Sandvik Blasthole Drill Transit and Port Guide

D25KX / D245X Series Rotary Drill Equipment In Transit

Starting and Tramming Procedures and Troubleshooting

4/21/2023

NOTE!

Place this manual in cabin of all crawler mounted equipment

SANDVIK

GENERAL

The intended purpose of this manual is to assist truck drivers and shipping dock personnel with starting and moving Sandvik rotary drill machines.

1. The procedures listed herein can be used to as a guide to operate or troubleshoot starting or operating a Sandvik rotary drill machine.
2. The procedures listed have been recorded start or operational problems and symptoms that may limit machine start or machine operation.
3. When required machine specific procedures will be noted.
4. Check and/or correct the item or items noted.

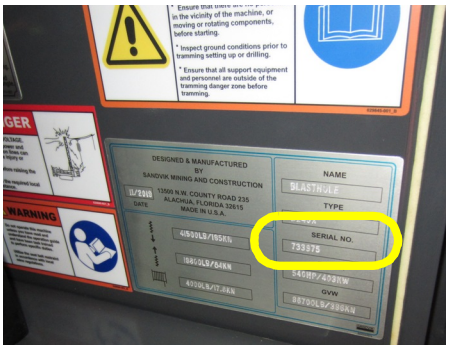
Attention Truck driver and/or dock personnel:

If you have trouble starting or operating this machine and you alter this product in any form *Please make notice inside cabin of the discrepancy* for our recipients at final destination.
Someone at final destination must make necessary troubleshooting repairs.
Altering this product for the purpose of transport may affect product warranty.

Sandvik Mining and Construction
Alachua, Florida USA
386-462-4100 Product Support

After hours contact:
David Gillenwalters 352-213-3069

Prior to calling please note the machine model, by decal on frame, and the 6 digit numeric serial number (73xxxx) inside the cabin on the operator console. These two items are required so we can better assist with starting or operational problems:

MACHINE MODEL	MACHINE SERIAL NUMBER 6 digit #
	

SAFE OPERATING PRACTICES - TRANSIT EQUIPMENT

Introduction

SANDVIK MINING drilling equipment is carefully designed, manufactured and tested. When operated by trained and qualified personnel, this machine will give safe and reliable service. There are SANDVIK MINING offices world-wide to answer questions concerning the safe operation and maintenance of this equipment.

To minimize the risk of accidents and injuries, all persons involved in the operation of this machine MUST read and understand the following safety precautions.

While we believe that we have properly identified several potential hazards that could result in property damage or injury or death to personnel, there are certain hazards which may be present that we have not contemplated. It therefore is the responsibility of the drill owner, operator and crew to be certain that the drill is properly equipped and safe to operate to assure accident free operation.

Management's Responsibilities

It is the responsibility of management to:

- See that all operators of this equipment are thoroughly trained (with special emphasis on safety), competent, physically fit and if required, licensed.
- Assign specific crew members specific safety responsibilities and instruct them how to report any unsafe conditions.

- Enforce the use of protective clothing, eye and hearing equipment.
- See that the operation of this drill is in compliance with all Federal, State and local codes, regulations and standards.
- Ensure that the work area is appropriately illuminated when operation is performed at night.
- Maintain a complete first aid kit at the job site. At least two members of the crew or personnel in the area where the drill is operated should be familiar with first aid and Cardiac Pulmonary Resuscitation.
- Thorough inspection of the machine must be performed before putting into service and scheduled maintenance must be followed during its life. Due to stress of operation can vary by site and use, periodic examination of frames, masts, ladders, and all welded items should be done to ensure structural integrity is maintained.

The Operator’s Responsibilities

Safety must always be the operator's most important concern. The operator must refuse to operate the drill if an unsafe condition exists. It is the responsibility of the drill operator to ensure that the drill is properly equipped, safe to operate and that the site conditions make it possible for safe operation:

- The operator must see that all emergency stops, "operational aids" and "warning signals" are functional before operating.
- The operator must be alert, physically fit, and free from the influences of drugs, alcohol and medications that might impair eyesight, hearing or reactions.

