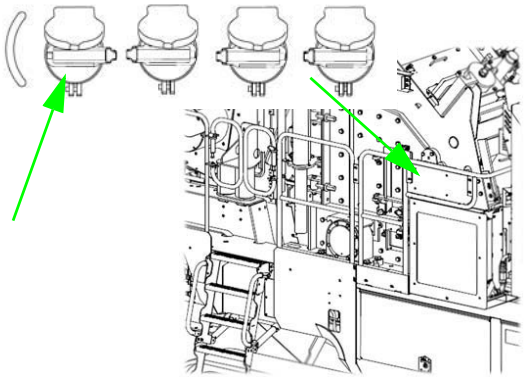
5. Turn the ignition key OFF.



6. Turn the impact chamber switch key anti-clockwise and remove the key.

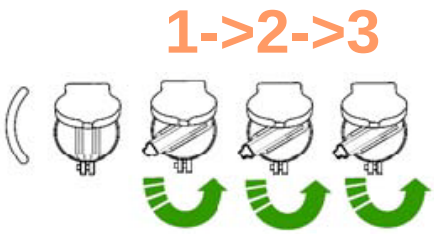
Note: This will disable the engine starting system.

7. Insert the impact chamber switch key in to the time delay unit located on the maintenance platform.



8. Turn the key anti-clockwise to set the timer, indicator shows red. This will engage a mechanical time lock to prevent the impactor from being opened while the rotor may still be turning.

9. When the timer has counted down the indicator shows white, and the three keys can be turned anti-clockwise then removed, in sequence 1,2,3, left to right. To use these keys, refer to ***6.8.3 Release impactor locking bolts***.



6.8.3 Release impactor locking bolts

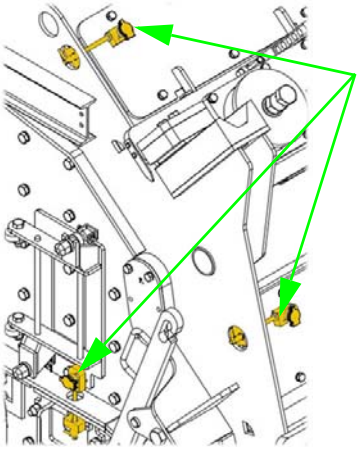
WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

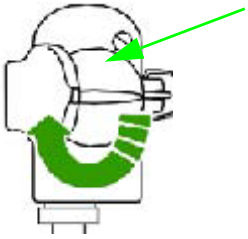
⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Release the access keys, refer to ***6.8.2 Release impactor access keys***.
3. Activate the battery pump, refer to ***6.8.4 Activate the battery pump***.

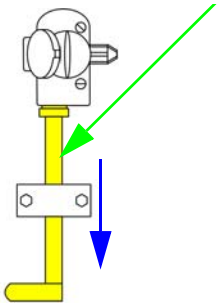
4. Insert switch key in to locking bolt on the impactor side for side access doors.
5. Insert switch key in to locking bolt on the impactor top for the appropriate access door.



6. Turn key clockwise to release the spring loaded bolt and secure the key.



7. The bolt can now be withdrawn.



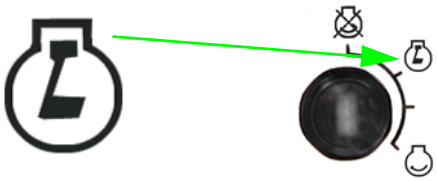
6.8.4 Activate the battery pump

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING	
	1. Switch off the engine refer to ***4.7 Shut down the machine***.

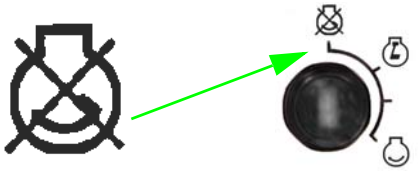
2. Open the right hand cabinet door and turn ignition key clockwise to the first 'RUN' position.



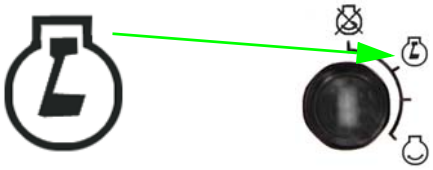
3. Press the blue emergency stop reset button. Lights will flash for several seconds and an alarm will start.

4. Make sure all emergency stops are operating correctly. Refer to ***3.3.6 Operation of an emergency stop*** and ***3.3.7 To reset an emergency stop***.

5. Turn the ignition key OFF.



6. Turn ignition key clockwise to the first 'RUN' position again.



7. Press the blue emergency stop reset button. Lights will flash for several seconds and an alarm will start.

8. Press button 8 to enable the battery pump.

6.8.5 Open impactor pivot frame

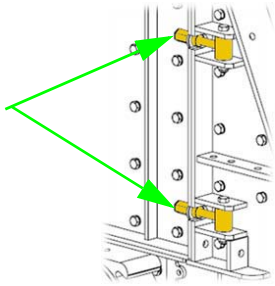
WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

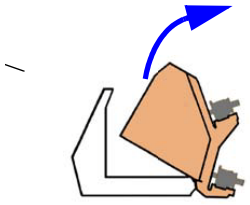
⚠ WARNING	
	PERSONNEL HAZARD **Make sure that no personnel are on the maintenance platform before opening the impactor pivot frame.**

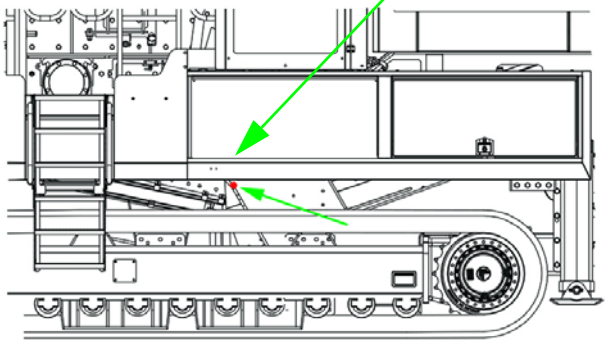
1. Release the side impactor locking bolts, refer to ***6.8.3 Release impactor locking bolts***.

2. Slacken and release the swing clamping bolts on each side of the impactor.



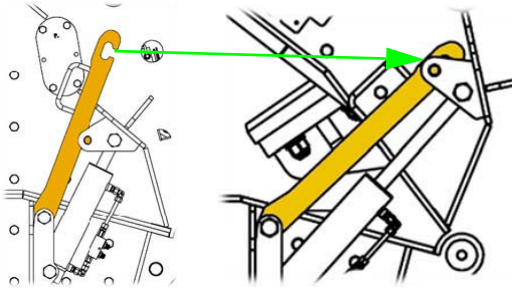
3. Press and hold the battery pump button while operating control lever to open the impactor pivot frame.





4. Raise the frame until the safety stay is locked in to position. Lower the frame so it is supported by the stay.

Note: Use the battery pump only when necessary, to preserve the battery charge.



NOTICE

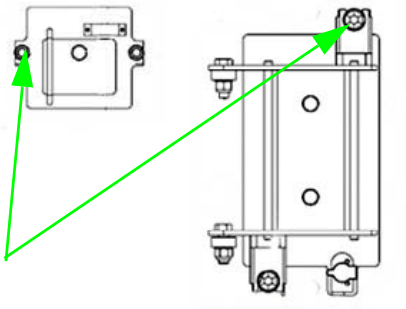
Do not open the impactor beyond the safety stay, this will damage the machine and invalidate any manufacturers warranty.

6.8.6 Open impactor side access doors

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

1. Release the side impactor locking bolt, refer to ***6.8.3 Release impactor locking bolts***.
2. Remove door securing nuts and bolts to gain access to the rotor.

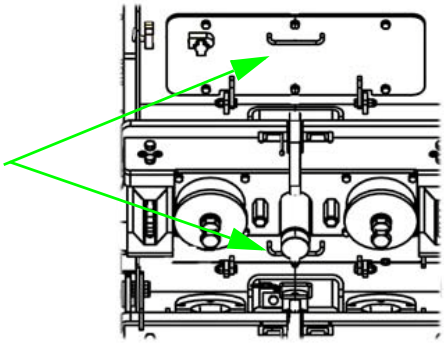


6.8.7 Impactor top access doors

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

1. Release the top impactor locking bolt, refer to ***6.8.3 Release impactor locking bolts***.
2. Remove door securing nuts and bolts to gain access to the rotor.



6.9 Impactor curtains

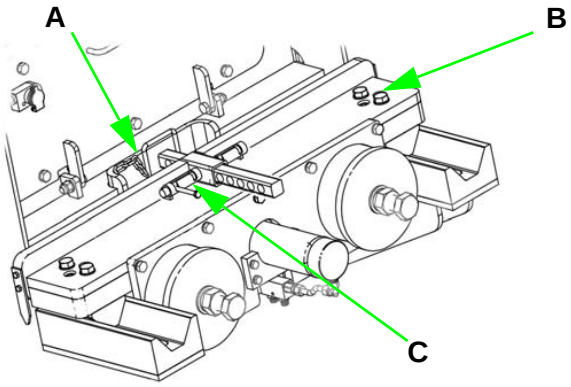
6.9.1 Adjustment

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

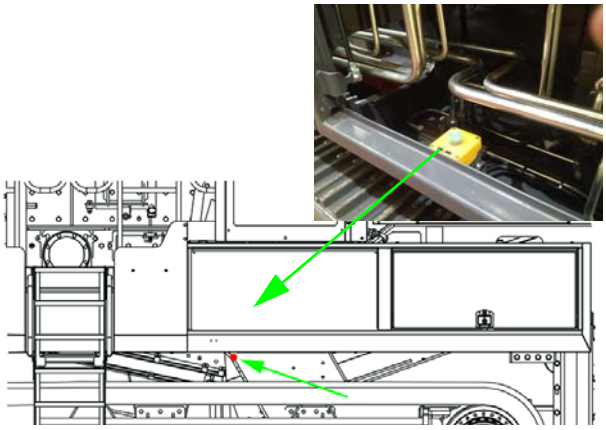
1. Release the access keys, refer to ***6.8.2 Release impactor access keys***.
2. Release the side door locking bolts, refer to ***6.8.3 Release impactor locking bolts***.
3. Open side access doors, refer to ***6.8.6 Open impactor side access doors***.

For more information and to adjust the first and second curtains, refer to ***10.1.5 Impact Crusher manual - Sandvik*** in the impactor operation manual.

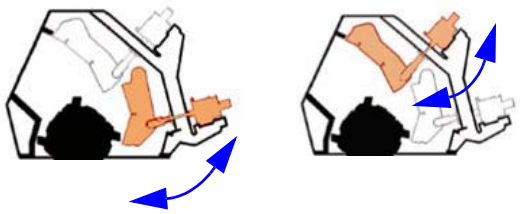


A. Hydraulic cylinder pin.
B. Brake locking screws.
C. Safety stop and pin.

4. Press and hold the battery pump button while operating control lever to open the impactor pivot frame.



5. Adjust the curtains in to the required positions.

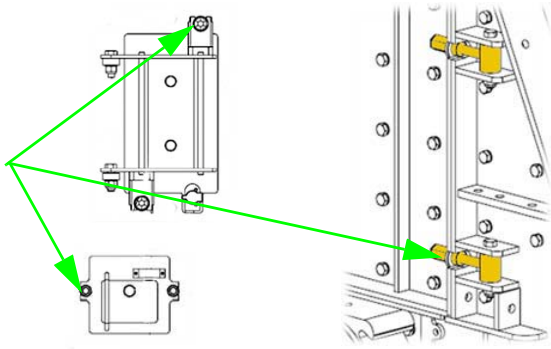


6.10 Restarting the crusher

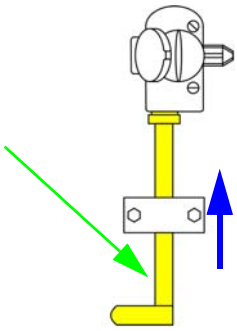
WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

1. All access doors and the pivot frame must be closed and secured.

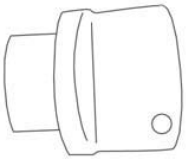


2. Insert and hold the locking bolts in to the key holders.

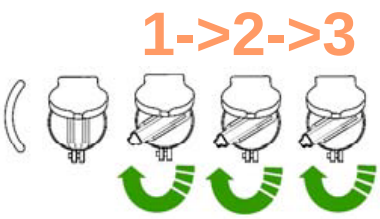


3. Turn the access keys anti-clockwise to hold the bolts in place.

4. Remove the access keys from the locking bolts.

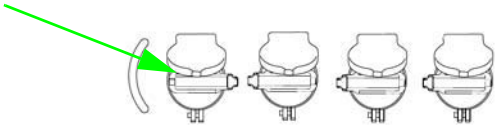


5. Insert the keys in to the time delay unit and turn them clockwise to retain them.



6. Turn impact chamber key clockwise and indicator will turn red.

7. Remove the impact chamber switch key from the time delay unit.



8. Insert the impact chamber key in to the control panel.

9. Start the engine refer to ***4.3 Engine starting procedure***.

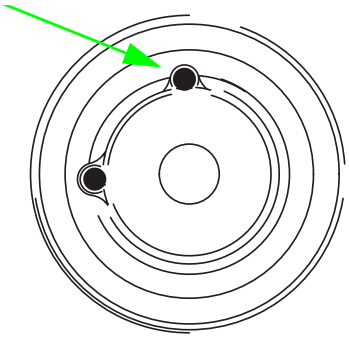
6.11 Track maintenance

6.11.1 Track gearbox oil - check top up

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

1. Start the engine, refer to ***4.3 Engine starting procedure***.
2. Prepare the machine for moving, refer to ***4.5.2 Moving the machine***.
3. Move the machine until the gearbox is in the correct position shown, with one of the plugs at the top.

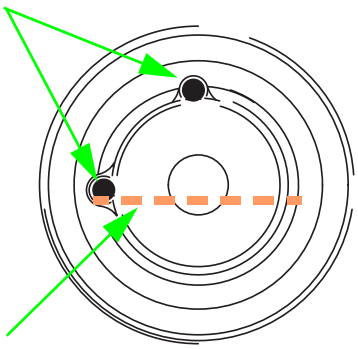


⚠ WARNING

4. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

5. Clean the area around the plugs then remove the plugs.
6. Top up through the upper hole with oil if required to the correct oil level, the bottom of the lower hole. Allow any surplus to drain before installing and tightening plug.

Note: Check plug seal before installing a plug.



Repeat process for track gearbox on the other side.

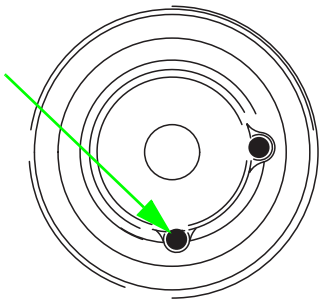
7. Clean up any excess oil and dispose of correctly, refer to ***1.3 Environmental safety***.
8. For lubrication information, refer to ***6.6 Lubricants and fluids***.

6.11.2 Track gearbox oil replace

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

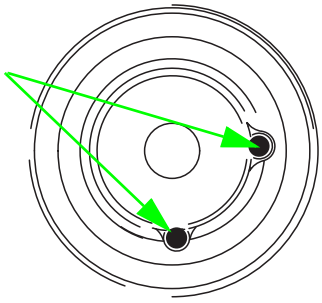
1. Start the engine, refer to ***4.3 Engine starting procedure***.
2. Prepare the machine for moving, refer to ***4.5.2 Moving the machine***.
3. Move the machine until the gearbox is in the correct position shown, with one of the plugs at the lowest point.



⚠ WARNING

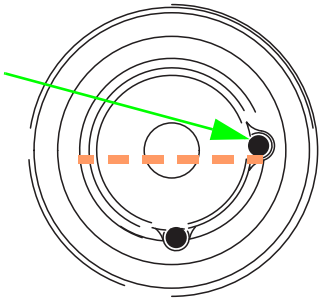
4. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

5. Clean the area around the plugs, then using a suitable container to catch the oil remove the plugs.
6. Allow oil to thoroughly drain then re-install the drain plug.



7. Fill gearbox to correct level, the bottom of the threaded hole. Allow any surplus to drain before installing and tightening filler plug.

   Note: Check plug seal before installing a plug.



Repeat process for track gearbox on the other side.

8. Clean up any excess oil and dispose of correctly, refer to ***1.3 Environmental safety***.
9. For lubrication information, refer to ***6.6 Lubricants and fluids***.

6.11.3 Tracks - inspect

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

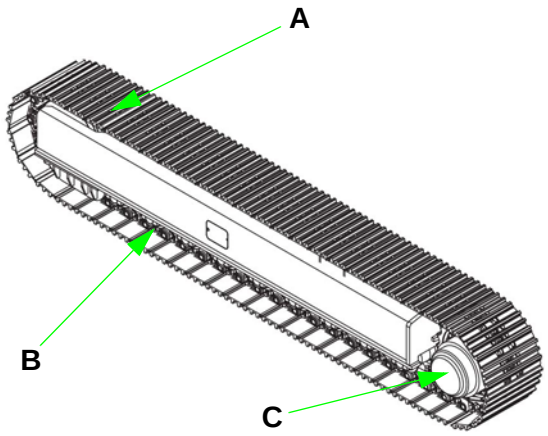
⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

Do a visual inspection of the track and tracking components, on both sides of the machine for any signs of damage or wear. Pay particular attention to the following:

A. Complete track pad assembly - Check and tighten the chassis pad bolts if necessary.

B. Rollers - Tighten if necessary.

C. Sprockets - Check sprocket bolts and tighten if necessary.



D. Idler and tension system, refer to ***6.11.4 Track tension - check***.

E. Track gearbox - Check oil and for any signs of leakage, refer to ***6.11.1 Track gearbox oil - check top up***.

Note: In order to inspect all of the tracks it will be necessary to inspect the visible upper section, then move the machine to inspect the remainder. Refer to 4.5.2 Moving the machine.

6.11.4 Track tension - check

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

1. Move the machine 10m (33ft) straight forwards and backwards on level ground, to allow the tracks to adopt there natural degree of tension. Refer to ***4.5.2 Moving the machine***.

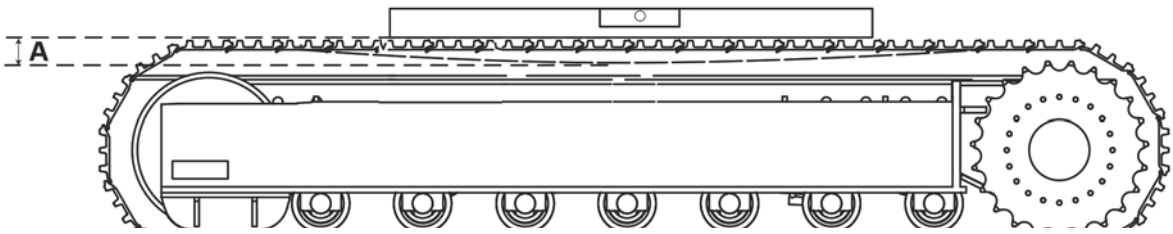
Note: Do not slew the machine.

⚠ WARNING

2. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

3. Using a straight edge, measure the droop of the track.

The droop dimension ‘A’ should not exceed 30mm (1.2in)



4. If necessary, adjust the track tension, refer to ***6.11.5 Adjusting the track tension***.

5. Move the machine a short distance straight forwards and backwards on level ground, to allow the tracks to adopt there natural degree of tension. Refer to ***4.5.2 Moving the machine***,

⚠ WARNING

6. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

Measure the droop dimension ‘A’ again and repeat procedure to adjust if necessary.

6.11.5 Adjusting the track tension

Increase

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

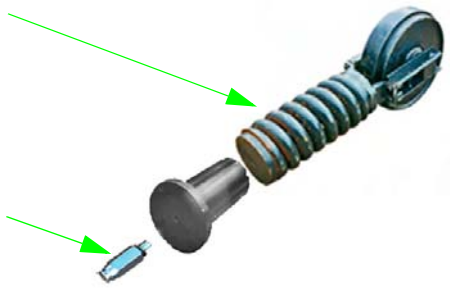
Always do a site specific risk assessment before doing all maintenance procedures.

NOTICE

DO NOT over tension the track as this places excessive loads on the gearbox and idler bearings, which will lead to accelerated wear and premature failures.

Track adjustment operates through a tensioning system:

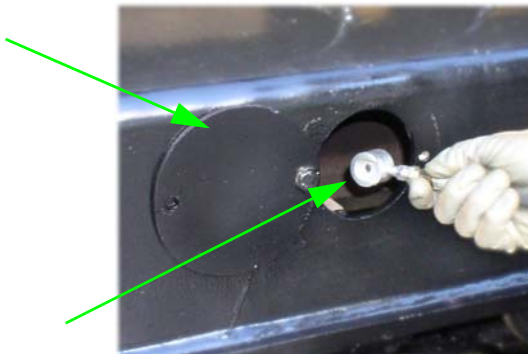
- When the tensioning cylinder is filled with grease it pushes the spring tension unit and idler forward.
- Grease is filled through the track adjuster grease nipple valve.



⚠ WARNING

1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Remove inspection cover from the track side frame.
3. Make sure grease nipple is secure and attach a grease gun connector to the nipple. Pump grease in to the tensioning system until track droop is correct.



4. Recheck track tension, refer to ***6.11.4 Track tension - check***.

Reduce

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

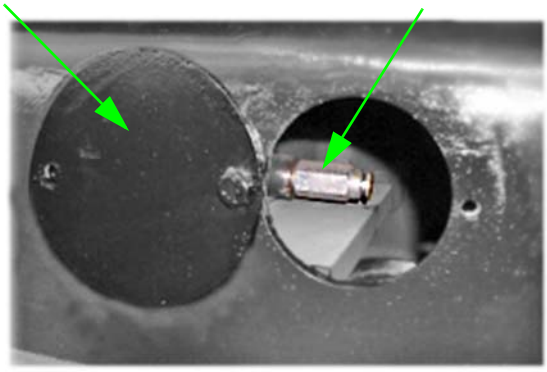
⚠ WARNING	
	PERSONNEL HAZARD **Grease under high pressure, could penetrate the skin causing serious injury or death.** **NEVER unscrew a grease nipple by more than half a turn, when track is under tension.**

WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Remove inspection cover from the track side frame.
3. Slacken grease nipple half a turn, anti-clockwise.

   Note: If track fails to loosen, apply a little pressure to the idler end of the tension system.

4. Grease will escape slowly from the track tensioning cylinder / grease nipple and track tension will reduce. Tighten grease nipple to set tension.



5. Recheck track tension, refer to ***6.11.4 Track tension - check***.
6. Add or release grease as required and repeat check.
7. Clean off any excess grease and install inspection cover
8. Clean up any excess grease and dispose of correctly, refer to ***1.3 Environmental safety***.

6.11.6 Fuel tank - check top up

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING

FLAMMABLE LIQUID HAZARD

Diesel fuel is flammable therefore is easily ignited and fires or explosions can result.

Smoking, open flames, sparks and welding is strictly prohibited while refuelling.

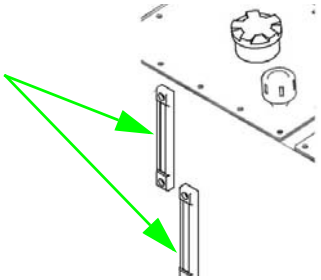
ALWAYS wear at least the minimum (CE approved) Personal Protective Equipment (PPE), refer to *1.4 Personal protective equipment (PPE)*.

NOTICE

RISK OF EQUIPMENT DAMAGE

Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the fuel is filled correctly.

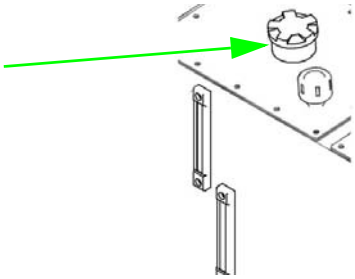
1. Check the level in the Diesel fuel tank with the gauges. A percentage level will show on the display. If the machine requires fuel.



⚠ WARNING	
	2. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

3. Remove the filler cap and top up as required.

   Note: Clean round filler cap before opening, to prevent contamination.



4. For the recommended fuel, refer to ***6.6 Lubricants and fluids***

6.12 Air cleaner - servicing

6.12.1 Donaldson type

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

A fault message will display on the control display if there is an air filter blockage.

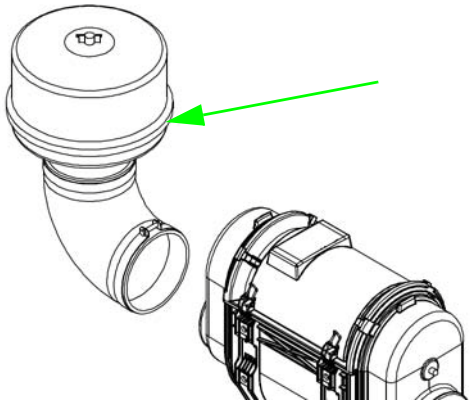
Note: When the engine is operated in environments that are dusty or dirty, the air cleaner elements may require more frequent servicing than stated in the maintenance schedules.

DANGER	
 	**INHALATION, DUST HAZARD** **Breathing or inhaling dust particles could cause serious injury or death.** **Make sure suitable breathing equipment is used throughout all procedures. ALL necessary precautions MUST be taken to reduce the risk of breathing in dust or particles.**

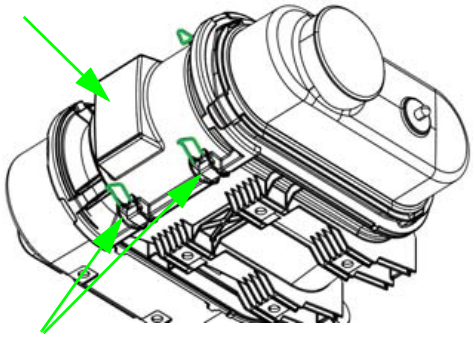
WARNING	
 	**Some maintenance requires working at height. Falling from height could cause serious injury or death.** **When working at height make sure of the following:** • **A full on site risk assessment has been done.** • **Maintenance platforms are in place.** • **All hand rails are fixed in position.** • **All ladders are lowered and fixed in position,** • **A safety harness is worn**.