- The operator should not attempt to start or operate the drill unless he has been properly trained and read this manual.
- Report transit damage to appropriate authorities.
- Do not operate equipment that has visual signs of component or structural damage.

- The operator should not operate this equipment if any of its controls display a "lockout" tag.
- If an unsafe condition exists, the operator must place a tag, identifying this condition, on the starting controls and alert other potential users of the drill.

- The operator should not operate the drill without first checking that all personnel protection devices and machinery guards are in place.

Operator's Safety Check

The operator must make a safety check before starting to work to ensure that the machine is in proper order for accident free operation. Some things to check are:

- Check that there are no "lockouts" or "tagouts" attached to the controls.
- Ensure fluid levels are correct per the operator’s manual and no leaks present prior to starting.
- After starting the engine, check all indicators, emergency stop, trip devices and gauges for serviceability.
- Check the fire extinguisher(s) for charge and accessibility.
- Clean the cab interior windows if necessary.

- Check access ladders and decking for damage and slipping hazards such as mud, oil or ice.

- The operator must properly secure the drill to prevent the machine from being operated by unauthorized individuals.
- The operator must never permit personnel to ride on the machine except in the passenger compartment.

- The operator should treat all power lines as live.

Planning the Job

The person in charge must have a clear understanding of the work to be done and consider all the hazards at the site. He must develop a plan to do the job safely and explain the plan to the crew members involved. Factors such as these should be considered:

- Are there utility lines or structures that must be moved or avoided?
- Are there unusual or extreme weather conditions expected?
- Will moving the machine be done in confined space?
- Will operating the machine be done in night hours?
- Will the machine be propelled on inclines?
- Will special transport tools be required to complete the job?

Operating Precautions

- Operating near or contacting a power line with any part of the machine can result in electrocution.
  Use extreme caution when operating machine in the vicinity of electrical power lines. Check the minimum safe operating perimeter set by local, state or federal regulations when equipment is near powerlines.

- Before leaving the operator's station, all controls must be in the neutral position with all locking and safety devices engaged.
  Do not allow the drill to operate unattended.
- Do not park or position the machine on grades that exceed the tilt ratings.
  Park or position the machine on level ground or across (horizontal) grade
- Park or position the machine to allow the wind to carry engine exhaust fumes away from the operator.
  Exhaust fumes from diesel engines are lethal.
- Accessories and decks may be attached to the mast for transit purpose.
  DO Not operate the mast function with accessories secured in the mast for transit.

General Safety Practices

While operating this machine be aware of the following:

- The sudden release of a pressurized lid or hose can spray hot oil.
  Do not open hydraulic tanks, air reservoirs or hydraulic connections while the machine is running or the systems are under pressure.
- Pressure in hydraulic systems can be retained for long periods of time. If not properly released before maintenance people attempt to work on the hydraulic system, this pressure can let components move or cause hot oil to spray and hose ends to shoot out at high speed.
  Release system pressure before attempting to make adjustments or repairs.

- Before entering any enclosure, be sure that the door is secured open. Avoid entrapment, be sure that no one is inside any enclosure before closing and latching the doors.
  Enclosures can cause suffocation.
- Before starting any service or maintenance work, always perform a safety/risk analysis of the task.
  Performing maintenance work without the proper tools and personal protection equipment can cause serious injury or death.
- Climbing the mast is a crushing and falling hazard.
  Climbing the mast may cause serious injury or death. Stay off the mast at all times.

- Hydraulic oil under extreme pressure from a small opening can penetrate the skin and inject oil into the body.
  Do not attempt to locate a hydraulic leak by using your hand.