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

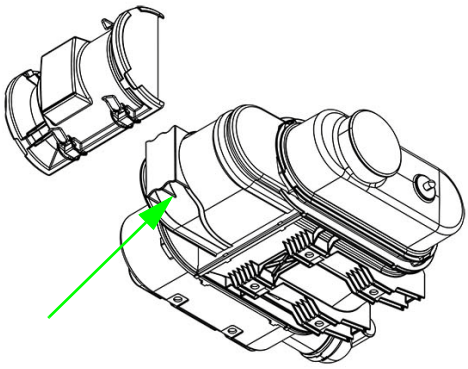
2. Using a suitable access platform as defined in a site specific risk assessment. Clean round the filter and remove the air pre-cleaner assembly.



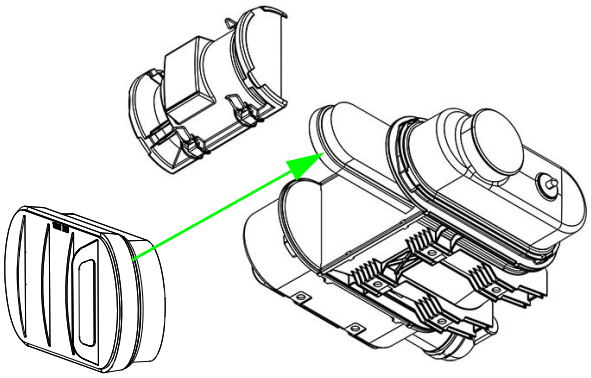
3. Open the clips.
4. Remove the cover.



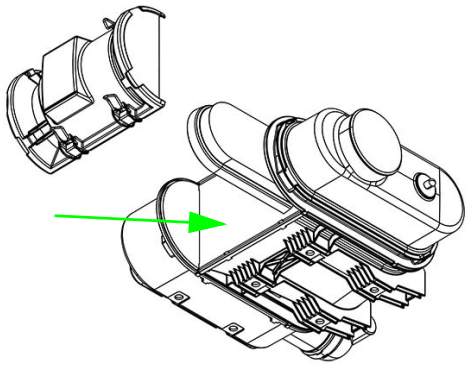
5. Remove the primary air filter.



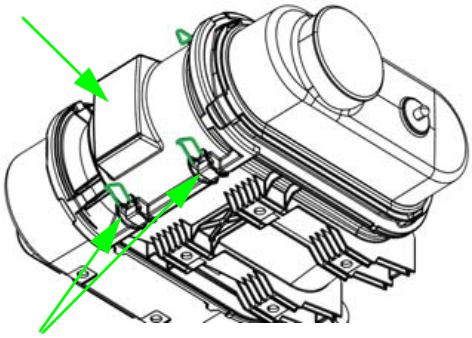
6. Only remove and replace the secondary air filter after five services.



7. Clean the inside with a dry cloth. Install the filters.



8. Install the cover and close the clips.

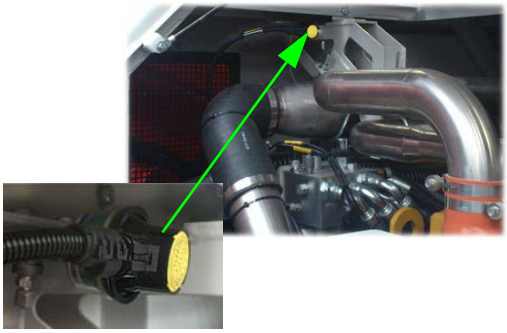


9. For engine air filters, refer to power pack parts manual for the appropriate servicing kits.

10. If an air filter blockage message is shown on the display.

11. It will be necessary to press the reset button inside the engine compartment.

Refer also to engine manufacturers manual.



6.12.2 CAT type)

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

A fault message will display on the control display if there is an air filter blockage.

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

DANGER

INHALATION, DUST HAZARD

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

Make sure suitable breathing equipment is used throughout all procedures. ALL necessary precautions MUST be taken to reduce the risk of breathing in dust or particles.

WARNING

Some maintenance requires working at height. Falling from height could cause serious injury or death.

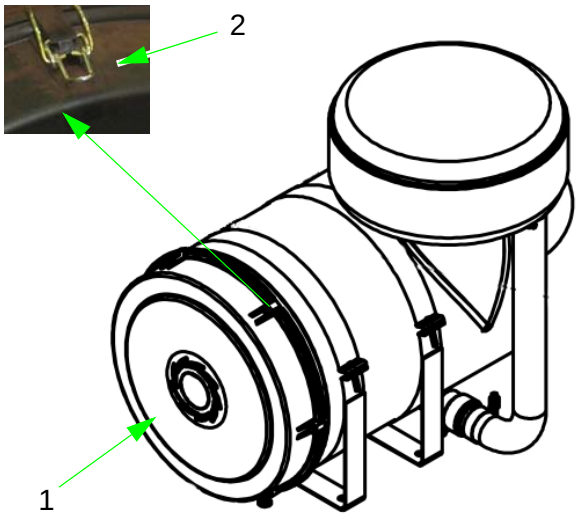
When working at height make sure of the following:

- **A full on site risk assessment has been done.**
- **Maintenance platforms are in place.**
- **All hand rails are fixed in position.**
- **All ladders are lowered and fixed in position,**
- **A safety harness is worn.**

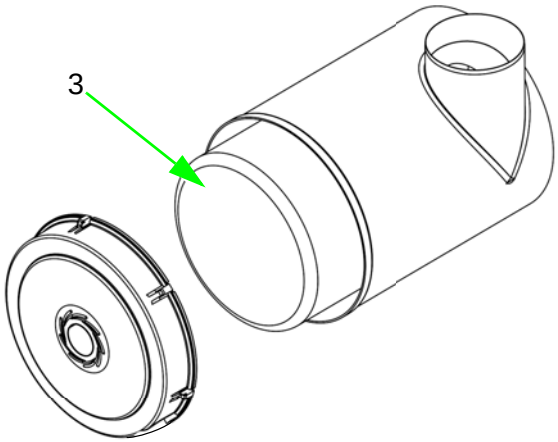
WARNING

1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

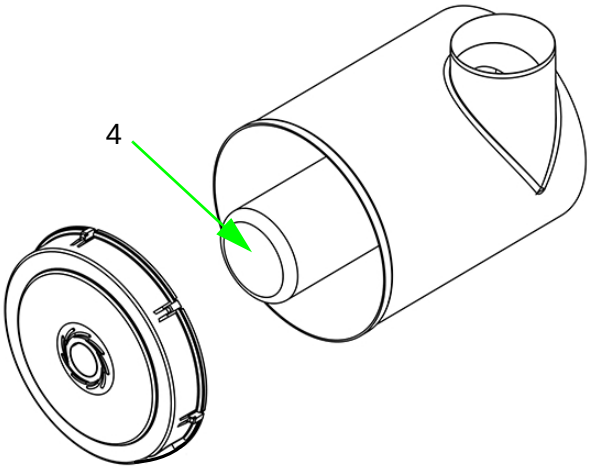
2. Using a suitable access platform as defined by a site specific risk assessment unclip (2) the cover (1) and remove.

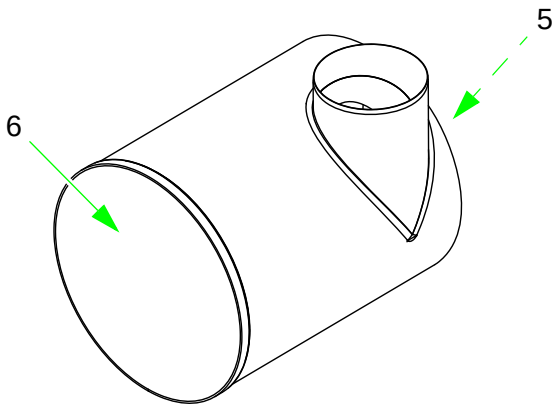


3. Remove and discard the primary air filter (3).



4. Remove and discard the secondary air filter (4).





5. Cover the turbocharger air inlet ((5) not shown) to prevent dirt ingress.
6. Clean the inside of the air filter body (6) and cover with a clean, dry cloth.
7. Install the new primary and secondary air filters.
8. Install the air filter cover.
9. If the operator's display still shows a fault, the air filter clogging sensor may require testing. Refer to the main operator manual, testing air filter clogging sensor.
10. Dispose of the used filters responsibly, refer to ***1.3 Environmental safety***.

6.12.3 AUS 32 - check level and top up (Tier 4 only)

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements* before starting the maintenance schedule.

Always do a site specific risk assessment before doing maintenance procedures.

⚠ WARNING

PERSONNEL HAZARD

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

DO NOT stand on the machine whilst it is working.

Stop machine, isolate, and tag out, before carrying out all maintenance work, refer to shutting down the machine and the lock out and tag procedure in the main operator manual.

Make sure at least the minimum Personal Protective Equipment (PPE) is worn during maintenance and repair, refer to *1.4 Personal protective equipment (PPE)*.

RISK OF CONTAMINATION

Clean up spills after performing these operations, with a spill kit that conforms to your local and national regulations.

NOTICE

RISK OF EQUIPMENT DAMAGE

AUS 32 causes corrosion damage. Do not remove urea hoses or wiring during normal service without secure ambient pressure inside the system.

AUS 32 is highly corrosive on electrical cables.

Tools that come into contact with AUS 32 must be cleaned.

Wipe up all spills.

Gloves must be changed.

Remove all contaminated clothes.

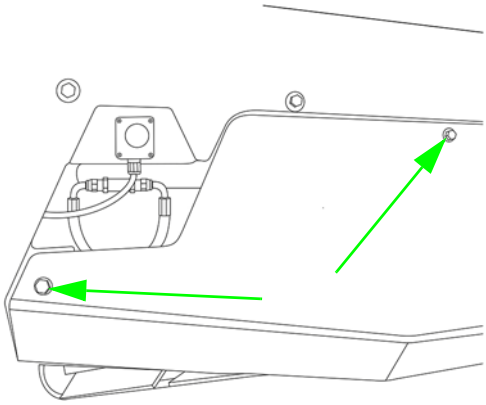
The AUS 32 tank is situated at the rear on the right hand, refer to ***3.2 Main components of machine***.

Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the fluid is filled correctly.

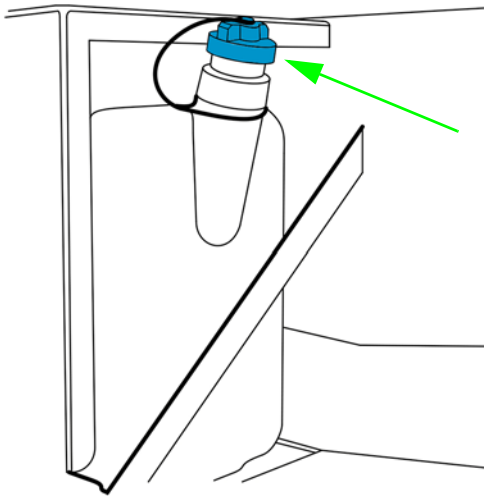
⚠ WARNING

1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

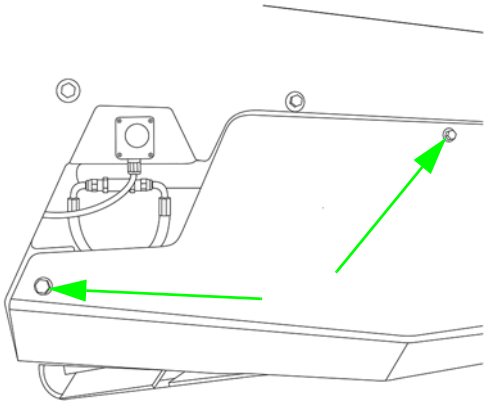
2. Remove the retaining bolts, and open out the AUS 32 tank.



3. Remove the filler cap, and using suitable equipment fill the AUS 32 tank.



4. When the AUS 32 tank is full refit the cap.
5. Close the AUS 32 tank and refit the retaining bolts.



NOTICE

Do not operate the machine with the tank in the open position as this will damage the machine, and invalidate any manufacturers warranty.

6.13 Hydraulic tank

6.13.1 Hydraulic tank - check / top up

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING	
 	**Some maintenance requires working at height. Falling from height could cause serious injury or death.** **When working at height make sure of the following:** **• A full on site risk assessment has been done.** **• Maintenance platforms are in place.** **• All hand rails are fixed in position.** **• All ladders are lowered and fixed in position,** **• A safety harness is worn.**

NOTICE

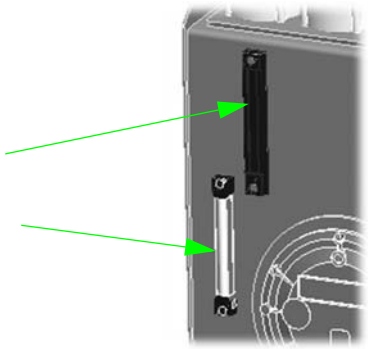
RISK OF EQUIPMENT DAMAGE

Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the fluid is filled correctly.

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

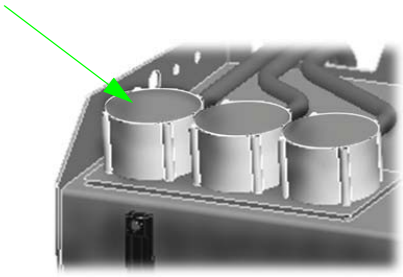
2. Using a suitable access platform as defined by a site specific risk assessment. Check level in hydraulic tank with the gauges.

Note: A warning on the display screen will also show a low fluid level.



3. If hydraulic fluid is required, remove one of the return filter caps and top up as necessary. Leave the filter in place and fill through the filter.

   Note: Clean round filters before removing, to prevent contamination.



4. For hydraulic fluid information, refer to ***6.6 Lubricants and fluids***.

6.13.2 Air vent filter element

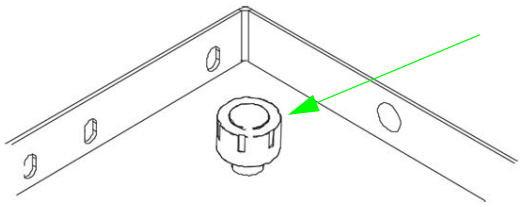
WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING	
	**Some maintenance requires working at height. Falling from height could cause serious injury or death.** **When working at height make sure of the following:** • **A full on site risk assessment has been done.** • **Maintenance platforms are in place.** • **All hand rails are fixed in position.** • **All ladders are lowered and fixed in position,** • **A safety harness is worn.**

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Using a suitable access platform as defined by a site specific risk assessment. On the top of the hydraulic tank, clean round the air vent.



3. Remove the cap of the air vent, renew the air vent filter element and install the air vent cap. Refer to ***6.4.5 500 Hrs maintenance schedule***.

Note: Only remove the cap to change the filter, not the complete vent housing.

6.13.3 Hydraulic return filters

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

DANGER

SKIN PENETRATION HAZARD

Hydraulic fluid under pressure can penetrate the skin, which will result in serious injury or death.

If fluid is injected under the skin, it must be surgically removed or gangrene will result. GET MEDICAL HELP IMMEDIATELY.

ALWAYS use a piece of cardboard to check for leaks. DO NOT USE YOUR HAND.

Make sure all hydraulic pressure has been released and the system has cooled before working on the hydraulic system.

NOTICE

RISK OF CONTAMINATION

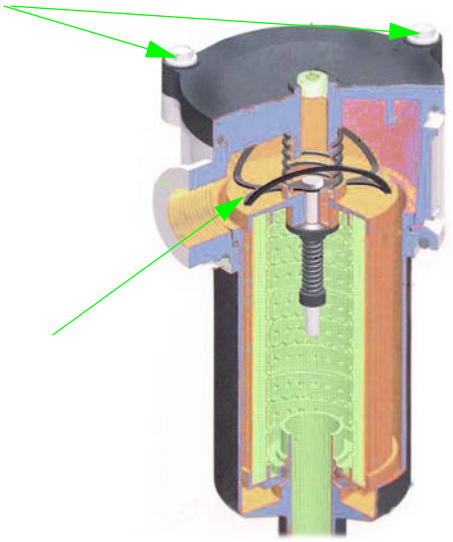
Clean up any spills after performing these operations, with a spill kit that conforms to your local and national regulations.

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

WARNING

1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Using a suitable access platform as defined by a site specific risk assessment. Clean the top of the hydraulic tank.



3. Remove return filter housing covers.

   Note: Filters will contain fluid which will require collecting and disposing of in a suitable container.

4. Remove and dispose of the three filter elements. Refer to ***1.3 Environmental safety***.

5. Install new filter elements, refer to parts manual for appropriate filters.

6.13.4 Strainers, filters and fluid renewal

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

DANGER

SKIN PENETRATION HAZARD

Hydraulic fluid under pressure can penetrate the skin, which will result in serious injury or death.

If fluid is injected under the skin, it must be surgically removed or gangrene will result. GET MEDICAL HELP IMMEDIATELY.

ALWAYS use a piece of cardboard to check for leaks. DO NOT USE YOUR HAND.

Make sure all hydraulic pressure has been released and the system has cooled before working on the hydraulic system.

NOTICE

RISK OF CONTAMINATION

Clean up any spills after performing these operations, with a spill kit that conforms to your local and national regulations.

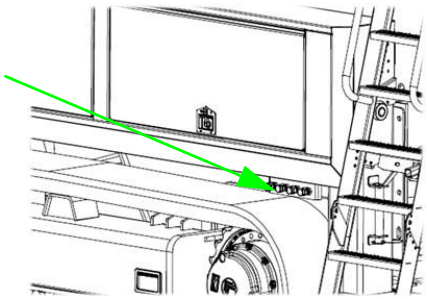
Make sure that filters are disposed of correctly in a way that meets the local and national environmental regulations.

WARNING

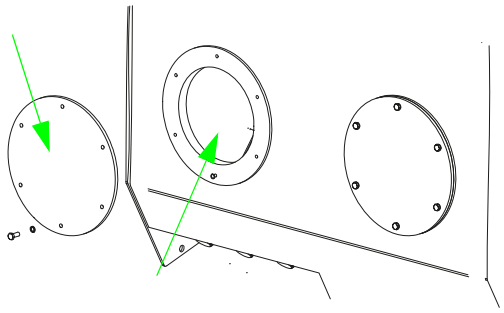
1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Drain the hydraulic fluid from the tank in to a suitable container, refer to ***6.6 Lubricants and fluids*** for tank capacity. Dispose of hydraulic oil in a way that meets local and environmental regulations, refer to ***1.3 Environmental safety***.

Location of drain points.

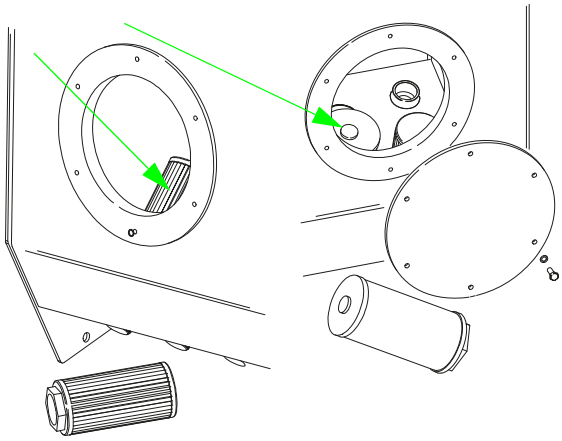


3. Using a suitable access platform as defined in a site specific risk assessment. Clean the outside of the tank, and surrounding area, to prevent contamination.
4. Remove the tank access covers.
5. Clean the tank of any sediment.



6. Remove and dispose of the hydraulic strainers and filters refer to ***1.3 Environmental safety***.

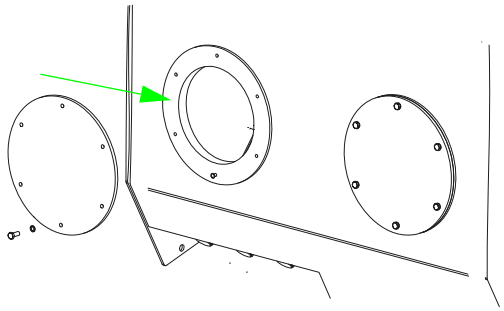
   Note: It is essential that all hydraulic system are clean and not contaminated.



7. Renew all hydraulic strainers and filter elements, refer to parts manual for appropriate filters.

8. Fit the tank access covers.

   Note: Make sure sealing surfaces on the covers and tank are clean. Renew gaskets if necessary.



9. Refill the tank to the correct level. For recommended fluid and quantity, refer to ***6.6 Lubricants and fluids***.

6.13.5 Pressure filters - renewal

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

DANGER

SKIN PENETRATION HAZARD

Hydraulic fluid under pressure can penetrate the skin, which will result in serious injury or death.

If fluid is injected under the skin, it must be surgically removed or gangrene will result. GET MEDICAL HELP IMMEDIATELY.

ALWAYS use a piece of cardboard to check for leaks. DO NOT USE YOUR HAND.

Make sure all hydraulic pressure has been released and the system has cooled before working on the hydraulic system.

NOTICE

RISK OF CONTAMINATION

Clean up any spills after performing these operations, with a spill kit that conforms to your local and national regulations.

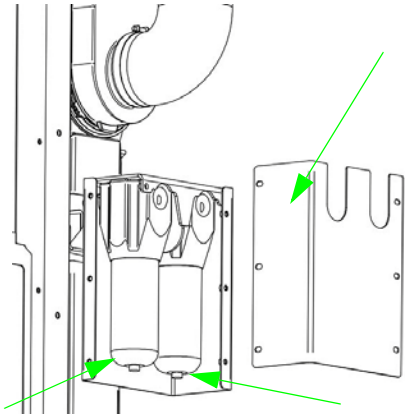
Make sure that filters are disposed of correctly in a way that meets the local and national environmental regulations.

WARNING

1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Remove the filter cover.
3. Clean round the filter housing, and remove the housings.

   Note: Filter housings will contain fluid which will require collecting and disposing of in a suitable container.



4. Install new filter elements, refer to parts manual for appropriate filters.

   Note: Make sure the covers are installed.

5. Check the hydraulic fluid level, refer to ***6.13.1 Hydraulic tank - check / top up***.

6.14 Battery maintenance

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING	
	Switch off the engine, lockout and tag out, refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure*.**

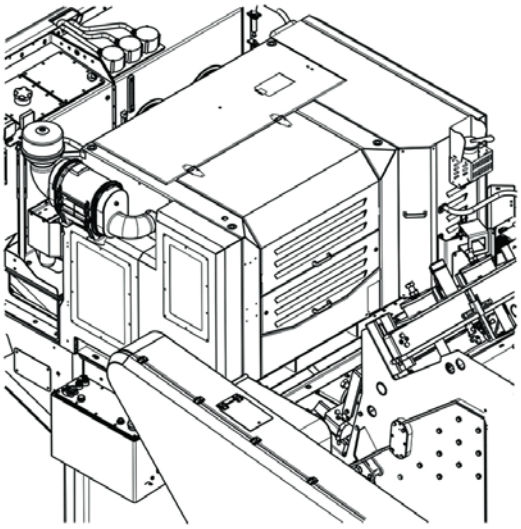
⚠ WARNING	
	**Automotive batteries contain sulphuric acid, an electrolyte which can cause severe burns and produce explosive gases when charged.**
	**Recharge batteries in a well ventilated area.** **Do not short circuit batteries this could cause a large spark and explosion.**

⚠ WARNING	
 	**Some maintenance requires working at height. Falling from height could cause serious injury or death.** **When working at height, make sure of the following:** **• A full on site specific risk assessment has been done.** **• Suitable maintenance platforms are in place.** **• All hand rails are fixed in position.** **• All ladders are lowered and fixed in position.** **• A safety harness is worn.**

⚠ WARNING	
	**ALL smoking is PROHIBITED including electronic cigarettes when maintaining automotive batteries.**
  	**NEVER allow contact with the skin, eyes or clothing.** **ALWAYS wear appropriate PPE, refer to *1.4 Personal protective equipment (PPE)*.** **Always isolate and disconnect the battery leads before carrying out any maintenance to the electrical system.** **Always observe the correct polarity.** **When disconnecting the batteries, disconnect the negative first and when connecting make sure the negative is connected last.**

⚠ WARNING	
	**TRIPPING HAZARD** **Make sure the area is clean and free from any build up of material, debris and ice.**

1. Using a suitable access platform as defined by a site specific risk assessment, Open the engine canopy.



2. Maintain the electrolyte level.

Note: Always use deionised water to prevent chemical contamination.

If the battery has removable vent caps make sure to regularly check the electrolyte level. Add deionised water to cover the plates. Do not overfill the vent wells.

3. Maintain the terminals.

If the terminals are dirty or corroded clean them.

A. Remove the Ground cable (-) first.

B. Remove the Positive cable (+).

C. Clean the battery terminals and cable connections.

D. Refit is the reverse.

4. Smear the terminals with petroleum jelly or a non acidic grease.

5. Keep the battery / housing clean.

Remove any build up of debris or dust from the batteries and housing.