- Carelessness in getting on and off equipment can result in serious injuries.
  Always wait until the machine has completely stopped. Do not jump on or off. Always use both hands and feet and use the 3-point contact rule.

- Riding the rotary head up and down the mast is a crushing hazard.
  Never ride the rotary head for any reason!!! It was not designed to be an elevator.

When there is a need for an operator or helper to work on the rig in the working area or danger zone and this work involves activation of one or several machine functions, this work shall only be done under the following conditions:

e. There must be two safety trained people present, one should supervise the safety of the other doing the servicing. Supervision should be done from the operator's station to ensure immediate access to an emergency stop at all times.

f. The area where the operation is to be done should be properly illuminated.

g. A reliable mode of communication should be establish between the operator and the supervisor.

h. The rig must be completely shut down and all methods of starting disabled before servicing work begins.

Fire Prevention

- Clean-up any oil and fuel spills particularly around hot surfaces and heat producing components.

- Check the Fire Suppression System (FSS), if fitted, for damaged hoses or cylinders.
- Check all electrical lines and connections including battery terminals for a tight fit, wear, abrasion, and corrosion.
- Check all machine ignition points (engine block, exhaust manifolds, mufflers, turbo-chargers, etc...) to make sure they are not in contact with any hoses.
- Keep the batteries secured in their compartment and covered.

- Never inject ether or other starting aids into the engine and compressor intake filter(s). Ether or other aids drawn into the compressor can cause an explosion.

- Do not store flammable fluids on or in the immediate vicinity of the machine.

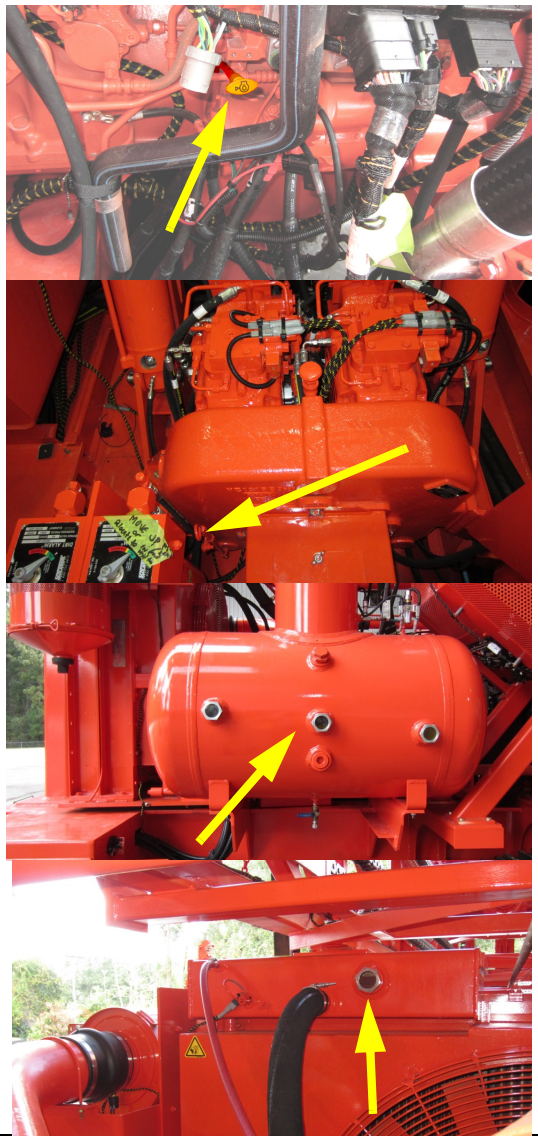
- Engine oil, hydraulic fluid and compressor oil are flammable. Do not operate a machine with leaking hoses or lines.
- Do not attempt to perform welding repairs until all flammable materials including oil and fuel spills oily rags, and rock and coal dust, have been isolated or removed from the machine.

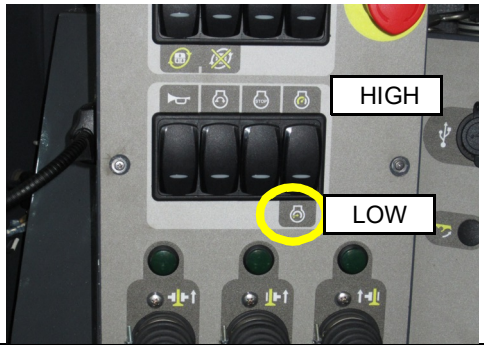
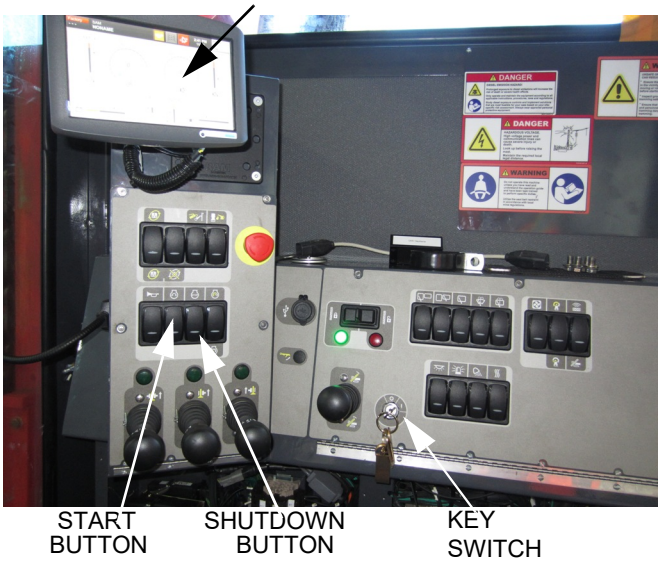
- Disconnect the battery cables before welding on the machine.
- Keep tools away from exposed live electrical parts such as terminals, to avoid arching.
- If charging the batteries, always turn the charger off before making or breaking connections to the battery.

TRUCK DRIVER INSTRUCTIONS

1. Starting the drill

Use the following table as a tool for starting the machine.

Function	Location
1A. Check fluid levels. Engine oil (dipstick) Gearbox oil (dipsticks) Compressor oil (center sight glass) Radiator coolant (sight glass)	
1B. Set battery master lock to ON.	

Function	Location
1C. Operator controls in neutral mode Drill Neutral Tram selector in Neutral (O). Tram paddles interrupt starting	
1D. Idle/Run switch in Low Idle mode Idle run switch decal indicates low and high idle and may be in different location than shown	
1E. Key switch 'ON'. 1F. Press Login button (Operator). 1G. Wait until the GUI has booted up and the display shows the gauges. Swipe across the screen if needed to change screens. 1H. Push the Start button. ***NOTE!*** Some machines use an engine pre-lubrication system which activates by the START button. This function causes a slight delay before the engine begins to crank and is normal. Do not release the button if this occurs. When the engine starts, release the Start button. ***NOTE!*** If the engine fails to start or stay running, wait for receiver air pressure to drain to zero before attempting to restart.	

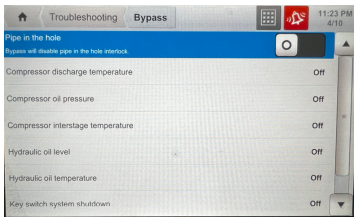
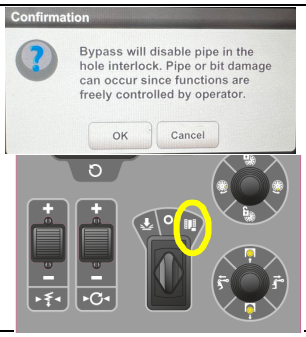
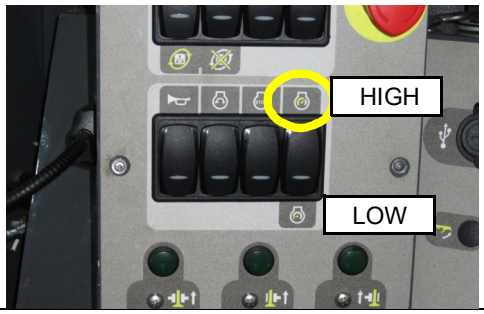
2. Shutting down the drill

Use the following table as a tool for shutting down the machine.