6.15 Clutch (power take off)

6.15.1 Clutch lubrication tank - check top up

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

NOTICE

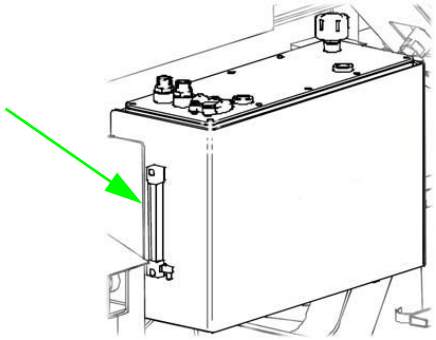
RISK OF EQUIPMENT DAMAGE

Incorrect filling procedures can cause contamination and can damage the equipment. Make sure that the fluid is filled correctly.

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

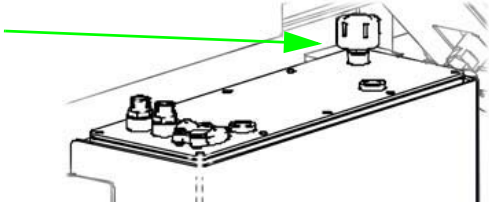
2. Check level in clutch lubrication tank with the gauge.

   Note: A warning on the display screen will also show a low fluid level.



3. If more oil is required, remove filler cap and top up as necessary.

   Note: Clean round filler before removing to prevent contamination.



4. For clutch oil information, refer to ***6.6 Lubricants and fluids***.

NOTICE

RISK OF CONTAMINATION

Clean up any spills after performing these operations, with a spill kit that conforms to your local and national regulations.

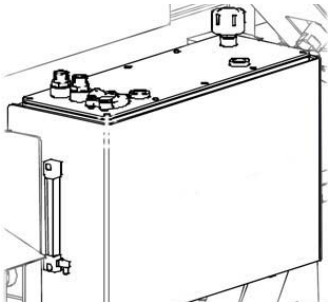
6.15.2 Clutch oil and filter

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

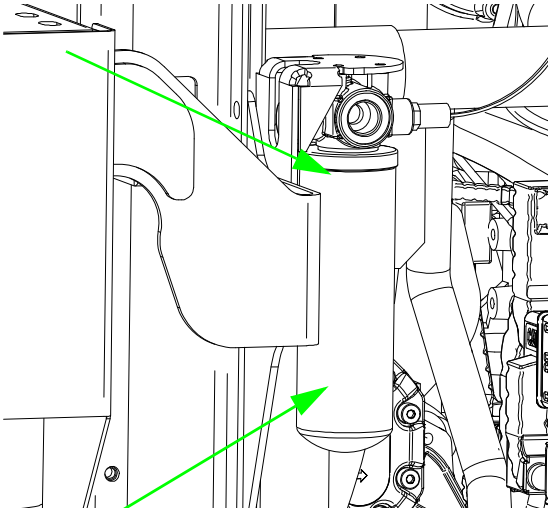
Always do a site specific risk assessment before doing all maintenance procedures.

WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Using a suitable access platform as defined in a site specific risk assessment. Clean the outside of the tank, and surrounding area, to prevent contamination.



3. Drain the oil from the tank in to a suitable capacity container, refer to ***6.6 Lubricants and fluids*** for capacity.
4. Drain position in base of tank, refer to ***6.3.1 Maintenance point locations***.



5. Clean round the filter housing and remove the filter, located in the power pack near the clutch (power take off).

   Note: Filter will contain oil which will require collecting and disposing of in a suitable container.

6. Remove and dispose of the filter element, (not illustrated).
7. Install new filter element refer to parts manual for appropriate service kits.

NOTICE

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

6.16 Conveyor belt tension

6.16.1 Natural fines side conveyor

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING

ENTANGLEMENT HAZARD

When a conveyor belt is running, the tension can only be visually checked.

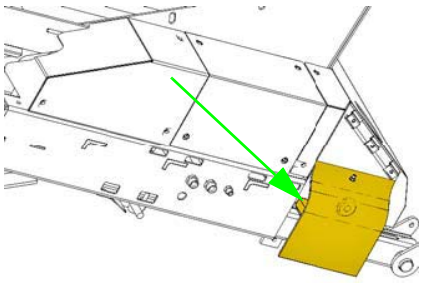
Adjustments of conveyor belts should be done by trained and authorised personnel. Do not attempt to adjust a conveyor belt without having adequate instruction and supervision.

If you have any concerns regarding the procedure or performance of the adjustments, contact your distributor or the manufacturer.

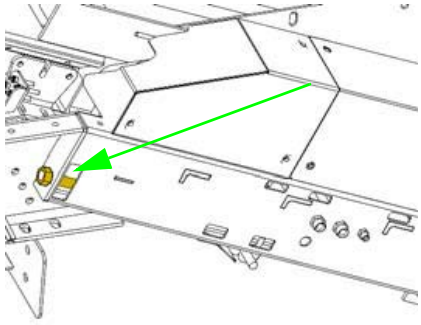
Stop engine, lockout and tag out, refer to *4.8 Lockout and tag procedure*.

Before tensioning belts makes make sure that they are free from obstructions and any excess material is removed. If any rips or tears are discovered do not operate the machine until the belt has been repaired or replaced.

1. Using a suitable access platform as defined in a site specific risk assessment. Raise the covers and loosen the bearing bolts on both sides of the drum.



2. Tighten the belt adjusters evenly until the required tension is obtained.



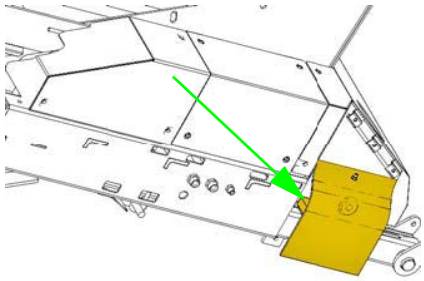
3. Start the engine, refer to ***4.3 Engine starting procedure***.
4. Start the natural fines side conveyor using the manual machine start mode, refer to ***5.5 Manual start mode***.
5. Visually check the tension and alignment of the belt, refer to ***6.17 Tracking conveyor belts***.

   Note: If the belt is not correctly aligned repeat steps 1 - 4.
6. Stop the natural fines side conveyor.

⚠ WARNING	
	7. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

8. Raise the covers and tighten the bearing bolts on both sides of the idler drum.

   Note: Make sure the covers are installed.



6.16.2 Main conveyor

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING

ENTANGLEMENT HAZARD

When a conveyor belt is running, the tension can only be visually checked.

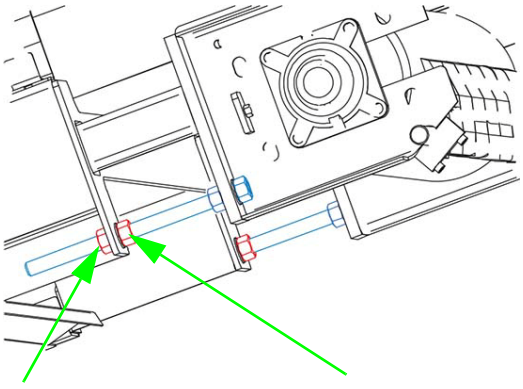
Adjustments of conveyor belts should be done by trained and authorised personnel. Do not attempt to adjust a conveyor belt without having adequate instruction and supervision.

If you have any concerns regarding the procedure or performance of the adjustments, contact your distributor or the manufacturer.

Stop engine, lockout and tag out, refer to *4.8 Lockout and tag procedure*.

Before tensioning belts makes make sure that they are free from obstructions and any excess material is removed. If any rips or tears are discovered do not operate the machine until the belt has been repaired or replaced.

1. Using a suitable access platform as defined in a site specific risk assessment. Loosen the lock nuts on both sides.
2. Tighten the belt by evenly turning the adjuster on both sides. Tighten both the lock nuts when set.



3. Start the engine, refer to ***4.3 Engine starting procedure***.
4. Start the main conveyor using the manual machine start mode, refer to ***5.5 Manual start mode***.
5. Visually check the tension and alignment of the belt, refer to ***6.17 Tracking conveyor belts***.

   Note: If the belt is not correctly aligned repeat steps 1 - 4.
6. Stop the main conveyor.

⚠ WARNING	
	7. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

6.17 Tracking conveyor belts

There are several factors that can have an effect on tracking of conveyor belts:

- Misalignment of trough roller sets
- Misalignment of return rollers
- Incorrectly adjusted drum bearings

NOTICE

If a conveyor belt is tracking off to the left or right the situation should be remedied immediately. If action is not taken the belt life will be shortened and through put wont be as efficient due to spillage.

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING

FALLING HAZARD

Some maintenance requires working at height. Falling from height could cause serious injury or death.

When working at height make sure of the following:

- **A full on site risk assessment has been done.**
- **Maintenance platforms are in place.**
- **All hand rails are fixed in position.**
- **All ladders are lowered and fixed in position,**

A safety harness is worn.

⚠ WARNING

ENTANGLEMENT HAZARD

When a conveyor belt is running, the tension can only be visually checked.

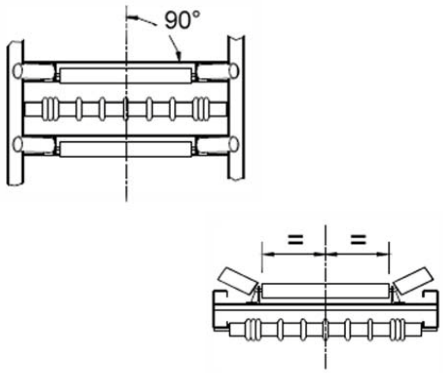
Adjustments of conveyor belts should be done by trained and authorised personnel. Do not attempt to adjust a conveyor belt without having adequate instruction and supervision.

If you have any concerns regarding the procedure or performance of the adjustments, contact your distributor or the manufacturer.

Stop engine, lockout and tag out, refer to *4.8 Lockout and tag procedure*.

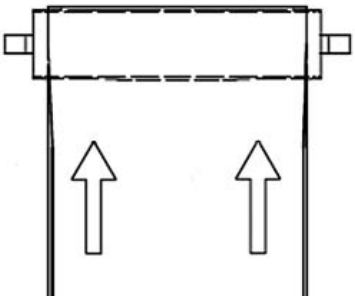
⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Using a suitable access platform as defined by a site specific risk assessment. Check the alignment of the trough sets and return rollers, make sure they are mounted at 90° to the conveyor frame about the central axis.



3. Start the engine, refer to ***4.3 Engine starting procedure***.
4. Start the appropriate conveyor using the manual start procedure, refer to ***5.5 Manual start mode***. Observe the way the belt is tracking.

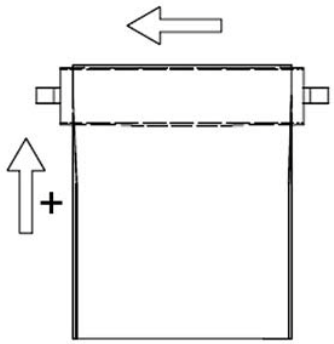
Correct alignment of belt.



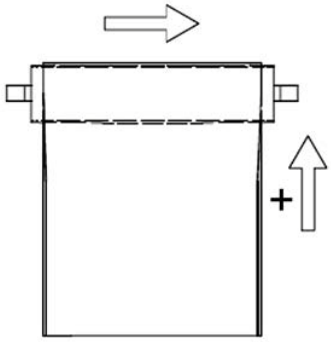
5. If alignment is not correct, stop the appropriate conveyor.

⚠ WARNING	
	6. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

7. if the belt is tracking to the left increase the length of the left adjuster. Refer to the adjustment instructions appropriate to the belt, as systems vary.



8. if the belt is tracking to the right increase the length of the right adjuster. Refer to the adjustment instructions appropriate to the belt, as systems vary.



9. Start the engine, refer to ***4.3 Engine starting procedure***.

10. Start the appropriate conveyor using the manual start procedure, refer to ***5.5 Manual start mode***.

11. Visually check the tension and alignment of the belt, refer to ***6.17 Tracking conveyor belts***.

Note: If the belt is not correctly aligned repeat steps 5 - 8.

6.18 Impactor liners replace

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

To replace the impactor liners, refer to ***10.1.5 Impact Crusher manual - Sandvik***.

6.19 Replacing the pre-screen mesh

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

⚠ WARNING

FALLING HAZARD

Some maintenance requires working at height. Falling from height could cause serious injury or death.

When working at height make sure of the following:

- **A full on site risk assessment has been done.**
- **Maintenance platforms are in place.**
- **All hand rails are fixed in position.**
- **All ladders are lowered and fixed in position,**

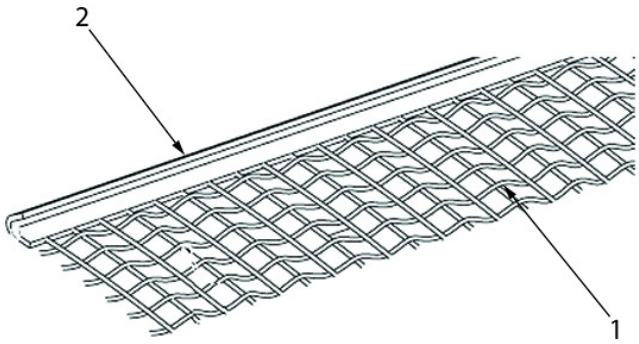
A safety harness is worn.

⚠ DANGER

INHALATION, DUST HAZARD

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

Make sure suitable breathing equipment is used throughout all procedures. ALL necessary precautions MUST be taken to reduce the risk of breathing in dust or particles.



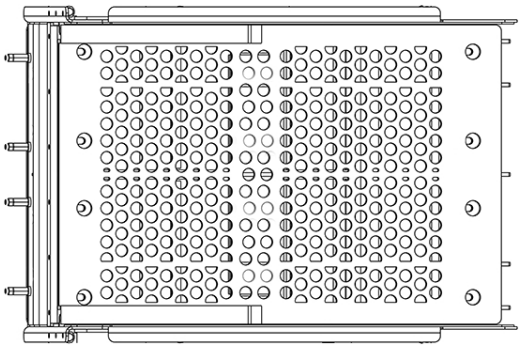
1.	Screening media
2.	Hook

Removal

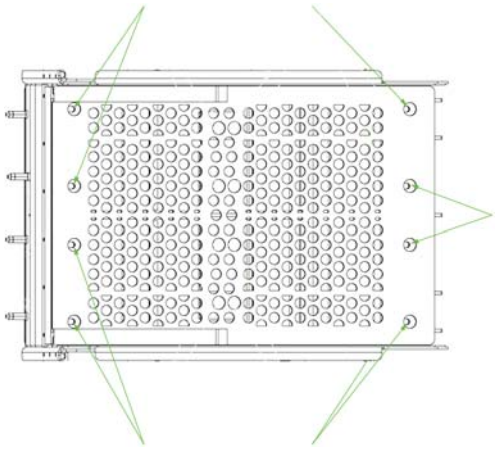
1. Lower the hopper sides, refer to ***2.2.3 Lowering hopper (Manual)***, ***2.2.4 Lowering hopper (Hydraulic)***.

⚠ WARNING	
	2. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

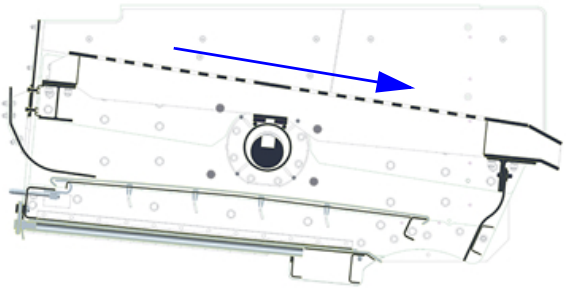
3. Using a suitable access as defined by a site specific risk assessment. Clean all debris and compacted dust from the area and retaining bolts.
4. Attach suitable lifting equipment to the top plate, as defined by a site specific risk assessment.

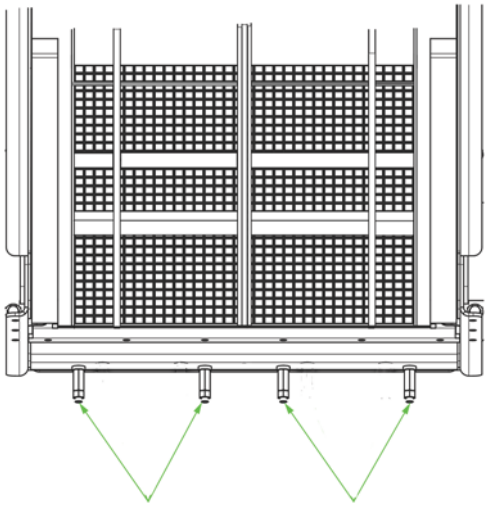


5. Remove the retaining bolts.



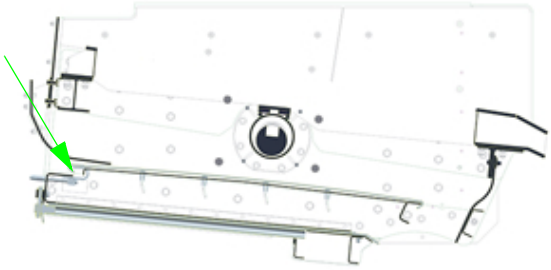
6. Slide the top plate forward clear of the feeder.
7. Carefully lift the plate clear of the pre-screen.



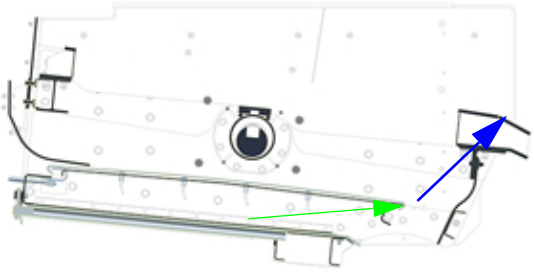


8. Loosen the locking nuts on the tensioning bolts.
9. Release the tensioning bolts sufficiently so that the lower mesh can be unhooked.

Note: Lubricate the threads.



10. Release the mesh from the tensioning end.



11. Unhook the bottom end of the mesh from the pre-screen.

12. Attach suitable lifting equipment to the top plate, as defined by a site specific risk assessment.
13. Carefully lift the mesh from the machine.

Install

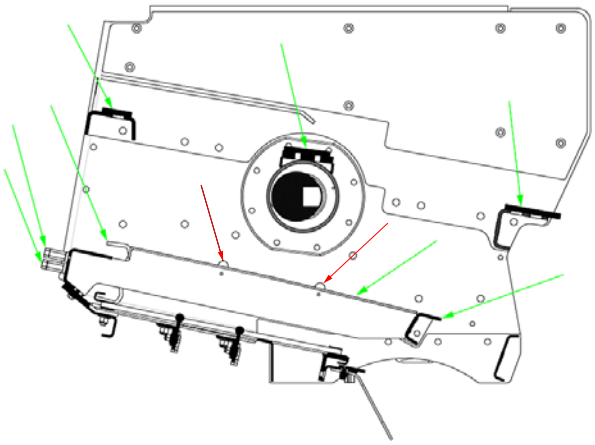
General guidelines

- Rigid metal media need more tensional force than thin rubber media.
- Tighten tensional screws alternately in small steps.
- Media should not flap during operation.

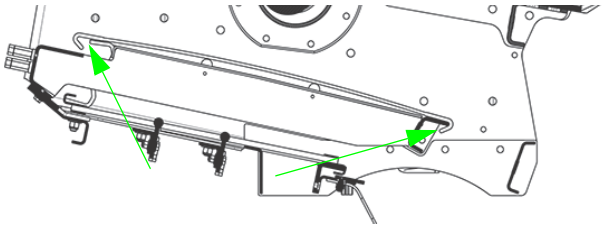
Bottom deck

⚠ WARNING	
	1. Switch off the engine and lock out refer to ***4.7 Shut down the machine*** and ***4.8 Lockout and tag procedure***.

2. Using a suitable access platform as defined by a site specific risk assessment. Clean all debris and compacted dust from the area, tensioning screws, hook mechanism and support bars.
3. Check there is no damage to the rubber on the support bars.

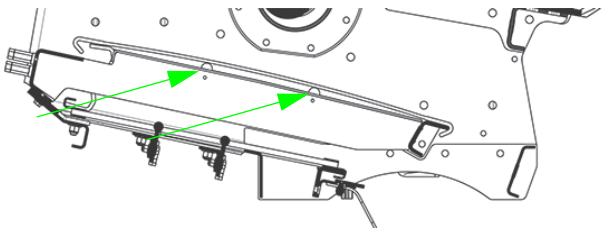


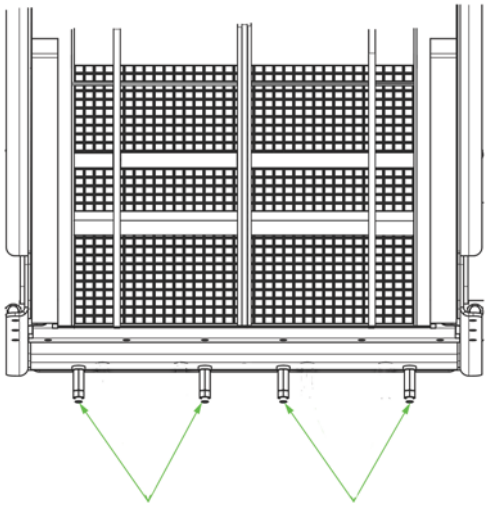
4. Make sure the tensioning screws are loosened sufficiently to engage the hook plate at both ends.



5. Using suitable lifting equipment as defined by a site specific risk assessment, lower the mesh in to the machine.

Note: Make sure it rests on the traverse support bars, and not on the hook strips.

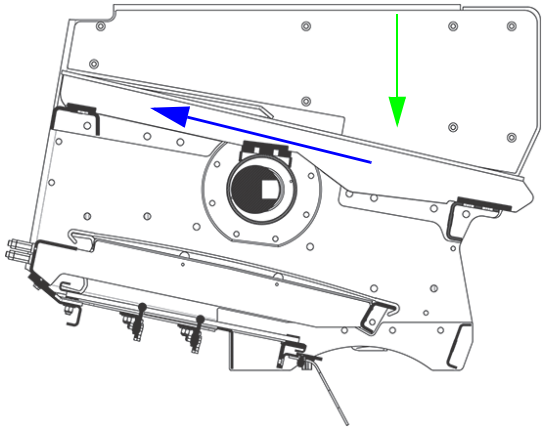




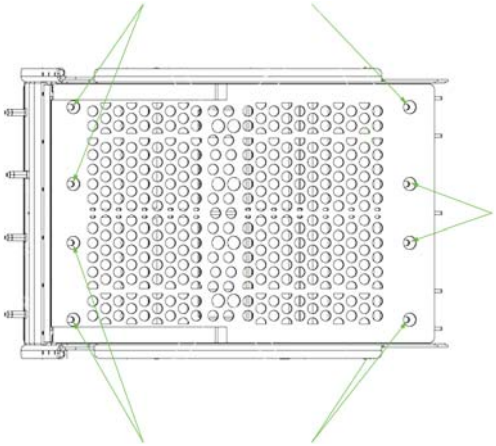
6. Tighten the tensional screws alternately in small steps. Make sure the hook strips locate on the hook plates.

7. Adjust the screening mesh until it is sufficiently tensioned.

Note: Make sure the screening mesh is correctly located.

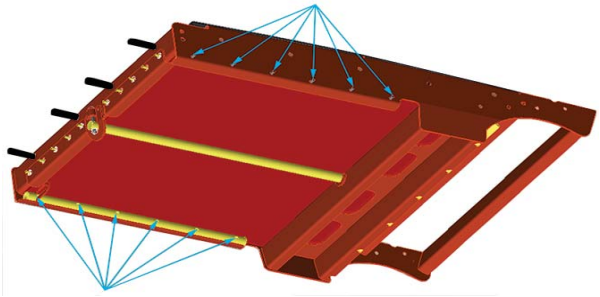


8. Using suitable lifting equipment as defined by a site specific risk assessment, lower the top plate in to the machine.
9. Slide the plate back to locate the retaining bolts.



10. Refit all the retaining bolts.

11. Check the tension of the red rubber on the underside of the feeder.



12. Replace any other items / safety equipment removed to gain access to the screening media.
13. Start the engine, refer to ***4.3 Engine starting procedure***.
14. Raise the hopper sides refer to ***4.6.5 Raising the hopper (manual lock)*** and ***4.6.7 Hopper (automatic lock)***.
15. Run the pre-screen empty for a short period of time.
16. Check for any unusual noises rectify if required.

NOTICE

Over tightening the tensional screws can cause damage to hook plates, screening media and support bars.

6.20 Maintenance displays

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

The following maintenance display screens describe the mode which allows each function of the machine to be operated independently of other functions. The functions are for service engineers only and can only be accessed after a security code is entered.

6.20.1 Access to maintenance displays

1. Press button 6 on the machine control display to access the maintenance display.

2. A security page appears. To gain access to the maintenance displays a 4 digit security code supplied by Sandvik is to be entered.

Note: To obtain the 4 digit security code contact Sandvik quoting the reference number on display.

3. Enter the 4 digit security code, using the numbered buttons and press the OK button.

When the correct code is entered, access is granted. If the incorrect code is entered, access is denied for 60 seconds before another attempt can be made.

Once the maintenance display is activated by the security code, the warning siren and flashing beacon operates. There is a 10 second delay before any function can be operated.

Note: Some displays and controls are only available to Sandvik personnel.

6.20.2 To exit maintenance displays

1. Scroll to page 1 of the maintenance displays.

2. Press ESC button

6.21 Machine maintenance log

The maintenance cards should be completed after all service periods. The service intervals are determined, by either operating hours of the diesel engine or periodic intervals.

The operating hours and periodic service intervals should be carried out regardless of each other.

6.21.1 How to read the maintenance card

A Diesel hours -- Every XXXX Hrs				
B Maintenance Procedure	**C Type**			**Notes**
Grease main conveyor		**D**	**E**	**F**
Check main conveyor belt				
When completed: Date..... Diesel Hrs..... Approved.....				