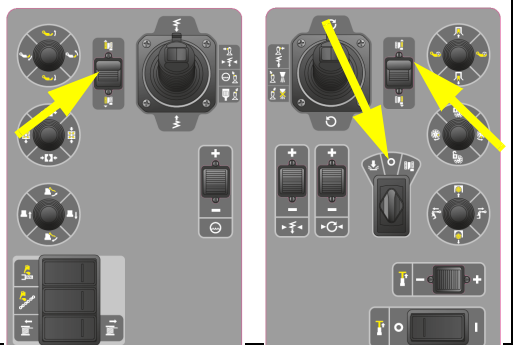
Function	Location
2A. Operator controls in neutral mode Drill Neutral Tram selector in Neutral (O). All joysticks and paddles returned to neutral if not already there.	
2B. Idle/Run switch to Low Idle mode Idle run switch decal indicates low and high idle and may be in different location than shown	
2C. Actuate the Shutdown button. 2D. Wait until the engine has shut down. Cooling cycle is up to 2 minutes 2E. Key switch to 'OFF'. 2D. Wait for the GUI to shut down (the display will turn dark or black). ***NOTE!*** The GUI will not shut down until the key switch is turned OFF.	
2F. Wait for the indicator light to go out. 2G. Set battery master lock to OFF.	

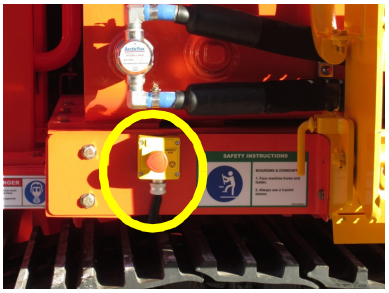
3. Tramming the machine:

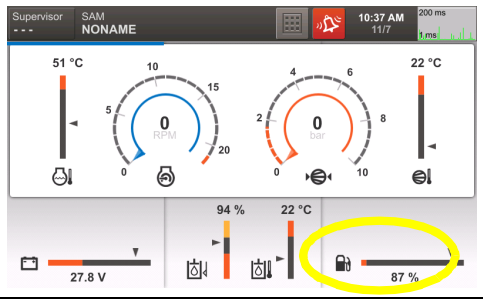
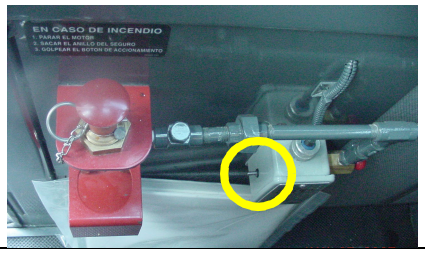
Use the following table as a tool for tramming the machine.

Function	Location
3A. Go to Menu > Troubleshooting > Bypass and disable the option **Pipe in the hole** 3B. Place Drill/Tram selector to Tram mode.	 
3B. Idle/Run switch to High mode	
3C. Step on the Tram Foot Pedal to enable Tram mode. ***NOTE!*** If you lift your foot from the pedal, the machine will stop tramming. **DO NOT** use this as a brake. Always return paddles to neutral to stop and then release the Tram foot pedal.	
3D. Use the Tram paddles on each armrest to tram the machine. 3E. Push forward to tram forward on that same side. Pull rearward to tram rearward. Left paddle controls Left track Right paddle controls Right track ***NOTE!*** The coolers are at the FRONT of the machine. The cab is at the REAR of the machine.	 

4. If engine will not start, check the following:

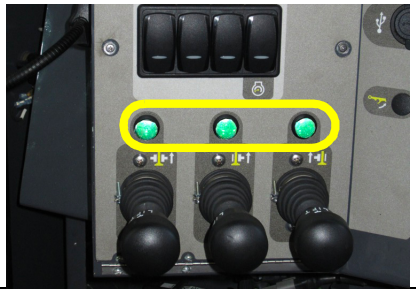
Problem	Items to check/correct	Location
4A. Engine will not start ***NOTE!*** No power in cab (GUI does not come on.)	Battery disconnect. Turn key to connect batteries.	
4B. Engine will not start ***NOTE!*** There is power in the cab (GUI comes on.)	Tram selector switch or tram control paddles not in 'Neutral' Center tram paddles ***NOTE!*** An audible signal should sound when tram paddles are out of neutral if the key is ON and machine in Tram mode.	

Problem	Items to check/correct	Location
4C. Engine will not start Any of up to five emergency stop push buttons interrupt starting	Emergency stop push button 1 on cab operator panel Turn red button counterclockwise to release	
	Emergency stop push button 2 beside boarding ladder This switch may be removed from frame and tied for transit Turn red button counterclockwise to release	
	Emergency stop push button 3 on engine junction box Turn red button counterclockwise to release	
	Emergency stop cable 4 on mast (optional) Push blue reset button	
	Left side access ladder. This switch may be removed from frame and tied for transit Turn red button counterclockwise to release	

Problem	Items to check/correct	Location
4D. Engine will not start	Main circuit breaker on engine junction box Push to reset main breaker stamped with 105 or 175	
4E. Engine will not start	Low fuel supply Add diesel fuel to fuel tank	
4F. Engine will not start	(Optional) Fire suppression test button engaged Push reset pin on left side of gray box	

5. If machine will not tram/propel:

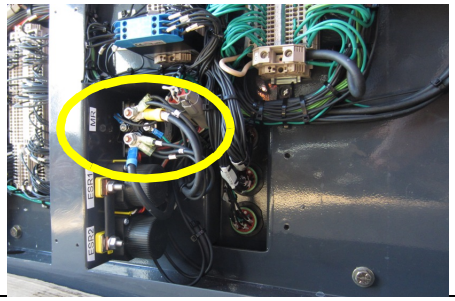
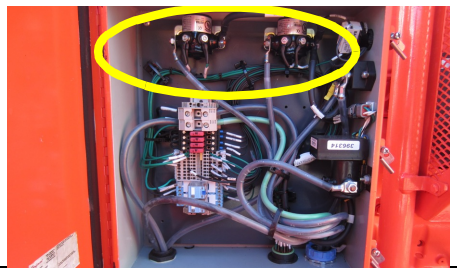
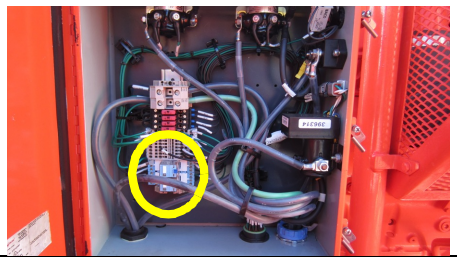
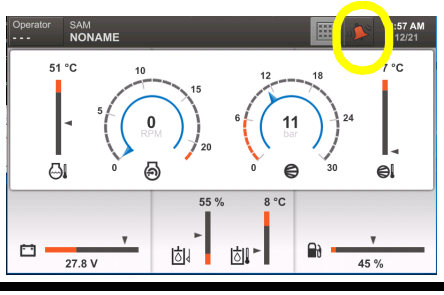
Problem	Items to check/correct	Location
5A. Machine started but will not move in tram/propel mode	Step on orange foot pedal engage tram controls ***NOTE:*** Stepping on pedal after moving paddles will not engage tram. Release tram paddles to neutral, step on tram foot pedal, and then move tram paddles as needed.	