A	Maintenance card title.	Hour type and period.
B	Maintenance procedure column.	Maintenance procedure.
C	Symbol column.	The symbol represents the maintenance procedure.
D	Page number of procedure.	Indicates the procedure page number.
E	Check column.	Mark as task completed.
F	Notes column.	Write any observations or concerns.

	Adjust		Empty		Check		Measure
	Replace	S	Service		Lubricate		Clean

6.22 Maintenance based on engine operating hours

6.22.1 40 Hrs (weekly)

Maintenance procedure	Type			Notes
General				
Do the daily maintenance checks		147		
Power Unit (Engine)				
Check battery fluid levels and condition		205		
Remove any build up of dust / debris				
Power Unit (Hydraulics)				
Check hoses and hydraulic components for leaks and damage				
Remove any build up of dust / debris				
Hpto (Clutch)				
Check ventilation holes in the bell housing				
Remove any build up of dust / debris				
Crusher				
Check crushing chamber wear				
Check crusher chamber condition				
Grease all tension device bearings				
Check tension device spring				
Feeder				
Check and clean the vibration gearbox breather				
Check liner and wear plate condition				

Pre-screen				
Check screen springs for damage				
Check top deck and hardox bolts for wear				
Check wear on the bottom deck rubbers				
Check screen chute for wear and damage				
Grease all screen bearings				
Pan feeder				
Check wear on the liner plates				
Conveyors				
Check skirting rubber condition				
Check belt scrapers tension and condition				
Check rollers				
Check magnetic belt				
Tracks				
Check gearbox oil levels		179		
Check track tension		183		
Track the machine 10m in each direction (to prevent track seizure)		91		
General				
Check wear rubbers				
Check hoses and clamps are secure				
Check electrical cables and sockets are secure and not rubbing				
When completed: Date..... Diesel Hrs..... Approved.....				

6.22.2 First 100 Hrs

Maintenance procedure	Type			Notes
Do the daily maintenance checks		147		
Do the weekly maintenance checks		149		
Feeder				
Change vibration gearbox oil				
Tracks				
Change gearbox oil		179		
When completed: Date..... Diesel Hrs..... Approved.....				

6.22.3 250 Hrs

Maintenance procedure	Type			Notes
Do the daily maintenance checks		147		
Do the weekly maintenance checks		149		
Power Unit (Engine)				
Change engine oil and filter (3A engine only)				
Collect engine oil sample (3A engine only)				
Change engine air filter		188		
Change engine fuel filters				
Tracks				
Check track tension				
When completed: Date..... Diesel Hrs..... Approved.....				

6.22.4 500 Hrs

Maintenance procedure	Type			Notes
Do the daily maintenance checks		147		
Do the weekly maintenance checks		149		
Do the 250 Hrs maintenance checks		152		
Power Unit (Engine)				
Change engine oil and filter (3B / tier 4 engine only)				
Collect engine oil sample (3A engine only)				
Change engine crank case breather				
Change fuel tank breather				
Power Unit (hydraulic)				
Change hydraulic tank breather		198		
Collect hydraulic oil sample				
Change hydraulic oil return filters		199		
Change hydraulic oil high pressure filters		203		
Hpto (clutch)				
Change oil and oil filter		209		
Replace breather				
Feeder				
Change gearbox oil				
When completed: Date..... Diesel Hrs..... Approved.....				

6.22.5 1000 Hrs

Maintenance procedure	Type			Notes
Do the daily maintenance checks		147		
Do the weekly maintenance checks		149		
Do the 250 Hrs maintenance checks		152		
Do the 500 Hrs maintenance checks		153		
Tracks				
Change gearbox oil		179		
When completed: Date..... Diesel Hrs..... Approved.....				

6.22.6 2000 Hrs

Maintenance procedure	Type			Notes
Do the daily maintenance checks		147		
Do the weekly maintenance checks		149		
Do the 250 Hrs maintenance checks		152		
Do the 500 Hrs maintenance checks		153		
Do the 1000 Hrs maintenance checks		154		
Power Unit (Engine)				
Change engine coolant				
Power Unit (hydraulic)				
Change hydraulic oil				
Change hydraulic oil suction filters				
When completed: Date..... Diesel Hrs..... Approved.....				

6.22.7 5000 Hrs

Maintenance procedure	Type			Notes
Do the daily maintenance checks				
Do the weekly maintenance checks				
Do the 250 Hrs maintenance checks				
Do the 500 Hrs maintenance checks				
Do the 1000 Hrs maintenance checks				
Do the 2000 Hrs maintenance checks				
Hpto (clutch)				
Fully service the Hpto (clutch)				
When completed: Date..... Diesel Hrs..... Approved.....				

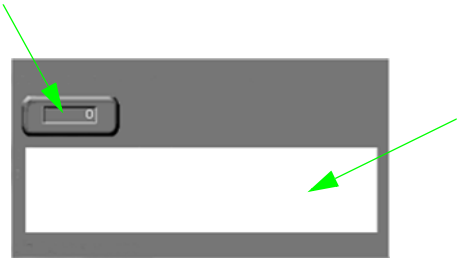
7 Trouble shooting

7.1 Machine fault codes

The machine can detect and display some common problems that can occur.

When the system detects a fault, the fault code and description are reported on the current screen.

If any of these occur, carry out any checks listed.



1. Each fault is identified by a fault code number.
2. A fault description is also shown with possible cause.

3. There are 3 categories of faults:
   - Red faults - stop the machine
   - Blue faults - stop the feeder
   - Engine faults

Refer to ***10 OEM Information and Data Sheets***.

7.2 Fault logs

A log of faults are available for viewing.

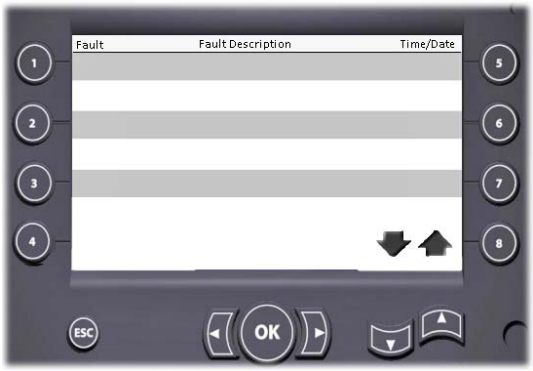
1. At the initial screen, press button 3.

2. From the operation screen press button 7.

3. Press button 1 to view faults.

4. The most recent faults are listed, displaying fault number, date and time.

   Note: If a fault occurs, it is highlighted on the current display screen so the operator can take appropriate action.



5. Scroll through the fault list using the up and down buttons.

6. To clear the fault message from the display the operator must confirm that action has been taken by pressing the OK button.

   Note: If the fault has not been rectified and cleared then the warning will reappear and another entry is recorded in the log.

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Sandvik QI Red Faults

QI – Fault Codes (Red) V1.10 On

Fault Code	1
Fault Description	**Emergency Stop Pressed**
Fault Criteria	Emergency stop input is low
Action	All outputs are switched off immediately
Troubleshooting	Ensure all emergency stops are released Investigate / Troubleshoot emergency stop circuit
Fault Code	2
Fault Description	**Low Hydraulic Oil Level**
Fault Criteria	Hydraulic oil level input is low
Action	Automatic shutdown in machine mode, Engine ECU power off Delayed engine shutdown in tracking mode
Troubleshooting	Ensure oil level is above minimum. Ensure oil level switch is closed, investigate oil level switch circuit
Fault Code	4
Fault Description	**High Hydraulic Oil Temperature**
Fault Criteria	Hydraulic oil temperature sensor input above 84 ℃ for 4 seconds
Action	Automatic shutdown in machine mode, Engine ECU power off
Troubleshooting	Ensure oil temperature is below maximum, Investigate oil temperature circuit, check sensor impedance, check 5v supply to sensor
Fault Code	7
Fault Description	**Cranking Too Long - Starter Motor Disable**
Fault Criteria	Crank input on for greater than 30 seconds without engine starting
Action	Engine cranking prevented
Troubleshooting	Investigate engine failure to start

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Sandvik QI Red Faults

Fault Code	8
Fault Description	**Crusher Belt Slip Warn**
Fault Criteria	Crusher drive belt slippage is greater than "*Belt Warn Slippage %*" set point
Action	Feeder stopped
Troubleshooting	Ensure crusher speed is stable Ensure reliable clutch speed signal Ensure reliable crusher speed signal
Fault Code	9
Fault Description	**Crusher Belt Slip Shutdown**
Fault Criteria	Crusher drive belt slippage is greater than "*Belt Stop Slippage %*" set point
Action	Auto stop
Troubleshooting	Ensure crusher speed is stable Ensure reliable clutch speed signal Ensure reliable crusher speed signal
Fault Code	10
Fault Description	**Crusher Low Engine Rpm**
Fault Criteria	Engine speed is less than "*Feeder Engine Drop Rpm*" Set pont
Action	Feeder stopped
Troubleshooting	Ensure engine speed remains above the set point
Fault Code	11
Fault Description	**ECU J1939 Timeout - Check ECU Power**
Fault Criteria	No coms from engine ECU
Action	Non
Troubleshooting	Ensure ECU power is ok Investigate Coms link
Fault Code	12
Fault Description	**Nv Checksum Error - Check Parameters**
Fault Criteria	Applications parameters are not reliable – after an application file transfer
Action	Engine start inhibited
Troubleshooting	Ensure default parameters are loaded

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Sandvik QI Red Faults

Fault Code	13
Fault Description	**Feeder Pvg Valve Error**
Fault Criteria	Feeder PVG error signal is high
Action	Feeder stopped
Troubleshooting	Ensure error signal is low Investigate PVG circuit
Fault Code	17
Fault Description	**Chamber Opened**
Fault Criteria	Chamber safety switch input is low
Action	Auto stop / ECU off
Troubleshooting	Ensure controller input is high Ensure key is correctly fitted and locked Investigate chamber stop circuit
Fault Code	18
Fault Description	**Hyd. Oil. Temp. Sensor Over Range**
Fault Criteria	Hydraulic oil temperature signal is open circuit
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure sensor is correctly connected Ensure sensor resistance is correct Investigate sensor circuit
Fault Code	19
Fault Description	**Hyd. Oil. Temp. Sensor Under Range**
Fault Criteria	Hydraulic oil temperature signal is short Circuit
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure sensor is correctly connected Ensure sensor resistance is correct Investigate sensor circuit
Fault Code	20
Fault Description	**Clutch Coil - Check Solenoids**
Fault Criteria	Clutch Coil Fault LED is on
Action	Automatic shutdown in machine mode
Troubleshooting	Investigate clutch coil

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Sandvik QI Red Faults

Fault Code	21
Fault Description	**Clutch Low Pressure**
Fault Criteria	Clutch oil pressure is less than "*Clutch pressure warning*" Set point
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure oil pressure is above the set point Investigate clutch oil pressure circuit
Fault Code	22
Fault Description	**Clutch Critical Pressure**
Fault Criteria	Clutch oil pressure is less than "*Clutch pressure Critical*" Set point
Action	Automatic shutdown in machine mode / ECU off
Troubleshooting	Ensure oil pressure is above the set point Investigate clutch oil pressure circuit
Fault Code	23
Fault Description	**Clutch Overload**
Fault Criteria	Clutch Overload Fault LED is on
Action	Automatic shutdown in machine mode
Troubleshooting	Investigate clutch
Fault Code	25
Fault Description	**Clutch Temperature High**
Fault Criteria	Clutch Temperature Fault LED is on
Action	Automatic shutdown in machine mode
Troubleshooting	Investigate clutch
Fault Code	26
Fault Description	**Clutch Filter Blocked**
Fault Criteria	Clutch Filter Blocked Fault LED is on
Action	Automatic shutdown in machine mode
Troubleshooting	Investigate clutch
Fault Code	27
Fault Description	**Clutch J1939 CAN Problem**
Fault Criteria	Clutch J1939 fault LED is on
Action	Auto stop
Troubleshooting	Investigate clutch to engine coms

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Sandvik QI Red Faults

Fault Code	28
Fault Description	**Clutch Over Speed**
Fault Criteria	Clutch Over speed Fault LED is on
Action	Auto stop
Troubleshooting	Investigate Clutch
Fault Code	29
Fault Description	**Clutch Locked Out**
Fault Criteria	Clutch Lockout LED is on
Action	Auto stop
Troubleshooting	Investigate Clutch
Fault Code	30
Fault Description	**Clutch is Unavailable**
Fault Criteria	No Coms from clutch controller
Action	Auto stop / ECU off
Troubleshooting	Investigate clutch J1939 Coms
Fault Code	31
Fault Description	**Clutch Oil Level Low**
Fault Criteria	Clutch oil level input is low
Action	Auto stop / ECU off
Troubleshooting	Ensure level switch is closed Ensure input is high Investigate level circuit
Fault Code	33
Fault Description	**Clutch failed to engage in Auto**
Fault Criteria	No clutch engaged LED from clutch controller
Action	Auto start aborted
Troubleshooting	Investigate clutch

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Sandvik QI Red Faults

Fault Code	34
Fault Description	**Clutch Failed to Disengage in Auto**
Fault Criteria	Clutch engaged LED remained on after stop request
Action	ECU off
Troubleshooting	Investigate clutch

Fault Code	36
Fault Description	**Clutch Disengaged in Auto**
Fault Criteria	Loss of clutch engaged signal
Action	Auto stop
Troubleshooting	Investigate clutch Investigate clutch Coms

Fault Code	37
Fault Description	**Clutch Oil Warn Temperature**
Fault Criteria	Clutch tank temperature is greater than “Clutch oil warn” set point
Action	Feeder Stopped
Troubleshooting	Ensure temperature is less than the set point Investigate temperature sensor circuit

Fault Code	38
Fault Description	**Clutch Oil Shutdown Temperature**
Fault Criteria	Clutch tank temperature is greater than “Clutch oil shut down” set point
Action	Auto stop
Troubleshooting	Ensure temperature is less than the set point Investigate temperature sensor circuit

Fault Code	39
Fault Description	**Clutch Oil Temperature Unavailable**
Fault Criteria	Signal from clutch temperature sensor is out of range
Action	Auto stop
Troubleshooting	Investigate clutch oil temperature sensor circuit

Fault Code	40
Fault Description	**Sensor Supply Low**
Fault Criteria	Controller sensor supply output is less than 4500 Mv
Action	Non
Troubleshooting	Investigate sensor circuits

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Sandvik QI Red Faults

Fault Code	41
Fault Description	**Doglead Left Joystick Failure**
Fault Criteria	Forward / Reverse signals form tracking handset out of range
Action	Prevents manual tracking
Troubleshooting	Ensure signals are correct, Investigate tracking handset circuit
Fault Code	42
Fault Description	**Doglead Right Joystick Failure**
Fault Criteria	Forward / Reverse signals form tracking handset out of range
Action	Prevents manual tracking
Troubleshooting	Ensure signals are correct, Investigate tracking handset circuit
Fault Code	43
Fault Description	**Tracks Pvg Valve Fault Left**
Fault Criteria	Error feedback input from left track valve is high
Action	Engine ECU power off
Troubleshooting	Investigate track valve, Note: red led indicates fault investigate track valve circuit
Fault Code	44
Fault Description	**Tracks Pvg Valve Fault Right**
Fault Criteria	Error feedback input from right track valve is high
Action	Engine ECU power off
Troubleshooting	Investigate track valve, Note: red led indicates fault investigate track valve circuit
Fault Code	50
Fault Description	**Radio Red Stop Pressed**
Fault Criteria	Radio stop button pressed message received from radio receiver
Action	Automatic shutdown in machine mode Engine ECU power off in tracking mode
Troubleshooting	Ensure radio transmitter is powered on and stop button released

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Sandvik QI Red Faults

Fault Code	51
Fault Description	**No Radio Signal**
Fault Criteria	No radio signal message received from radio receiver
Action	Radio disabled
Troubleshooting	Ensure radio battery is charged
Fault Code	52
Fault Description	**Radio CAN Unavailable**
Fault Criteria	No Coms from radio receiver
Action	Non
Troubleshooting	Investigate coms link
Fault Code	53
Fault Description	**Radio Left Joystick Failure**
Fault Criteria	Joystick fault message received from radio received
Action	Prevents radio tracking / Radio functions
Troubleshooting	Ensure radio transmitter battery is charged, Ensure radio transmitter is in serviceable condition
Fault Code	54
Fault Description	**Radio Right Joystick Failure**
Fault Criteria	Joystick fault message received from radio received
Action	Prevents radio tracking / Radio functions
Troubleshooting	Ensure radio transmitter battery is charged, Ensure radio transmitter is in serviceable condition
Fault Code	60
Fault Description	**Fuel Sender Under-Range Fault**
Fault Criteria	Fuel level sender signal is less than 10ohms
Action	Non
Troubleshooting	Investigate fuel level sender circuit
Fault Code	61
Fault Description	**Fuel Sender Over-Range Fault**
Fault Criteria	Fuel level sender signal is greater than 180 ohms
Action	Non
Troubleshooting	Investigate fuel level sender circuit

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Sandvik QI Red Faults

Fault Code	62
Fault Description	**Teir 4 Soot Warning Level - Feeder Disabled**
Fault Criteria	Soot level is greater than "*Soot load warning*" Set point
Action	Auto stop
Troubleshooting	Investigate Soot load
Fault Code	63
Fault Description	**Teir 4 Soot Warning Level – Auto Shutdown**
Fault Criteria	Soot level is greater than "*Soot load Shutdown*" Set point
Action	Auto stop
Troubleshooting	Investigate Soot load
Fault Code	80
Fault Description	**Main Conveyor - Critical Speed**
Fault Criteria	Main conveyor speed input is less than *'Main Conveyor Critical Speed'* for 4 seconds
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit
Fault Code	81
Fault Description	**Side Conveyor - Critical Speed**
Fault Criteria	Side conveyor speed input is less than *'Side Conveyor Critical Speed'* for 4 seconds
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit

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Sandvik QI Red Faults

Fault Code	82
Fault Description	**ReCirc Conveyor - Critical Speed**
Fault Criteria	ReCirc conveyor speed input is less than *'ReCirc Conveyor Critical Speed'* for 4 seconds
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit
Fault Code	83
Fault Description	**Stock Conveyor - Critical Speed**
Fault Criteria	Stock conveyor speed input is less than *'Stock Conveyor Critical Speed'* for 4 seconds
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit
Fault Code	84
Fault Description	**Fines Conveyor - Critical Speed**
Fault Criteria	Fines conveyor speed input is less than *'Fines Conveyor Critical Speed'* for 4 seconds
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit
Fault Code	85
Fault Description	**Transfer Conveyor Critical Pressure**
Fault Criteria	Transfer conveyor pressure input is greater than *'Transfer pressure critical'* for 4 seconds
Action	Automatic shutdown in machine mode
Troubleshooting	Ensure pressure is less than set point Investigate pressure sensor circuit

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Sandvik QI Red Faults

Fault Code	86
Fault Description	**Transfer Conveyor Pressure Sensor Unavailable**
Fault Criteria	Pressure sensor signal I greater than 4.5v or less than 0.5v
Action	Automatic shutdown in machine mode
Troubleshooting	Investigate sensor circuit
Fault Code	1200 – 1280
Fault Description	**CAT Spn Code – See cross reference table**
Fault Code	1300 – 1324
Fault Description	**PT Tech Spn Code – See cross reference table**

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Sandvik QI Blue Faults

QI Warning Codes (Blue) V1.10 On

Code	1003
Description	**Hydraulic Oil Temperature Warning**
Criteria	Hydraulic oil temperature is greater than 79 Deg C
Action	Feeder stopped
Troubleshooting	Ensure Oil Temperature is lower than the warning level Investigate oil temperature circuit, check sensor impedance, check 5v supply to sensor
Code	**1014**
Description	**Engine Air Flow Restriction Active**
Criteria	Air filter restriction input is high
Action	Feeder Stopped
Troubleshooting	Ensure air filter restriction input is low Ensure switch is reset
Code	**1015**
Description	**Fuel Level Warn**
Criteria	Fuel level is below *'fuel level warning'* set point
Action	Feeder Stopped
Troubleshooting	Ensure fuel level is above the set point, Investigate the fuel level sensor circuit

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Sandvik QI Blue Faults

Code	1016
Description	**Fuel Level Critical**
Criteria	Fuel level is below '*fuel level Critical*' set point
Action	Auto stop
Troubleshooting	Ensure fuel level is above the set point, Investigate the fuel level sensor circuit

Code	1065
Description	**Unexpected Engine Start**
Fault Criteria	Engine speed is being received unexpectedly
Action	Non
Troubleshooting	Ensure engine has stopped

Code	1070
Description	**Main Conveyor Pull Stop Active**
Criteria	Main conveyor pull stop signal is low
Action	Main conveyor and feeder stopped + interlocks
Troubleshooting	Ensure pull stop is reset, Investigate pull stop circuit, ensure input to controller is high

Code	1071
Description	**Side Conveyor Pull Stop Active**
Criteria	Fines conveyor pull stop signal is low
Action	Side conveyor and feeder stopped + interlocks
Troubleshooting	Ensure pull stop is reset, Investigate pull stop circuit, ensure input to controller is high

Code	1072
Description	**Re-Circ Conveyor Pull Stop Active**
Criteria	Re-Circ conveyor pull stop signal is low
Action	Re-Circ conveyor and feeder stopped (Re-Circ system stopped)
Troubleshooting	Ensure pull stop is reset, Investigate pull stop circuit, ensure input to controller is high
Code	1073
Description	**Stock Conveyor Pull Stop Active**
Criteria	Stock conveyor pull stop signal is low
Action	Stock conveyor and feeder stopped (Re-Circ system stopped)
Troubleshooting	Ensure pull stop is reset, Investigate pull stop circuit, ensure input to controller is high
Code	1074
Description	**Fines Conveyor Pull Stop Active**
Fault Criteria	Fines conveyor pull stop signal is low
Action	Fines conveyor and feeder stopped (Re-Circ system stopped)
Troubleshooting	Ensure pull stop is reset, Investigate pull stop circuit, ensure input to controller is high
Code	1075
Description	**Main Conveyor Low Speed**
Criteria	Main conveyor speed is less than "*Main conveyor speed warning*" set point
Action	Feeder stopped + interlocks
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit

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Code	1076
Description	**Side Conveyor Low Speed**
Criteria	Side conveyor speed is less than "*Side conveyor speed warning*" set point
Action	Feeder stopped + interlocks
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit
Code	1077
Description	**ReCirc Conveyor Low Speed**
Criteria	ReCirc conveyor speed is less than "*ReCirc conveyor speed warning*" set point
Action	Feeder stopped + interlocks
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit
Code	1078
Description	**Stock Conveyor Low Speed**
Criteria	Stock conveyor speed is less than "*Stock conveyor speed warning*" set point
Action	Feeder stopped + interlocks
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit
Code	1079
Description	**Fines Conveyor Low Speed**
Criteria	Fines conveyor speed is less than "*Fines conveyor speed warning*" set point
Action	Feeder stopped + interlocks
Troubleshooting	Ensure belt speed is above the set point Ensure speed wheel signal is being received by controller, investigate speed wheel circuit

JMG SYSTEMS LTD.

Sandvik QI Blue Faults

Code	1086
Description	**Transfer Conveyor Critical Pressure**
Criteria	Transfer pressure is greater than "*Transfer pressure warning*" set point
Action	Feeder stopped
Troubleshooting	Ensure pressure is lower than the set point Investigate pressure sensor circuit

8 Engine

8.1 Engine information

8.1.1 Engine manual

The engine manufacturer supplies a manual which should be referred to for further information on the engine fitted to the machine.

8.1.2 Alternative Caterpillar engines

Alternative specifications of Caterpillar engines can be fitted to the machine power pack, C13 for Tier 3a, C13 Tier 3b or Tier 4 Final regulations.

Engine alternatives	Caterpillar C13, Tier 3a, C13 Tier 3b or Tier 4 Final
Engine power	328kW (440hp)
Speed	1700 to 2100 rpm

Make sure any information regarding servicing requirements, reported faults and spare parts are correct and applicable to the engine fitted.

8.2 Engine maintenance schedules

8.2.1 250 Hours engine maintenance schedule - C13 Tier 3a only

Note: Not applicable to C13 Tier 3b engine

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this schedule is carried out every 250 hours (minimum requirement).

For the Caterpillar C13, tier 3a engine only, do the 250 hours maintenance.

- Renew engine oil and filters.
- Renew primary and secondary fuel filters.

Refer to the engine operation and maintenance manual.

For service kits, refer to the appropriate power pack parts manual.

8.2.2 500 Hours engine maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this schedule is carried out every 500 hours (minimum requirement) C13 tier 3b and C13 tier 4 final.

On the Caterpillar C13 tier 3a engine only do the 250 hours maintenance schedule, refer to ***8.2.1 250 Hours engine maintenance schedule - C13 Tier 3a only***.

Do the engine 500 hours maintenance schedule, Refer also to engine manufacturers manual.

- Renew engine oil and filters.
- Renew primary and secondary engine air cleaners.
- Renew primary and secondary fuel filters.

For service kits, refer to the appropriate power pack parts manual.

8.2.3 1000 Hours engine maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this schedule is carried out every 1000 hours (minimum requirement).

Do the engine 500 hours maintenance schedule. Refer to ***8.2.2 500 Hours engine maintenance schedule***.

For service kits, refer to the appropriate power pack parts manual.

8.2.4 2000 Hours or 1 year engine maintenance schedule

WARNING Follow the maintenance safety instructions in *6.1 Maintenance - minimum safety requirements*, before starting this maintenance schedule.

Always do a site specific risk assessment before doing all maintenance procedures.

Make sure that this schedule is carried out every 2000 hours (minimum requirement).

Do the engine 500 hours maintenance schedule. Refer to ***8.2.2 500 Hours engine maintenance schedule***.

Do the engine 2000 hours inspection and maintenance. Refer to engine manufacturers operation and maintenance manual.

- Drain engine cooling system and renew engine coolant.
- Clean the crankcase vent cannister (Caterpillar C13a engine only).
- Renew filter - fumes disposal (Caterpillar C13 3b engine only).

For service kits, refer to the appropriate power pack parts manual.

For 2500, 3000, 4000, 5000, 6000, 10000 and 12000 hours service intervals refer to the OEM engine manual.

8.3 Engine lubrication and fluids

8.3.1 Lubricants and fluids used in manufacture

Reference	Maximum volume	Temperature	Manufacturer - Equivalent Specification	Sandvik Part No
Engine coolant (pre-mixed)	70 litres (18.5 US gallons)	ALL	Univar Caflon HDA	CN8015
Diesel fuel	660 litres (174 US gallons)	--	Ultra low sulphur diesel	CN7834
Engine oil Oil used in tier 3b and tier 4 engines must be compliant for use in them	37 litres (9 US gallons)	-10 to +50°C (14 to +122°F)	Shell Rimula R4T L 15W-40	CN7898
		-35 to +25°C (-31 to 77°F)	Shell Rimula R6 LME 5W -30	CN7998
AUS 32 (Adblue)	47 litres (12 US gallons)		ISO 22241	CN7835

8.3.2 Engine oil renewal

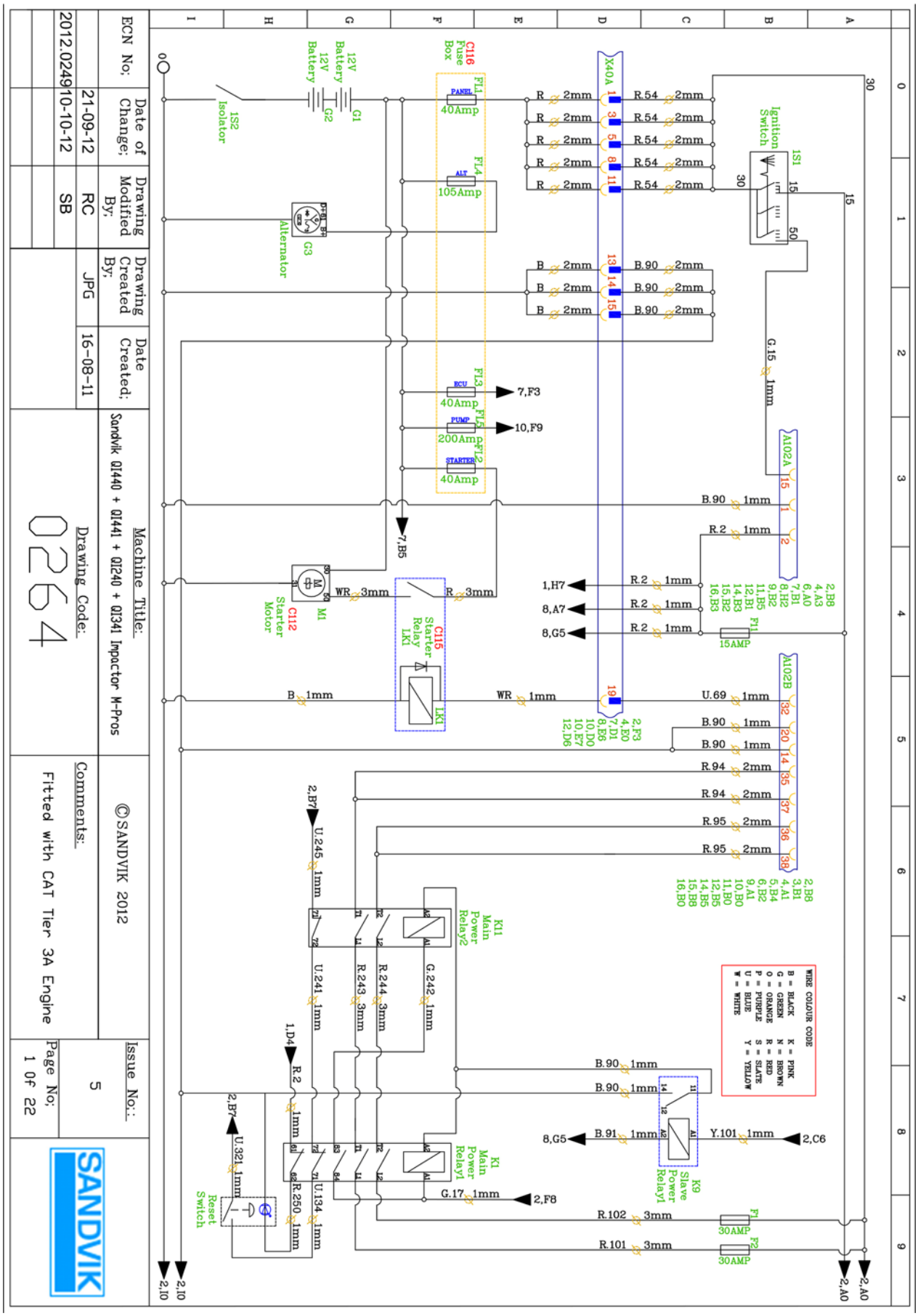
Refer to engine manufacturers manual for there recommendations, ***10.1.4 Engine manual***.

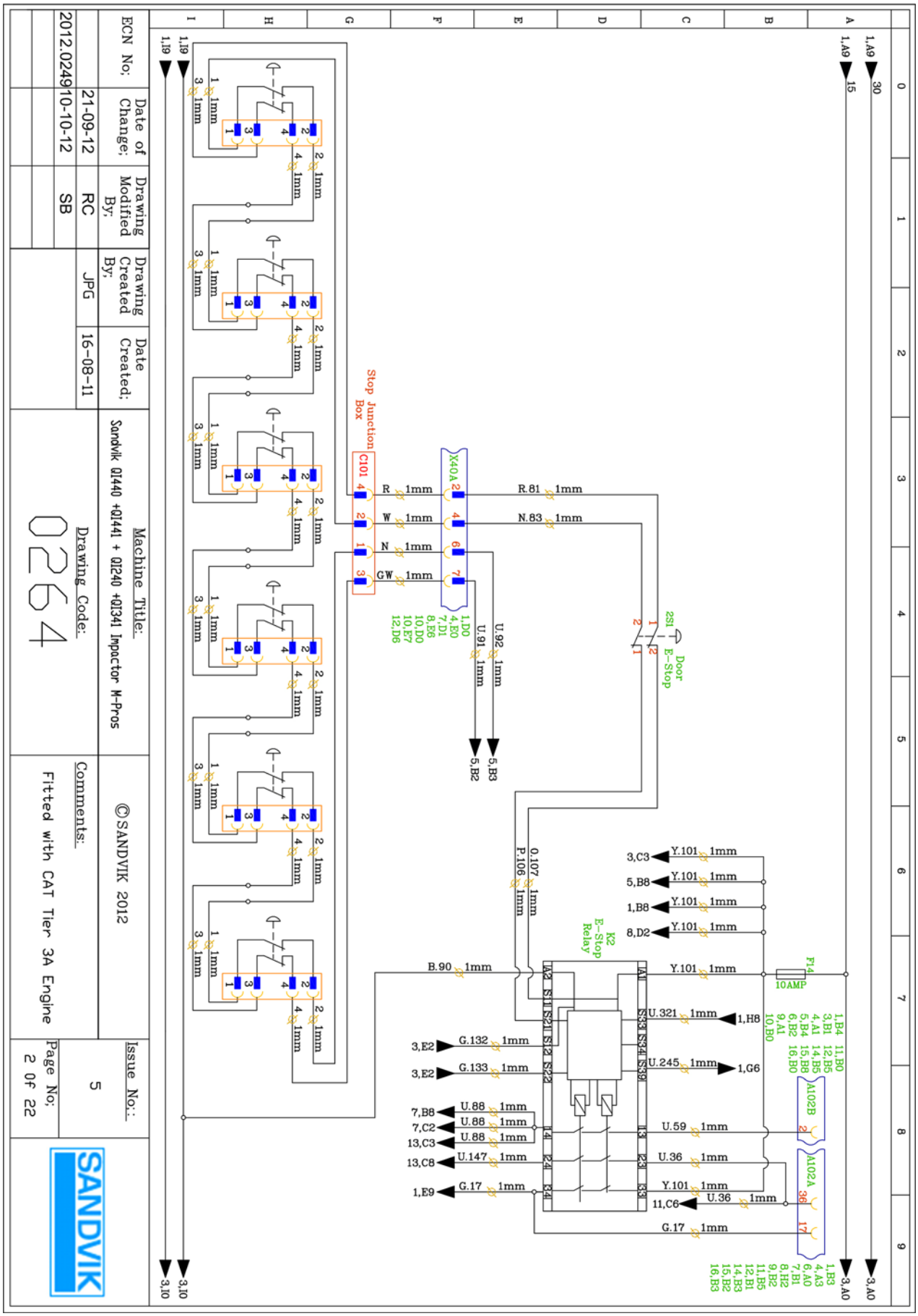
9 Electrical & Hydraulic Information

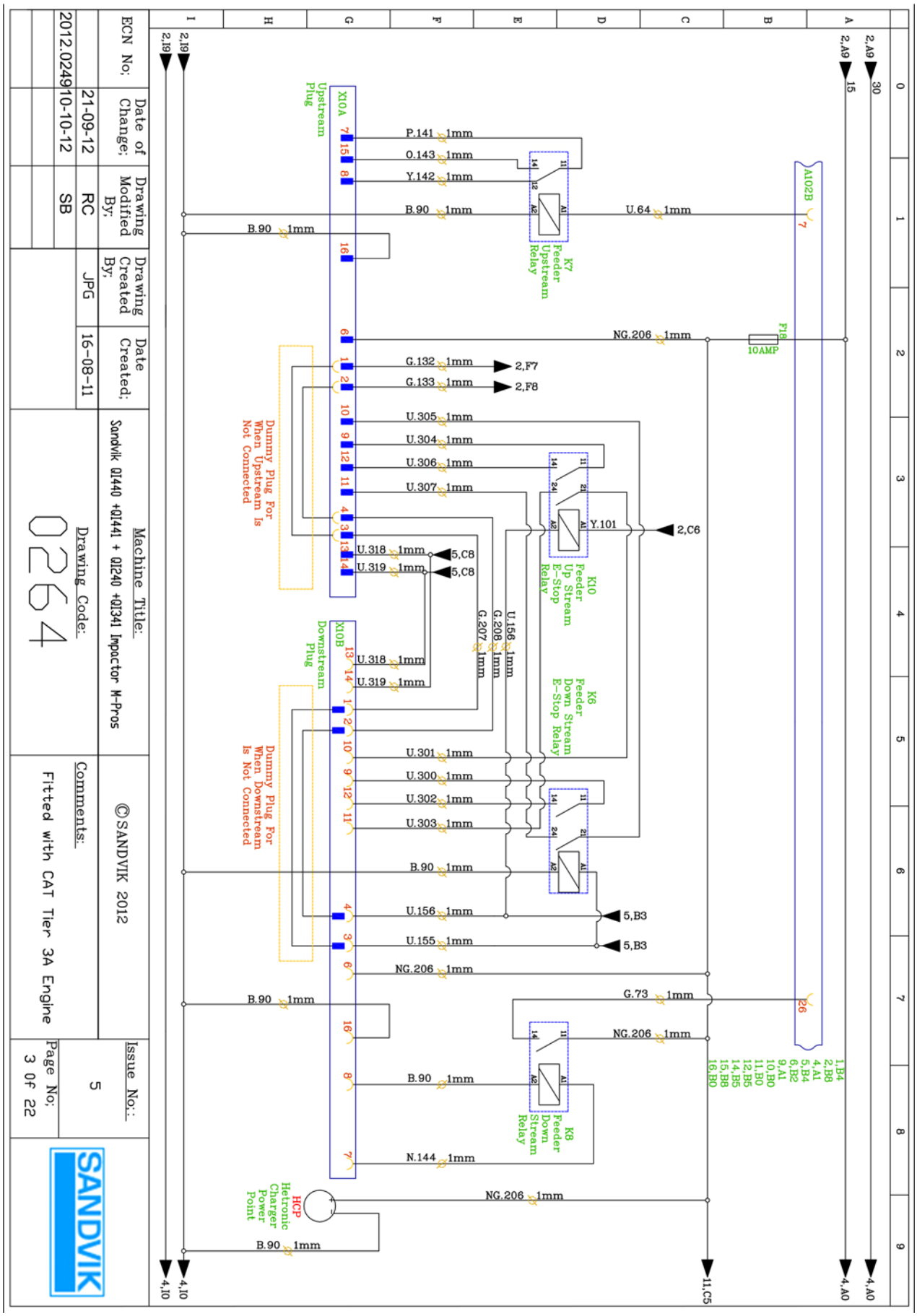
9.1 Schematic diagrams

9.1.1 Electrical information

Refer to appropriate electrical diagrams pdf document.



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Drawing Created By:
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16-08-11
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Sandvik QI440 +QI441 + QI240 +QI341 Impactor M-Pros
Drawing Code:
0264
©SANDVIK 2012
Comments:
Fitted with CAT Tier 3A Engine
Issue No::
5
Page No:
3 of 22
SANDVIK
X10A
Upstream Plug
X10B
Downstream Plug
K7 Feeder Upstream Relay
K10 Feeder Up Stream E-Stop Relay
K6 Feeder Down Stream E-Stop Relay
K8 Feeder Down Stream Relay
A102B
F18
10AMP
HCP
Hetronic Charger Power Point
Dummy Plug For When Upstream Is Not Connected
Dummy Plug For When Downstream Is Not Connected
P.141 1mm
O.143 1mm
Y.142 1mm
B.90 1mm
U.64 1mm
NG.206 1mm
G.132 1mm
G.133 1mm
U.305 1mm
U.304 1mm
U.306 1mm
U.307 1mm
Y.101
U.318 1mm
U.319 1mm
G.207 1mm
G.208 1mm
U.156 1mm
U.301 1mm
U.300 1mm
U.302 1mm
U.303 1mm
U.155 1mm
G.73 1mm
N.144 1mm
2,F7
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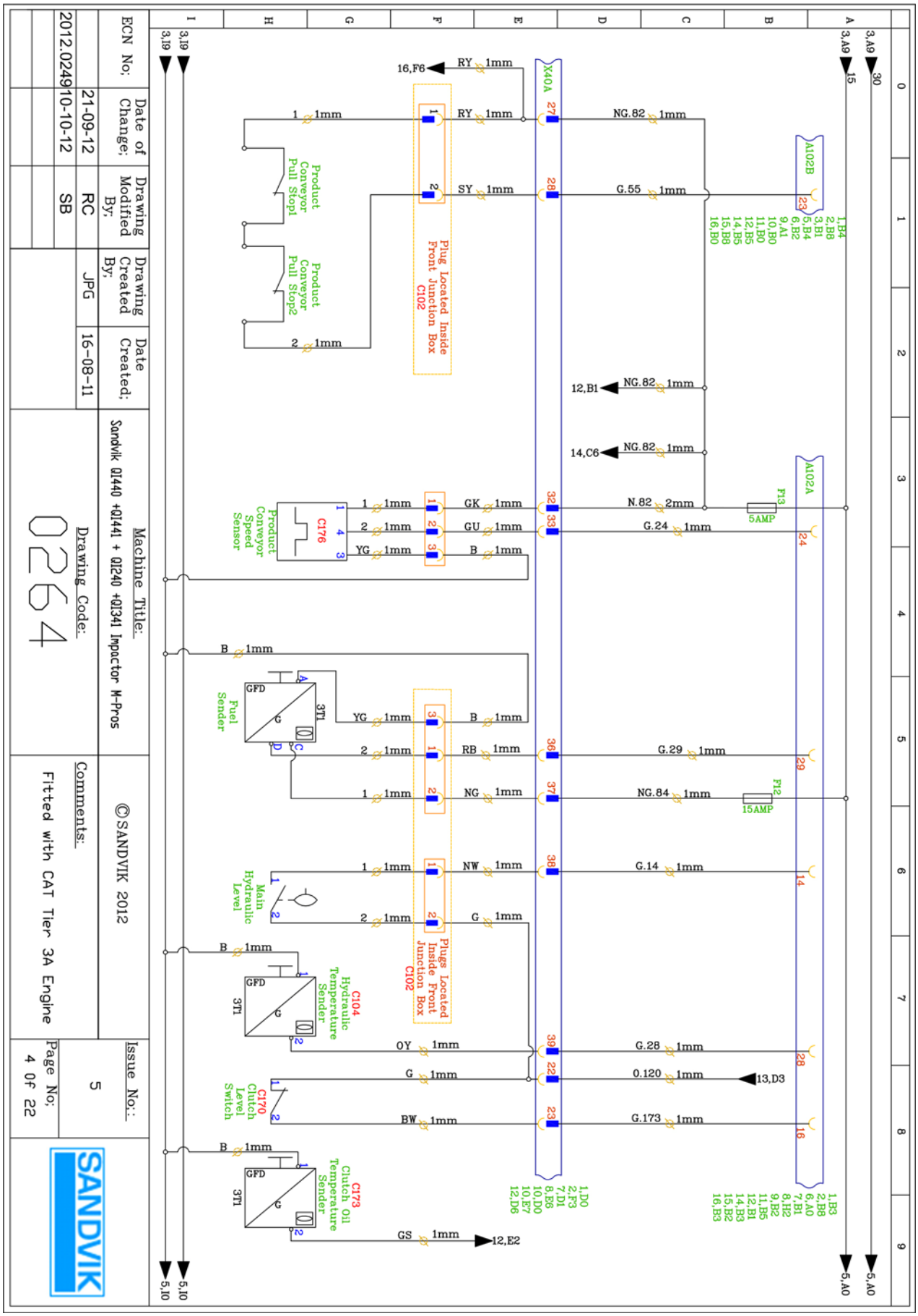
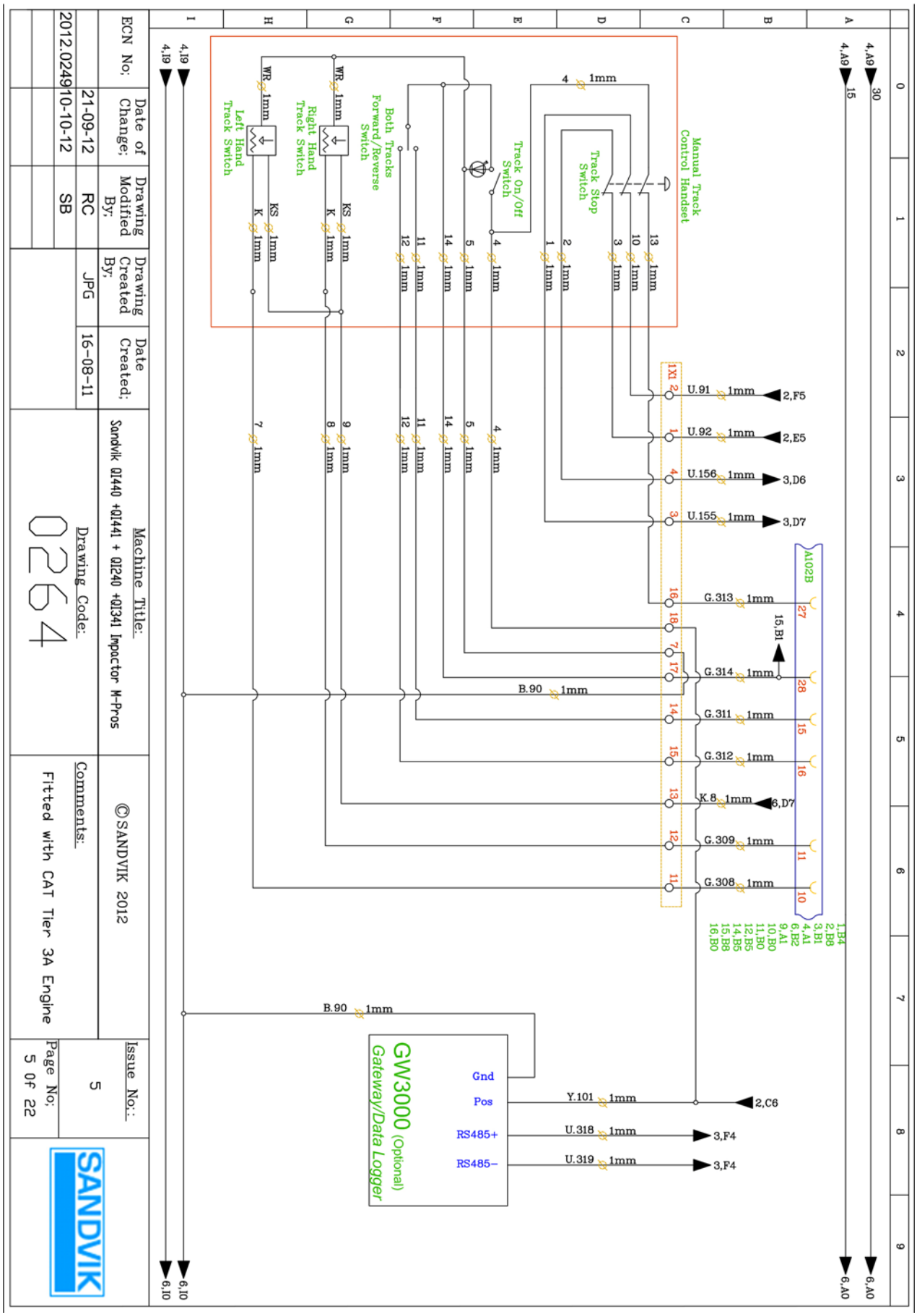
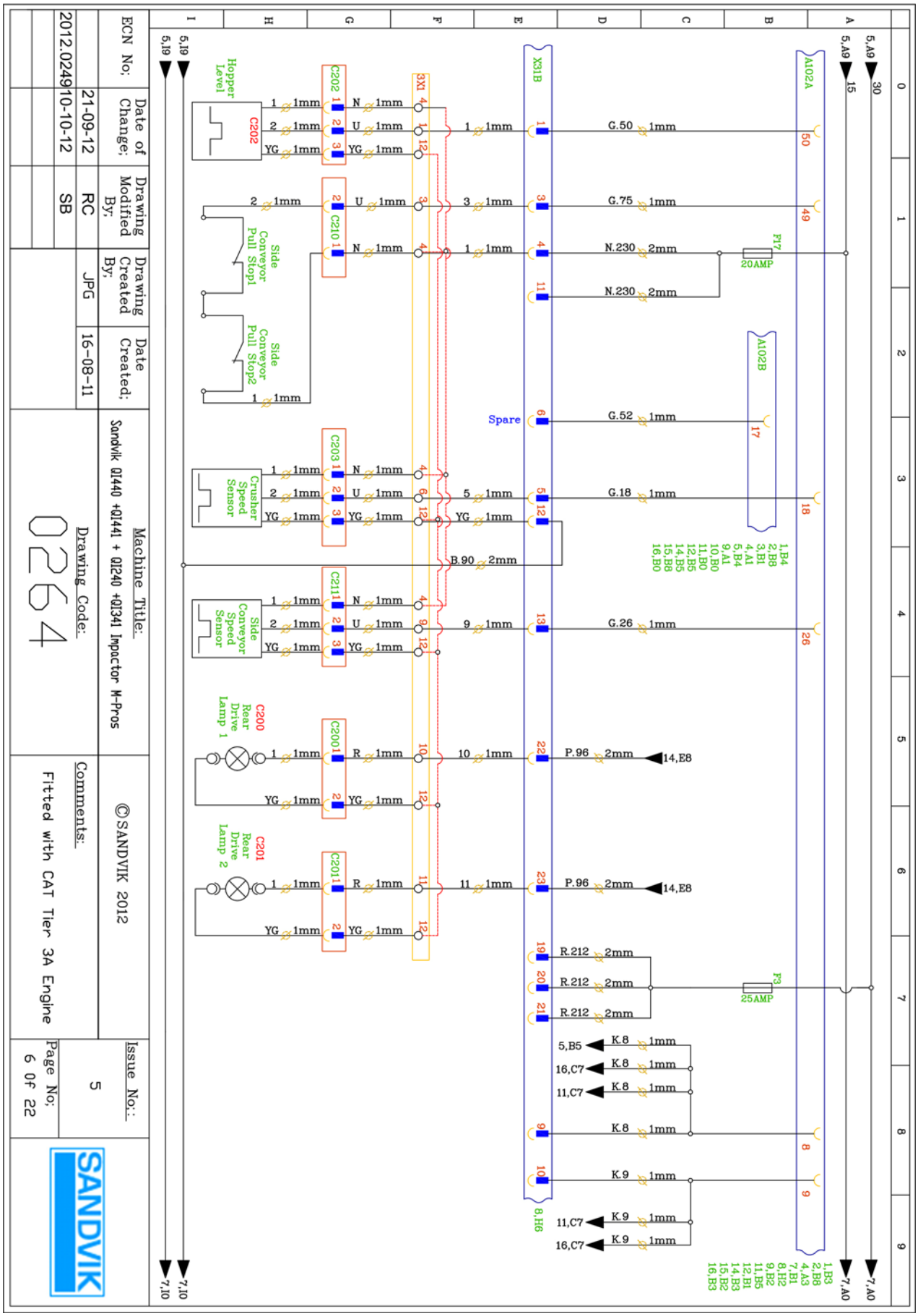
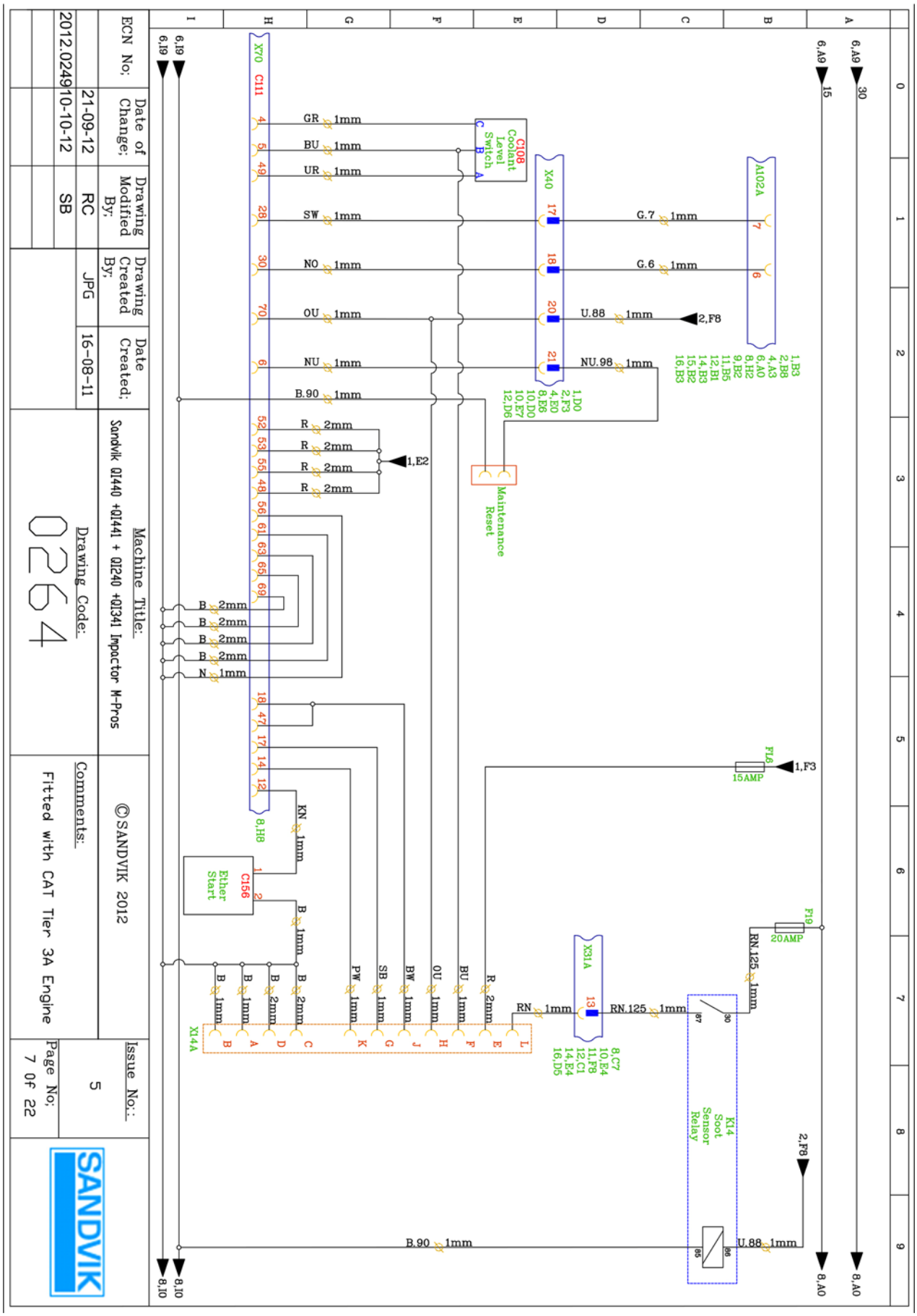
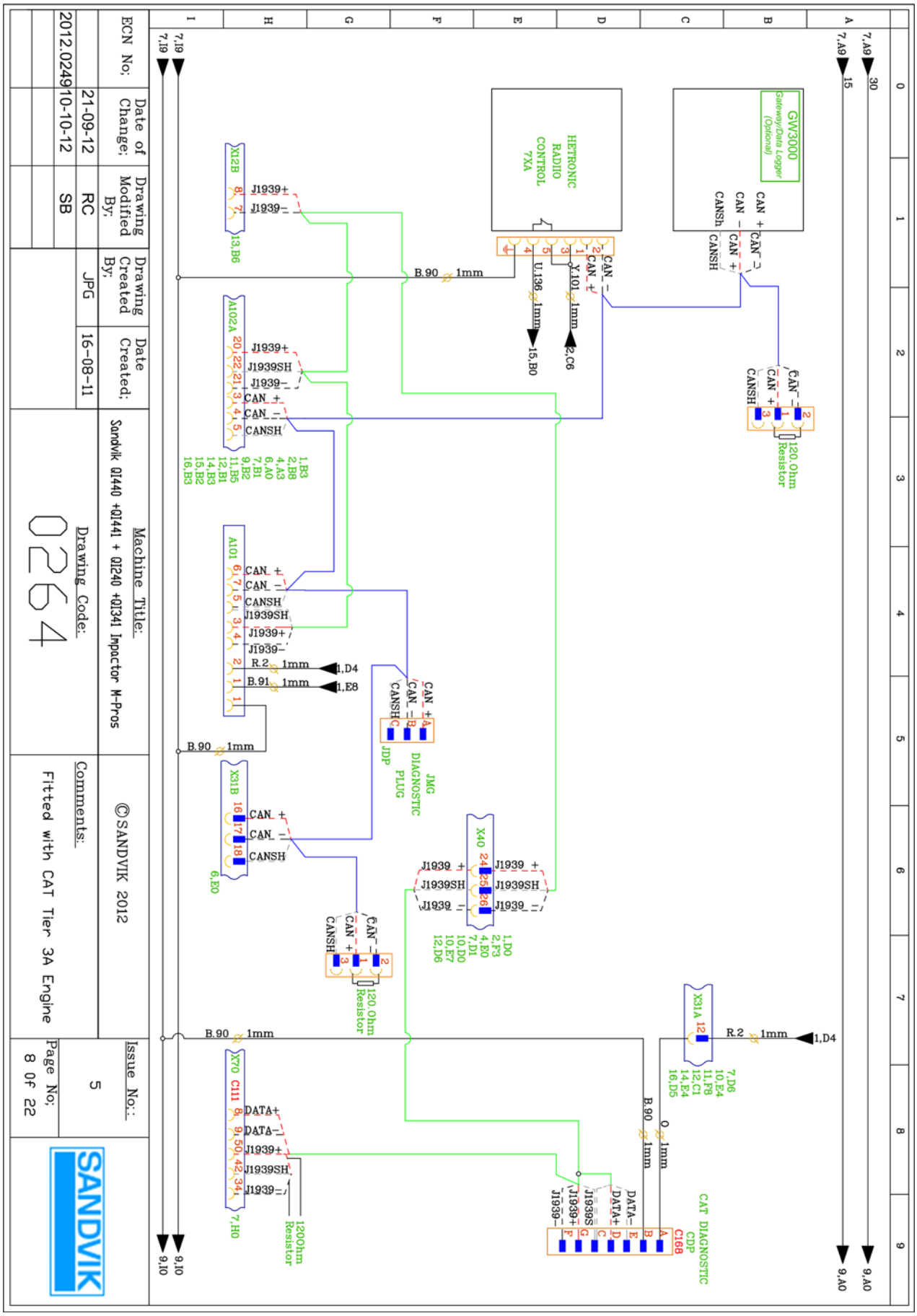
2,C6
5,C8
5,B3
11,C5
4,A0
4,10
2,A9
2,I9

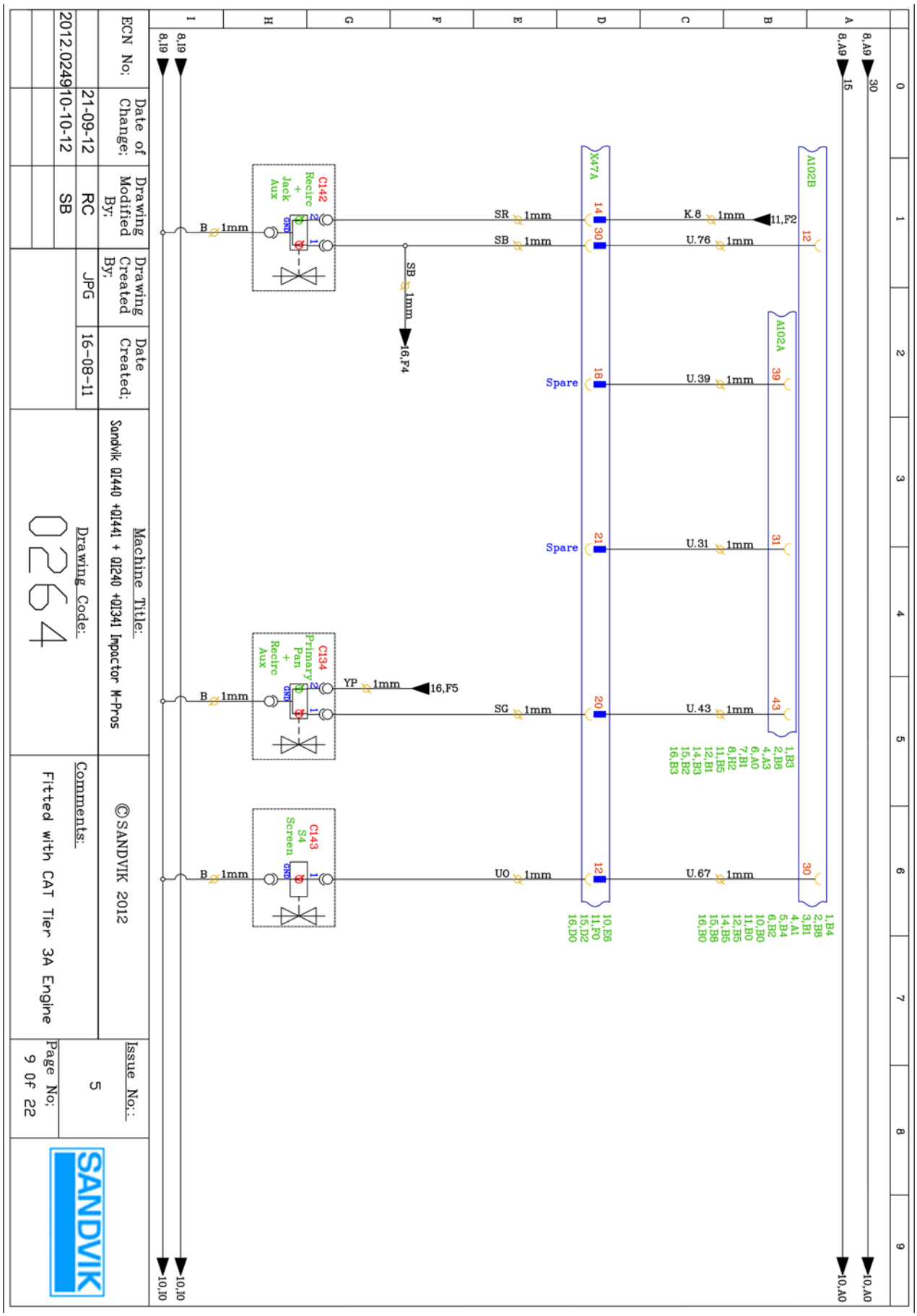


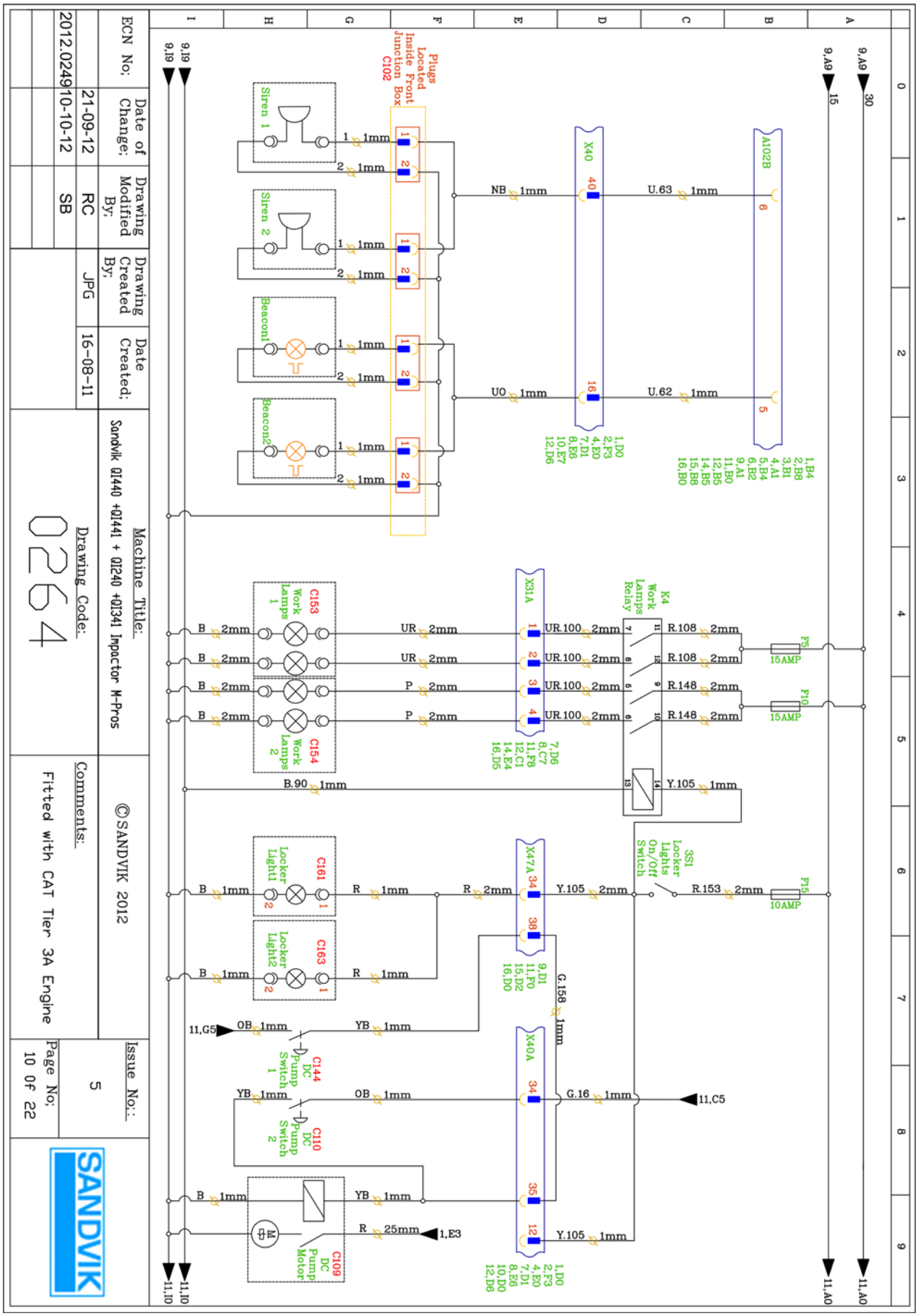

Manual Track Control Handset
Track Stop Switch
Track On/Off Switch
Both Tracks Forward/Reverse Switch
Right Hand Track Switch
Left Hand Track Switch
GW3000 (Optional)
Gateway/Data Logger
Gnd
Pos
RS485+
RS485-
A102B
U.91 1mm 2,F5
U.92 1mm 2,E5
U.156 1mm 3,D6
U.155 1mm 3,D7
G.313 1mm
G.314 1mm
G.311 1mm
G.312 1mm
K.8 1mm 6,D7
G.309 1mm
G.308 1mm
B.90 1mm
Y.101 1mm 2,C6
U.318 1mm 3,F4
U.319 1mm 3,F4
15,B1
Machine Title: Sandvik QI440 +QI441 + QI240 +QI341 Impactor M-Pros
Drawing Code: 0264
©SANDVIK 2012
Comments: Fitted with CAT Tier 3A Engine
ECN No: 2012.024
Date of Change: 21-09-12 10-10-12
Drawing Modified By: RC SB
Drawing Created By: JPG
Date Created: 16-08-11
Issue No:: 5
Page No: 5 of 22
SANDVIK

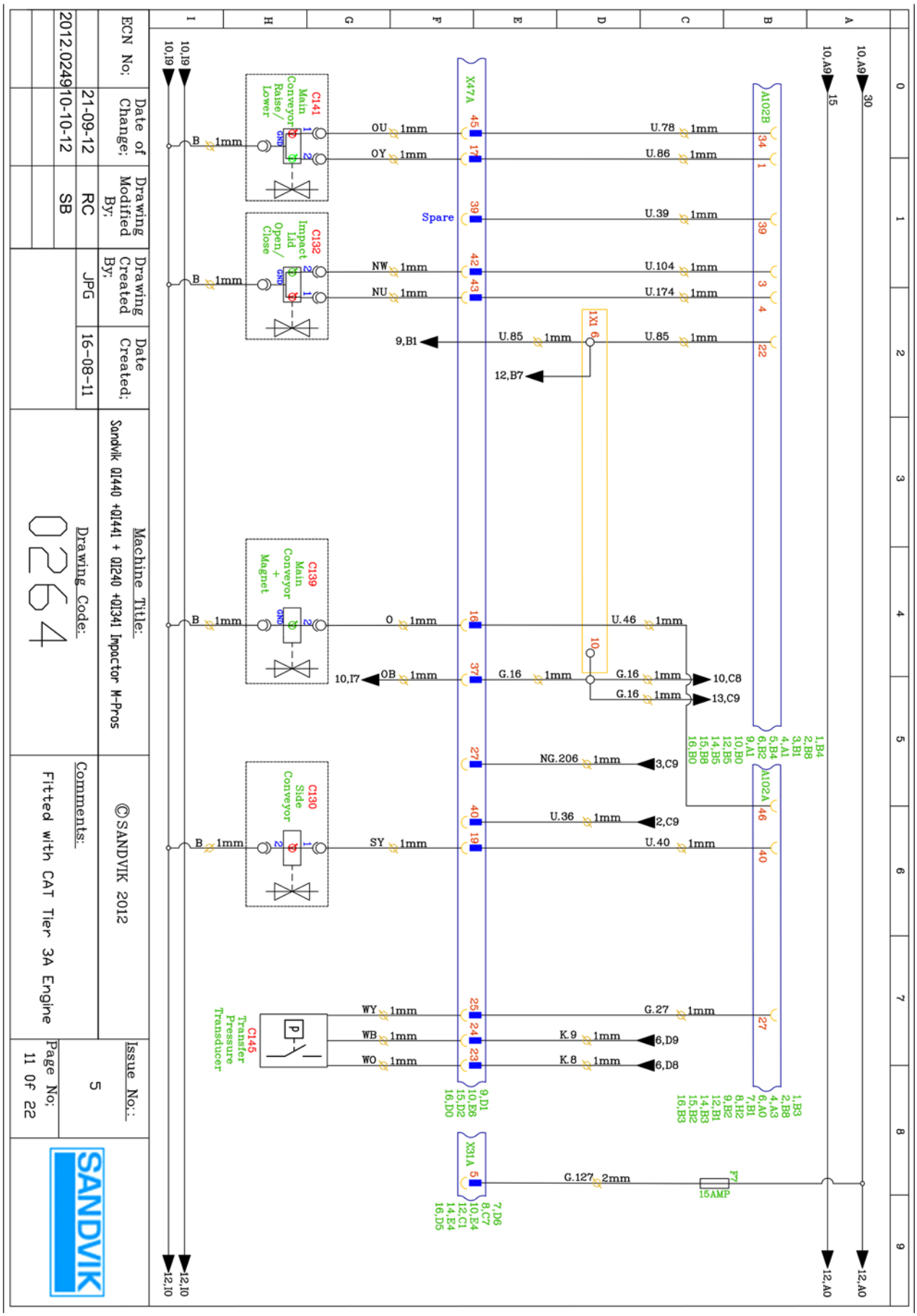








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Drawing Created By: JPG
Date Created; 16-08-11
Machine Title: Sandvik QI440 +QI441 + QI240 +QI341 Impactor M-Pros
Drawing Code: 0264
©SANDVIK 2012
Comments: Fitted with CAT Tier 3A Engine
Issue No:: 5
Page No: 11 of 22
SANDVIK
C141 Main Conveyor Raise/ Lower
C132 Impact Lid Open/ Close
C139 Main Conveyor + Magnet
C130 Side Conveyor
C145 Transfer Pressure Transducer
X47A
X31A
A102B
A102A
1X1
F7 15AMP
Spare
OU 1mm
OY 1mm
NW 1mm
NU 1mm
O 1mm
OB 1mm
SY 1mm
WY 1mm
WB 1mm
WO 1mm
NG.206 1mm
U.36 1mm
U.78 1mm
U.86 1mm
U.39 1mm
U.104 1mm
U.174 1mm
U.85 1mm
U.46 1mm
G.16 1mm
U.40 1mm
G.27 1mm
K.9 1mm
K.8 1mm
G.127 2mm
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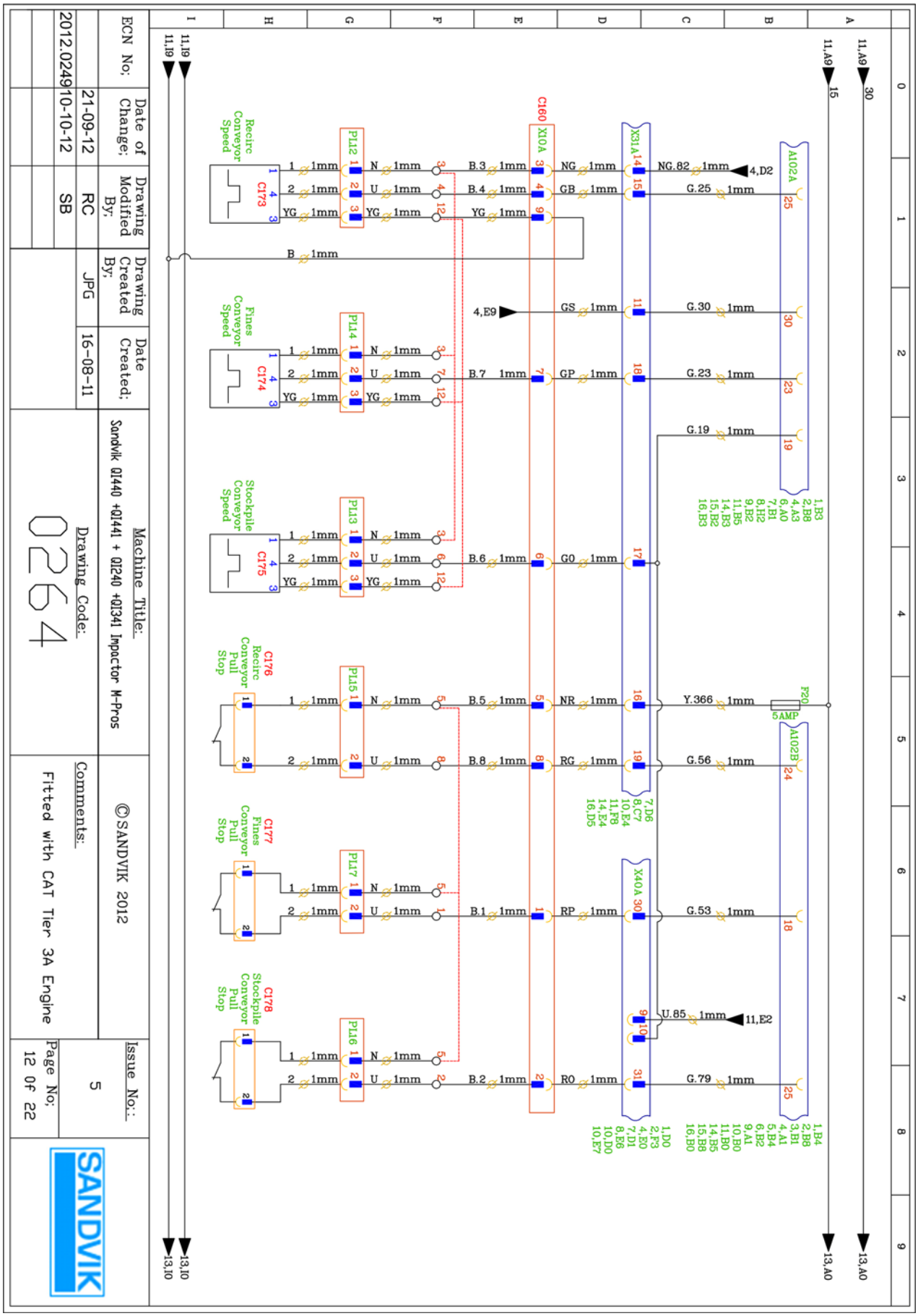
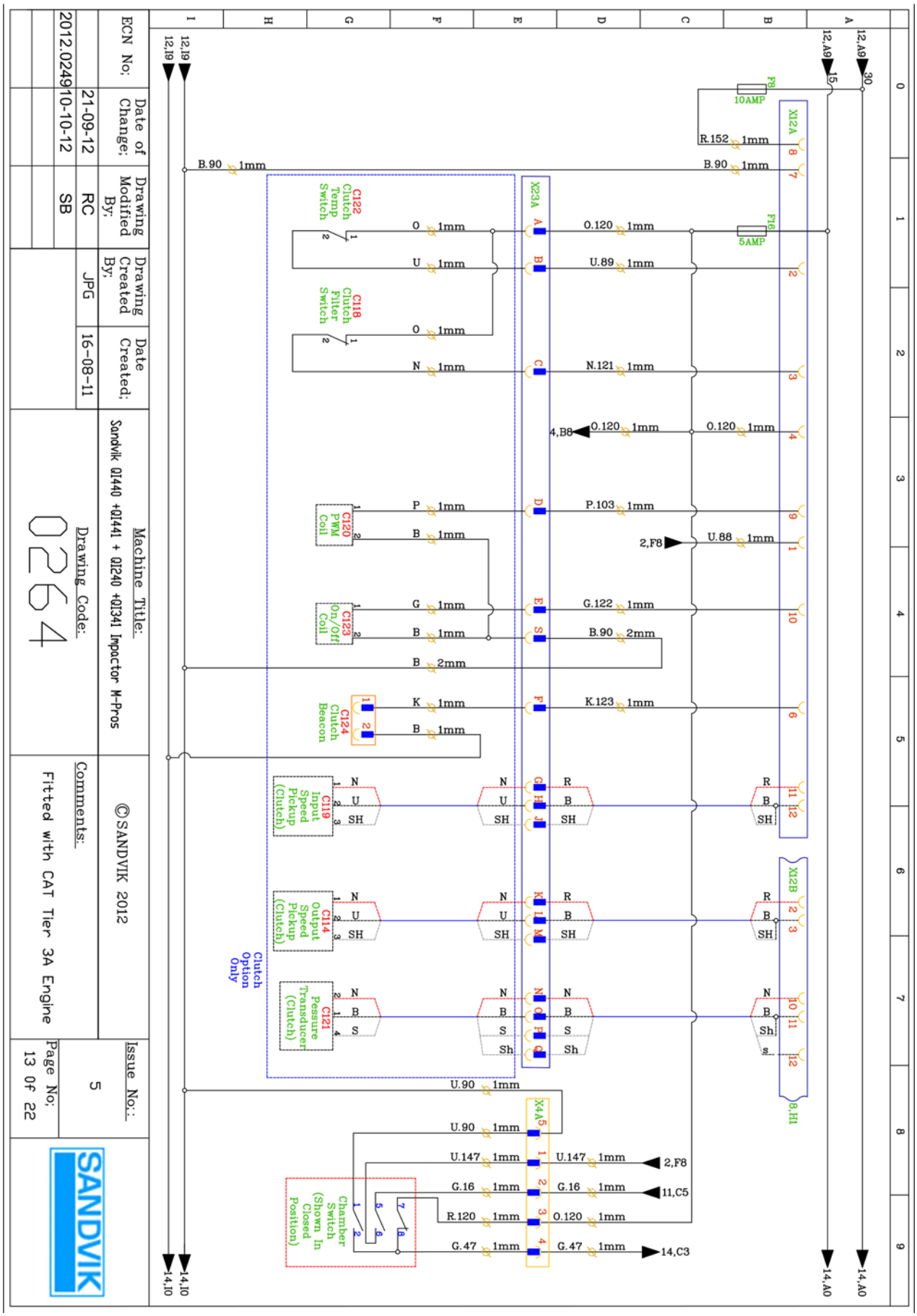
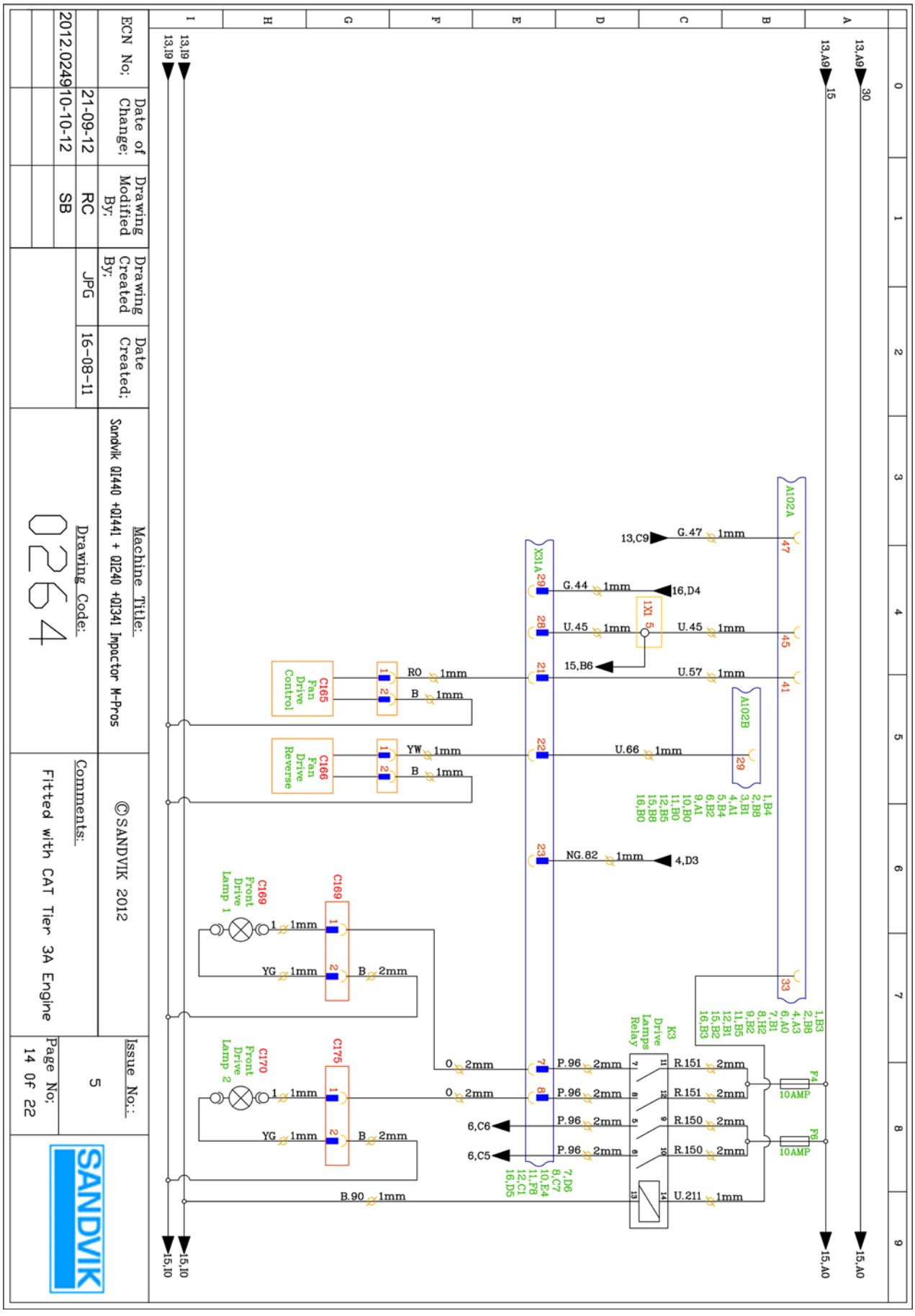
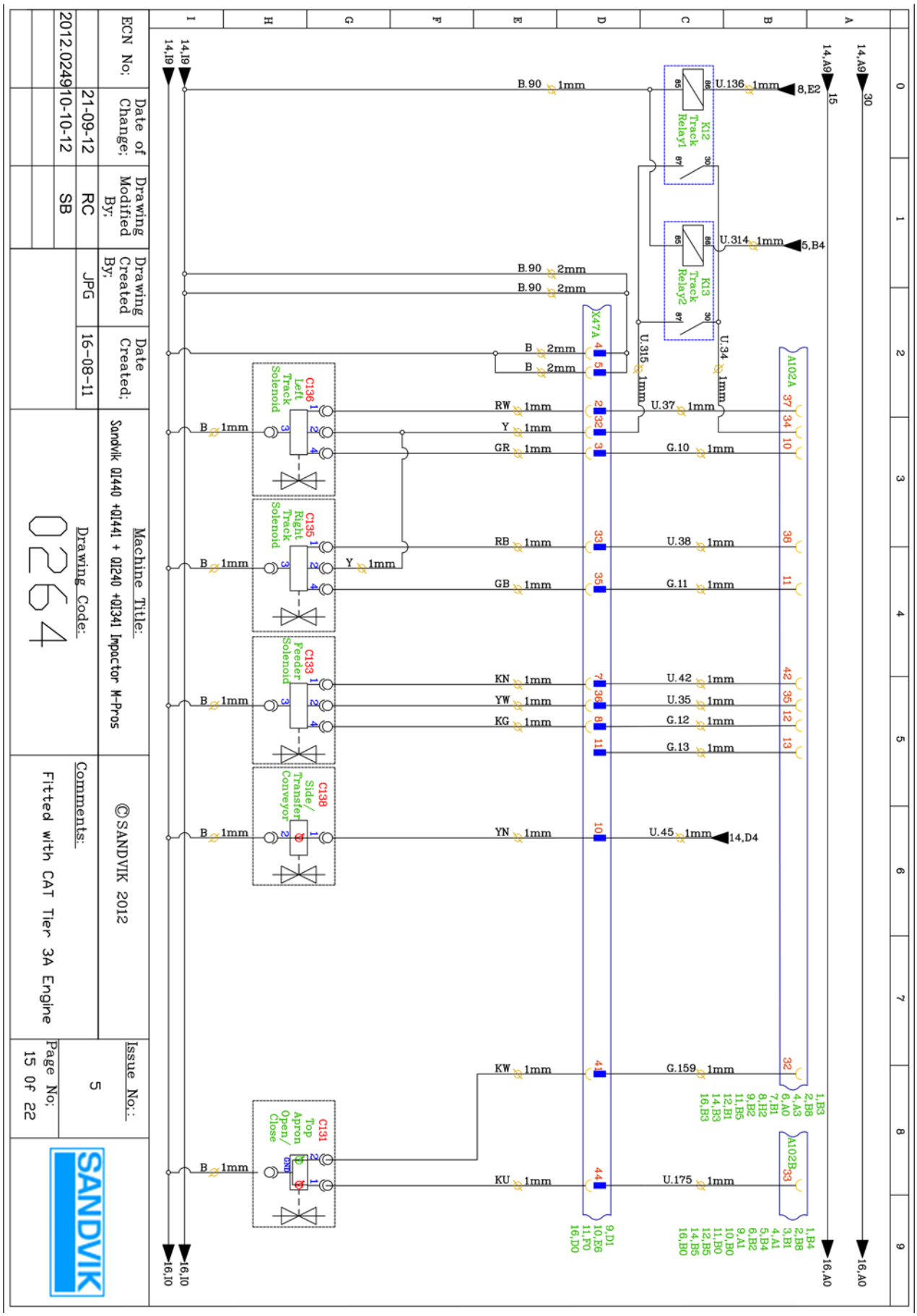
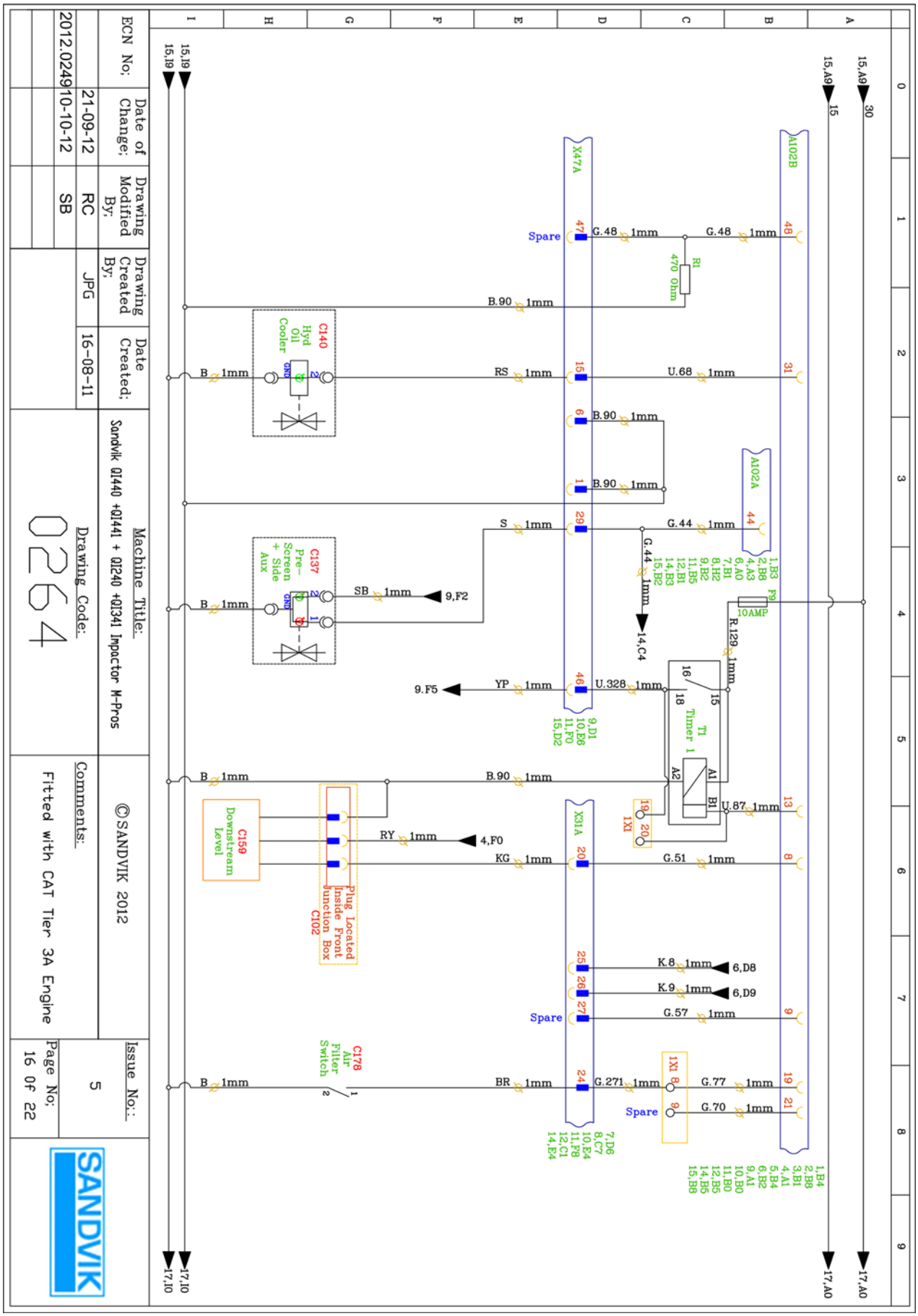
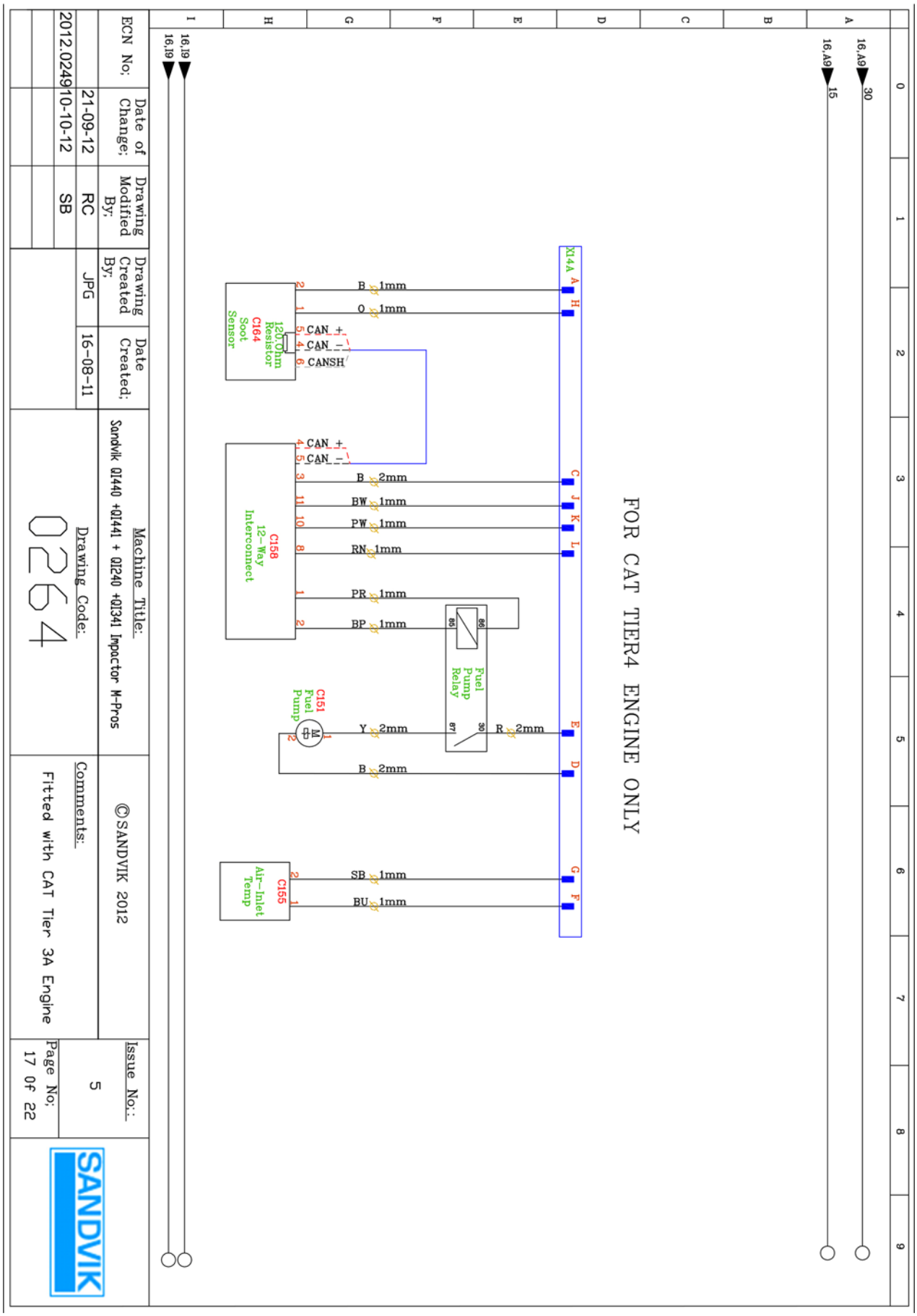


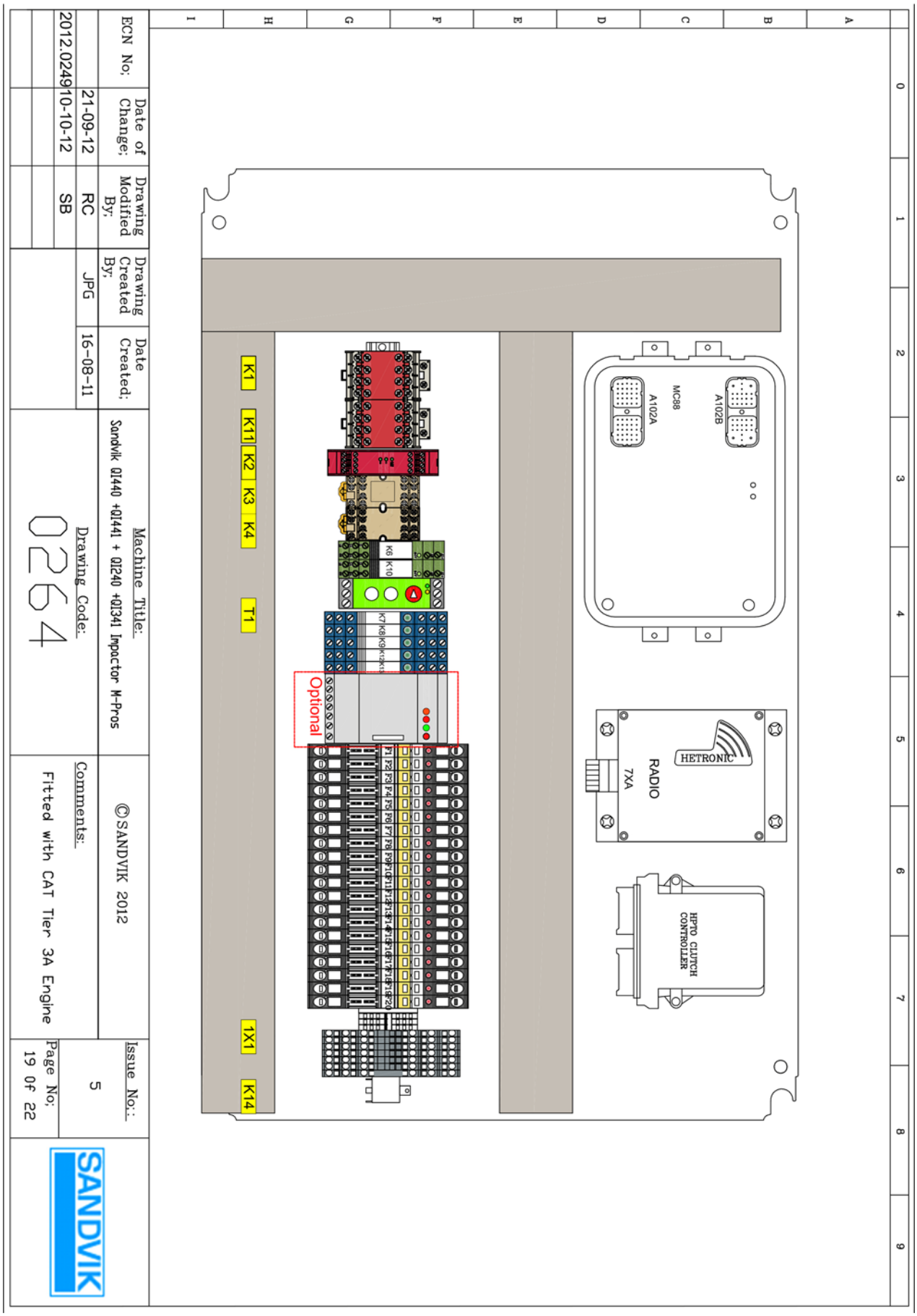


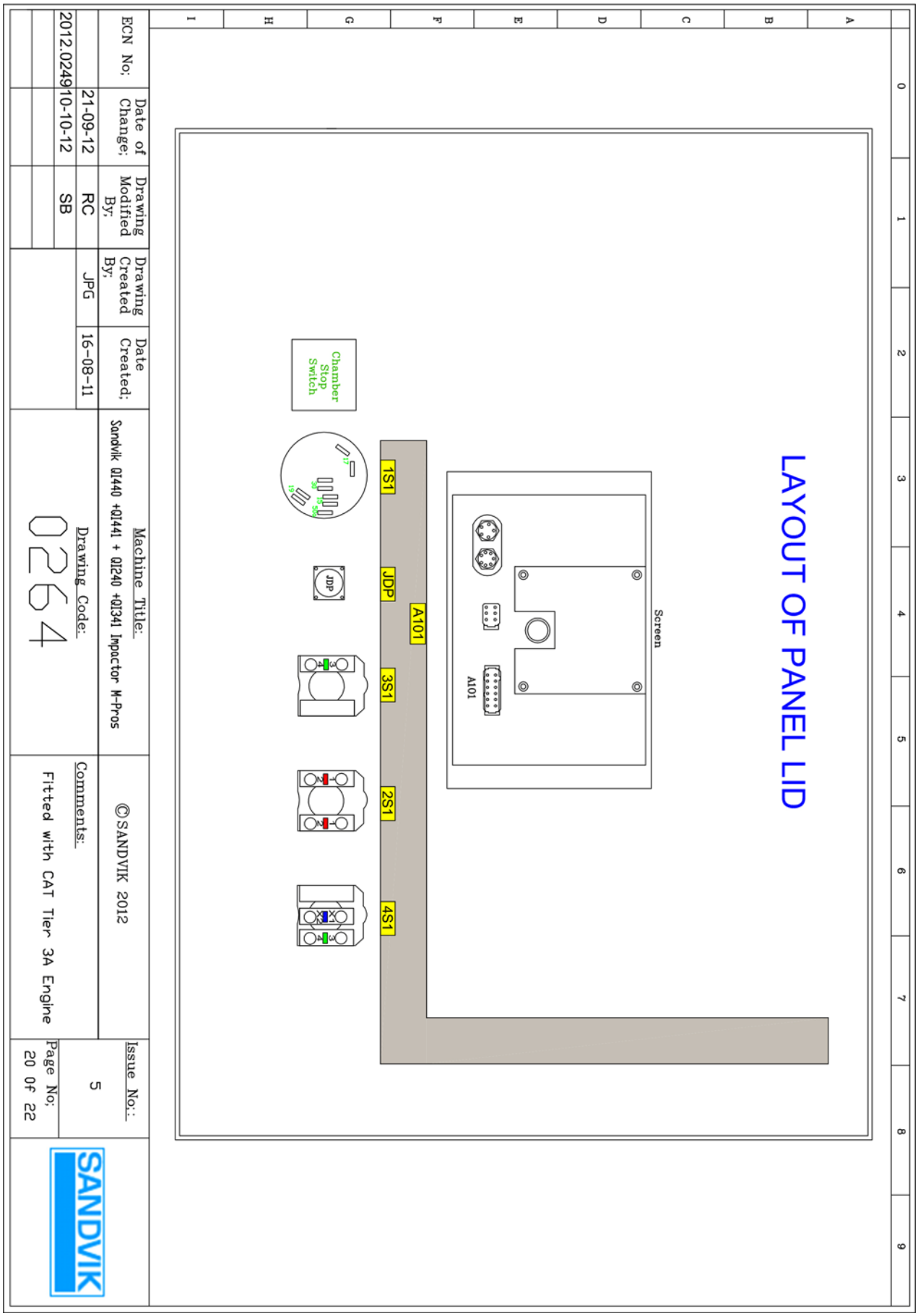


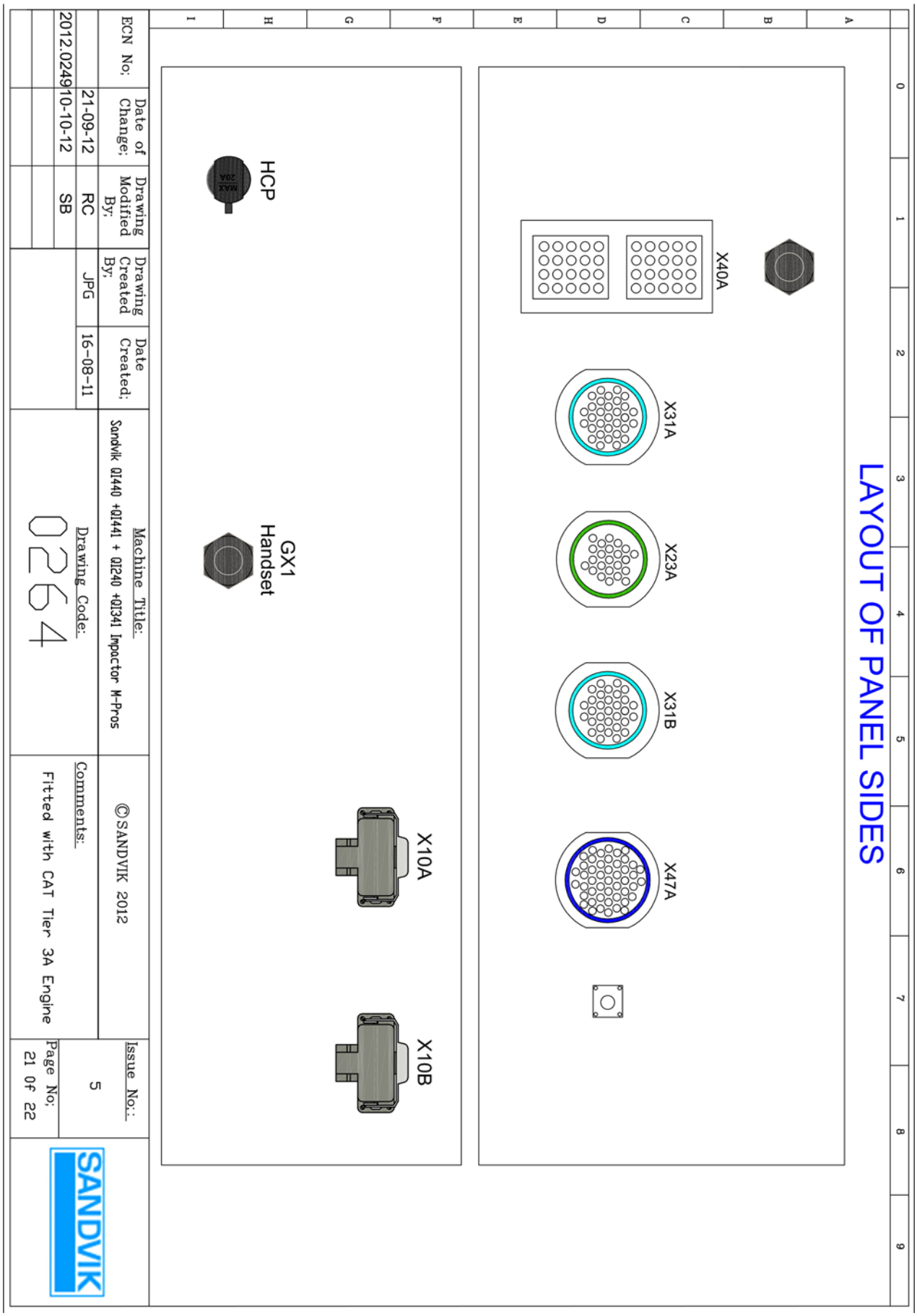






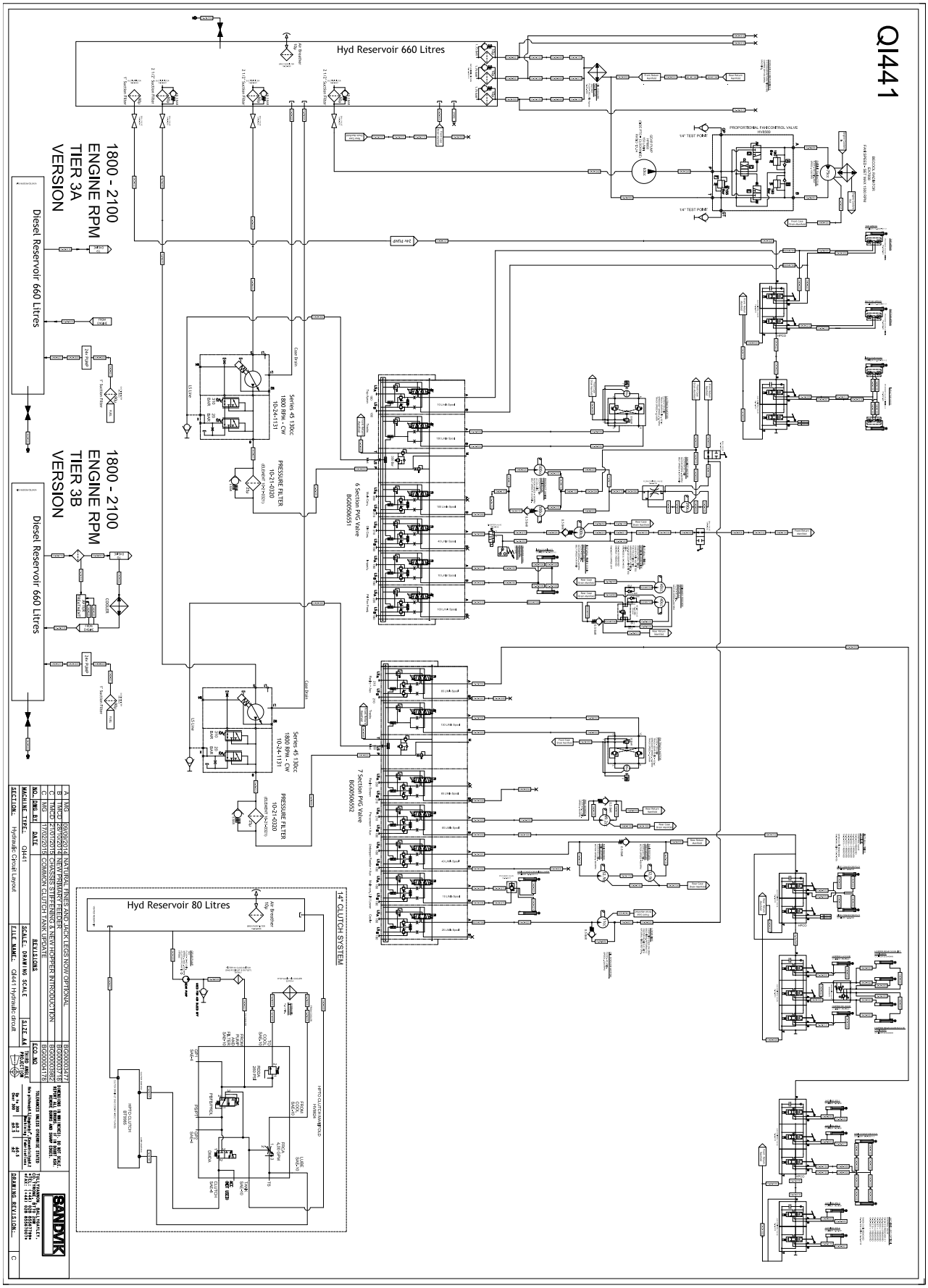


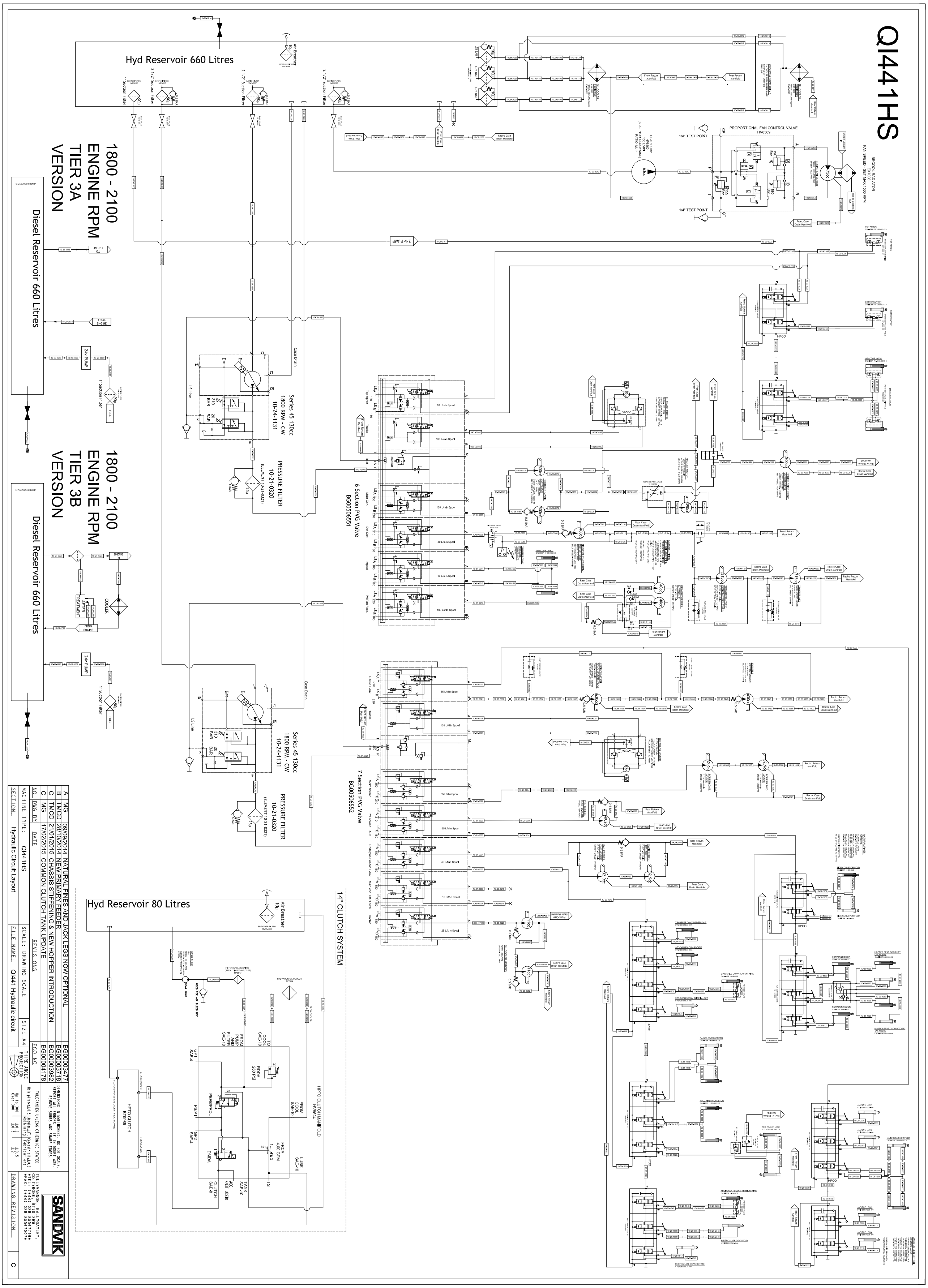




9.1.2 Hydraulic information

Refer to appropriate hydraulic diagrams pdf documents.




QI441HS
Hyd Reservoir 660 Litres
1800 - 2100 ENGINE RPM TIER 3A VERSION
Diesel Reservoir 660 Litres
1800 - 2100 ENGINE RPM TIER 3B VERSION
Diesel Reservoir 660 Litres
Series 45 130cc 1800 RPM - CW 10-24-1131
PRESSURE FILTER 10-21-0320
6 Section PVG Valve BG00506551
7 Section PVG Valve BG00506552
PROPORTIONAL FAN CONTROL VALVE
1/4" TEST POINT
Hyd Reservoir 80 Litres
14" CLUTCH SYSTEM
A MG 09/09/2014 NATURAL FINES AND JACK LEGS NOW OPTIONAL BG00003477
B TMCD 28/10/2014 NEW PRIMARY FEEDER BG00003718
C TMCD 21/01/2015 CHASSIS STIFFENING & NEW HOPPER INTRODUCTION BG00003982
C MG 17/02/2015 COMMON CLUTCH TANK UPDATE BG00004178
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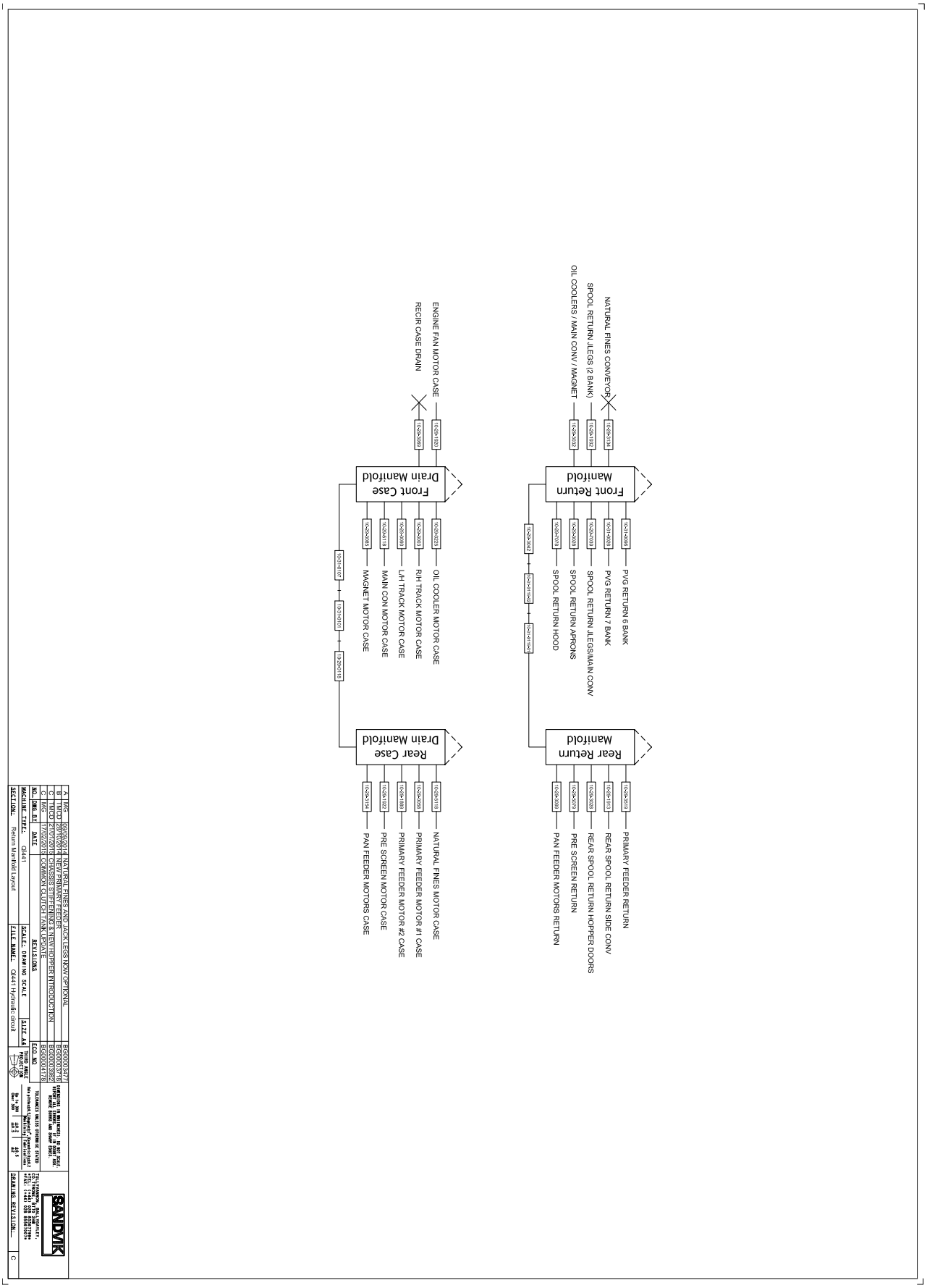
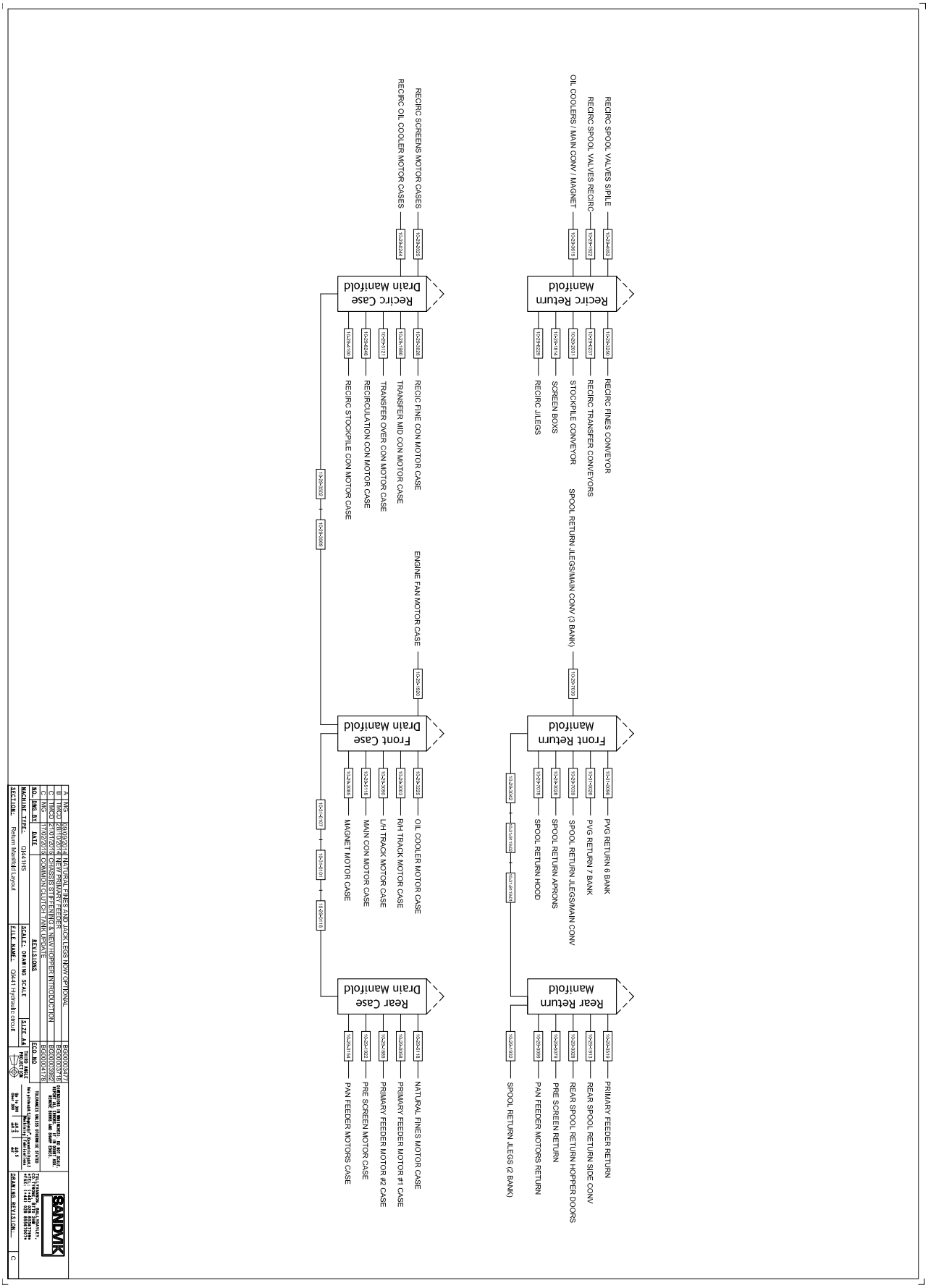
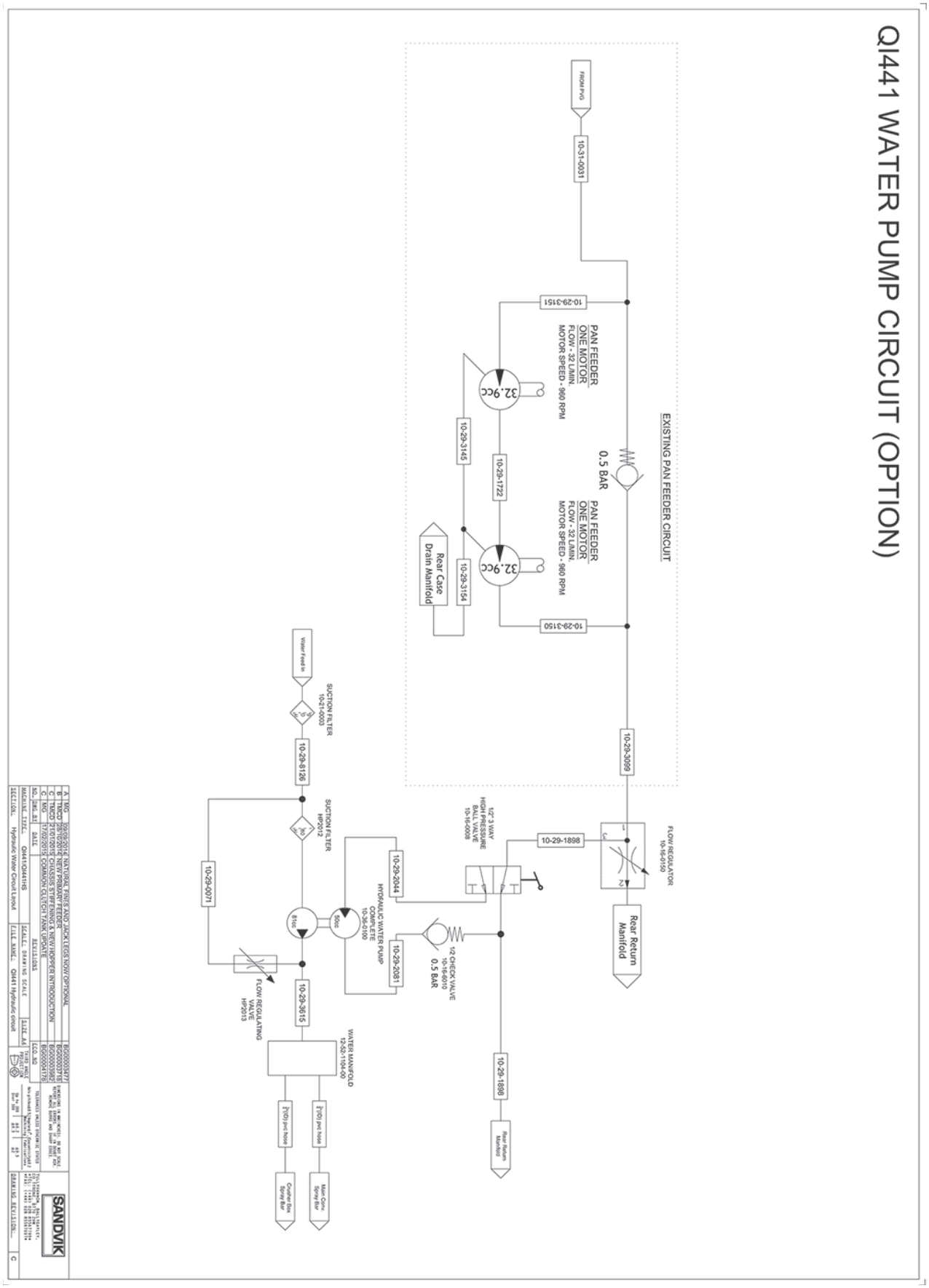
SECTION: Hydraulic Circuit Layout
FILE NAME: QI441 Hydraulic circuit
SIZE A4
SANDVIK







10 OEM Information and Data Sheets

10.1 Original Equipment Manufacturer information

Note: Please make sure you read this section carefully. It contains information supplied by original equipment manufacturers of components and hazardous substances used in the machine, therefore Sandvik has reservations for misprints.

10.1.1 Tracks - Strickland

Refer to Strickland pdf document.

10.1.2 Clutch - PT Tech

Refer to PT Tech hydraulic power take-off (HPTO 12) pdf document.

10.1.3 Display manual JMG

Refer to JMG pdf document.

10.1.4 Engine manual

The engine manual is supplied separately.

10.1.5 Impact Crusher manual - Sandvik

The impact crusher manuals are supplied separately for reference where applicable only.

- Operator and maintenance.
- Spare parts.

Note: The instructions supplied with the impact crusher are intended for a crusher installed and operated in a static position with different controls, but are included for information and reference.

10.1.6 SV feeder manual

Refer to SV pdf document.

10.1.7 OMB vibrator manual

Refer to OMB pdf document.

10.1.8 Automatic grease lubrication (optional)

Refer to appropriate manufacturers manuals if fitted.

10.1.9 Magnetic belt

Refer to Eriez pdf document

10.2 Hazardous substances

1. Univar Caflon - engine coolant.
2. Low sulphur Diesel fuel oil.
3. Shell Rimula R4T L - engine lubrication oil.
4. Shell Rimula R6 LME 5W30 engine lubrication oil.
5. Shell Tellus T46 - hydraulic fluid.
6. Shell Tellus T32 - hydraulic fluid.
7. Shell Gadus S3 V220 C2 - grease.
8. Shell Spirax S6 GXME 75W-80 - track gear oil.
9. Shell Spirax S3 TLV - clutch bearing lubrication oil.
10. Shell Tellus Artic 32.
11. Cat TDTO 0W-20 - clutch bearing lubrication oil.
12. Mobil Unirex N3.