Problem	Items to check/correct	Location
5B. Machine started will not move in tram/propel mode	Three green jack up indicator lights must be illuminated. If not, raise the jacks. See “Three green jack up indicator lights must be illuminated” on page 12.	
5C. Machine started will not move in tram/propel mode	Remote tram option switch in remote tram mode. Place remote tram toggle switch to off position (Down).	

DOCK SIDE PERSONNEL

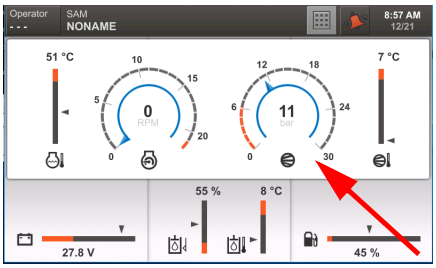
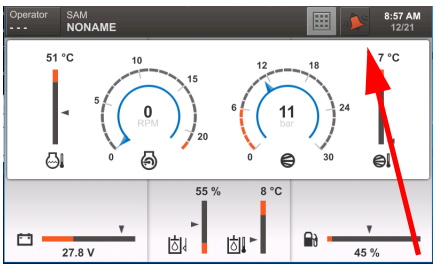
1. Steps for starting and operating rotary drill

Refer to the truck driver instructions for starting and operating.
Use the following table as tool for troubleshooting the machine. This section notes technical details that may require hand tools to troubleshoot and get machine operating.

Problem	Items to check/correct	Location
1A. Engine will not start Engine does not turn over No start condition	Tools required to open junction box Main relay without power inside cab junction box	
1B. Engine will not start Engine turns over spinning fast No evidence of fuel No start condition	Power when key is engaged Check fuel level.	Reference emergency stop switches. Reference fire suppression switch.
1C. Engine will not start Engine does not turn over No start condition	Tools required to open junction box Starter solenoid or solenoids without power inside engine junction box	
1D. Engine will not start Engine turns over spinning fast No evidence of fuel No start condition	Tools required to open junction box Shutdown relay (SDR) without power inside engine junction box	
1E. Engine will not start Engine turns over spinning fast No start condition	Check engine/diagnostic code. Alarm flashing. Engine problem requires engine technician Call factory with machine model and serial number	

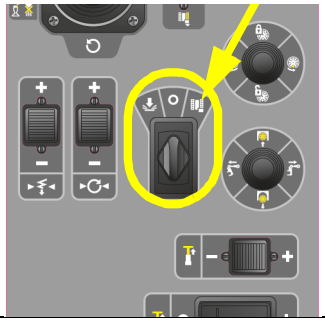
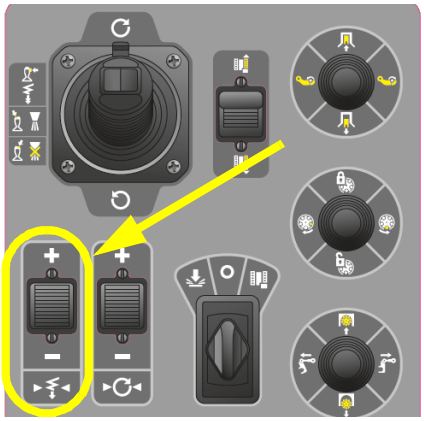
2. Technical subjects needing technician

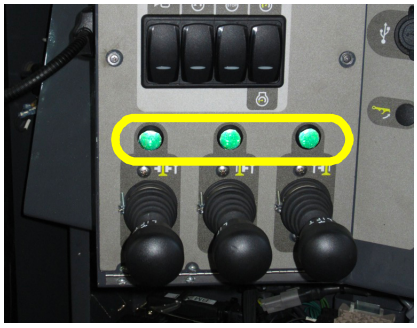
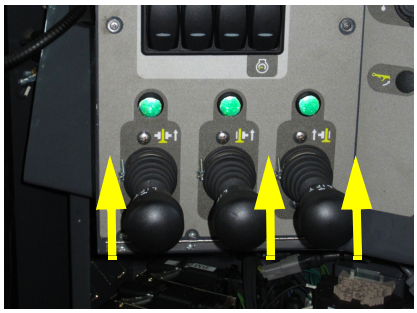
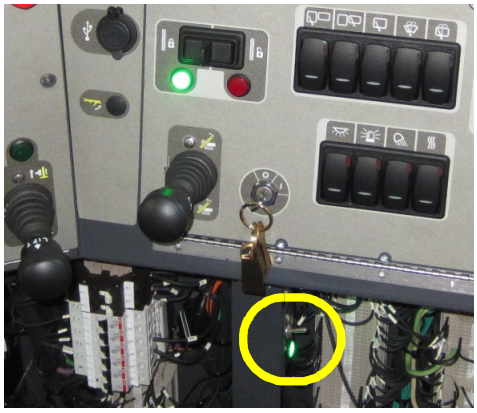
The following may require hand tools and technical support.

Problem	Items to check/correct	Location
2A. Engine starts and engine stops Engine starts then stops No start condition	Low air pressure in air receiver tank If receiver air pressure inner ring is red or indicates in the red range of the outer ring, the compressor is not building and holding air pressure. Check air hoses, inlet control valve, or call factory with machine model and serial number.	After start, air pressure will raise to above the red range 
2B. Engine starts and engine stops Engine starts then stops No start condition	Compressor oil pressure or engine coolant flow alarms are set Turn the ignition key OFF and allow the GUI to shut down. Turn the ignition key ON, allow the GUI to reboot, and restart.	
2C. Engine starts and engine stops Engine starts then stops No start condition	Tools required to open junction box Shutdown relay (SDR) inside engine junction box without power. Unplug relay to test startability. Replace relay into base after starting. Equipment Liability The SDR serves as a safety circuit for this equipment. DO NOT leave the SDR unplugged. Make note in cabin for final destination.	

3. Machine model specific

The following data relates to machine model specific operating techniques. Truck driver or dock personnel must identify rotary drill equipment by model decal.

Problem	Items to check/correct	Location
3A. Machine started, will not move in tram/propel mode	Operator console tram paddles are not in neutral or the drill/tram selector switch must be in tram mode	
3B. Machine started will not move in tram/propel mode	Step on orange foot pedal to engage tram controls	
3C. Machine started will not move in tram/propel mode	Feed pump pressure may be set too low or off. Increase Feed Pump pressure on right arm controls.	

Problem	Items to check/correct	Location
3D. Machine started will not move in tram/propel mode	Three green jack up indicator lights must be illuminated	
	Place the Drill/Tram switch in Drill mode.	
	Lift the leveling jack control lever or levers to raise the jacks and obtain green lights on all three positions.	
	Place the Drill/Tram switch in Tram mode to tram.	
3E. Machine started will not move in tram/propel mode	Utilize tram interloc bypass switch. Switch is accessible through opening in the panel cover. If not, remove panel. ***NOTE!*** Ensure jacks are up as bypass will permit traming with jacks down and could damage machine.	

Problem	Items to check/correct	Location
3E. Machine started, will not move in tram/propel mode	Remote tram option switch in remote tram mode Place the remote tram toggle switch to OFF position Decal may be in foreign text	

Attention Truck Driver and/or Dock Personnel:

if you have trouble starting or operating this machine and you alter this product in any form Please make note below and leave this form in the cabin for our recipients at the machine's final destination.
Our representative at the final destination is responsible for making any necessary trouble-shooting repairs. Please be aware that altering this product for the purpose of transport may affect the product warranty.

Notes: