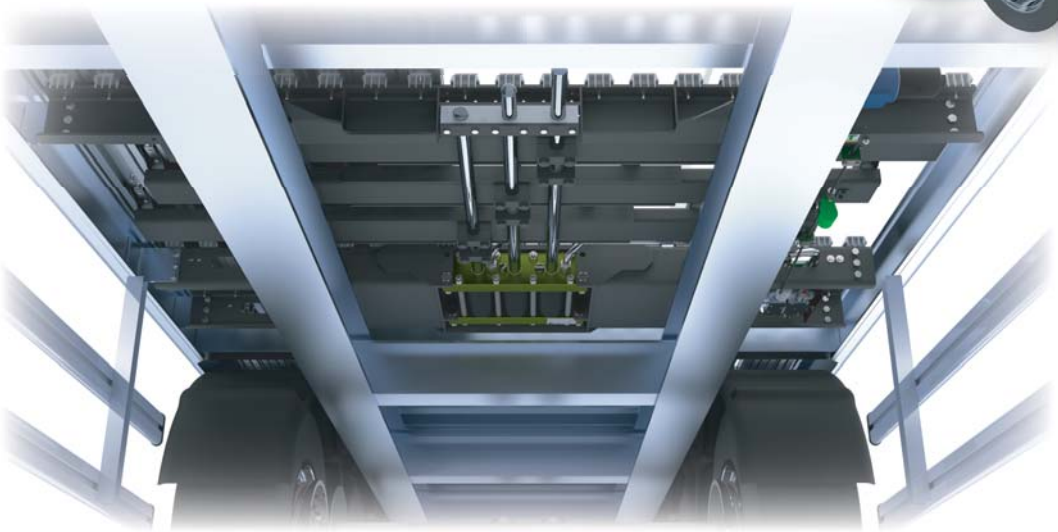
NEXUS™

powered by HALLCO™

OWNER'S MANUAL

100 mm through 140 mm frames. Manual, hybrid and electric control function.



HALLCO™ INDUSTRIES

Original Instructions

> 06/19

Table of Contents

About This Manual

This manual is to be used as the primary guide for operating your NEXUS™ LIVE FLOOR® conveying system. A separate Installation Manual is also included in your kit.

Carefully read the Owner's Manual prior to running the equipment. It may also be helpful to review the Installation Manual as this will give you additional insight into the operation of your NEXUS™ LIVE FLOOR® conveying system. Make sure you have a complete understanding of how to SAFELY operate this equipment prior to putting it into service.

Hallco will periodically update these manuals. You can find the latest versions online at www.hallco.eu/downloads/nexus-downloads/ or you can contact your Hallco representative. Also note, in the lower right corner of each page is the Hallco part number and, if revised, a revision letter of the manual. This will allow you to quickly identify if you have the latest version.

Use this QR code to quickly locate manuals on your smart phone.

Safety

Your safety is the utmost importance to Hallco. Follow safe working practices while operating your NEXUS™ LIVE FLOOR® conveying system. Review all safety guidelines and pay attention to safety warning symbols as they will highlight specific dangerous aspects of this machinery.

Only properly trained and authorized personnel shall install, service or operate Hallco equipment. Operators are expected to have a fundamental understanding of safe working practices around industrial machinery.

DO NOT deviate from these instructions or modify the equipment without written authorization from Hallco. Modifications can render the equipment unsafe and void your warranty.

Hallco is not responsible for equipment damage or personal injury as a result of failing to follow these instructions or failing to incorporate safe working practices.

If you have any questions regarding these instructions or the safe operation of your equipment contact your local authorized representitive or Hallco Industries as we have experts on hand to assist in answering your questions.

FAILURE TO FOLLOW SAFETY GUIDELINES WILL RESULT IN INJURY OR DEATH.

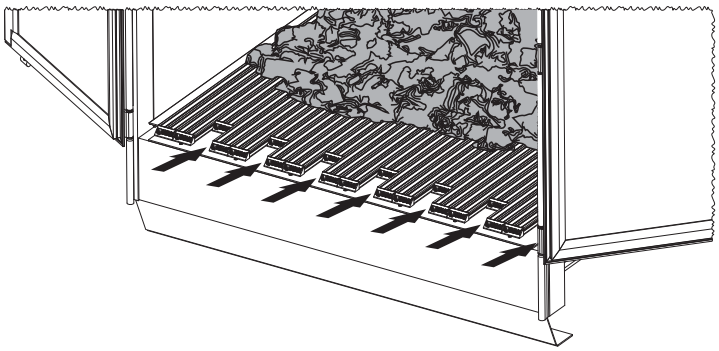
What is a Live Floor™ Conveyor and How it Works

A Live Floor™ conveyor is designed to unload the contents of a trailer through the rear doors without the need for lifting or tilting the trailer itself.

A Live Floor™ conveyor is made of multiple slats or boards that are as long as the conveyor. The slats are arranged side by side and all at the same level so they cover the entire width of the floor. They don't move up and down or side to side, only back and forth.

Entire trailer loads are unloaded at once by conveying all of the slats together in one direction for a stroke; keeping two thirds of the slats stationary and retracting one third at a time under the load to their original position; then conveying all of the slats together again.

The slats are divided into three groups and each group is driven by a hydraulic cylinder. There are very few moving parts.



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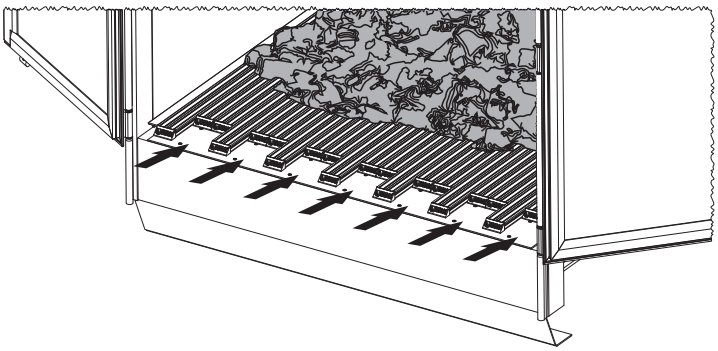

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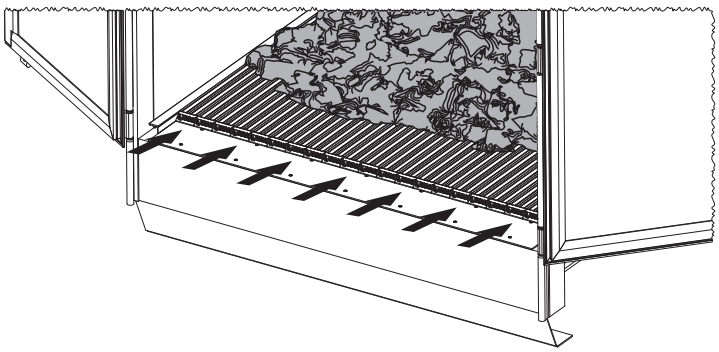
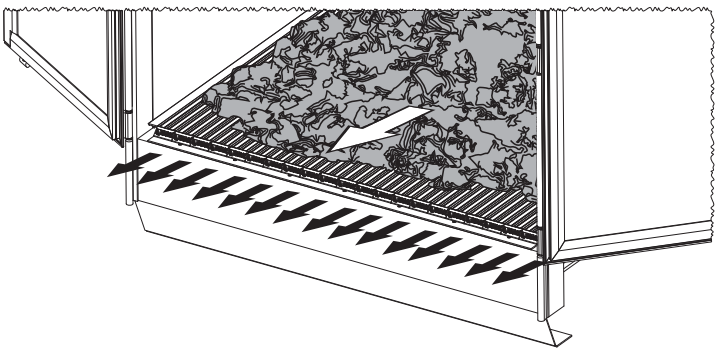


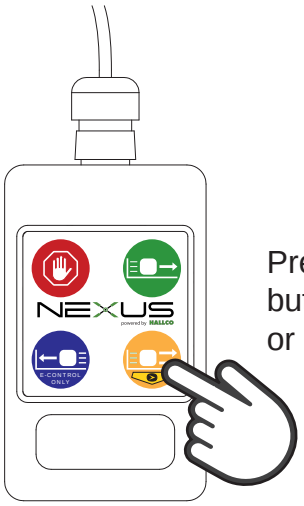
Third Group Retracts



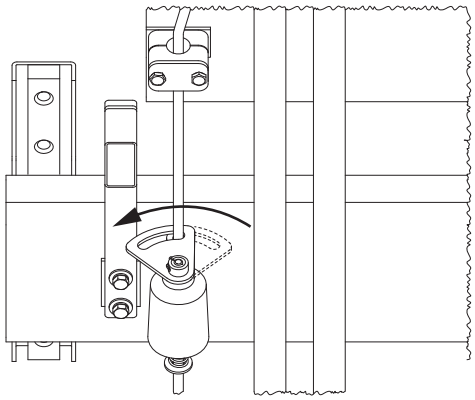
All Groups Convey Together

The Benefits of Hallco Accelerator Technology

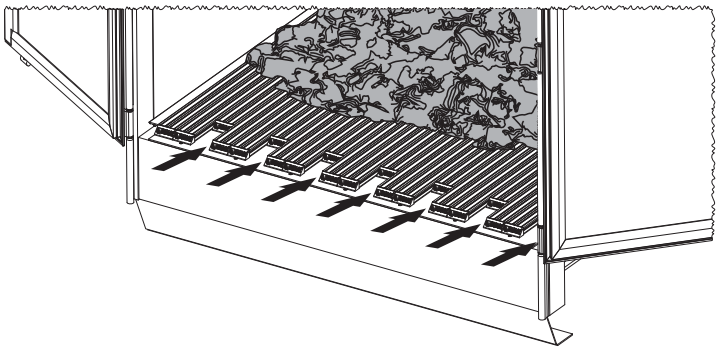
30% faster unload at the touch of a button, ACCELERATOR allows you to choose.
Because some loads only need the force of a 2-step cycle, ACCELERATOR switches your floor from a standard 3-step operation to a 2-step all within the same system.



Press the Accelerator button on base control or remote control



Accelerator actuator toggles



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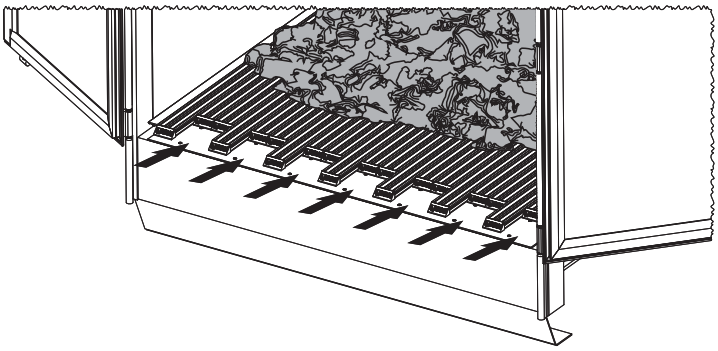
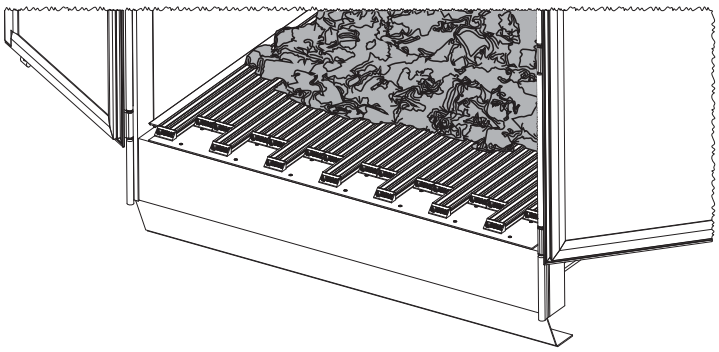
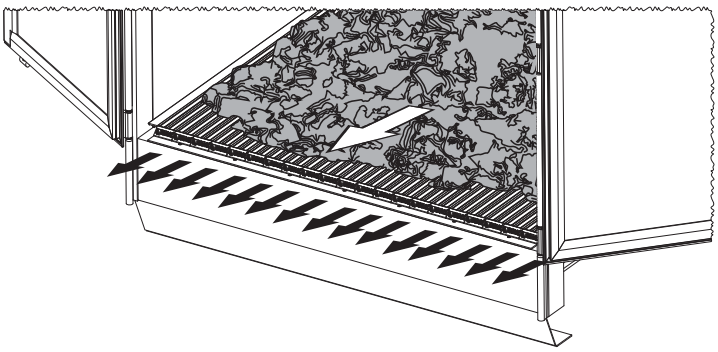


Second Group Retracts



Third Group Remains
Saving valuable time



Two Groups Convey Together

Safety Symbols

The following safety symbols are used throughout this manual, and on safety decals; they represent potential hazards, mandatory notices and safety precautions that should be taken while working with Hallco equipment. A description of the alert will accompany each icon. Familiarize yourself with them below to quickly identify important information while working on this equipment.

These symbols indicate immediate dangers or hazards associated with the task at hand. Take extra precautions where indicated:

Signifies a general hazard to your safety or potential damage to equipment.

Signifies a crushing hazard between two moving parts.

Signifies an electrical hazard.

Signifies a burn hazard or hot surface.

Signifies a trip hazard.

Signifies a slip/fall hazard.

Signifies a crushing hazard by ejected or falling loads.

These symbols indicate a safety requirement or informational safety instruction:

Signifies a mandatory safety precaution that must be taken.

Signifies there is additional information in a supplementary manual or guide that must be read prior to carrying out a task.

Signifies all forms of energy must be locked in the OFF position prior to carrying out a task. Follow safe lock-out-tag-out procedures.

Signifies the various forms of personal protective equipment (PPE) required to safely complete a task.

Safety Guidelines

BE CAREFUL around the NEXUS™ LIVE FLOOR® conveying system. It is industrial equipment that can move without warning!

STOPPED EQUIPMENT IS NOT SAFE EQUIPMENT! Just because the machine is not running does not mean it is safe. LOCK OUT AND BLOCK all stored energy prior to working on the equipment.

Consider all these areas EXTREME HAZARD ZONES and take extra precautions when nearby. Visually clear area prior to operating the equipment.

DO NOT STAND NEAR THE TRUCK WHILE UNLOADING!

Operators may leave the truck in NEUTRAL to assist in unloading. TRUCK MAY MOVE UNEXPECTEDLY crushing someone between the truck and immovable objects or under the tires.

DO NOT LEAVE THE TRUCK UNATTENDED WHILE UNLOADING!

Materials being unloaded will behave in unpredictable ways causing jams or creating projectiles. Be aware of the area around the vehicle and be ready to initiate an emergency shutdown at all times.

DO NOT STAND BEHIND THE TRAILER!

Do note stand near the discharge end of a Live Floor conveyor. Materials may get stuck or jammed. DO NOT attempt to unjam the materials from the rear of the trailer! Doing so can cause the load to shift unexpectedly and bury or overwhelm persons in this area.

DO NOT ENTER THE TRAILER WHEN IT IS LOADED!

Loads are unstable and can shift while in the trailer. DO NOT stand between the load and the front wall of the trailer. The load can reverse and crush you! DO NOT attempt to climb the load!

DO NOT TOUCH THE CROSS-DRIVES WHEN ENERGIZED!

Cross-drives will crush you when they operate! DO NOT place your hands near or in-between the cross-drives when the system is powered on and hydraulics are pressurized. Only enter this area after proper lock-out tag-out procedures have been implemented!

DO NOT TOUCH THE FRAME WHEN ENERGIZED!

Cross-drives will crush you when they operate! DO NOT place your hands near or in between the frame and the cross-drives or cross-drive shoes when the system is powered on and hydraulics are pressurized. Only enter this area after proper lock-out tag-out procedures have been implemented!

DO NOT TOUCH THE SLATS WHEN ENERGIZED!

Slats can crush hands or feet between the front wall and the slat ends. Sharp edges on the slats can cut you!

DO NOT TOUCH THE HYDRAULICS!

Allow the system to cool before touching. The hydraulic systems will get hot enough to burn you.

Safety Guidelines (cont.)

DO NOT DISABLE, REMOVE OR OVERIDE ANY GUARDS!

All guards that are supplied with the system must stay in place during operation. Moving parts will CRUSH and DISMEMBER. MOVING PARTS DO NOT STOP WHEN OBSTRUCTED!

DO NOT ATTEMPT TO DISLODGE JAMMED OR STUCK LOADS BY HAND!

Jammed or stuck loads are EXTREMELY DANGEROUS! Loads can give way at anytime causing deadly avalanche of debris! Only use caged or guarded heavy equipment to dislodge loads from a safe distance.

DO NOT OVERLOAD THE SYSTEM!

Overloading the trailer will result in damage to the NEXUS™ LIVE FLOOR® conveying system creating potentially hazardous situations! Always adhere to maximum load capacity as specified by the trailer OEM.

DO NOT OVERHEAT THE SYSTEM!

Monitor the temperature at the tank occasionally during operation. Oil temperature shall not exceed 82° C [180° F]. Excessive temperatures will damage the internal seals and components!

ALWAYS VERIFY TRAILER DOORS ARE OPEN PRIOR TO STARTING THE SYSTEM!

Running the system with the trailer doors closed will severely damage the trailer and the NEXUS™ system! Loads will eventually force the doors open in an explosive manner!

ALWAYS MONITOR THE SPACE AT THE FRONT WALL WHEN LOADING!

While in LOAD MODE, avoid piling loads against the front wall of the trailer. Excessive load on the front wall of the trailer will result in damage to the trailer and the NEXUS™ system!

There are many other areas on the NEXUS™ LIVE FLOOR® conveying system that are hazardous. Take extra precautions when working with the system and always follow safe lock-out tag-out procedures.

Prior to starting the NEXUS™ always complete the PRE-STARTUP checklist and the RUNNING safety checklist on page 17.

General Guidelines for Proper Operation of your NEXUS™ LIVE FLOOR®

Your NEXUS™ LIVE FLOOR® conveying system will **convey poorly or not at all** if any of the following conditions apply to the material you are trying to convey.

- If the load adheres to the slats or the walls of the container.
- If the load has a higher pressure against the walls than against the floor. This happens when a light weight, compressible material is loaded from the top and then compressed into the container from the top. The risk of this happening can be reduced by sloping the side walls so that the distance between the walls is narrow at the top and wide near the floor.
- If the load is not cohesive. In order to unload all of the material a tarp or other form of sheeting will need to be placed under 2-3 m [6.6'-9.8'] of the load and all of the way up the front wall. This sheeting will need to be free to move with the load.
- If a load is palletized on pallets that do not evenly distribute the weight over their base. This causes the pallets to only be moved by one or two of the slat groups making them try to twist instead of convey. Place something under these pallets that will more evenly distribute the weight across the floor.

The NEXUS™ LIVE FLOOR® conveying system will **wear out quickly** if you load it with materials of the following characteristics:

- Abrasive materials such as crushed glass or sharp gravel.
- Corrosive materials such as chicken manure or other materials with a very high or very low acidity [pH] level.
- High impact where heavy objects are dropped directly on the aluminum slats from over 2 m [6.6'] height.
- High temperature, materials exceeding 75° C [167° F].

The NEXUS™ LIVE FLOOR® is not designed to prevent load liquids from leaking to the ground.

The ends of the slats will wear out quickly if the load is not free to fall off the end of the conveyor but is restrained by a wall or the pile of unloaded material.

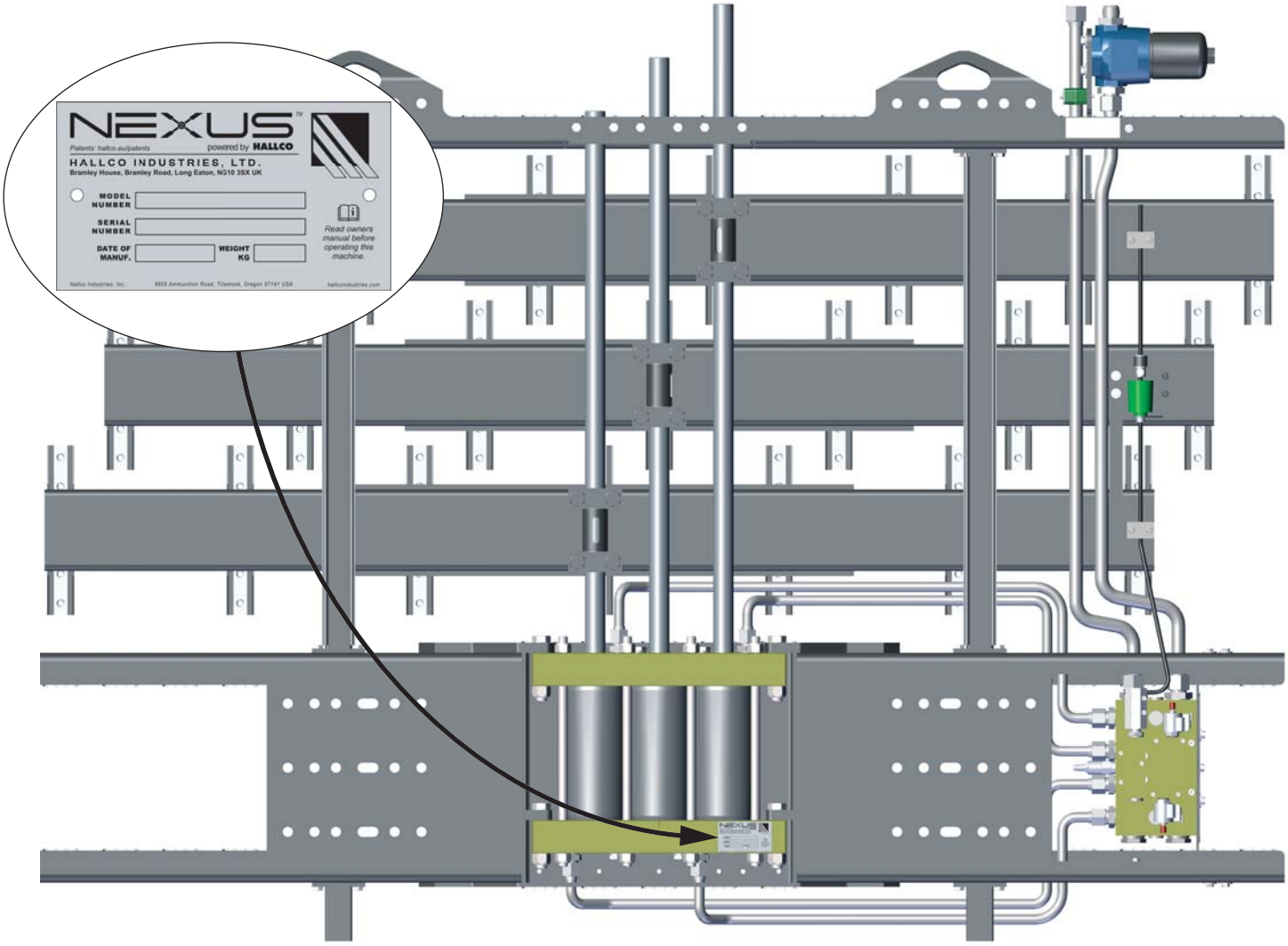
In freezing conditions the floor may hesitate or not move due to slats being frozen together. If the floor exhibits signs of jamming in freezing conditions wait until temperatures rise enough to thaw the load before attempting to unload.

Evenly distributed loads will provide for the best unloading/loading conditions. When possible load the trailer as evenly as possible.

NEXUS™ Identification

When requesting information or technical support it is important to have your NEXUS™ Serial number and Model number available. You can find this on the bottom of your NEXUS™ base manifold. Please locate the serial number, model number and date of manufacture and write it below for quick future reference.

If your serial plate becomes damaged or unreadable contact your Hallco representative for a replacement.



Serial Number: _____

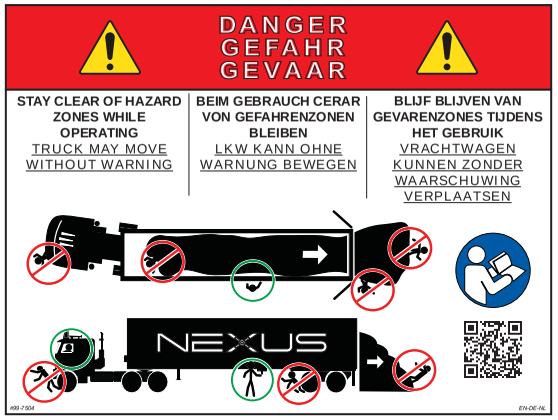
Model Number: _____

Date of Manufacture: _____

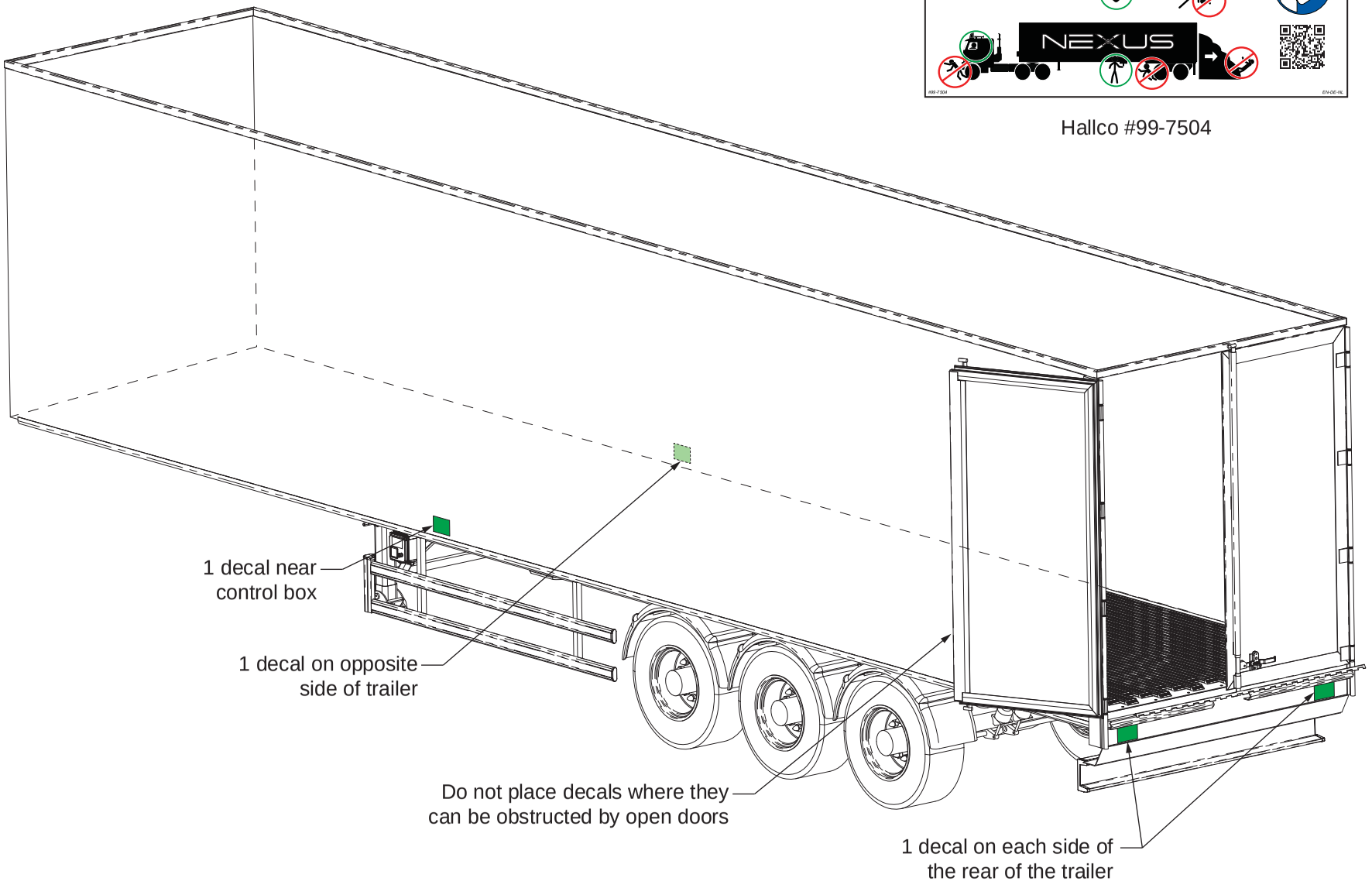
Safety Decals

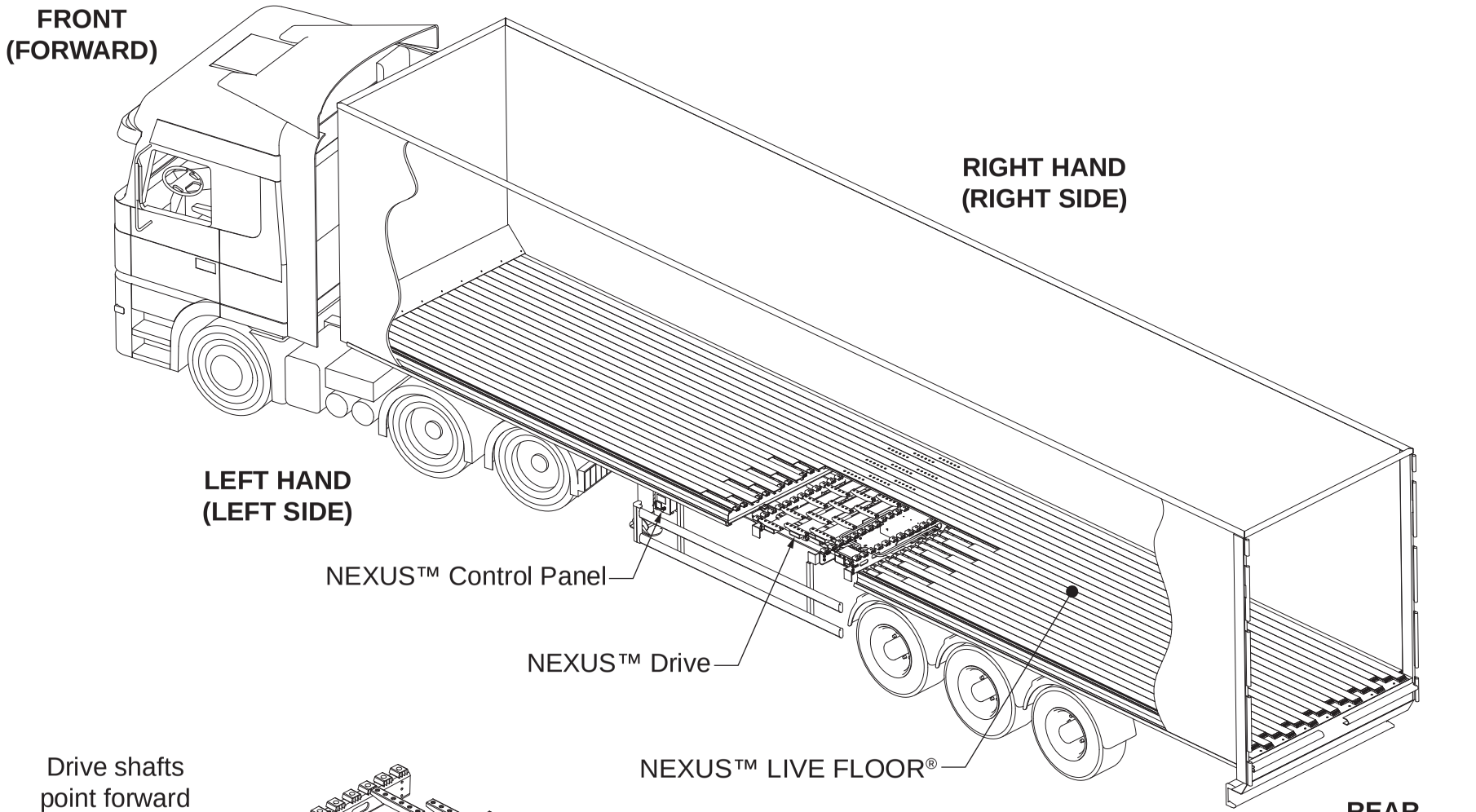
Hallco provides four decals warning of hazard zones. The decals must be applied so that they are easily identifiable from all approach angles.

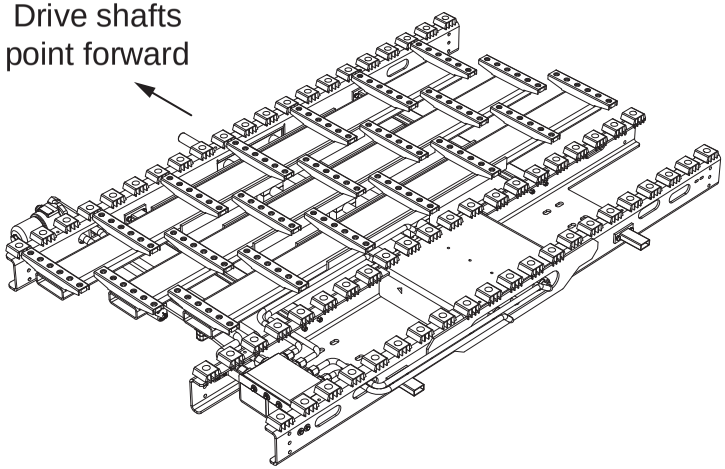
If these decals are damaged or removed contact your Hallco representitive for replacement.



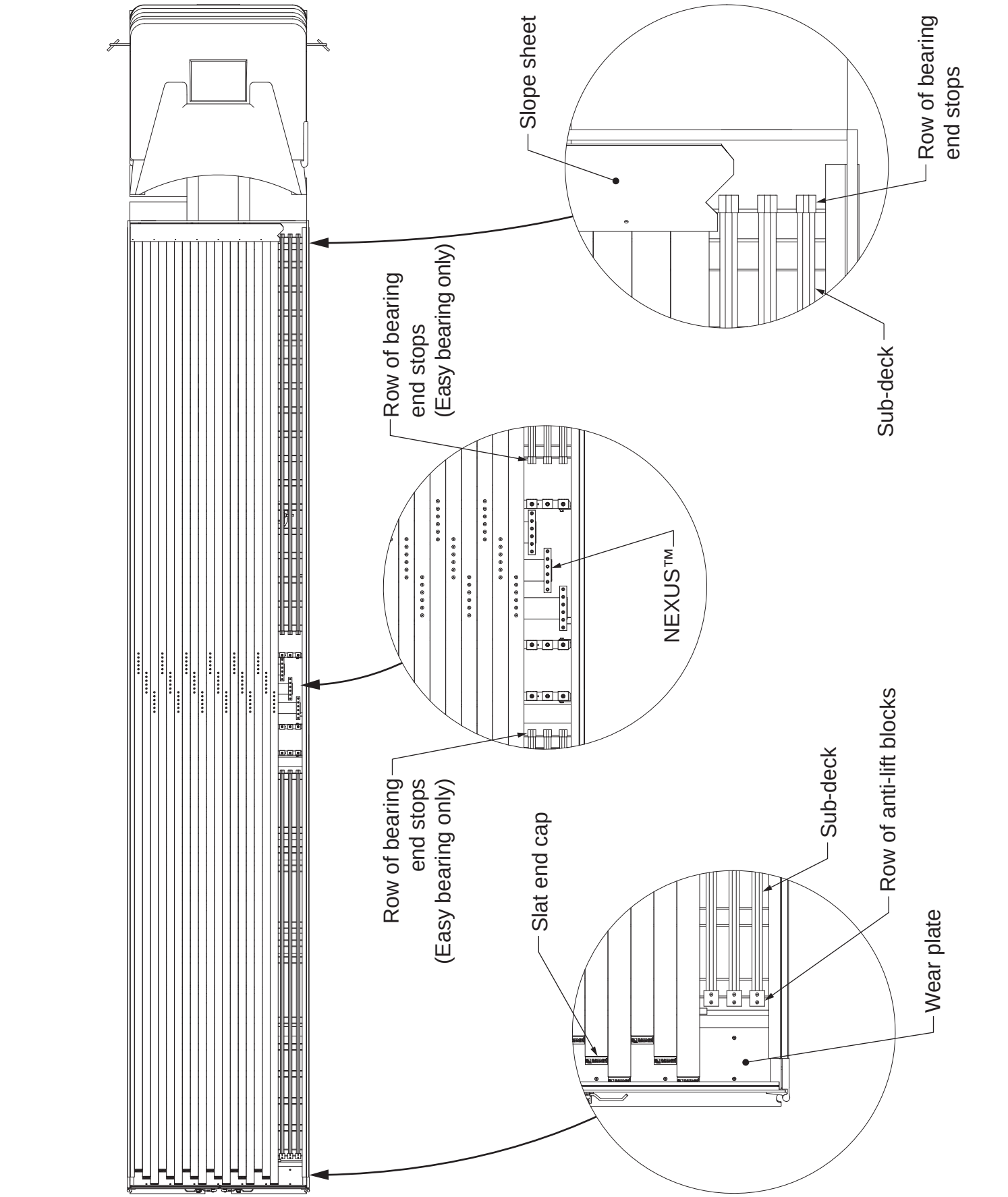
Hallco #99-7504



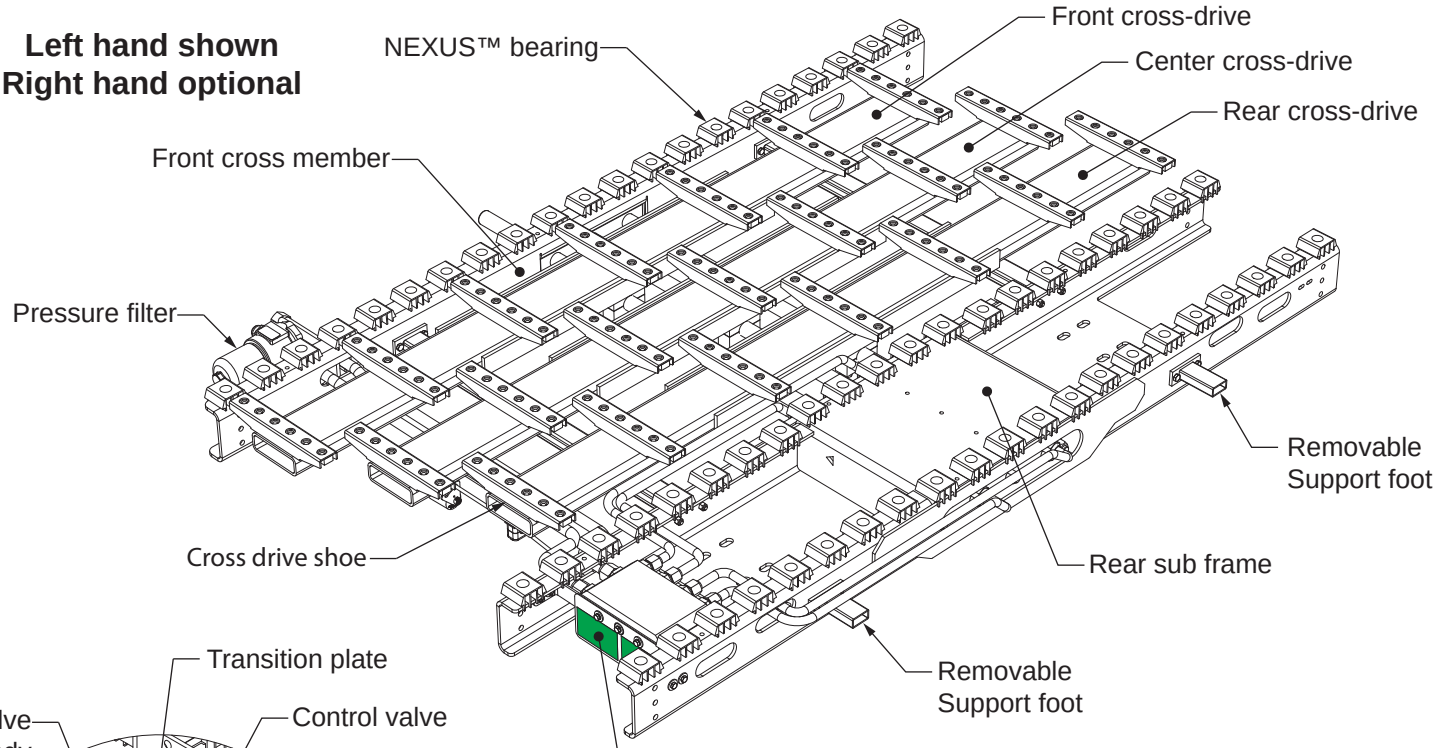


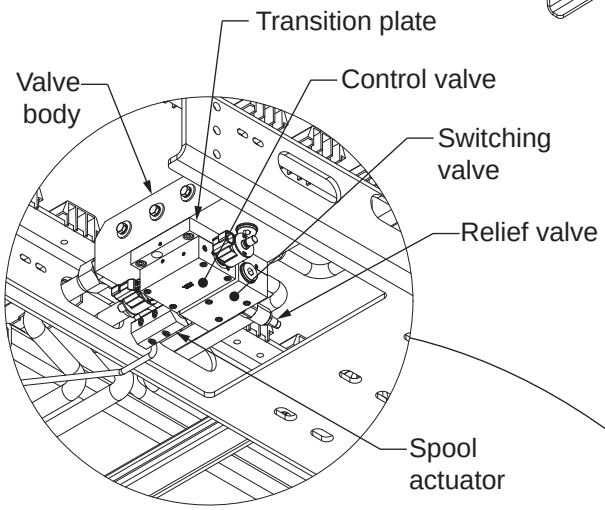


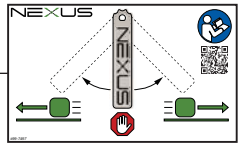
Left hand configuration shown
Right hand configuration optional


Slope sheet
Row of bearing end stops
Sub-deck
Row of bearing end stops (Easy bearing only)
NEXUS™
Row of bearing end stops (Easy bearing only)
Slat end cap
Sub-deck
Row of anti-lift blocks
Wear plate

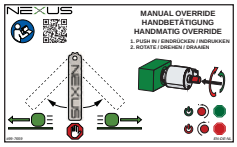
Left hand shown
Right hand optional



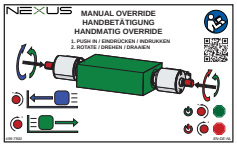




Hallco #99-7497
HDS-M Version

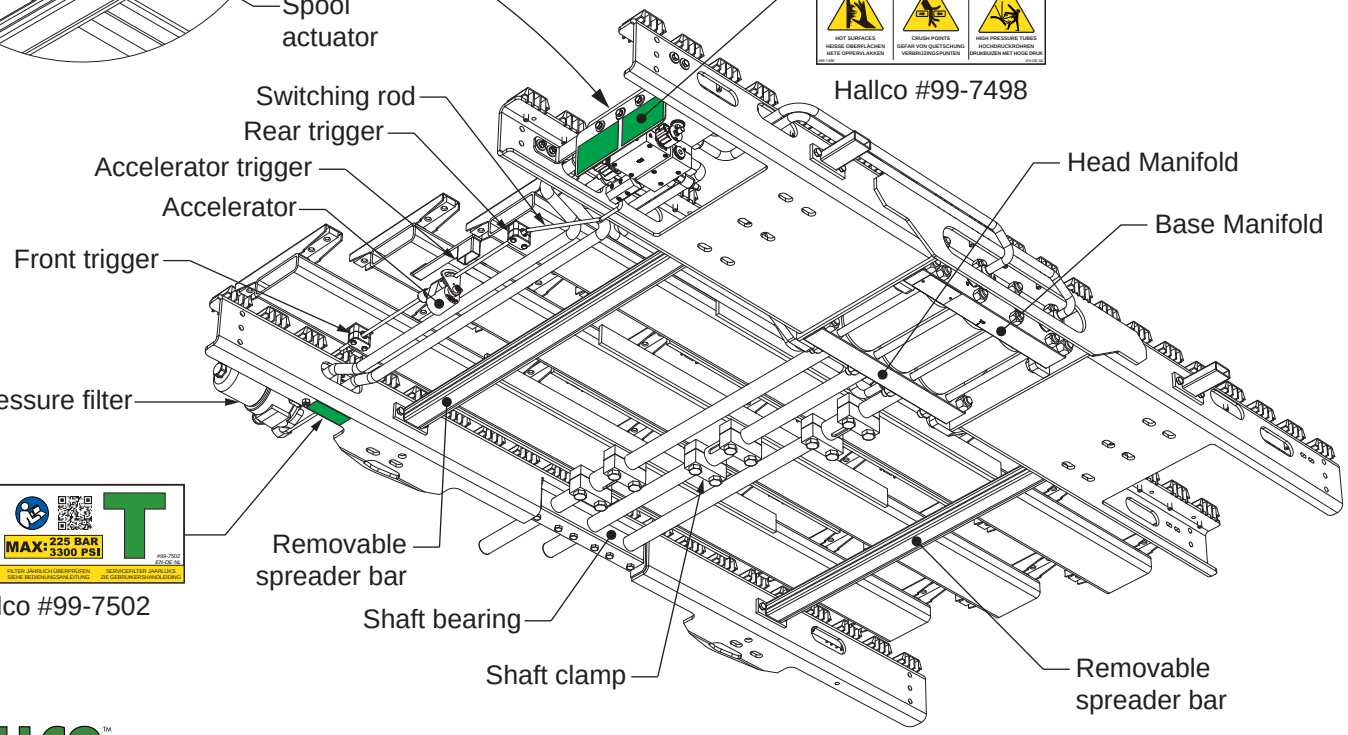


Hallco #99-7659
HDS-H Version



Hallco #99-7500
HDS-E Version

Hallco #99-7498



Hallco #99-7502

NEXUS™ System Specifications

Shaft Diameter	38.1 mm [1.5"]
Cylinder Diameter	100 mm [3.94"]
Stroke	200 mm [7.87"]
Max. Operating Pressure	225 bar [3300 psi]
Max. Operating Flow Rate	120 lpm [32 gpm]
Load Capacity	40 Metric Ton [44 Ton]

Theoretical Minimum Unload Times for a 13.6 m [44'] Trailer

Oil Flow		Cycles Per Minute	Convey Speed[1]		Unloading Time[1] (minutes)
LPM	[GPM]		m/min	[ft/min]	
20	[5]	2.29	0.50	[1.64]	29.7
40	[11]	4.58	0.90	[2.95]	14.9
60	[16]	6.87	1.40	[4.59]	9.9
80	[21]	9.15	1.80	[5.91]	7.4
100	[26]	11.44	2.30	[7.55]	5.9
120	[32]	13.73	2.70	[8.86]	5.0

1. Convey speeds and unload times shown are at 100% efficiency and do not account for such things as load slippage or other environmental factors. Actual conveyor speeds and unload times vary by load type.

Hydraulic System Requirements

Hydraulic Fluid

Anti-Wear (AW). Viscosity of ISO 32 to 46
Petroleum OR mineral base.
Moisture content, H_2O < 1%
Some eco-friendly oils may be used.
Contact Hallco for compatibility.

Fluid Temperature: < 82° C [180° F]

Pump

Pump must be a Gear, Vane or Piston type that will provide the desired oil flow rate at a full 250 bar [3,600 psi].
Pump must be matched to it's power source.
Drive it directly or through a PTO by an engine or electric motor powerful enough to support the flow and pressure.

Summary:

Recommended flow: 20-120 lpm [5-32 gpm]
Pressure rating: ≥ 250 bar [3,600 psi]
Power source for 120 lpm [32 gpm]: ≥ 50 kw [68 hp]
Speed: Motor or PTO ↔ Pump

Tank / Reservoir

Use a reservoir that has all of these features:

- Capacity equivalent to desired flow rate.
  i.e. 120L capacity for 120lpm flow rate.
- Inlet diameter greater than 30 mm [1.25"].
- Outlet diameter greater than 50 mm [2"].
- Turbulence reducer on return inlet.
- Pump supply outlet near bottom.
- Whirlpool prevention on the outlet.
- Filler cap with breather and filter.
- Visible fluid level gauge.
- Visible Thermometer.
- Oil heater for climates with ambient temps below 0°C

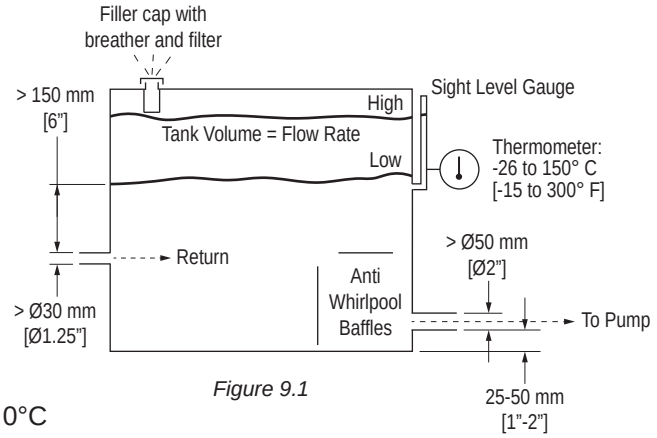


Figure 9.1

Hydraulic Supply Circuit

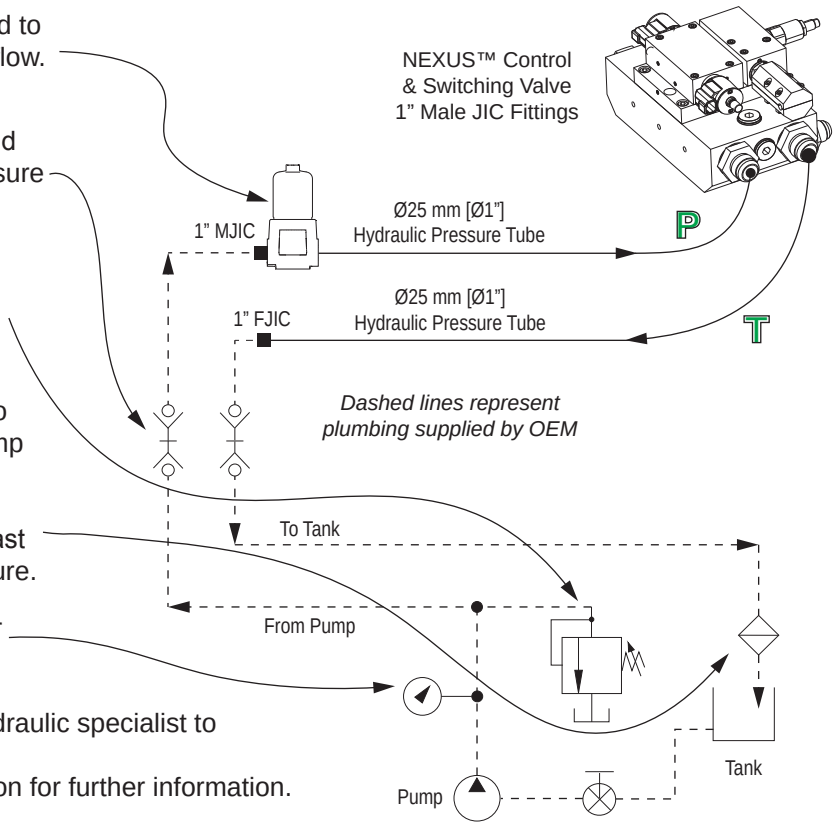
60 micron (max.) pressure filter rated to handle the maximum pressure and flow. Included with the NEXUS™ system.

Quick connects that are matched and rated for the maximum system pressure and flow rate.

Pressure relief valve set at 225 bar [3,300 psi] maximum and rated to handle at least the maximum pump output flow.

25 micron (max.) return filter rated to handle more than the maximum pump flow. Place it as close to the tank as possible. Make the hydraulic line between the filter and the tank at least Ø38 mm [Ø1.5"] to prevent filter failure.

Visible pressure gauge. 0 to 350 bar [0 to 5000 psi]. Glycerin filled.



Hallco recommends consulting a hydraulic specialist to design the hydraulic supply system.
Refer to pump supplier documentation for further information.

Pre-Startup Checklist

Hallco strongly recommends operators follow a Pre-Startup Checklist at the beginning of each shift or prior to starting the floor after it has been sitting for periods exceeding 24 hours.

- ✓ Check the entire floor to make sure all the slats are fully on each bearing.
- ✓ Check the front and rear slat clearances for obstructions.
- ✓ Make sure all the hydraulic fittings are tight.
- ✓ Make sure the switching rod is straight and the stops are tight. Skip this check if the stops have not been set yet.
- ✓ Make sure there are no clamps, temporary blocks or tools in the area where the cross-drives move back and forth.
- ✓ Make sure the chrome surface of the shafts near the cylinders is clean and free of paint, weld spatter or other roughness which could damage the seals.
- ✓ Check that the pressure and return lines are correctly plumbed to the hydraulic pump.
- ✓ Check the electrical connections to make sure they are proper.

Running Checklist

IMPORTANT! Perform this safety check EVERYTIME you operate the floor.
Failing to clear the surrounding area prior to operating the NEXUS™ can lead to injury or death!

- ✓ Check to make sure rear doors are open and secured.
- ✓ Check to make sure there are no persons or property in the unloading zone behind or to the sides of the trailer.
- ✓ Check under the trailer to make sure there are no persons or property in the hazard zone under the trailer.
- ✓ Check for nearby persons that are not familiar with the function of the machine be aware of their location at all times. ESPECIALLY IF VEHICLE IS TO REMAIN IN NEUTRAL DURING THE UNLOADING PROCESS!

Operating the NEXUS™ Manual Version (HDS-M)

To operate the NEXUS™ with Manual Control. You need to simply rotate the handle in the direction you want the floor to move. The handle will be held in place by a detent ball and spring.

The mechanical switching rod will automatically cycle the floor until it is stopped or the PTO/PUMP is shut off.

To stop the floor rotate the handle in the straight down position (fig. 1).

In the event of an emergency rotate the handle to the straight down position to stop the floor then immediatley turn off the PTO/PUMP.

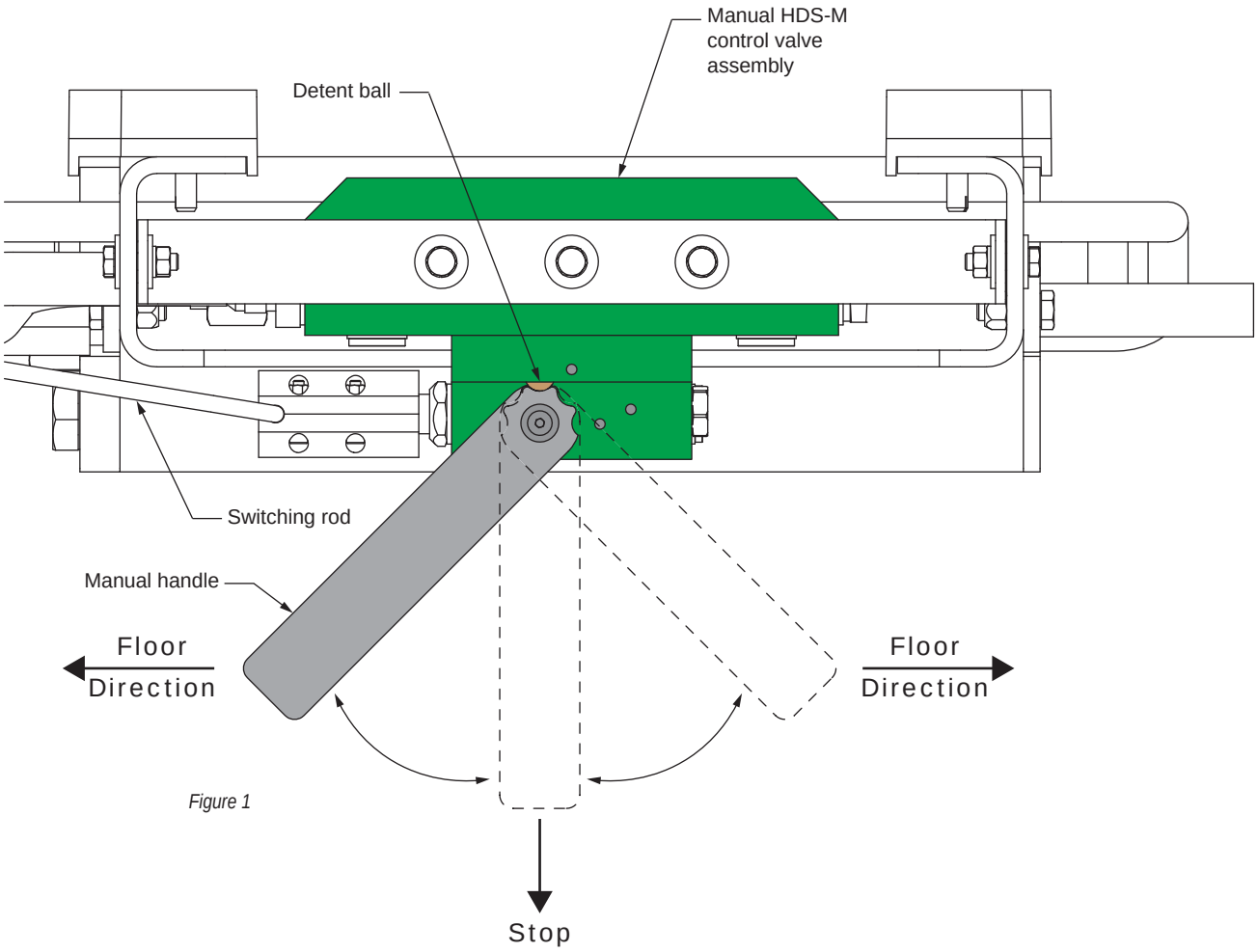


Figure 1

Operating the NEXUS™ Hybrid Version (HDS-H)

To operate the NEXUS™ with Hybrid Control. You need to simply rotate the handle in the direction you want the floor to move. The handle will be held in place by a detent ball and spring (fig. 1). The switching rod will automatically cycle the floor until it is stopped or the PTO/PUMP is shut off.

To START the floor, press the GREEN UNLOAD button or the YELLOW ACCELERATOR button on the base unit keypad or on the optional tethered/wireless keypad (fig. 1 & 2, page 20).

To STOP the floor, press the RED STOP button on the base unit keypad or on the optional tethered/wireless keypad (fig. 1 & 2, page 20).

Alternatively, to stop the floor you can rotate the manual handle in the straight down position.

When the handle is in the STOPPED (down) position the keypad buttons and the manual override on solenoid will not operate.

In the event of an emergency, press the e-stop button on the base control box then immediately turn off the PTO/PUMP.

In the event of a malfunction or for troubleshooting you can manually override the solenoid by pushing in the RED cap on the valve and turning it CLOCKWISE to turn OFF the floor and COUNTER-CLOCKWISE to turn ON the floor (fig. 2).

When the manual override on the solenoid is activated the keypad buttons will not have control over START/STOP functions, although the buttons will light up as usual.

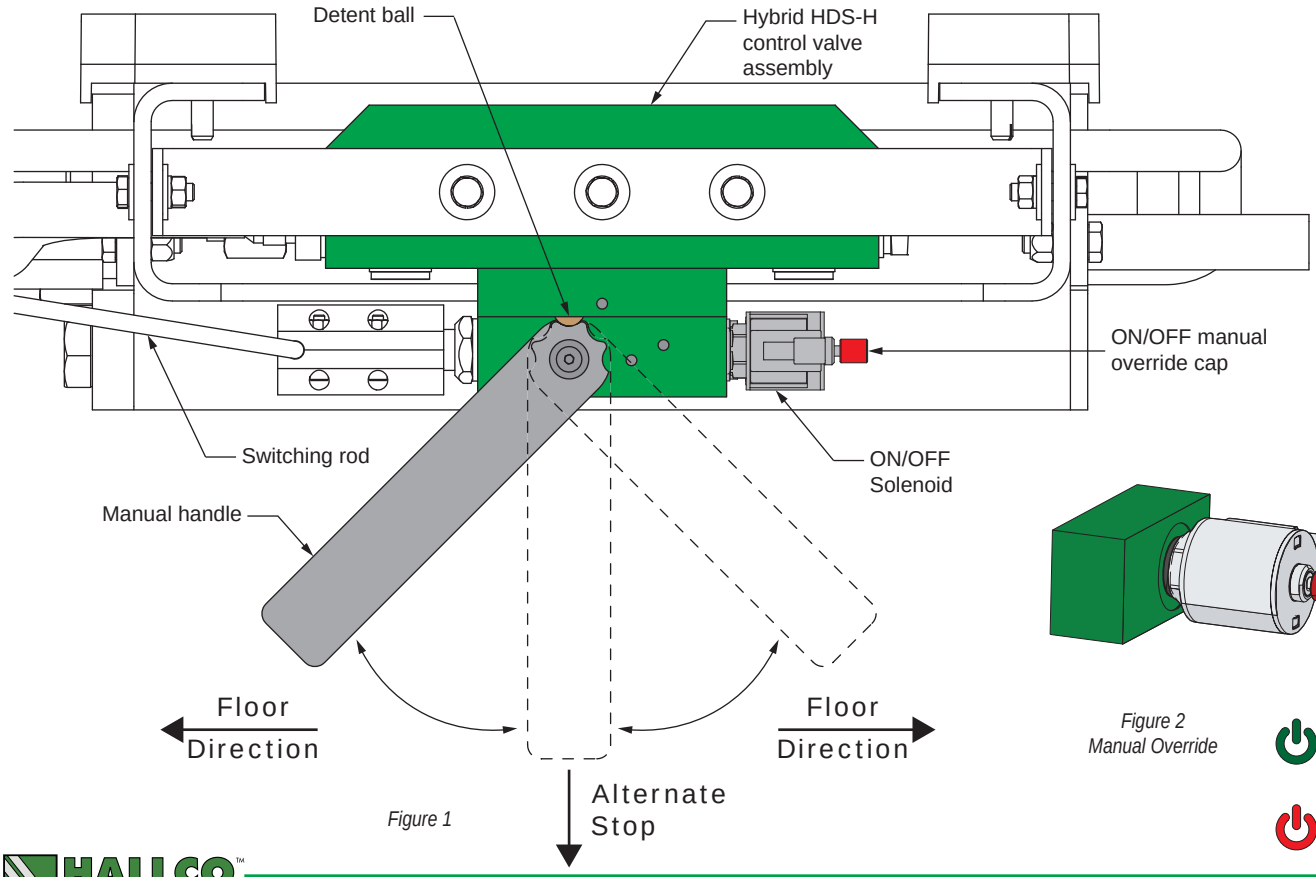


Figure 1

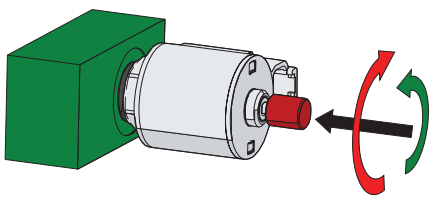
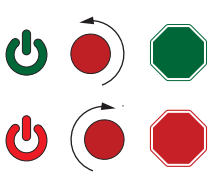


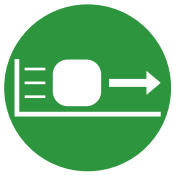
Figure 2
Manual Override



Operating the NEXUS™ Hybrid Version (HDS-H) (cont.)

The base control box functions are outlined below.
When the trailer lights are turned on the RED stop button will light up.

Red STOP button.
Lights up when system is in stopped state.
Press to STOP the floor.



Green UNLOAD button.
Will light up when pressed.
All other buttons will go dark.
Press once to activate.
Press STOP to deactivate.
Will not change floor direction in HDS-H version.
Floor direction set by position of manual handle.

Blue LOAD button.
Will light up when pressed.
All other buttons will go dark.
Press and hold to activate.
Release to deactivate.
Will not change floor direction in HDS-H version.
Floor direction set by position of manual handle.

Yellow ACCELERATOR button.
Will light up when pressed.
All other buttons will go dark.
Press once to activate
Press STOP to deactivate.
Will not change floor direction in HDS-H version.
Floor direction set by position of manual handle.
Use with larger products and irregular shapes for optimum performance

Red E-STOP button.
Stops floor and routes oil back to the pump.
E-stop DOES NOT STOP PUMP!
Press to engage.
Rotate clockwise to disengage.
When the e-stop is engaged keypad lights will go dark.

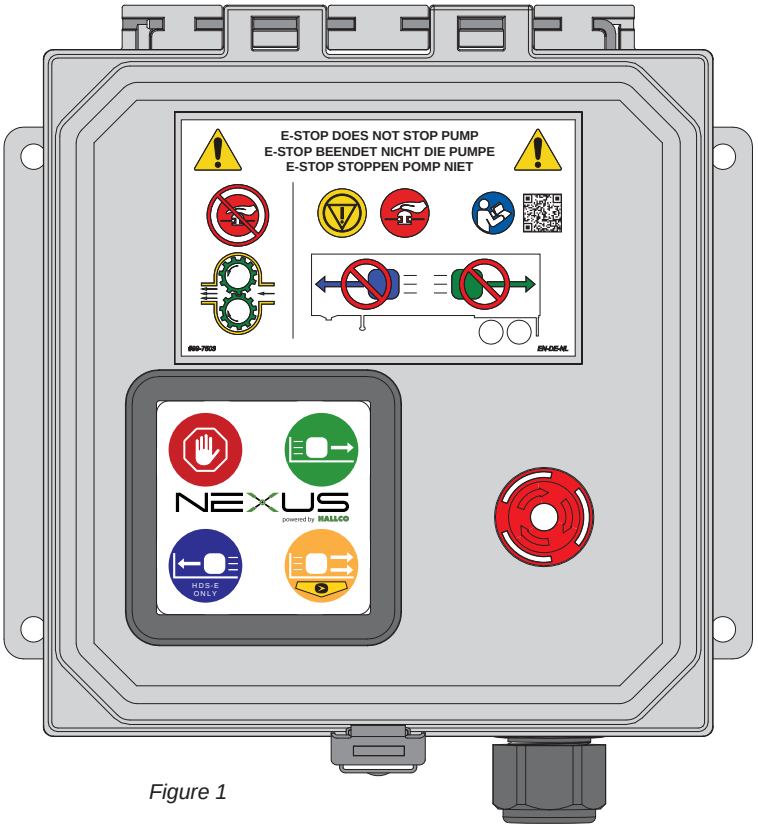


Figure 1

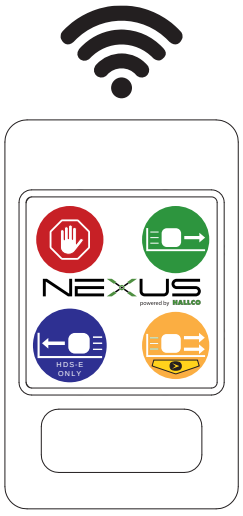
When operating hand-held remotes:

Remote buttons are synchronized to base unit. Pressing a button on either keypad will over-ride current function on other keypad.

If connected. Keypads will illuminate simultaneously to indicate current function.

If wired remote looses signal, system will stop.
This can happen if cable is damaged or disconnected.

If wireless remote looses signal, system will stop.
This can happen if remote is out of range.



Optional wireless control.
Keypads function same as base control.

Figure 2

Prewired to inside of base unit.

Optional wired control.
Keypads function same as base control.

Operating the NEXUS™ Electric Version (HDS-E)

To operate the NEXUS™ with Electric Control. You simply press the corresponding button on the base unit keypad or on the optional tethered/wireless keypad (fig. 1 & 2, page 22). The switching rod will automatically cycle the floor until it is stopped or the PTO/PUMP is shut off.

To START the floor in UNLOAD mode, press the GREEN UNLOAD button or the YELLOW ACCELERATOR button on the base unit keypad or on the optional tethered/wireless keypad (fig. 1 & 2, page 22).

To STOP the floor in UNLOAD mode, press the RED STOP button on the base unit keypad or on the optional tethered/wireless keypad (fig. 1 & 2, page 22).

To START the floor in LOAD mode, press and HOLD the BLUE UNLOAD button on the base unit keypad or on the optional tethered/wireless keypad (fig. 1 & 2, page 22).

To STOP the floor in LOAD mode, release the BLUE LOAD button.

In the event of an emergency, press the e-stop button on the base control box then immediately turn off the PTO/PUMP.

In the event of a malfunction or for troubleshooting you can manually override the START/STOP solenoid by pushing in the RED cap on the valve and turning it CLOCKWISE to turn OFF the floor and COUNTER-CLOCKWISE to turn ON the floor (fig. 2).

In the event of a malfunction or for troubleshooting you can manually override the LOAD/UNLOAD solenoid by pushing in the RED cap on the valve and turning it CLOCKWISE to UNLOAD the floor and COUNTER-CLOCKWISE to LOAD the floor (fig. 2).

When the manual override on the solenoid is activated the keypad buttons will not have control over functions, although the buttons will light up as usual.

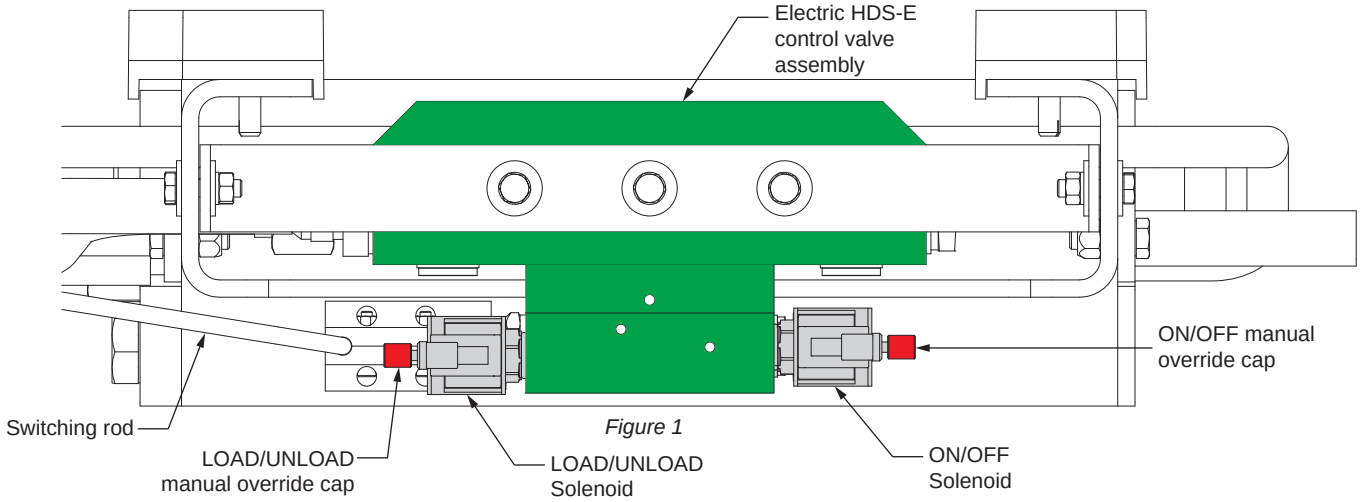


Figure 1

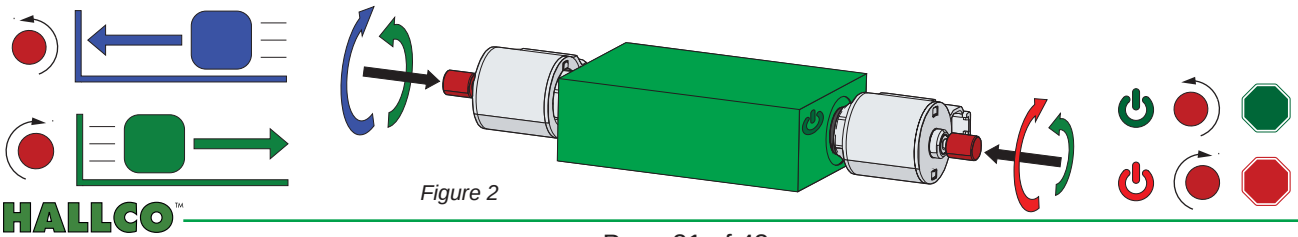
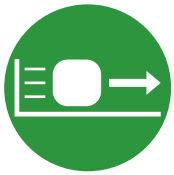


Figure 2

Operating the NEXUS™ Hybrid Version (HDS-H) (cont.)

The base control box functions are outlined below.
When the trailer lights are turned on the RED stop button will light up.

Red STOP button.
Lights up when system is in stopped state.
Press to STOP the floor.



Green UNLOAD button.
Will light up when pressed.
All other buttons will go dark.
Press once to activate.
Press STOP to deactivate.

Blue LOAD button.
Will light up when pressed.
All other buttons will go dark.
Press and hold to activate.
Release to deactivate.

Yellow ACCELERATOR button.
Will light up when pressed.
All other buttons will go dark.
Press once to activate
Press STOP to deactivate.
Use with larger products and irregular shapes for optimum performance

Red E-STOP button.
Stops floor and routes oil back to the pump.
E-stop DOES NOT STOP PUMP!
Press to engage.
Rotate clockwise to disengage.
When the e-stop is engaged keypad lights will go dark.

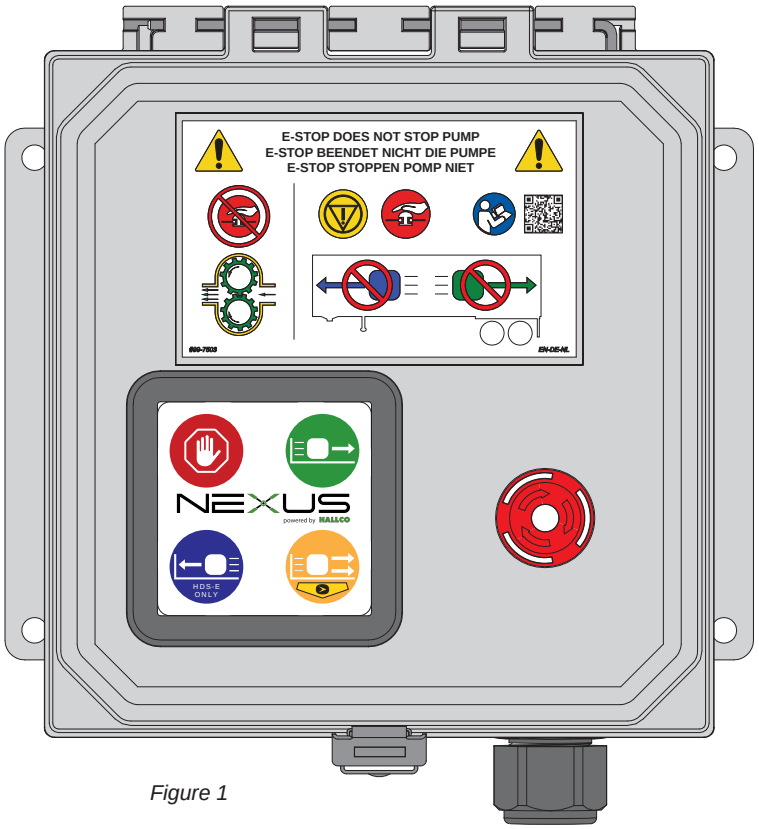


Figure 1

When operating hand-held remotes:

Remote buttons are synchronized to base unit. Pressing a button on either keypad will over-ride current function on other keypad.

If connected. Keypads will illuminate simultaneously to indicate current function.

If wired remote looses signal, system will stop.
This can happen if cable is damaged or disconnected.

If wireless remote looses signal, system will stop.
This can happen if remote is out of range.

Prewired to inside of base unit.

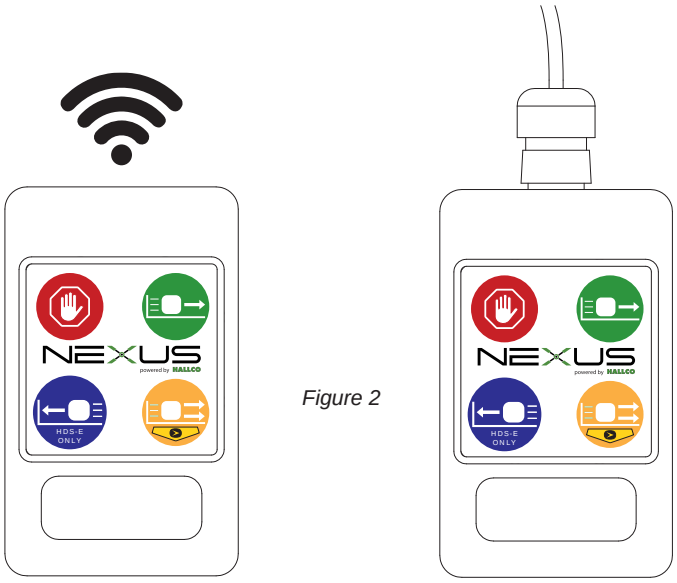


Figure 2

Optional wireless control.
Keypads function same as base control.

Optional wired control.
Keypads function same as base control.

Adjusting the Switching Rod

The NEXUS™ switching rod is pre-adjusted from the factory. The stop collar screws will be marked indicating the NEXUS™ has been test run and adjusted.

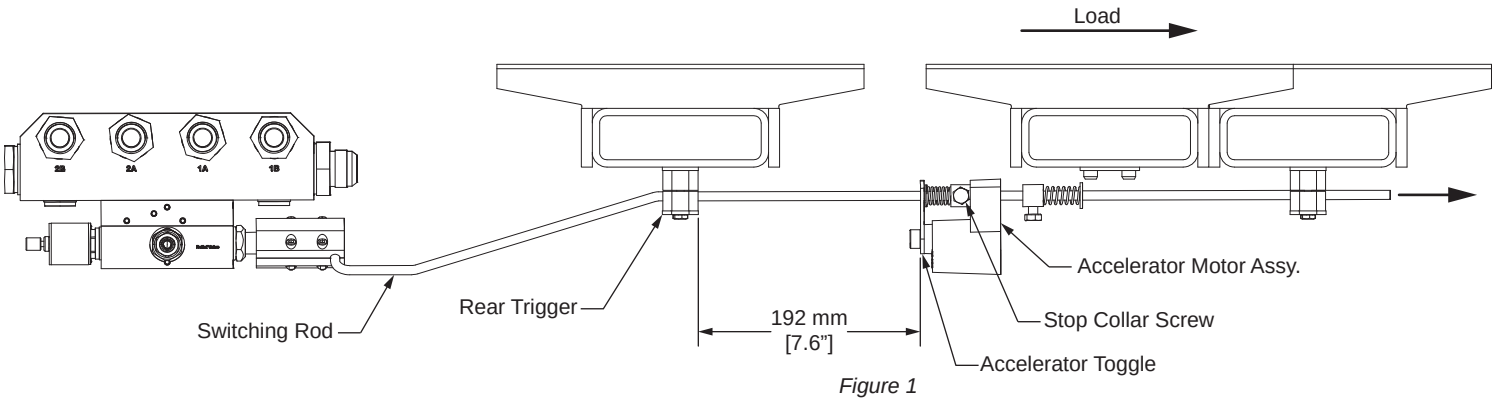


Figure 1

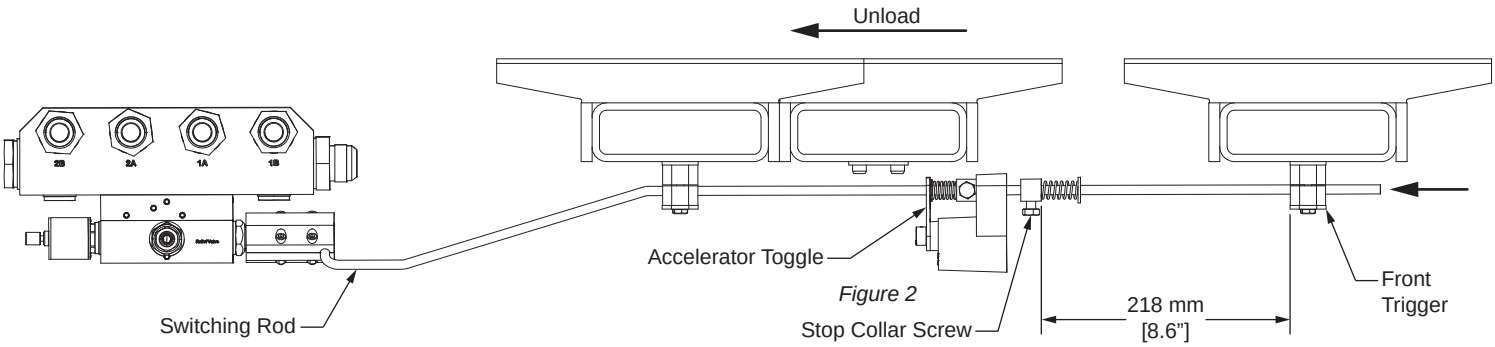


Figure 2

Process for Adjusting Switching Rod

Reference figure 1 for these steps:

1. Pull the switching rod forward.
2. Turn the floor on in “LOAD” mode until the rear cross-drive reaches it’s end of stroke.
3. Stop the floor.
4. Make sure the switching rod is still pulled forward.
5. Move the accelerator motor assembly and its stop until the actuator toggle is 192 mm [7.6”] from the rear trigger then tighten the stop collar screw to 11 Nm [8 lb-ft].

Reference figure 2 for these steps:

6. Push the switching rod rearward.
7. Turn the floor on in “UNLOAD” mode until the front cross-drive reaches it’s end of stroke.
8. Stop the floor.
9. Make sure the switching rod is still pushed rearward.
10. Move the front rod stop until it is 218 mm [8.6”] from the front trigger then tighten the stop collar screw to 11 Nm [8 lb-ft].

Preventative Maintenance

Hallco strongly recommends operators periodically check the wear of the various system components. Proactively inspecting and replacing worn components will extend the life of the system as a whole.

The best way to track wear is to keep a log tracking the number of loads processed. Due to the wide range of materials, conditions and varying use of the equipment Hallco can only recommend an interval based on average usage. It is important that in the first year of operation you pay close attention to how quickly parts wear and develop a maintenance schedule tailored to your specific needs.

Check After First 10 Loads

Deck Bolts: Check the tightness of the deck bolts. To check tightness observe whether there is movement of the bolt head relative to the slat when the floor is moving. If there is movement then remove the bolt, clean the female threads, and insert a new bolt with medium thread-lock and tighten to the appropriate torque. Refer to the NEXUS™ Installation Manual.

Slats: Check the slats and the slat surfaces for shiny metal or unusual wear patterns. This may be an indication of mis-alignment that could cause premature wear. If there is anything unusual contact your local Hallco representative.

Check Every 600 Loads

Deck Bolts: Check the tightness of the deck bolts. To check tightness observe whether there is movement of the bolt head relative to the slat when the floor is moving. If there is movement then remove the bolt, clean the female threads, and insert a new bolt with medium thread-lock and tighten to the appropriate torque (reference installation manual).

NEXUS™ Mounting Bolts *(if applicable)*: Visually inspect the NEXUS™ frame. Look for indications the frame is moving relative to the chassis. This is easily identified by missing coating on the frame where it is shifting. If found, tighten the bolts attaching the NEXUS™ frame to the trailer chassis using the “torque-angle” method outlined in the NEXUS™ Installation Manual.

NEXUS™ Hydraulic Module Mounting Bolts: Check the tightness of the four (4) bolts attaching the NEXUS™ hydraulic module to the NEXUS™ frame. The front bolts should be torqued at 500 Nm [368 lb-ft] of torque. Only check the rear bolts for tightness.

NEXUS™ Hydraulic Module:

Cylinders and Pistons: When the cylinders walls, pistons and seals wear down there will be less power available and the oil will heat up a lot faster. A local temperature increase of the cylinders during operation will indicate that there is bypassing oil around the pistons that requires repair. Use an infrared thermometer to measure the temperature of various components of the hydraulic system to see where there is localized higher temperature.

Hydraulic shaft seals: Check for leaking oil where the shaft enters the aluminum head. Leaking oil may be caused by damaged seal glands or damaged shaft surfaces.

Check Every 600 Loads (cont.)

Switching Rod Springs: Check the switching rods springs to make sure they are intact and not broken.

Shaft Bearing Block: Shine a light on one side of the block and see if you can see any light coming through around the shaft. If there looks like there is a gap of more than 2 mm then tighten the mounting bolts enough to close the gap. Do not tighten more than this as it will increase the friction on the shaft significantly.

Check Every 1,200 Loads

Slats: The rear end of the slats wear the fastest. When the weld on the top of the aluminium endcap is worn through then the slat will need to be rotated end for end or replaced.

Slat Seals: Look for material sifting through the slats and falling on the ground or piling on top of the NEXUS™ drive unit. This is an indication that the seals need to be replaced.

Side Trim: Replace the rear portion of the side trim when the slats are rotated or replaced. Move closer to the slat if there is a gap.

Bearings & Hold Downs: Measure from the bottom of the slat leg to the top of the trailer cross-member. When this measurement is under 2mm then the bearings and hold downs should be replaced.

Slope Sheet Wiper: The wiper needs to be touching the top of the slat. If it is not then reposition the wiper or replace it.

Pressure Filter Element: *Dirty oil is the primary cause for failure in the hydraulic system.* Remove the pressure and return filter elements and inspect for contamination. Replace if dirty.

NOTE: Check every 600 loads if the pressure and return quick connects are disconnected often or if the pump system is wearing out.

Yearly Inspection

Oil Reservoir: Inspect the oil and the reservoir and replace the oil and clean the reservoir if it is contaminated with water and dirt.

Troubleshooting the NEXUS™ drive system

If you experience problems with your NEXUS™ drive follow the troubleshooting guide over the next few pages.

If you get stuck at anytime contact your Hallco representative. Make sure you have your model number and serial number ready before calling, see page 10 for locating this information.

IMPORTANT TROUBLESHOOTING SAFETY NOTES

When troubleshooting the NEXUS™ make sure that you have locked out and tagged out all energy sources. DO NOT operate the NEXUS™ without its guarding.

When hydraulics are disconnected take extra precautions to prevent debris from entering the system. Small particulates can prevent the NEXUS™ from switching properly.

When troubleshooting, have the PTO/PUMP documentation readily available. The NEXUS™ is an integral piece of a larger machine, some steps will require you to check status of the PTO/PUMP and it's components.

DO NOT attempt to troubleshoot the system if you do not have experience running it. When troubleshooting you will be expected to know what is proper operational sounds, lights and movements. Inexperienced users can cause additional damage if they are not familiar with the equipment.

PROBLEM: No part of the floor moves.

Confirm the following conditions:

The PTO/pump is on and operating normally. **Confirmed**

→ Do all the lights on the Base Unit Keypad light up normally?

Yes Attach a pressure gauge to the NEXUS™ test point (optional). Follow the steps based on readings:

225 bar [3263 psi] Are all of the cross drives and slats all at the front position or all at the rear position?

Yes Is the spring between the trigger and the rod stop compressed?

Yes Then there is something wrong with the switching valve. Loosen the rod stop enough that the rod can be shifted back and forth manually. If it is moved back and forth manually does the floor start to move again?

Yes Manually shift it some more to see if it gets stuck again. If you can't get the floor to stick again. Re-position the rod stop and tighten it. Run the floor as usual. The cause was probably a small bit of debris in the oil keeping the spool from shifting. Replace the pressure filter element.

No Load may be too heavy or frozen or there is a switching valve problem. Replace the switching valve, OR visit a Hallco service location.

No Move the rod manually. Does the floor move again?

Yes Does it get stuck in the same place?

Yes The rod stop must be re-positioned OR there is some debris between the end of the slats and the front wall or between the cross drives keeping them from moving.

No Contact Hallco service.

No Check the return disconnect between the truck and trailer to make sure that it is connected and properly matched. Contact Hallco service.

No Load may be too heavy or frozen or there is a switching valve problem. Replace the switching valve, OR visit a Hallco service location.

15-50 bar [218-725 psi] Replace the ON/OFF cartridge valve.

0 or 50-225 bar [725-3263 psi] Is the tank full of oil?

Yes Check the pressure line disconnect between the truck and trailer to make sure that it is connected and properly matched.

Check the pump to make sure that it can produce 225 bar pressure. See pump documentation for more information.

Replace the pressure relief valve at the pump and/or on the NEXUS HDS valve.

No Refill to proper levels. See page 16 for hydraulic oil details.

Continue to next page...

PROBLEM: No part of the floor moves (cont.)

...continued from previous page

No — If the red Stop button on the Base Unit Keypad is faintly lit or not lit at all but the other buttons light up when pressed and the floor runs when the ON/OFF manual override is turned on then replace the ON/OFF solenoid.

(If no lights are lit up see: "PROBLEM: None of the buttons on Base Unit Keypad light up when pressed")

PROBLEM: Floor moves in "Unload" mode but gets stuck in "Load" mode OR floor moves in "Load" mode but gets stuck in "Unload" mode.

Confirm the following conditions:

1. The PTO/pump is on and operating normally.
2. All of the buttons light up properly.

Confirmed

- Is there debris between the cross drives or damage to the cross drives preventing them from moving?
  - Yes — Clear the cross drives, check for and repair additional damage prior to running the floor.
  - No — Is there debris or damage on either end of the slats preventing them from moving?
    - Yes — Clear the slats, check for and repair additional damage prior to running the floor.
    - No — Contact Hallco service.

PROBLEM: None of the buttons on the Base Unit Keypad light up when pressed.

Confirm the following conditions:

1. The PTO/pump is on and operating normally.
2. The floor turns on and off when I engage and disengage the manual override on the ON/OFF cartridge valve.

Confirmed

- Is the e-stop button disengaged?
  - Yes — Continue to the next troubleshooting step.
  - No — Rotate e-stop clockwise until the button head pops up indicating the e-stop has been disengaged.
- Are the trailer lights on?
  - Yes — Check the fuse on the back of the Base Unit Keypad (inside the Control Box). Is it blown?
    - Yes — Replace fuse with 2 amp mini ATC (blade style) fuse. Check wiring for damage, repair if needed.
    - No — Does the Base Unit Keypad have 24vdc power?
      - Yes — Are the supply wires connected to the back of the Base Unit Keypad correctly?
        - Yes — Replace the Base Unit Keypad.
        - No — Re-wire back of Base Unit Keypad per schematic on back decal.
      - No — Check all source wiring. Look for and repair any wire damage.
  - No — Turn on trailer lights. Trailer lights provide source voltage to Base Control Box.

PROBLEM: Floor will not shift into “LOAD” mode even when the blue LOAD/UNLOAD button on the Keypad is pressed and lit.

Confirm the following conditions:

1. All of the buttons light up properly.
2. The floor will shift into “Load” mode when the LOAD/UNLOAD manual override is engaged.

Confirmed

→ Replace the LOAD/UNLOAD solenoid.

PROBLEM: Floor will not shift into “ACCELERATOR” mode even when the yellow “ACCELERATOR” button on the Keypad is pressed and lit.

Confirm the following conditions:

1. The buttons on the Keypad light up properly.
2. The floor turns on and operates in both directions.

Confirmed

→ Is the YELLOW cable connected properly to the back of the keypad?

- Yes — Continue to the next troubleshooting step.
- No — Review wiring diagram and connect cables properly.

→ Is the Deutsch connector end of the YELLOW cable connected at the switching valve?

- Yes — Continue to the next troubleshooting step.
- No — Check for damage and reconnect.

→ Manually move the accelerator toggle back and fourth does it move freely?

- Yes — Contact Hallco service location for additional troubleshooting.
- No — Replace accelerator motor.

PROBLEM: Floor is running in “ACCELERATOR” mode adn then when the “ACCELERATOR” button is pressed the floor runs in normal *non*-accelerator mode.

Switch the polarity of the 2 YELLOW wires where they are connnected at the back of the Keypad.

PROBLEM: Floor operates in “LOAD” mode regardless of which button (LOAD/UNLOAD) is pressed.

Is the manual override on the LOAD/UNLOAD cartridge valve engaged (ref. pages 20 & 22)?

- Yes — Disengage the manual override on the LOAD/UNLOAD cartridge valve.
- No — Replace the LOAD/UNLOAD cartridge valve.

PROBLEM: Floor starts running as soon as pump is turned on and the “STOP” button is lit.

Is the manual override on the ON/OFF cartridge valve engaged (ref. pages 20 & 22)?

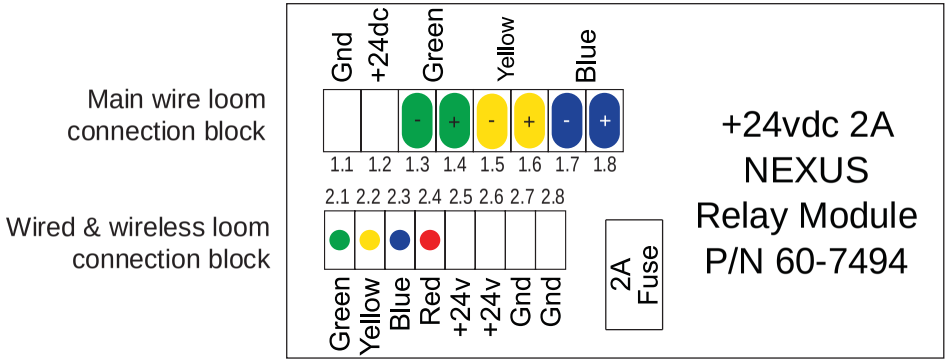
- Yes — Disengage the manual override on the ON/OFF cartridge valve.
- No — Replace the ON/OFF cartridge valve.

Relay Module Pinout Chart

Use the chart below to help troubleshoot wiring problems.

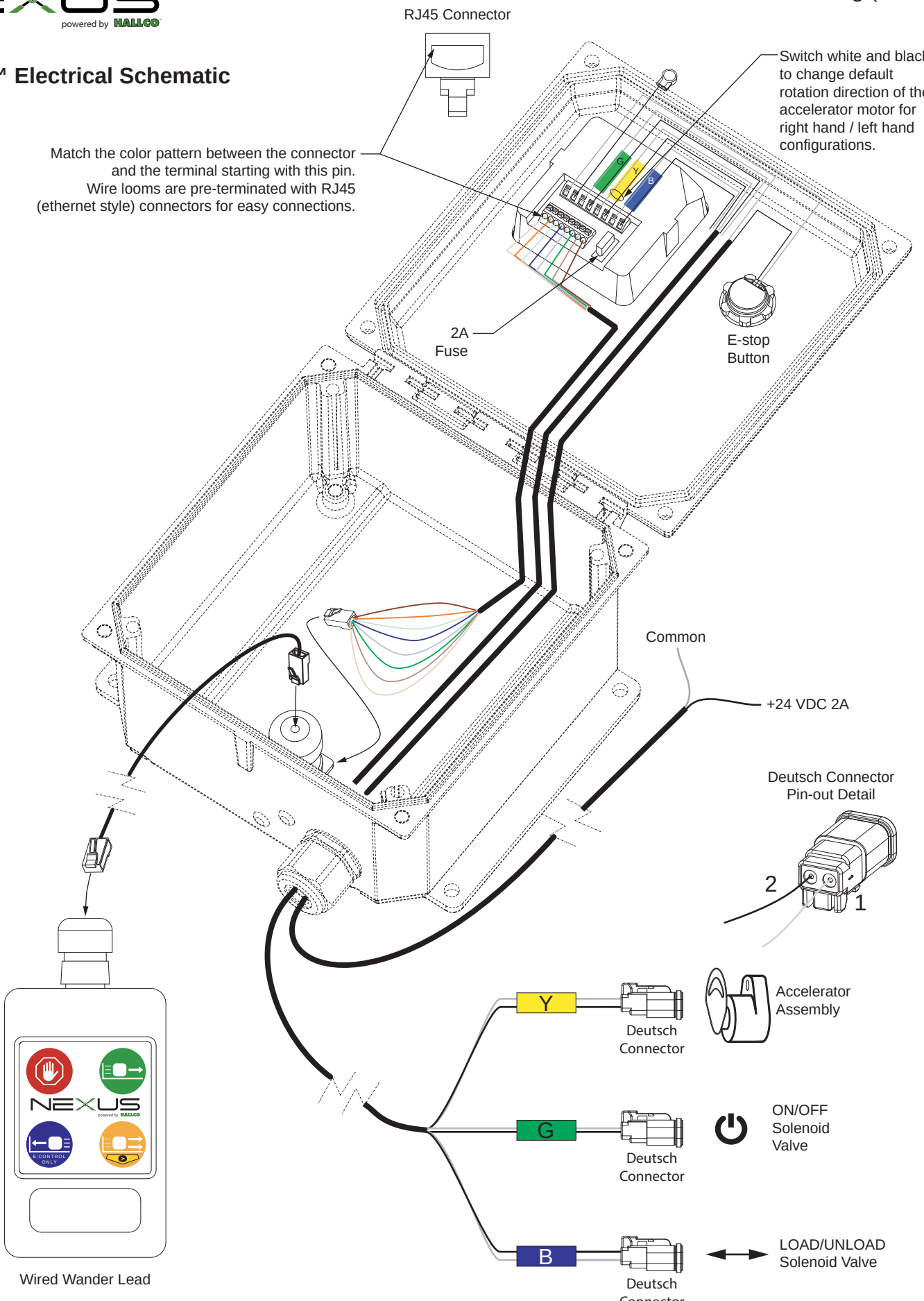
Caution! System is powered by 24vdc. Caution should be taken around electricity even when working with low voltages.

Make sure power is disconnected prior to rewiring, otherwise damage to electronics may occur.



Button states					Voltage relative to common, negative														
E-Stop	Red Button	Green Button	Blue Button	Yellow Button	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8
Out	Lit	Off	Off	Off	0	+24	0	0	0	0	0	0	0	0	0	0	0	+24	0	0
Out	Off	Lit	Off	Off	0	+24	0	+24	+24	0	0	0	+24	0	0	0	+24	+24	0	0
Out	Off	Off	Lit	Off	0	+24	0	+24	+24	0	0	+24	0	0	+24	0	+24	+24	0	0
Out	Off	Off	Off	Lit	0	+24	0	+24	0	+24	0	0	0	+24	0	0	+24	+24	0	0
In	Off	Off	Off	Off	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NEXUS™ Electrical Schematic



NEXUS™ Disassembly

The following pages outline the general disassembly procedures of your NEXUS™ LIVE FLOOR® conveying system. Specific rebuild manuals for the Hydraulic Module and Switching Valve assembly are available from your Hallco representative. Instructions are shown using a LEFT HAND system. RIGHT HAND disassembly is the same.

Caution! Before disassembly, you must prep the area with catch pans for hydraulic fluid. There will be residual fluid in all the lines, cylinders and filter. DO NOT ALLOW HYDRAULIC FLUID TO DRAIN ONTO THE GROUND.

STEP 1 (Removing Hydraulic Tubes)

Remove the four (4) hydraulic pipes that run between the Hydraulic Module and the Switching valve (fig. 1).

You will need to GENTLY snake the lines around the hydraulic shafts taking great care to NOT damage the shaft chrome.

Hallco recommends installing plastic plugs over all exposed fittings to prevent contamination.

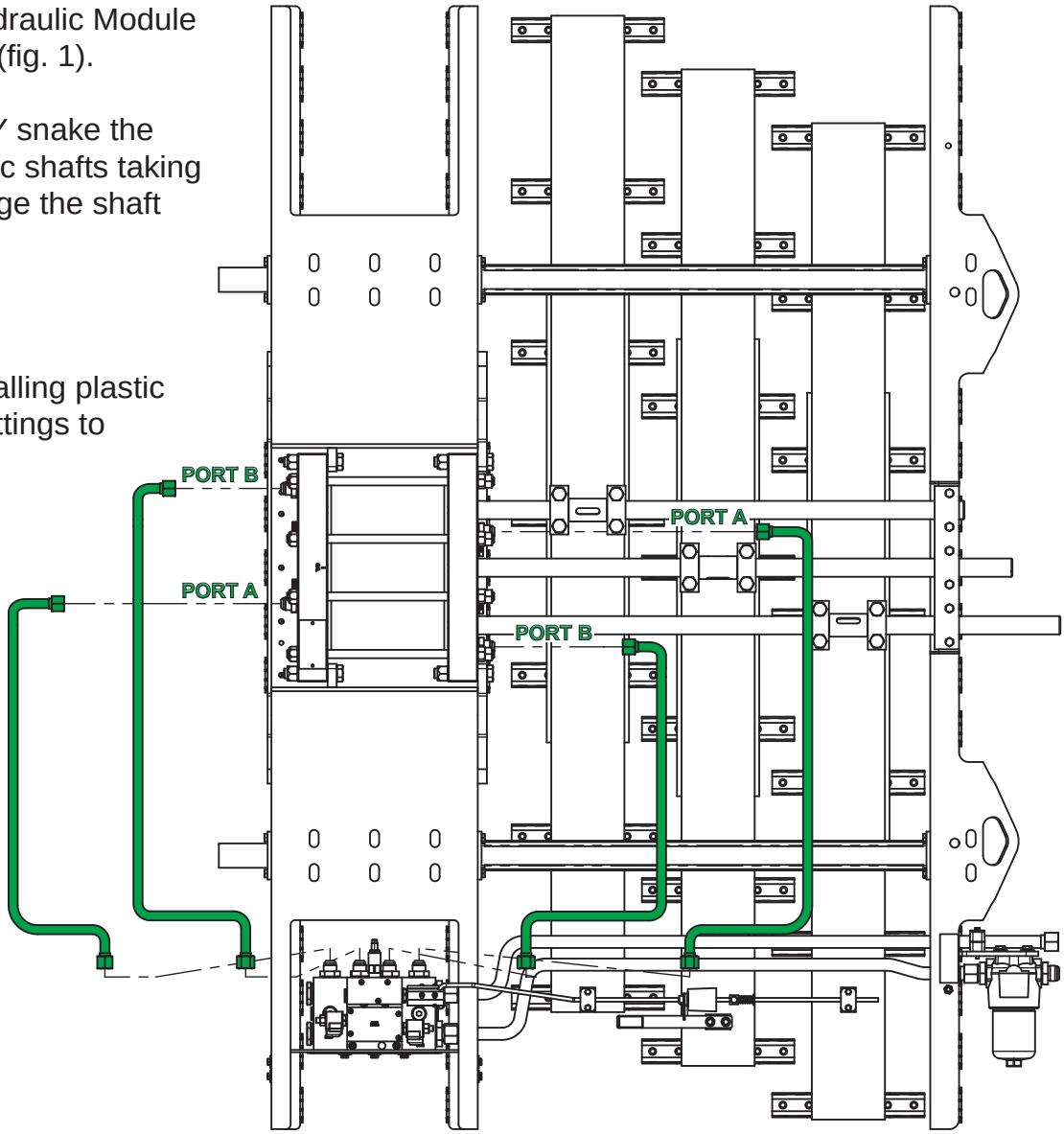


Figure 1
Looking up from bottom

STEP 2 (Removing Hydraulic Module)

2a. Remove the six (6) M10 Bearing Block bolts along with the Bearing Block Mounting Plate and Bearing Block. Set aside.

2b. Remove the four (4) M20 Head and Base mounting bolts. Note bolt orientation for re-assembly.

CAUTION! Fully support the Hydraulic Module prior to moving to the next step. The Hydraulic Module weighs approximately 80 kg [176 lbs] and is not stable when disconnected! See fig. 2 for approximate center of gravity of the Hydraulic Module.

2c. Remove the twelve (12) M16 Cross-drive Clamp bolts along with the six (6) Cross-drive Clamps. WARNING as you remove these bolts the Hydraulic Module may shift and settle, keep hands clear when removing last bolts.

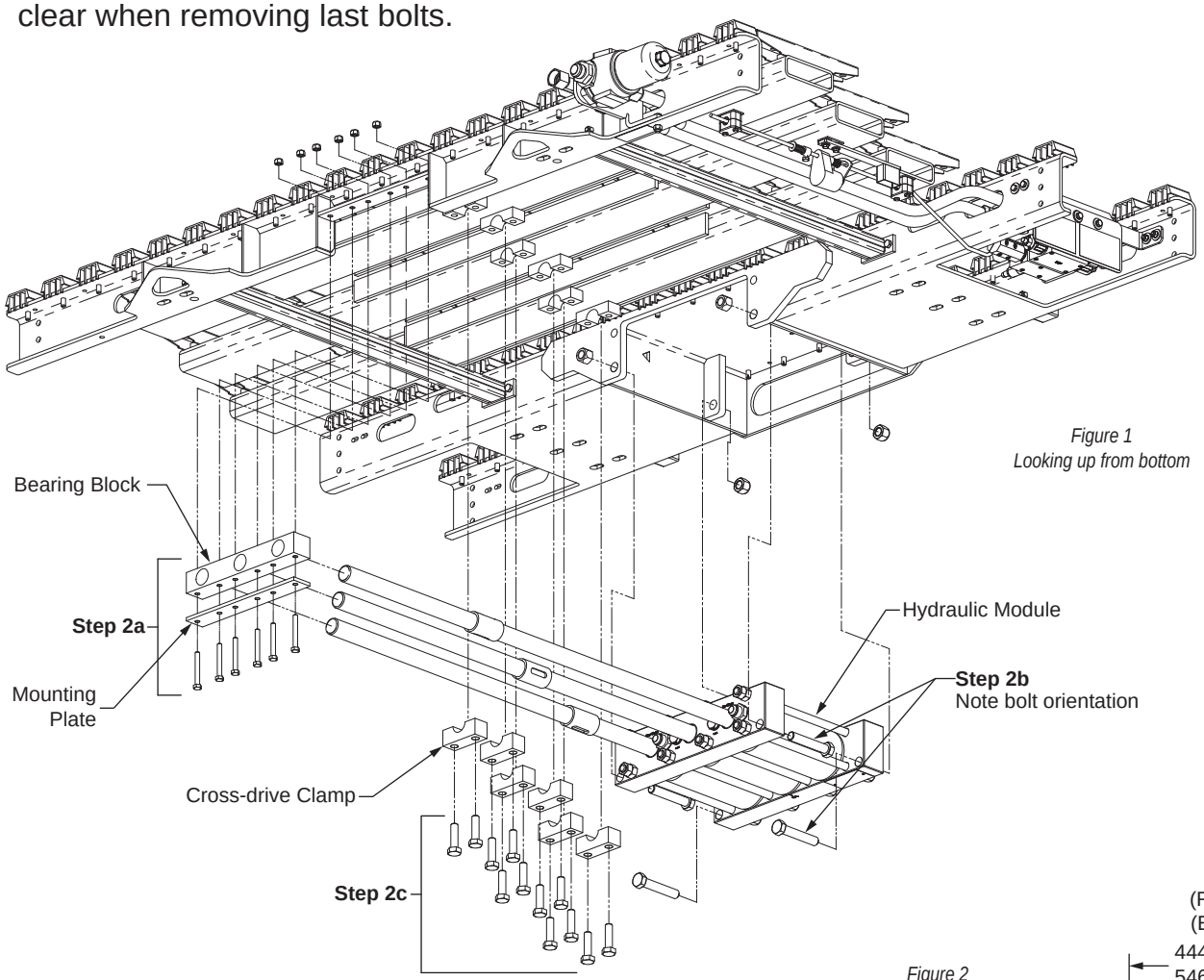


Figure 1
Looking up from bottom

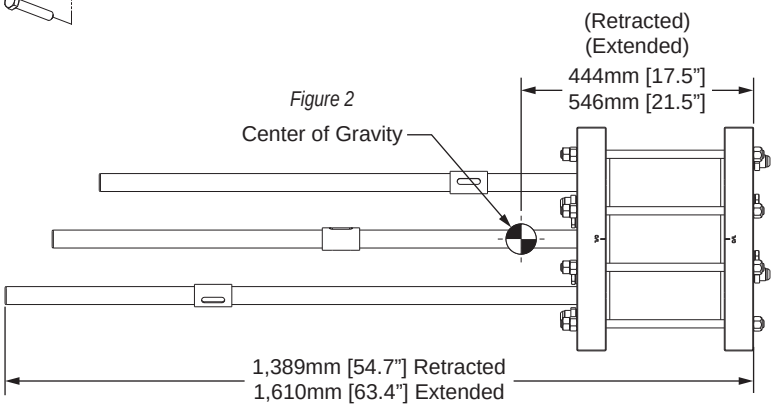


Figure 2

STEP 3 (Removing Switching Rod and Accelerator)

Note: When removing the switching rod you DO NOT need to loosen the rod stops or remove the accelerator motor and trigger. Hallco recommends keeping the stops tight so the system adjustment is not disturbed. Always check switching rod adjustment after reassembly.

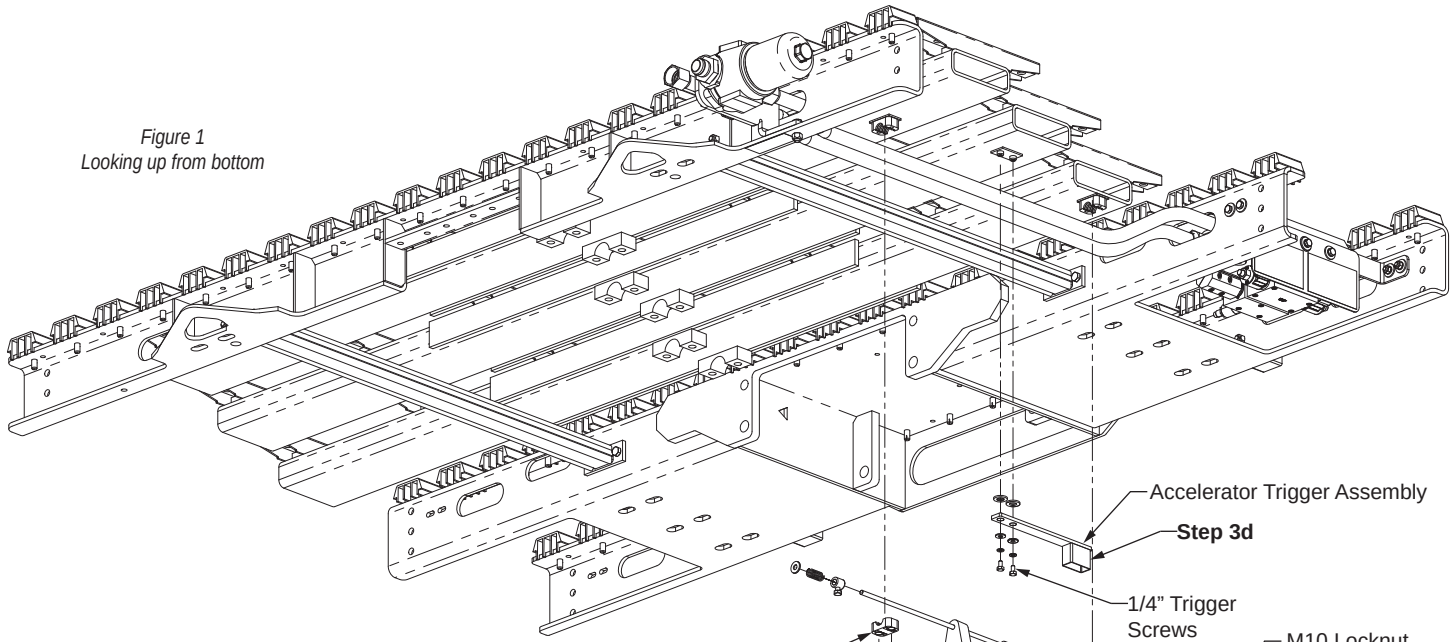
3a. Disconnect the Accelerator Motor Deutsch connector. This is the YELLOW marked wire connected near the Switching Valve Assembly.

3b. Remove the two (2) 1/4” bolts on the two (2) Switching Rod Guide Clamps.

3c. Remove the M10 nylon locking nut holding the Switching Rod inside the Pilot Spool Actuator.

3d. Optional - Remove the Acclerator Trigger Assembly by removing two (2) 1/4” screws.

Figure 1
Looking up from bottom



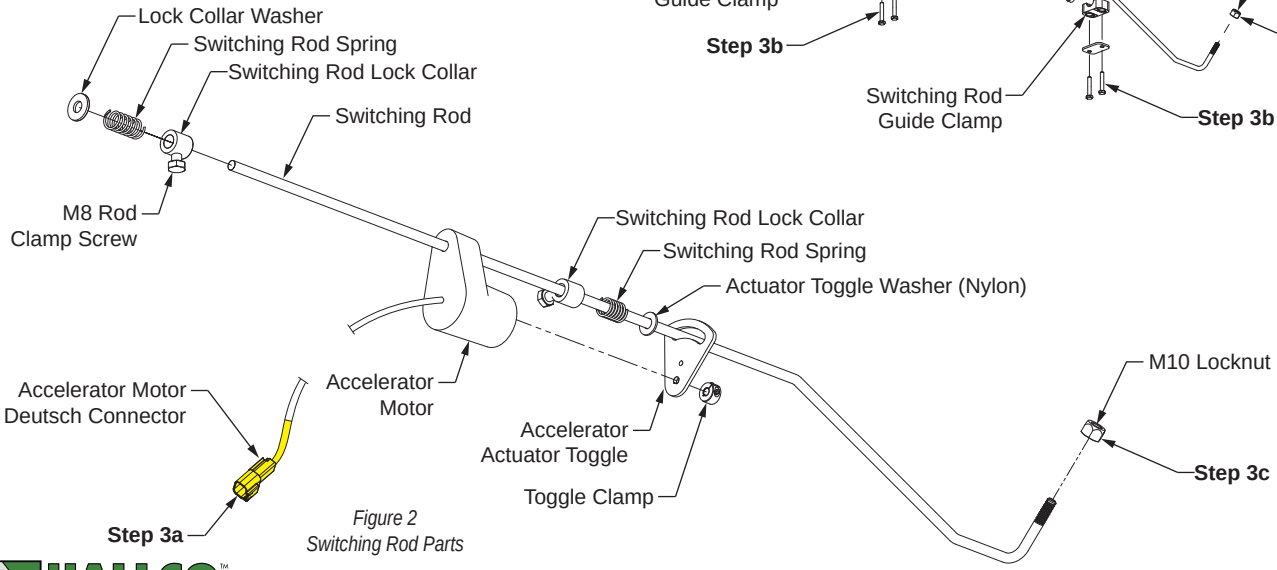


Figure 2
Switching Rod Parts

STEP 4 (Removing Pressure and Return Lines)

Note: When removing the hydraulics, be sure to catch all residual oil and plug lines when not in use to prevent contaminating with debris.

4a. Loosen the Return Line hydraulic tube nut from the Switching Valve assembly.

4b. Disconnect the two (2) M6 Hydraulic Clamp screws.

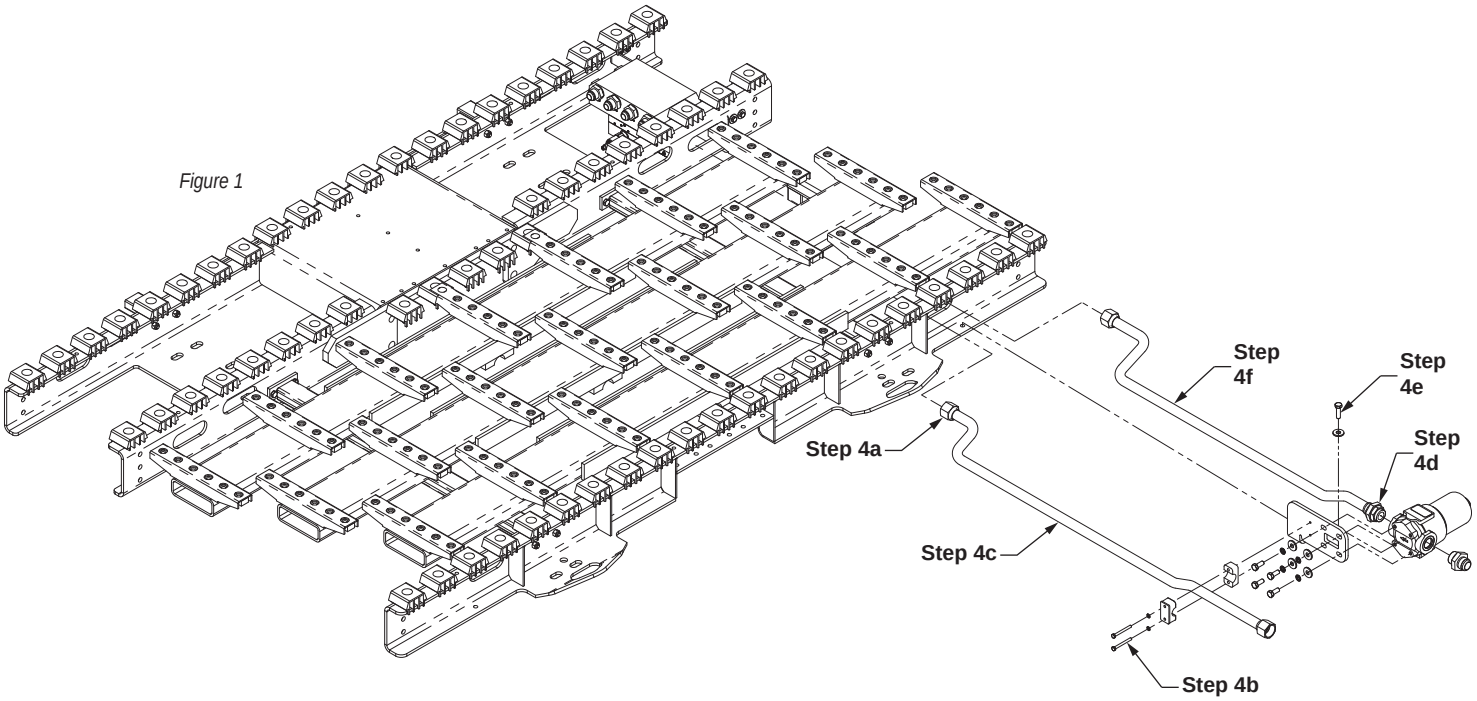
4c. Remove the Return Line and plug ends.

4d. Loosen the Pressure Line hydraulic tube nut from the filter assembly.

4e. Remove the one (1) M10 bolt and disconnect the Filter Assembly Bracket from the NEXUS™ frame. NOTE: You DO NOT need to disconnect the filter from the bracket. The filter and bracket can remain as a complete assembly.

4f. Remove the Pressure Line and plug ends.

Figure 1



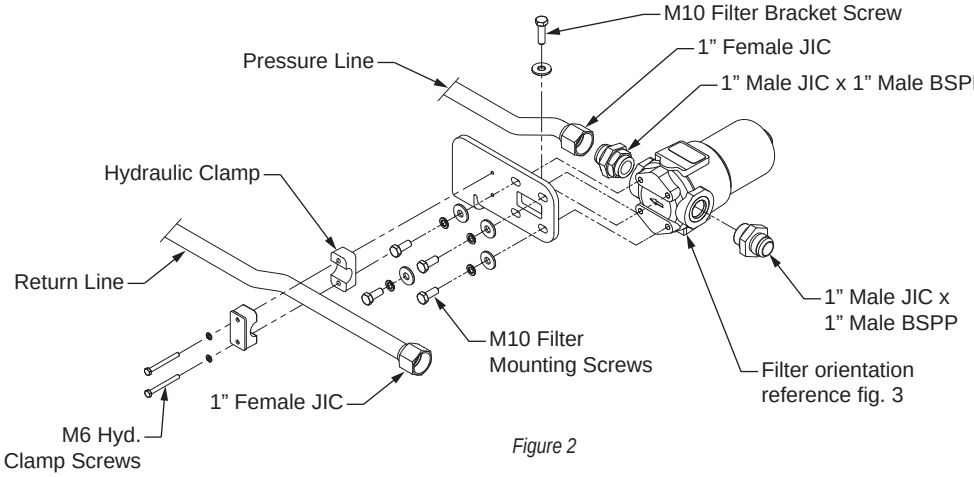


Figure 2

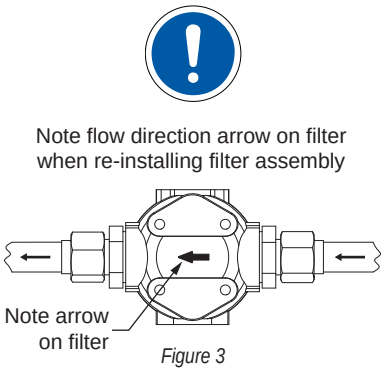


Figure 3

STEP 5 (Removing Switching Valve)

5a. Remove the four (4) M8 screws from the Switching Valve Mounting Bracket.

5b. Remove the outside two (2) M8 screws from the Switching Valve Decal Plate.

5c. Remove the center M8 screw from the Switching Valve Mounting Bracket.

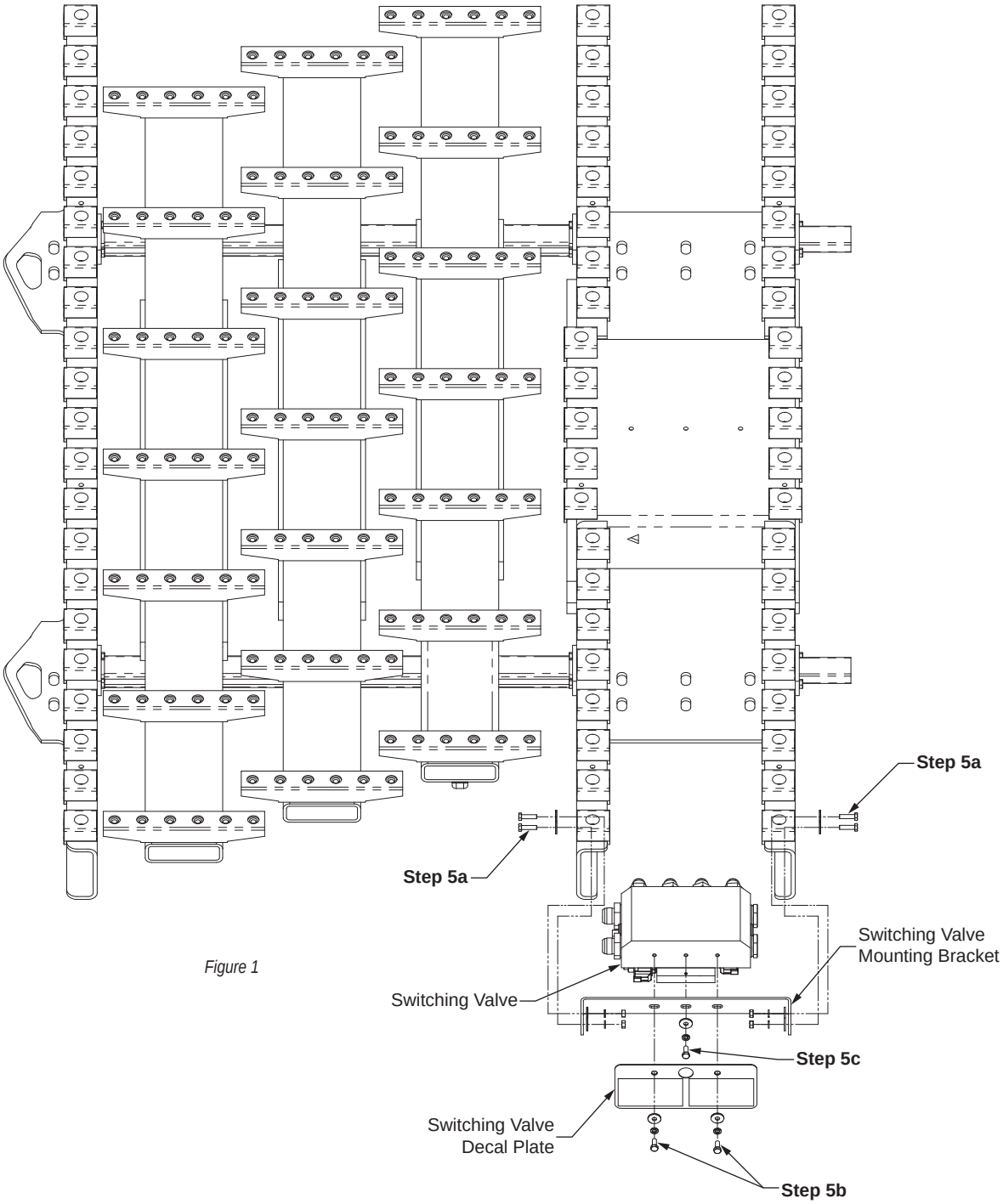


Figure 1

STEP 6 (Removing Slats)

6a. Remove four (4) (or six (6)) M12 slat bolts from nut bar under NEXUS™ shoe (fig. 1).

6b. Remove nut bar from NEXUS™ shoe (fig. 1).

6c. Slide slat out back of the trailer (fig. 2).

6d. Remove screws from Anti-lift block and pull up Easy Bearings off sub-deck (fig. 2).

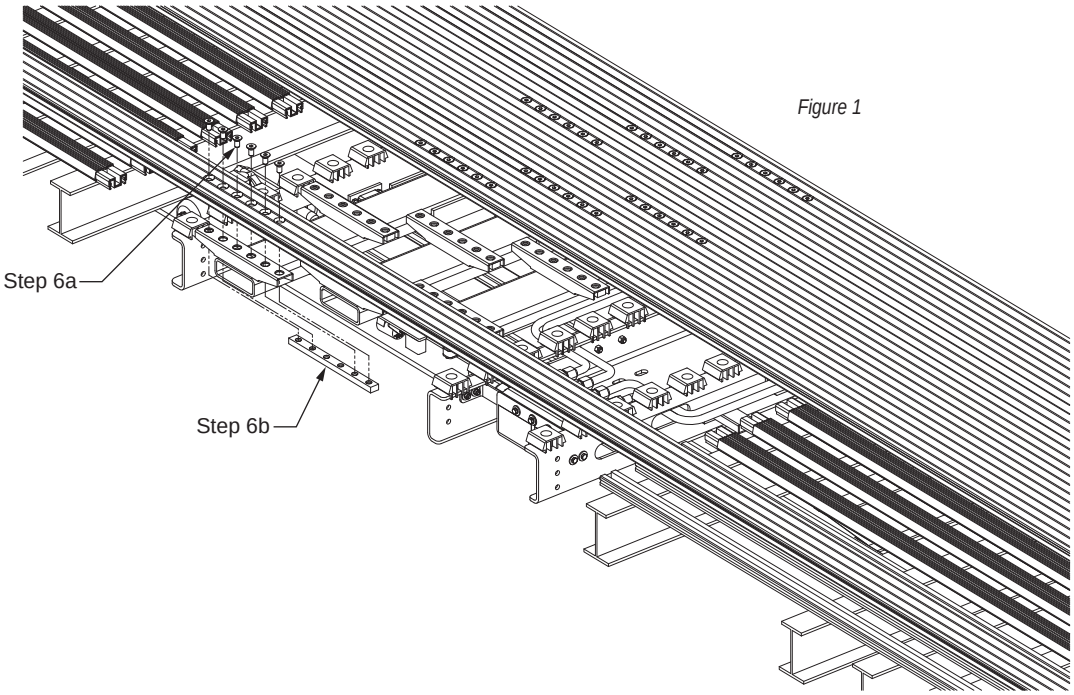


Figure 1

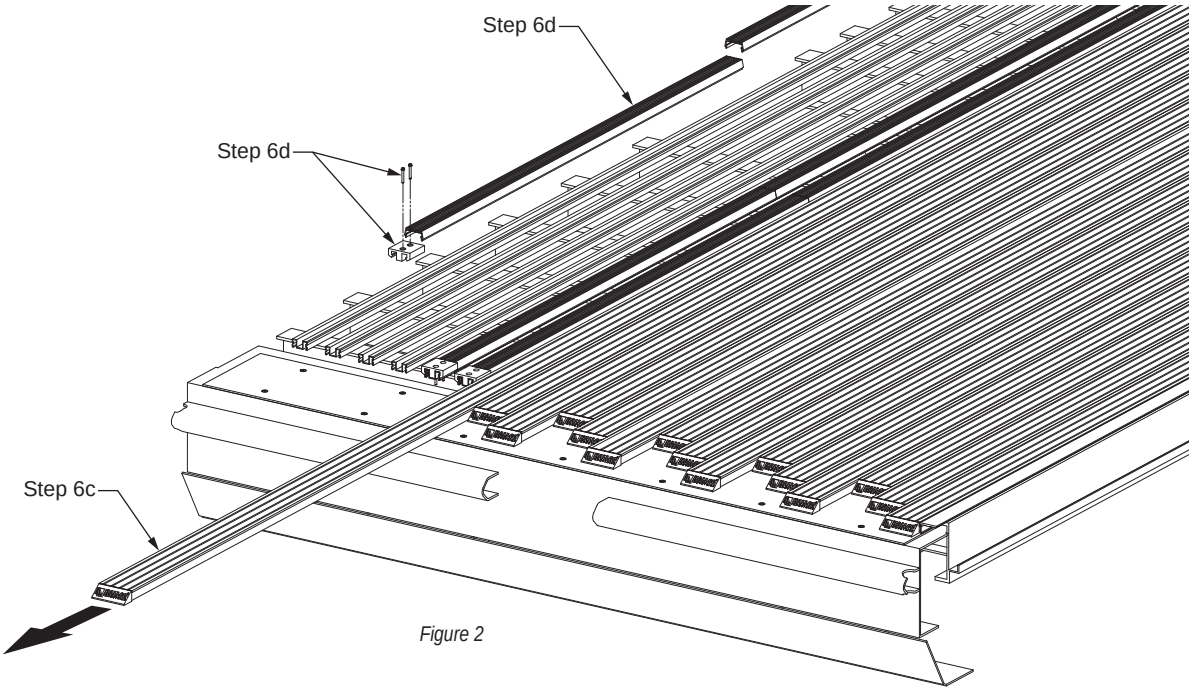


Figure 2

Recommended Spare Parts

Hallco recommends the following spare parts to be on hand to reduce the likelihood of machine downtime.

Contact your Hallco representative for a comprehensive spare parts list tailored to your specific NEXUS™ models, usage and fleet numbers.

For additional part level detail refer to the NEXUS™ disassembly instructions starting on page 31 and the Technical & Parts Drawings in Annex I.

Not all parts listed below will fit all NEXUS™ versions. Contact your Hallco representative for sales assistance.

Hallco P/N	Part Description	Notes
85-7312	Replacement Filter Element, FMM, 60 Micron SS Mesh	Filter element only
56-7679	Switching Valve Assembly, NEXUS, LH	Switching valve incl. spool, fittings and mounting hardware
56-7706	Switching Valve Assembly, NEXUS, RH	Switching valve incl. spool, fittings and mounting hardware
56-7355	Relief Valve	
60-7557	NEXUS Wander Lead, Wired	Pendant and cable
60-7494	NEXUS Keypad Module, 24V	
60-7556	Fuse, Mini ATC 2A	
56-6523	Cartridge Valve, No Solenoid	
56-7409	Solenoid Coil, 24VDC	
60-7459	Accelerator Assembly, NEXUS	
56-7596	Switching Rod Spring, 1.25" Free Length, Stainless	2 required per assembly

Disposal of Hydraulic Oil

Hydraulic oil damages the environment and contaminates water sources if it isn't disposed of correctly.

After each oil change or prior to dismantling the system. Transfer the hydraulic oil to a metal or thick plastic sealable storage container, such as a metal can or used oil container. Secure the container's lid tightly once all the hydraulic oil has been transferred.

Find a recycling center near you that accepts used motor oil. You can find this information online.

Hydraulic oil and motor oil can be mixed together for recycling purposes.
Do not mix used hydraulic oil with anything other than similar oils for recycling.

Recycling

The NEXUS™ system is primarily made of steel and aluminum with some plastic parts. Once system has reached its end of life Hallco recommends complete disassembly of the system and recycling as follows:

Frame, brackets, cross-drives, barrels and shafts are all carbon steel and should be taken to the nearest recycling center that accepts steel.

Slats, sub-decks, head, base, pistons and nut bars are all aluminium and should be taken to the nearest recycling center that accepts aluminum.

Switching valve manifolds and bodies are aluminum but contain non-removable stainless steel expansion plugs. Please notify your recycling center regarding acceptance of these parts.

Hydraulic tubes are stainless steel and should be cleaned and taken to the nearest recycling center that accepts stainless steel.

Frame bearings, Continuous Easy bearings, Flic-On bearings and are all HDPE plastics and should be taken to the nearest recycling center that accepts HDPE plastics.

Shaft bearing blocks are PTFE, contact nearest recylcling center for recycling options.

Hardware, fittings, springs, poppets and small parts vary by material use your best judgment regarding recycling.

Pressure washing and/or degreasing the components prior to recycling helps prevent cross-contamination and reduces the likelyhood of parts being rejected by the recycling center.

Maintenance Log

Use the maintenance logs to keep track of regular maintenance of your NEXUS™ system.

Service Date	Load Count	Service Performed	Mechanic Name	Inspected	Remarks

Maintenance Log (cont.)

Service Date	Load Count	Service Performed	Mechanic Name	Inspected	Remarks

Maintenance Log (cont.)

Service Date	Load Count	Service Performed	Mechanic Name	Inspected	Remarks

Maintenance Log (cont.)

Additional maintenance log pages available digitally. Contact your Hallco representative.

Service Date	Load Count	Service Performed	Mechanic Name	Inspected	Remarks

REVISIONS				
SHEET	ZONE	REV	DESCRIPTION	DATE
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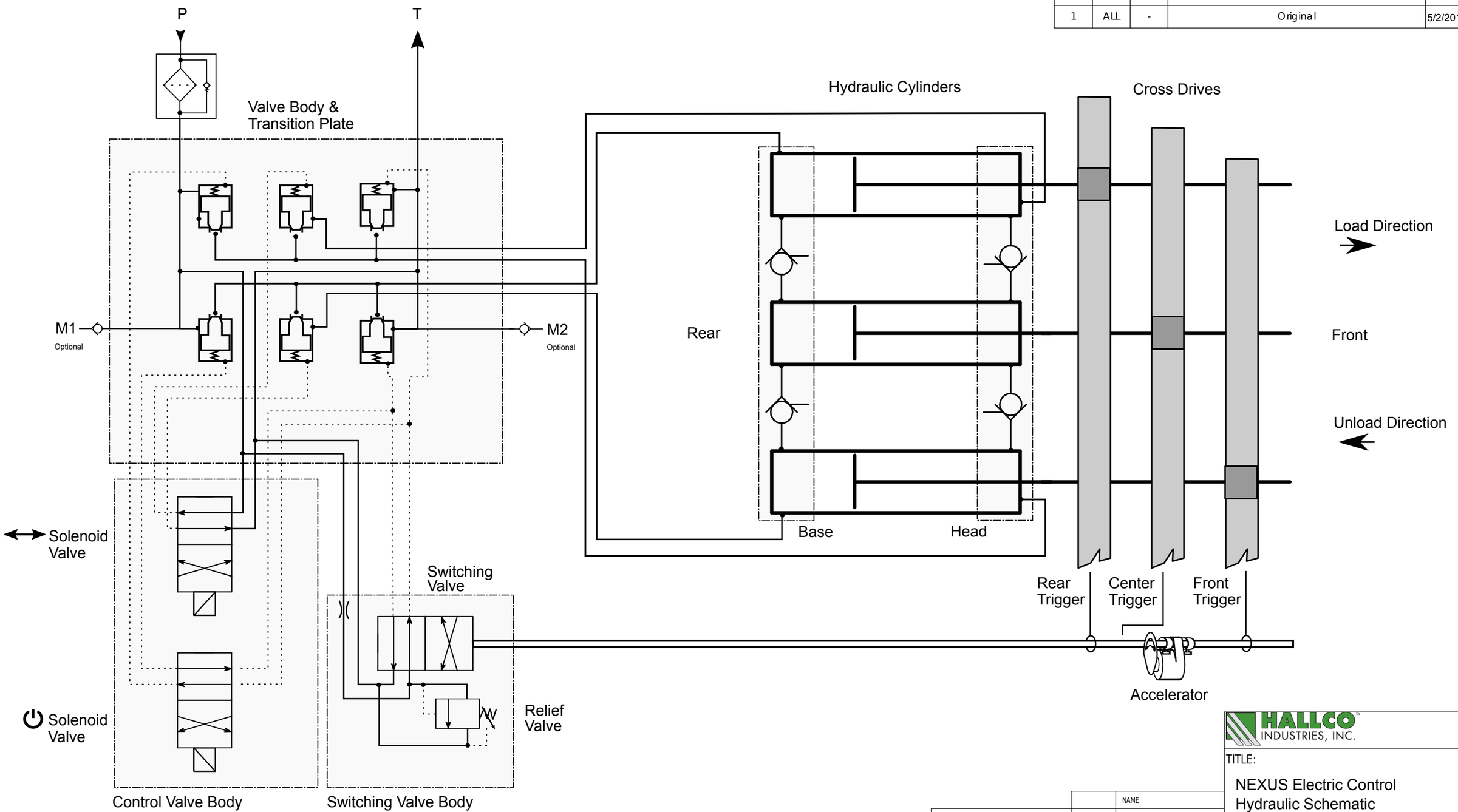


HALLCO INDUSTRIES, INC.

TITLE:

NEXUS Electric Control
Hydraulic Schematic

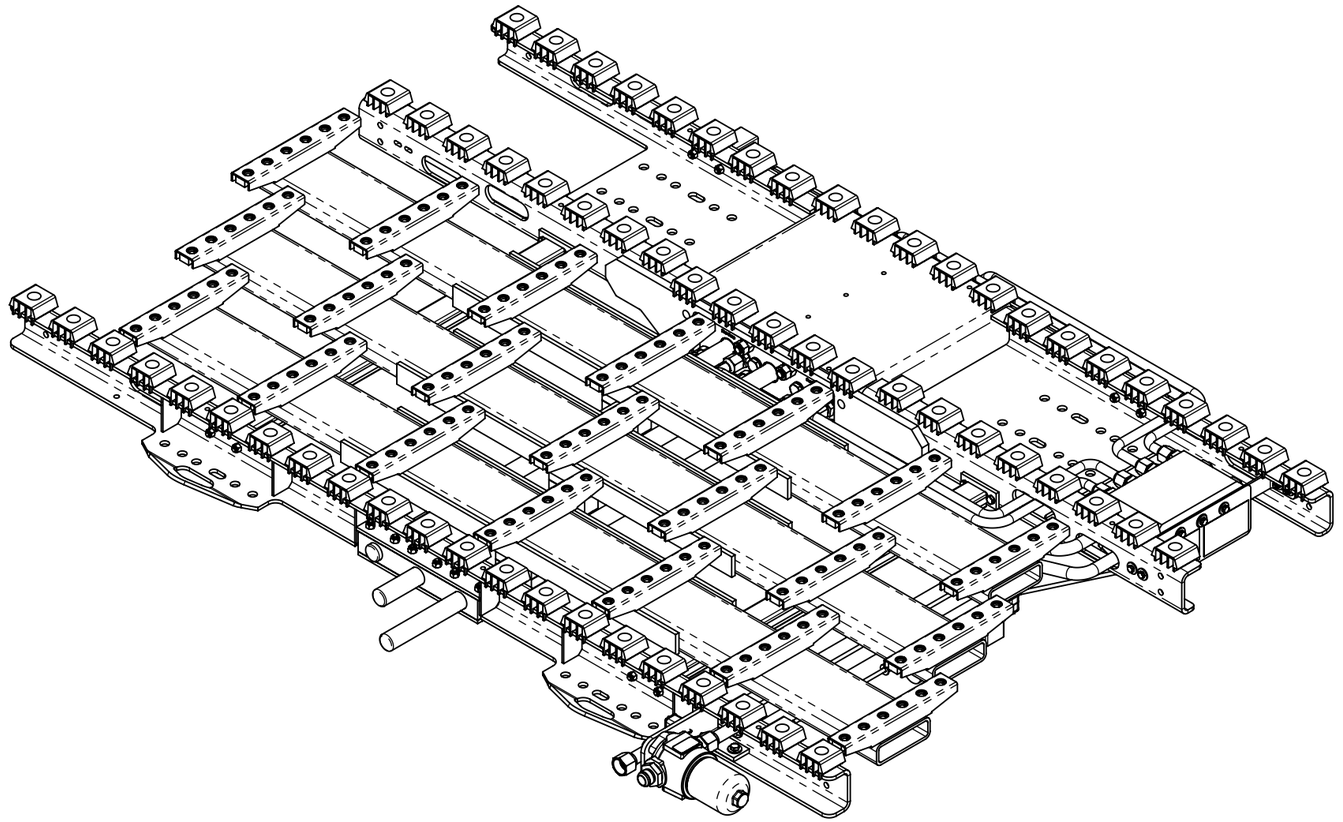
	NAME
DRAWN	TMB
CHECKED	
MFG APPR.	
APPROVED	
DATE	

SIZE	DWG. NO.	REV
B	99-7649	-

SCALE: 1:16 | 1 of 1

ITEM	QTY	PART #	DESCRIPTION
1	1	51-7627	Frame Assembly, NEXUS, 100mm, LH
2	1	49-7080	Hydraulic Module, NEXUS
3	4	81-7108	Cap Screw, Hex Head, M20-2.5 x 110, Partial Thread, DIN 931, Class 10.9, Zinc
4	4	81-7109	Locknut, Nylon Insert, M20-2.5, DIN 985, Class 10, Zinc
5	1	51-7605	NEXUS Bearing Block Mounting Plate - Coated
6	1	39-7053	NEXUS Bearing Block, Machined
7	6	81-7446	Cap Screw, Hex Head, M10-1.5 x 80, Partial Thread, DIN 931, Class 8.8, Zinc
8	7	81-7107	Locknut, Nylon Insert, M10-1.5, DIN 985, Class 8, Zinc
9	1	51-7604	Cross Drive, Set, NEXUS for 21 Slats 112mm Centers - Coated
10	1	56-7121	NEXUS Control Valve Assembly, LH
11	3	81-7104	Washer, Flat, Steel, M8, DIN 125, Zinc
12	3	81-7105	Washer, Split Lock, Steel, M8, DIN 127, Zinc
13	3	81-7096	Cap Screw, Hex Head, M8-1.25 x 20, Full Thread, DIN 933, A2-70, Stainless
14	1	85-7311	High Pressure Filter, FMM, w/ G1-11 BSPP ports, w/ 60 Micron SS Filter Element
15	4	81-7424	Washer, Flat, Steel, M10, DIN 125, Zinc
16	4	81-7269	Washer, Steel, Split Lock, M10, DIN 127, Zinc
17	4	81-7432	Cap Screw, Hex Head, M10-1.5 x 25, Full Thread, DIN 933, Class 8.8, Zinc
18	2	85-7316	Fitting, G1 w/Seal Washer x 1" Male JIC, Straight
19	1	85-3020	Hanger Assembly, Single - For 1" Hydraulic Tube / 3/4" Hydraulic Hose
20	2	81-7433	Washer, Split Lock, Steel, M6, DIN 127, Zinc
21	2	81-7433	Cap Screw, Hex Head, M6-1.0 x 60, Full Thread, DIN 933, Class 8.8, Zinc
22	1	85-7356	Hydraulic Tube Assy, NEXUS, Tube 1, LH
23	1	85-7357	Hydraulic Tube Assy, NEXUS, Tube 2, LH
24	1	85-7358	Hydraulic Tube Assy, NEXUS, Tube 3, LH
25	1	85-7359	Hydraulic Tube Assy, NEXUS, Tube 4, LH
26	1	85-7361	Hydraulic Tube Assy, NEXUS, Pressure Tube, LH
27	1	85-7360	Hydraulic Tube Assy, NEXUS, Return Tube, LH
28	1	51-7607	Switching Rod, NEXUS, 100mm - Coated
29	2	51-7251	Switching Rod Lock Collar - Metric
30	2	81-7445	Cap Screw, Hex Head, M8-1.25 x 12, Full Thread, DIN 933, Class 8.8, Zinc
31	2	56-7596	Spring, S-771, Compression, 1.25" Free Length, .625" O.D. Ø.063", Stainless
32	1	81-7680	Washer, .340" I.D. x .740" O.D. x .05"-.07" Thick
33	1	81-4410	5/16 USS Flat Washer
34	1	60-7459	Electric Accelerator Actuator Assy
35	1	51-7704	NEXUS Accelerator Trigger Assy
36	63	39-7274	Bearing, NEXUS, 65mm, Bolted
37	63	81-7283	Self-Tapping Screw, M10-1.5 x 30mm, Hex Washer Head, DIN 7500D, Zinc
38	1	51-7525	Decal Plate, NEXUS Switching Valve
39	1	99-7500	Decal, NEXUS, Electric Control Valve Operation, EN-DE-NL, 3x5
40	1	99-7498	Decal, NEXUS, Danger Symbols, EN-DE-NL, 3x5
41	1	99-7502	Decal, NEXUS, Pressure-Tank, RH, 1.5x4

REVISIONS			
ZONE	REV.	DESCRIPTION	DATE
ALL	-	Initial Release	05-28-2019



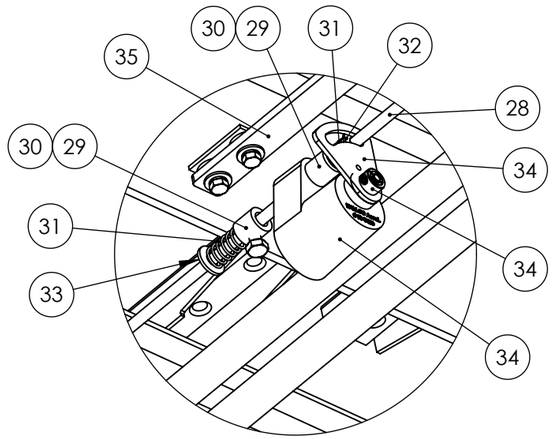
Engineering Notes:
1. Dry weight as shown: 412kg [909 lbs]

HALLCO™ INDUSTRIES, INC.

TITLE:
CDU, NEXUS, 100mm, 21 Slat, Electric, LH

SIZE	PART NUMBER	REV
B	52-7376	-

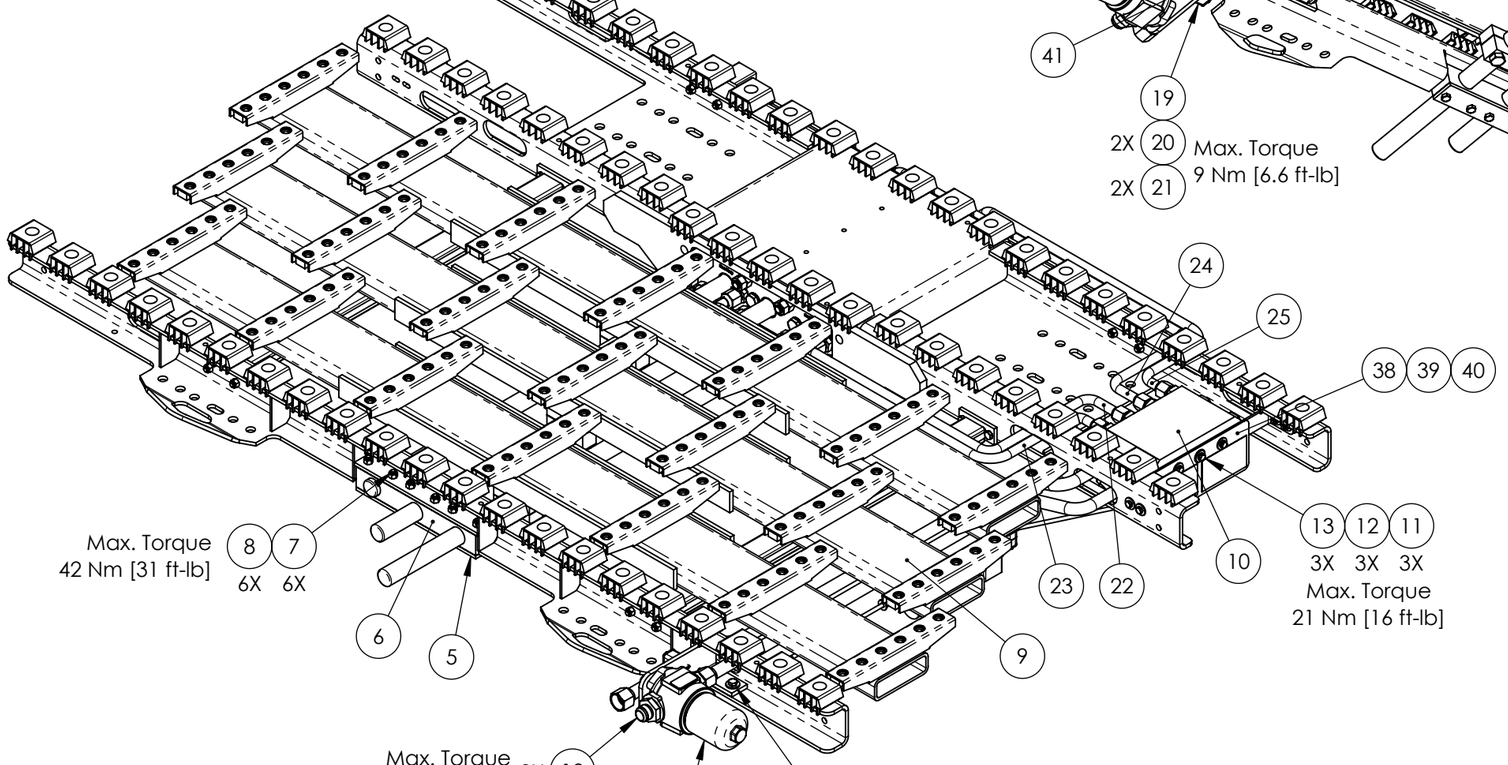
SCALE: 1:24 | 1OF3



DETAIL A
Accelerator Assy

Thread Forming Torque:
14-19 NM [10-14 ft-lb]
Max. Re-install Torque
45 Nm [33 ft-lb]

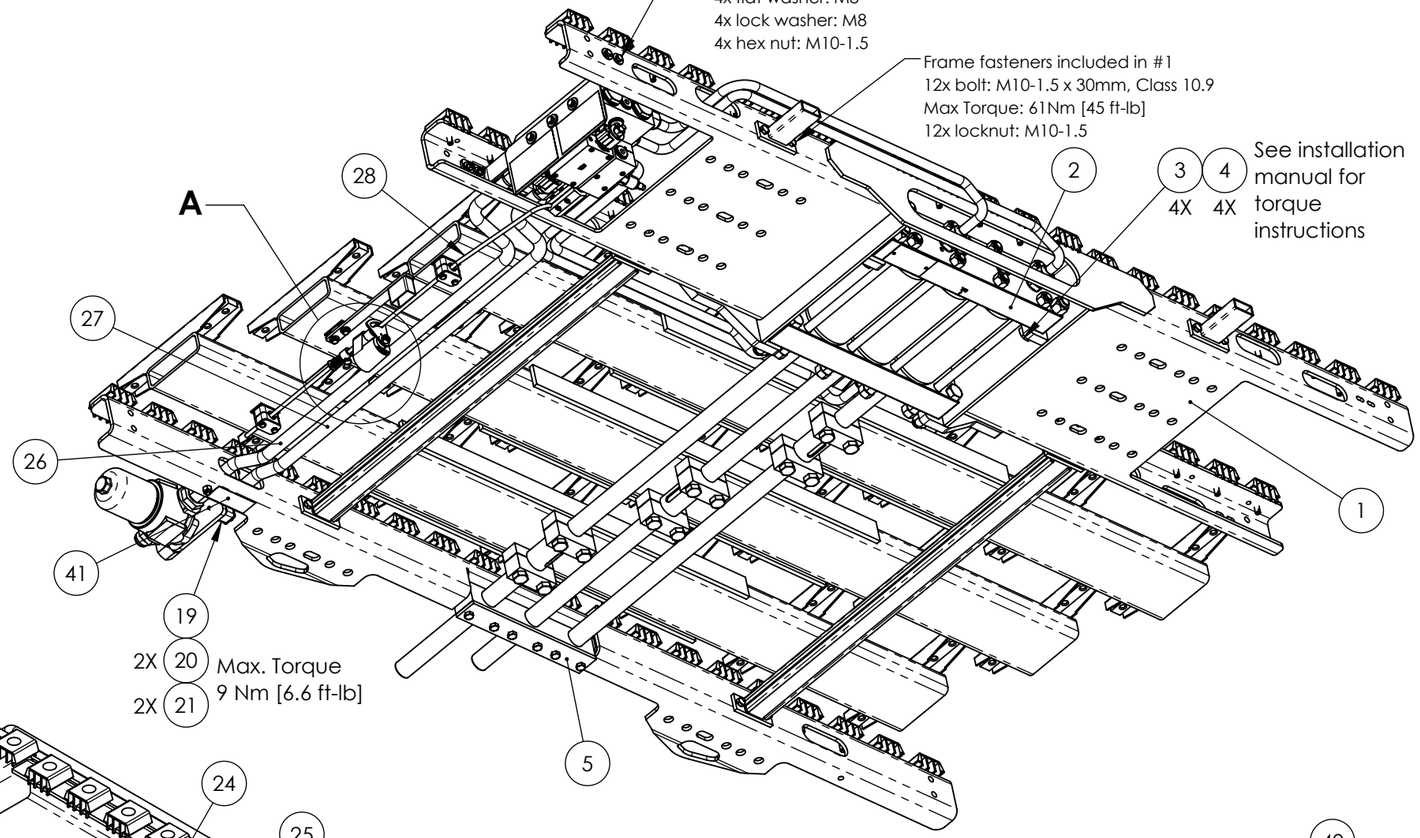
36 37
63X 63X

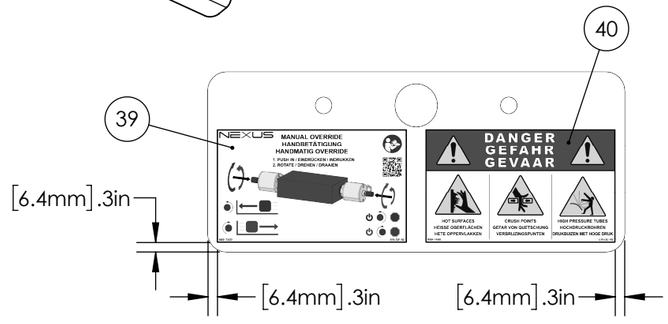


Bracket fasteners included in #1
1x bolt: M10-1.5 x 35mm
Max. Torque: 42Nm [31 ft-lb]
1x flat washer: M10
1x locknut: M10-1.5

Bracket fasteners included in #1
4x bolt: M8-1.25 x 30mm
Max Torque: 16Nm [21 ft-lb]
4x flat washer: M8
4x lock washer: M8
4x hex nut: M10-1.5

Frame fasteners included in #1
12x bolt: M10-1.5 x 30mm, Class 10.9
Max Torque: 61Nm [45 ft-lb]
12x locknut: M10-1.5





Safety Decal Locations

HALLCO™ INDUSTRIES, INC.

TITLE:
CDU, NEXUS, 100mm, 21 Slat, Electric, LH

SIZE	PART NUMBER	REV
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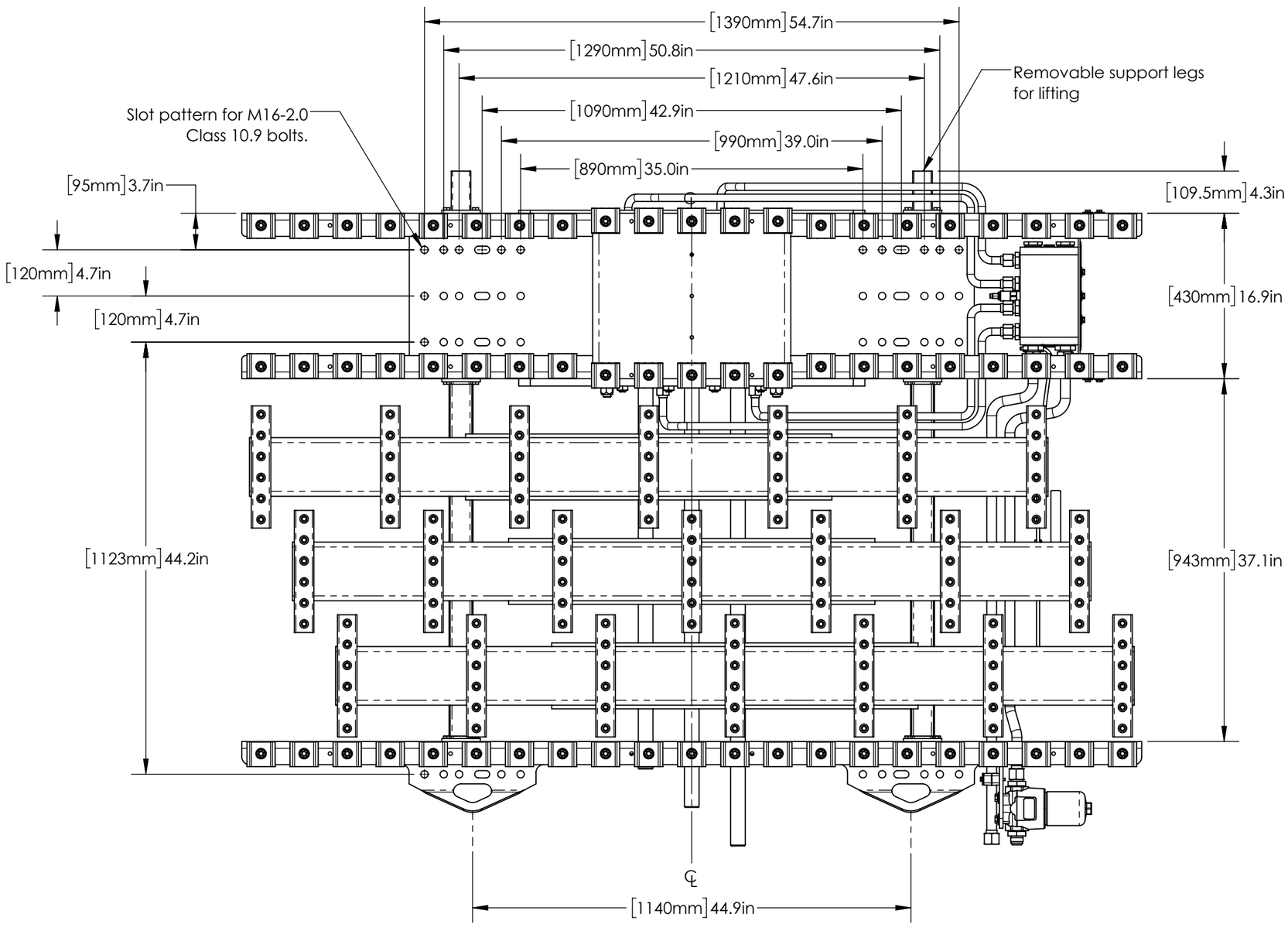
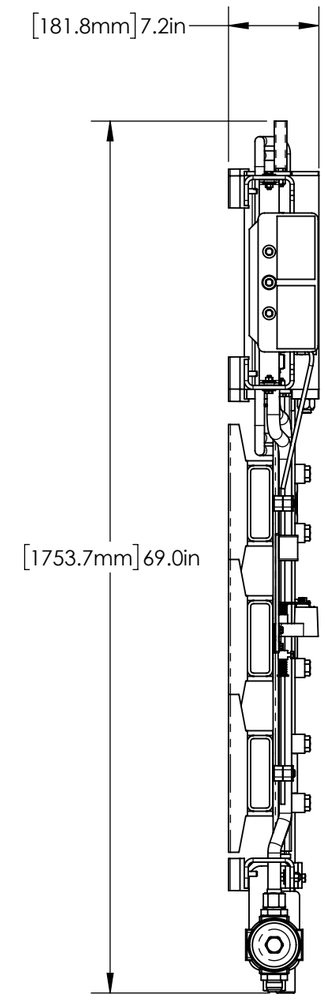
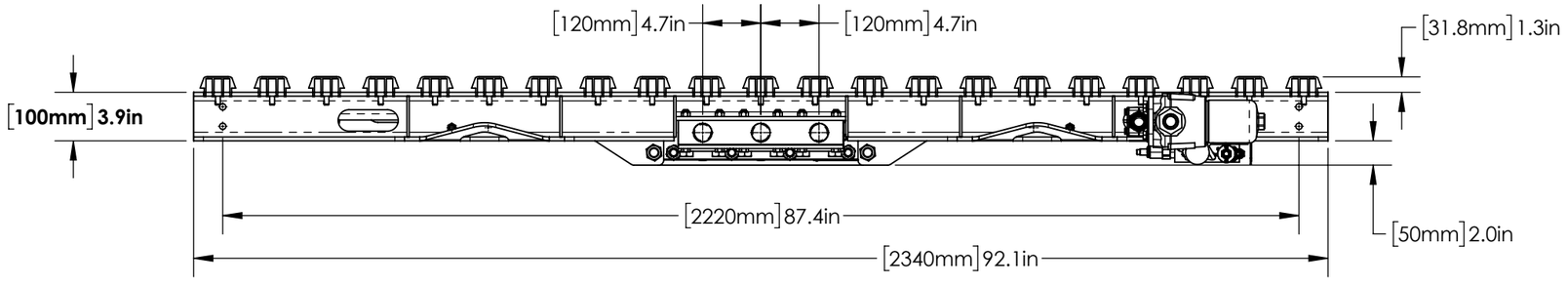
SCALE: 1:24 | 2OF3







Left hand configuration shown.
Right hand configuration optional.

HALLCO™ INDUSTRIES, INC.

TITLE:
CDU, NEXUS, 100mm, 21 Slat, Electric, LH

SIZE	PART NUMBER	REV
B	52-7376	-

SCALE: 1:24 | 3OF3

ITEM	QTY	PART #	DESCRIPTION
1	1	51-7628	Frame Assembly, NEXUS, 100mm, RH
2	1	49-7080	Hydraulic Module, NEXUS
3	4	81-7108	Cap Screw, Hex Head, M20-2.5 x 110, Partial Thread, DIN 931, Class 10.9, Zinc
4	4	81-7109	Locknut, Nylon Insert, M20-2.5, DIN 985, Class 10, Zinc
5	1	51-7605	NEXUS Bearing Block Mounting Plate - Coated
6	1	39-7053	NEXUS Bearing Block, Machined
7	6	81-7446	Cap Screw, Hex Head, M10-1.5 x 80, Partial Thread, DIN 931, Class 8.8, Zinc
8	7	81-7107	Locknut, Nylon Insert, M10-1.5, DIN 985, Class 8, Zinc
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10	1	56-7022	NEXUS Control Valve Assembly, RH
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12	3	81-7105	Washer, Split Lock, Steel, M8, DIN 127, Zinc
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16	4	81-7269	Washer, Steel, Split Lock, M10, DIN 127, Zinc
17	4	81-7432	Cap Screw, Hex Head, M10-1.5 x 25, Full Thread, DIN 933, Class 8.8, Zinc
18	2	85-7316	Fitting, G1 w/Seal Washer x 1" Male JIC, Straight
19	1	85-3020	Hanger Assembly, Single - For 1" Hydraulic Tube / 3/4" Hydraulic Hose
20	2	81-7433	Washer, Split Lock, Steel, M6, DIN 127, Zinc
21	2	81-7433	Cap Screw, Hex Head, M6-1.0 x 60, Full Thread, DIN 933, Class 8.8, Zinc
22	1	85-7016	Hydraulic Tube Assy, NEXUS, Tube 1, RH
23	1	85-7013	Hydraulic Tube Assy, NEXUS, Tube 2, RH
24	1	85-7017	Hydraulic Tube Assy, NEXUS, Tube 3, RH
25	1	85-7018	Hydraulic Tube Assy, NEXUS, Tube 4, RH
26	1	85-7031	Hydraulic Tube Assy, NEXUS, Return Tube, RH
27	1	85-7032	Hydraulic Tube Assy, NEXUS, Pressure Tube, RH
28	1	51-7607	Switching Rod, NEXUS, 100mm - Coated
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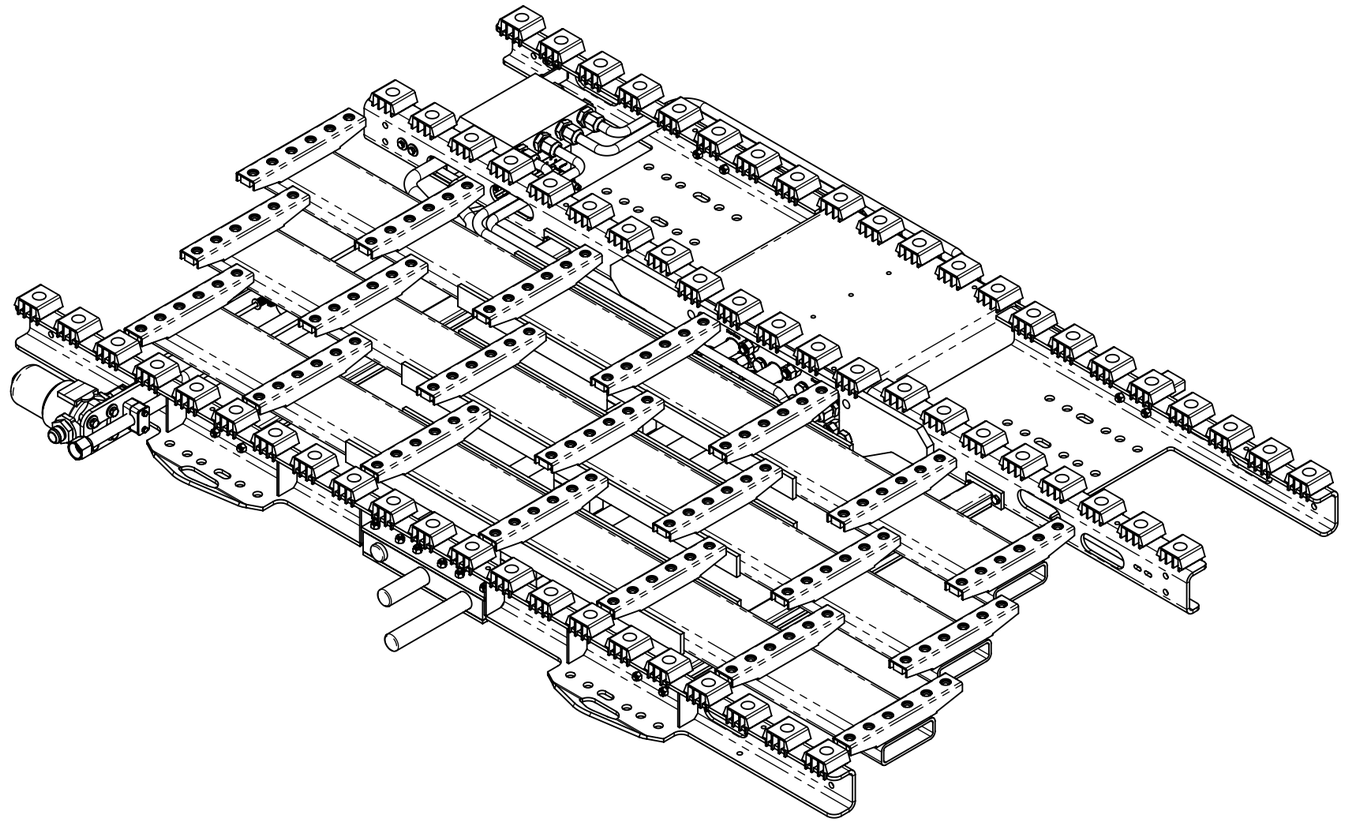
40	1	99-7498	Decal, NEXUS, Danger Symbols, EN-DE-NL, 3x5
41	1	99-7502	Decal, NEXUS, Pressure-Tank, RH, 1.5x4

REVISIONS			
ZONE	REV.	DESCRIPTION	DATE
ALL	-	Initial Release	05-28-2019



Engineering Notes:

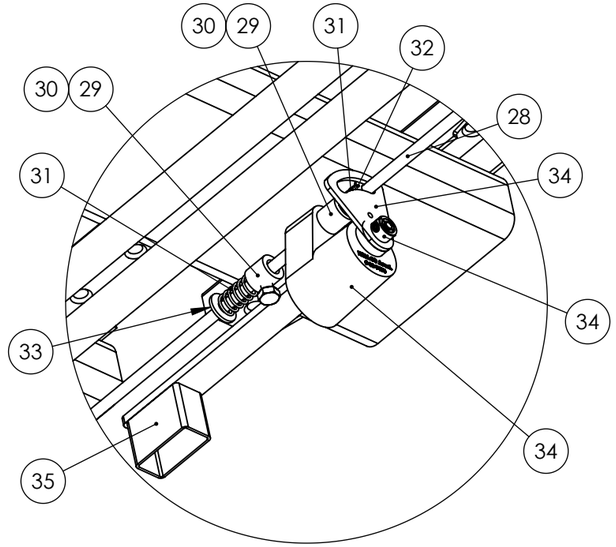
1. Dry weight as shown: 412kg [909 lbs]

HALLCO™ INDUSTRIES, INC.

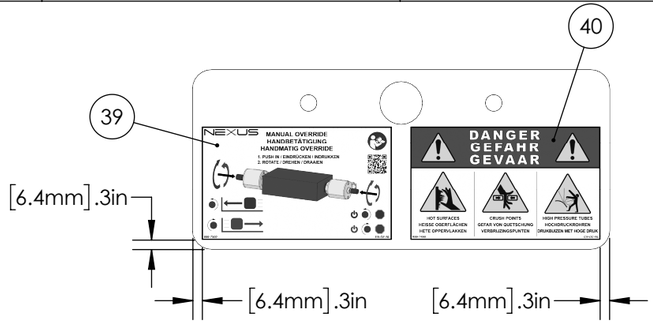
TITLE:
CDU, NEXUS, 100mm, 21 Slat, Electric, RH

SIZE	PART NUMBER	REV
B	52-7377	-

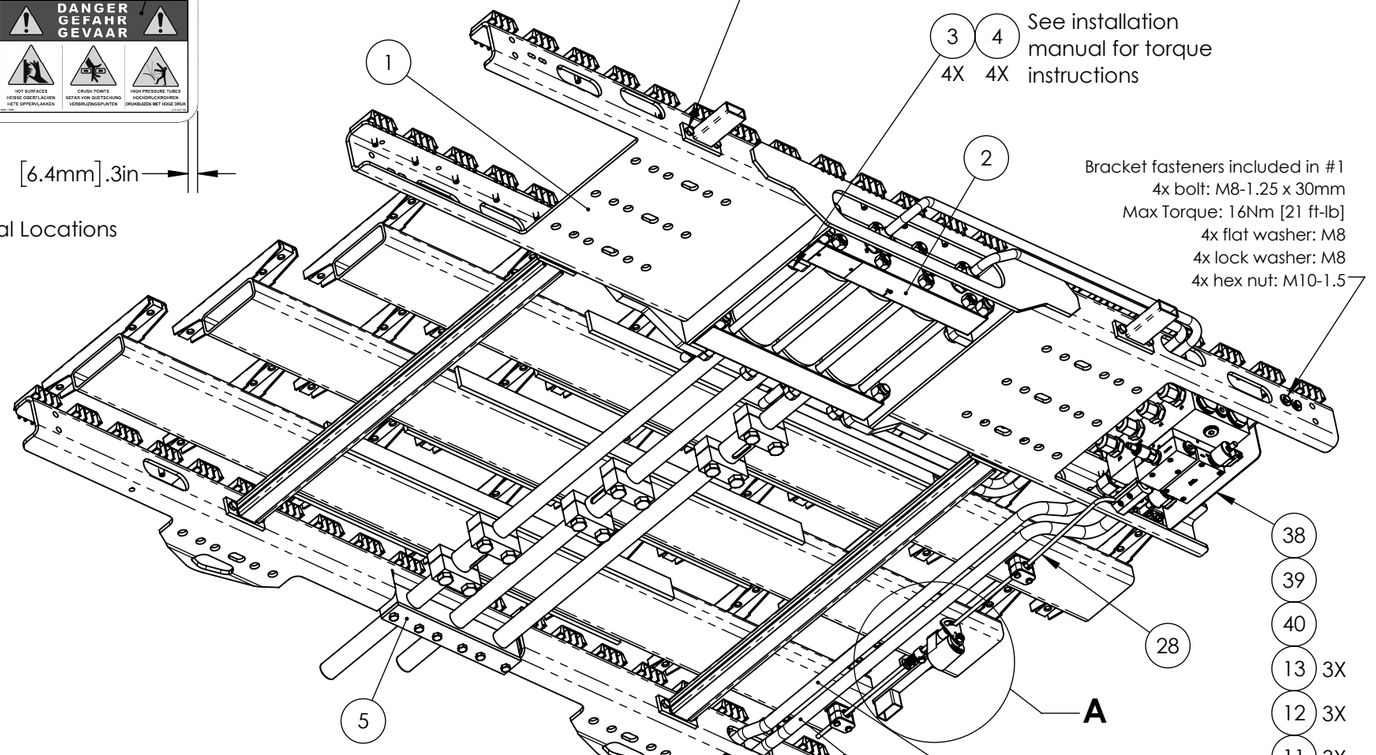
SCALE: 1:24 | 1OF3

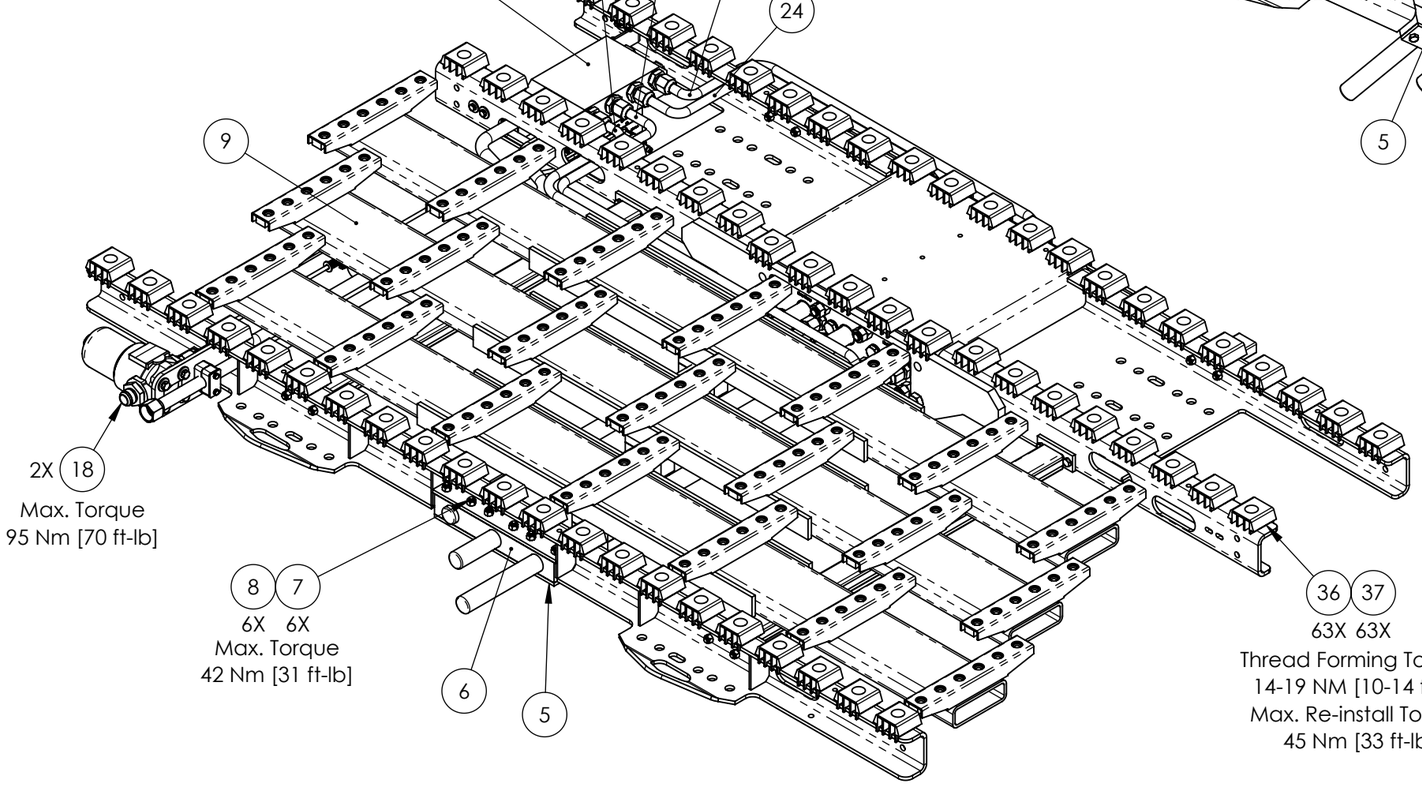


DETAIL A
Accelerator Assy



Safety Decal Locations



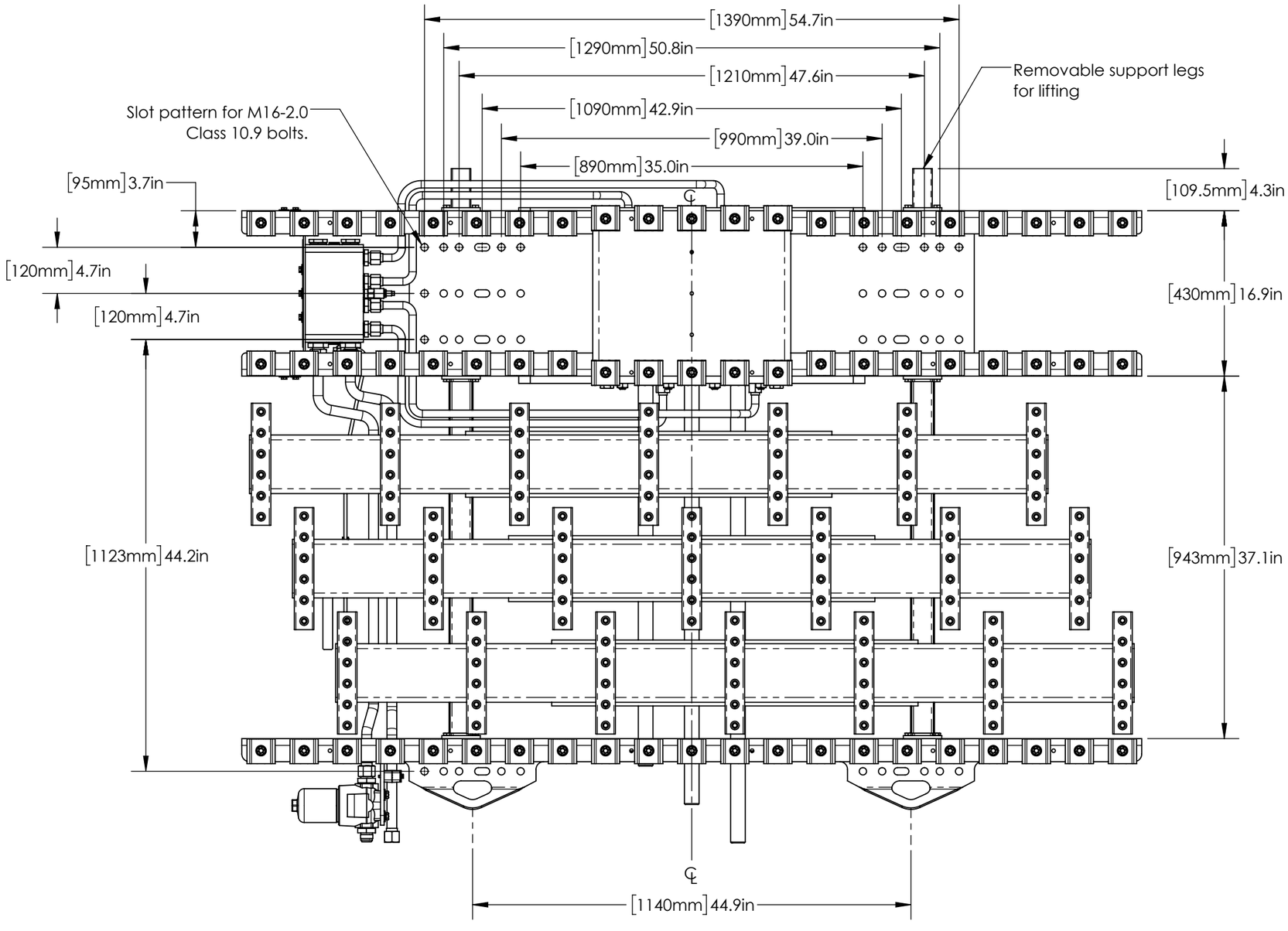


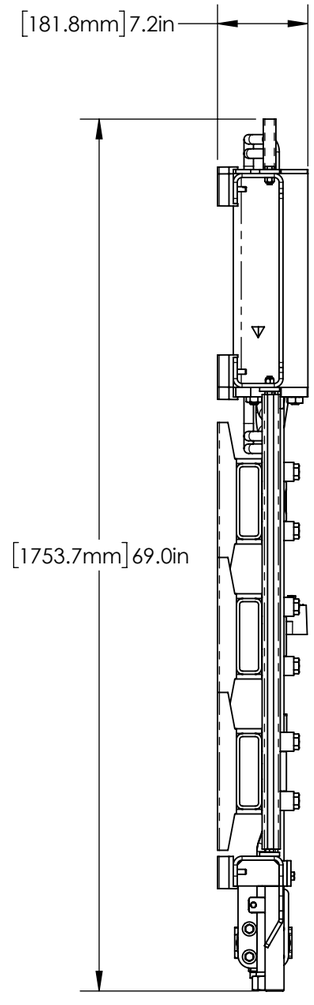
HALLCO INDUSTRIES, INC.

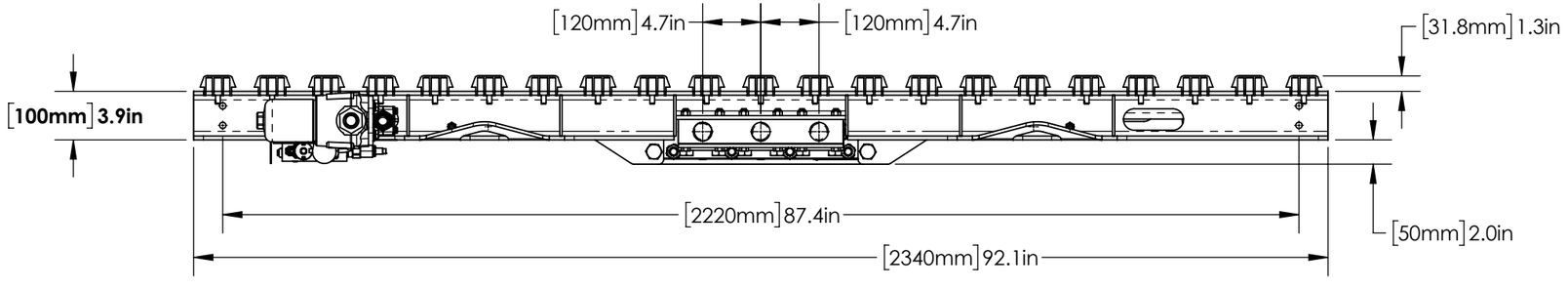
TITLE:
CDU, NEXUS, 100mm, 21 Slat, Electric, RH

SIZE	PART NUMBER	REV
B	52-7377	-

SCALE: 1:24 | 2OF3







Right hand configuration shown.
Left hand configuration optional.

HALLCO INDUSTRIES, INC.

TITLE:
CDU, NEXUS, 100mm, 21 Slat, Electric, RH

SIZE	PART NUMBER	REV
B	52-7377	-

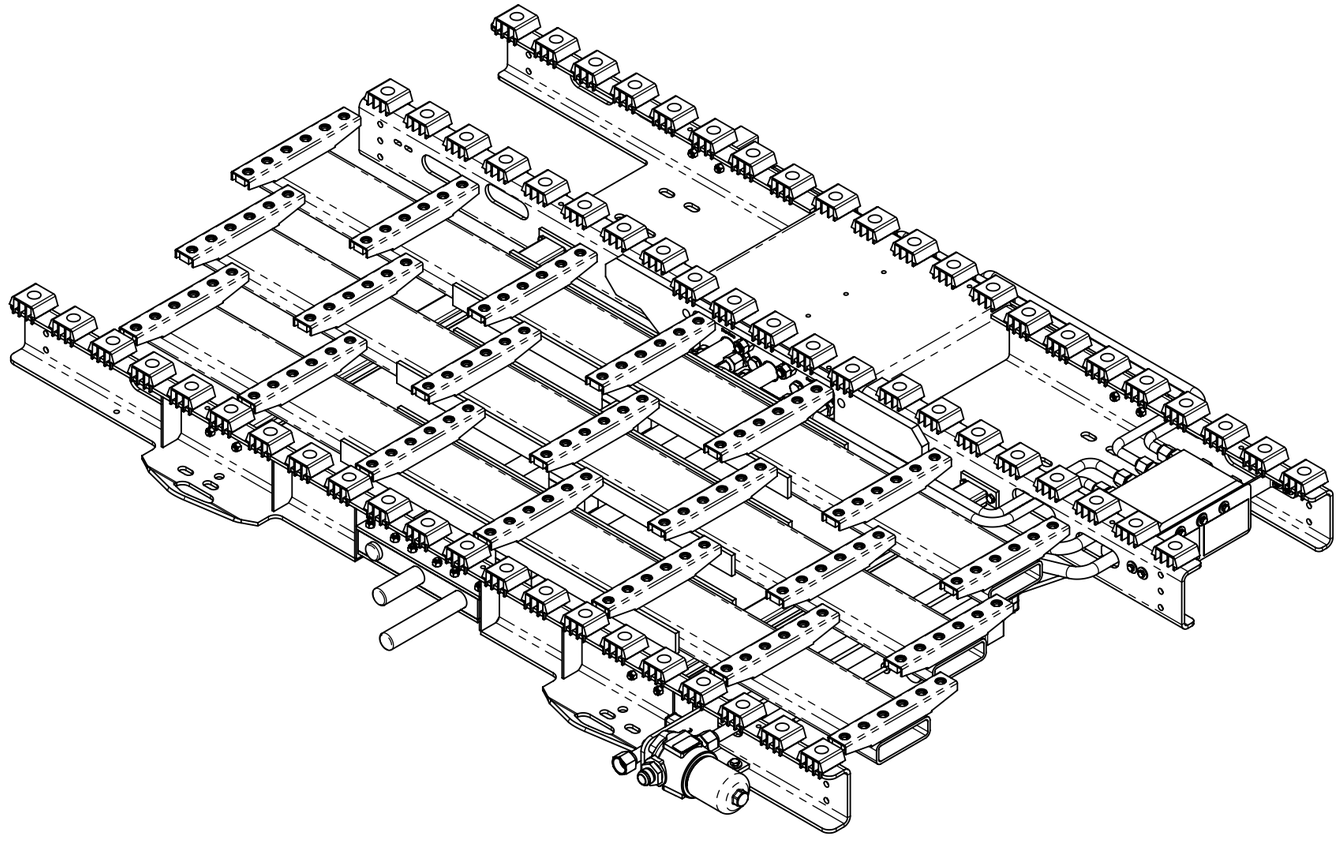
SCALE: 1:24

BOM Table

ITEM	QTY	PART #	DESCRIPTION
1	1	51-7629	Frame Assembly, NEXUS, 140mm, LH
2	1	49-7080	Hydraulic Module, NEXUS
3	4	81-7108	Cap Screw, Hex Head, M20-2.5 x 110, Partial Thread, DIN 931, Class 10.9, Zinc
4	4	81-7109	Locknut, Nylon Insert, M20-2.5, DIN 985, Class 10, Zinc
5	1	51-7605	NEXUS Bearing Block Mounting Plate - Coated
6	1	39-7053	NEXUS Bearing Block, Machined
7	6	81-7446	Cap Screw, Hex Head, M10-1.5 x 80, Partial Thread, DIN 931, Class 8.8, Zinc
8	7	81-7107	Locknut, Nylon Insert, M10-1.5, DIN 985, Class 8, Zinc
9	1	51-7604	Cross Drive, Set, NEXUS for 21 Slats 112mm Centers - Coated
10	1	56-7121	NEXUS Control Valve Assembly, LH
11	3	81-7104	Washer, Flat, Steel, M8, DIN 125, Zinc
12	3	81-7105	Washer, Split Lock, Steel, M8, DIN 127, Zinc
13	3	81-7096	Cap Screw, Hex Head, M8-1.25 x 20, Full Thread, DIN 933, A2-70, Stainless
14	1	85-7311	High Pressure Filter, FMM, w/ G1-11 BSPP ports, w/ 60 Micron SS Filter Element
15	4	81-7424	Washer, Flat, Steel, M10, DIN 125, Zinc
16	4	81-7269	Washer, Steel, Split Lock, M10, DIN 127, Zinc
17	4	81-7432	Cap Screw, Hex Head, M10-1.5 x 25, Full Thread, DIN 933, Class 8.8, Zinc
18	2	85-7316	Fitting, G1 w/Seal Washer x 1" Male JIC, Straight
19	1	85-3020	Hanger Assembly, Single - For 1" Hydraulic Tube / 3/4" Hydraulic Hose
20	2	81-7433	Washer, Split Lock, Steel, M6, DIN 127, Zinc
21	2	81-7433	Cap Screw, Hex Head, M6-1.0 x 60, Full Thread, DIN 933, Class 8.8, Zinc
22	1	85-7356	Hydraulic Tube Assy, NEXUS, Tube 1, LH
23	1	85-7357	Hydraulic Tube Assy, NEXUS, Tube 2, LH
24	1	85-7358	Hydraulic Tube Assy, NEXUS, Tube 3, LH
25	1	85-7359	Hydraulic Tube Assy, NEXUS, Tube 4, LH
26	1	85-7361	Hydraulic Tube Assy, NEXUS, Pressure Tube, LH
27	1	85-7360	Hydraulic Tube Assy, NEXUS, Return Tube, LH
28	1	51-7560	Switching Rod, NEXUS, 140mm
29	2	51-7251	Switching Rod Lock Collar - Metric
30	2	81-7445	Cap Screw, Hex Head, M8-1.25 x 12, Full Thread, DIN 933, Class 8.8, Zinc
31	2	56-7596	Spring, S-771, Compression, 1.25" Free Length, .625" O.D. Ø.063", Stainless
32	1	81-7680	Washer, .340" I.D. x .740" O.D. x .05"-.07" Thick
33	1	81-4410	5/16 USS Flat Washer
34	1	60-7459	Electric Accelerator Actuator Assy
35	1	51-7704	NEXUS Accelerator Trigger Assy
36	63	39-7274	Bearing, NEXUS, 65mm, Bolted
37	63	81-7283	Self-Tapping Screw, M10-1.5 x 30mm, Hex Washer Head, DIN 7500D, Zinc
38	1	51-7525	Decal Plate, NEXUS Switching Valve
39	1	99-7500	Decal, NEXUS, Electric Control Valve Operation, EN-DE-NL, 3x5
40	1	99-7498	Decal, NEXUS, Danger Symbols, EN-DE-NL, 3x5
41	1	99-7502	Decal, NEXUS, Pressure-Tank, RH, 1.5x4

REVISIONS

ZONE	REV.	DESCRIPTION	DATE
ALL	-	Initial Release	05-28-2019



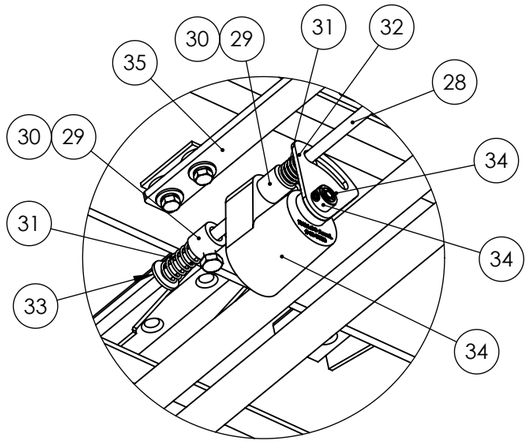
Engineering Notes:
1. Dry weight as shown: 427kg [942 lbs]

HALLCO™ INDUSTRIES, INC.

TITLE:
CDU, NEXUS, 140mm, 21 Slat, Electric, LH

SIZE	PART NUMBER	REV
B	52-7388	-

SCALE: 1:24 | 1OF3



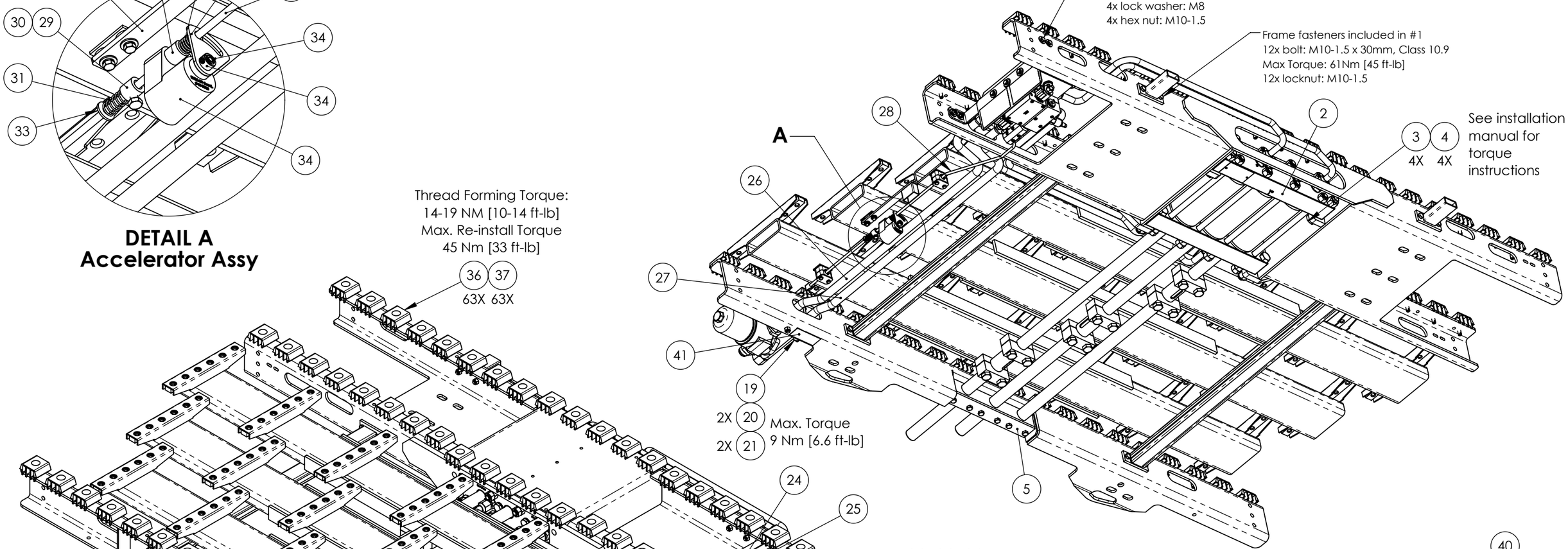
DETAIL A
Accelerator Assy

Thread Forming Torque:
14-19 NM [10-14 ft-lb]
Max. Re-install Torque
45 Nm [33 ft-lb]

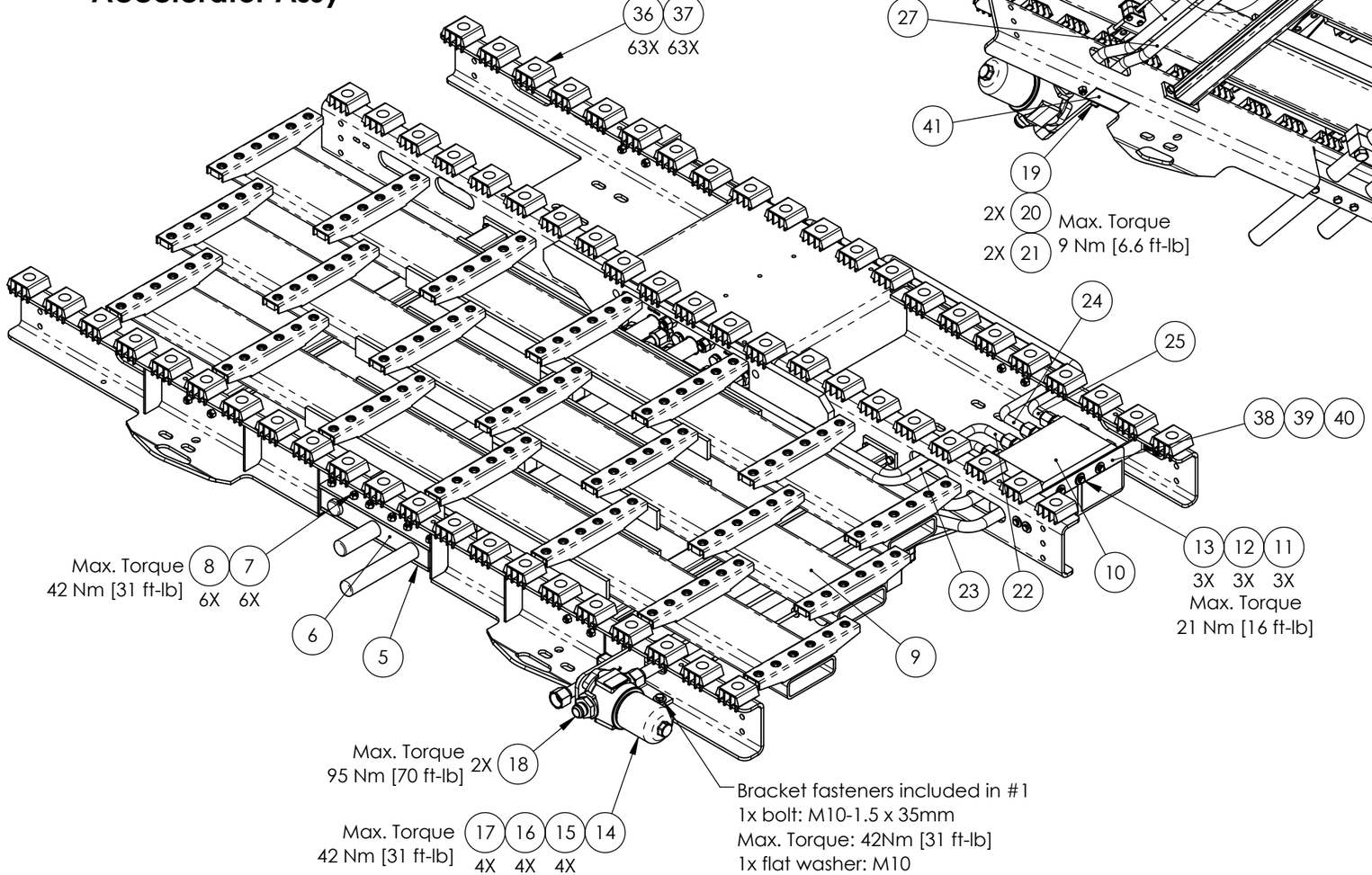
36 37
63X 63X

Bracket fasteners included in #1
4x bolt: M8-1.25 x 30mm
Max Torque: 16Nm [21 ft-lb]
4x flat washer: M8
4x lock washer: M8
4x hex nut: M10-1.5

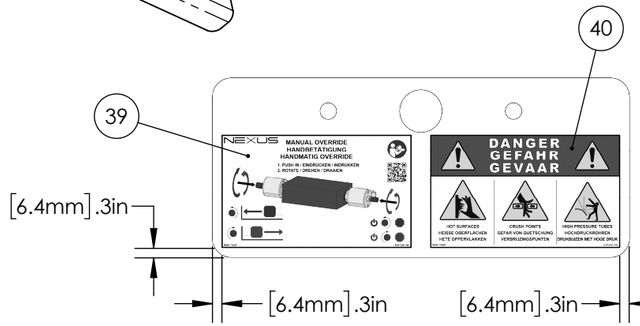
Frame fasteners included in #1
12x bolt: M10-1.5 x 30mm, Class 10.9
Max Torque: 61Nm [45 ft-lb]
12x locknut: M10-1.5



See installation manual for torque instructions



Bracket fasteners included in #1
1x bolt: M10-1.5 x 35mm
Max. Torque: 42Nm [31 ft-lb]
1x flat washer: M10
1x locknut: M10-1.5



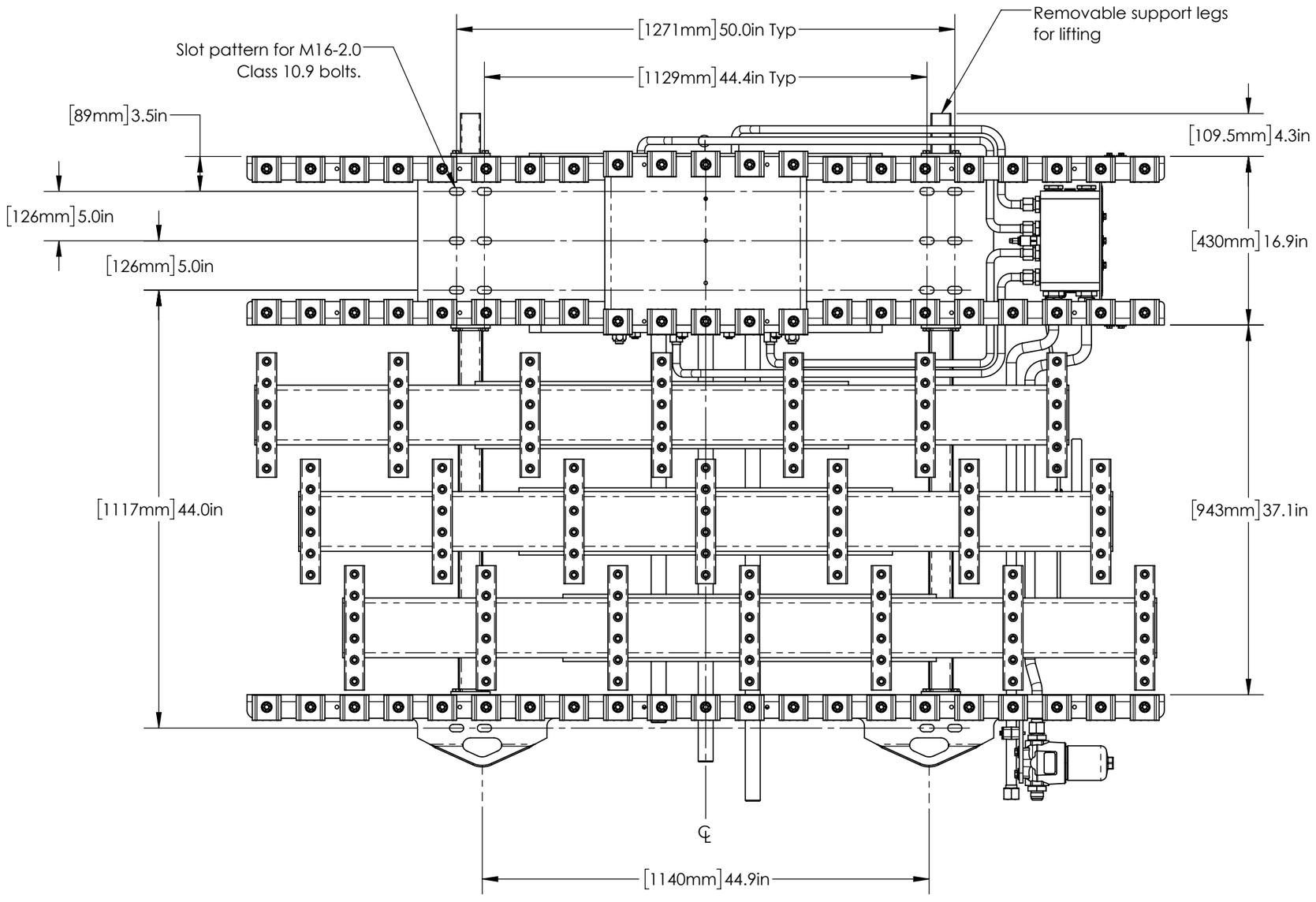
Safety Decal Locations

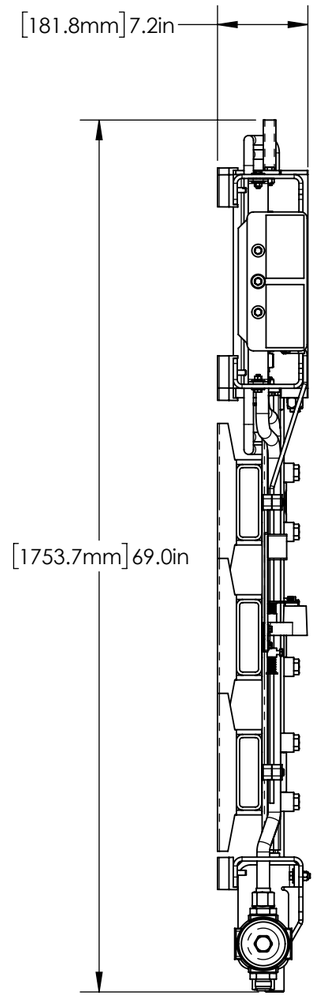
HALLCO INDUSTRIES, INC.

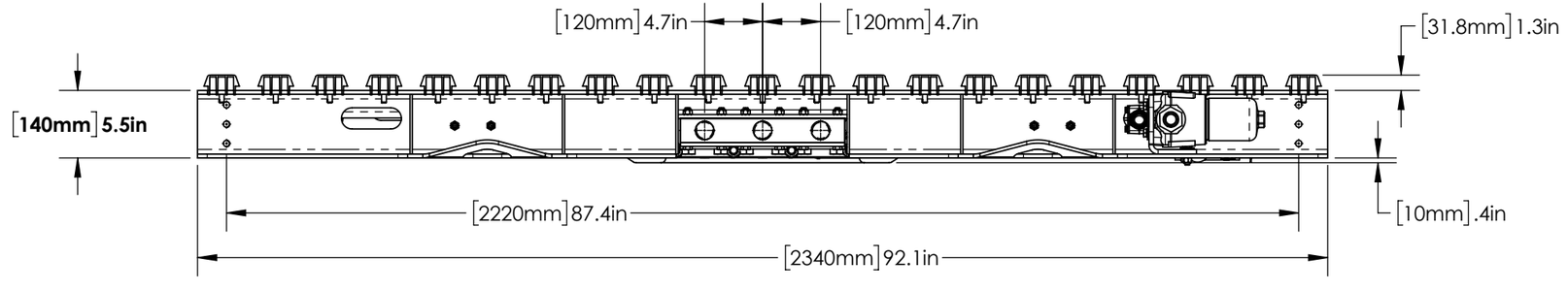
TITLE:
CDU, NEXUS, 140mm, 21 Slat, Electric, LH

SIZE	PART NUMBER	REV
B	52-7388	-

SCALE: 1:24 | 2OF3







Left hand configuration shown.
Right hand configuration optional.

HALLCO INDUSTRIES, INC.

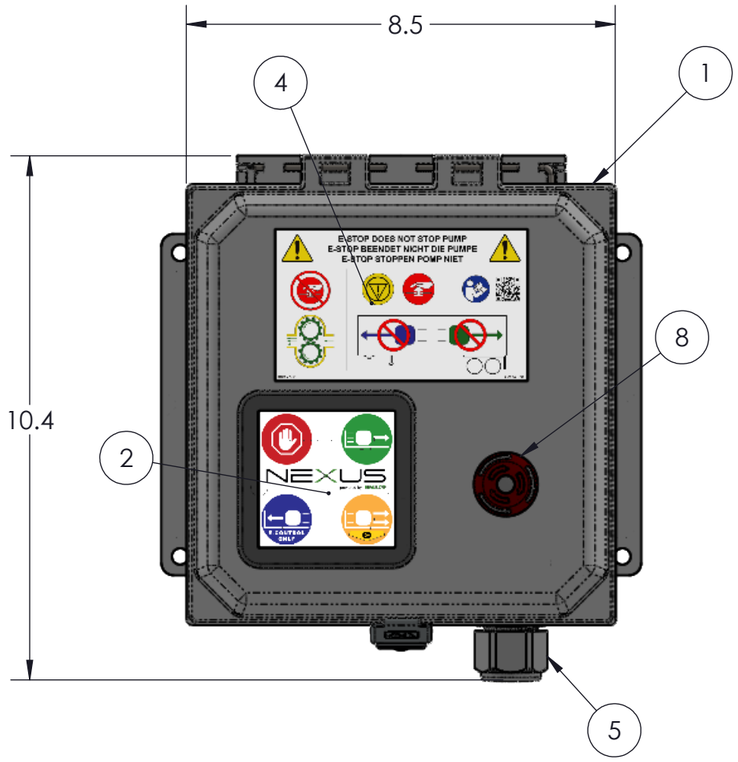
PROPRIETARY AND CONFIDENTIAL

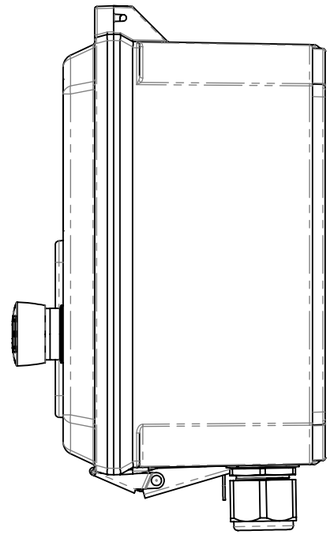
TITLE:
CDU, NEXUS, 140mm, 21 Slat, Electric, LH

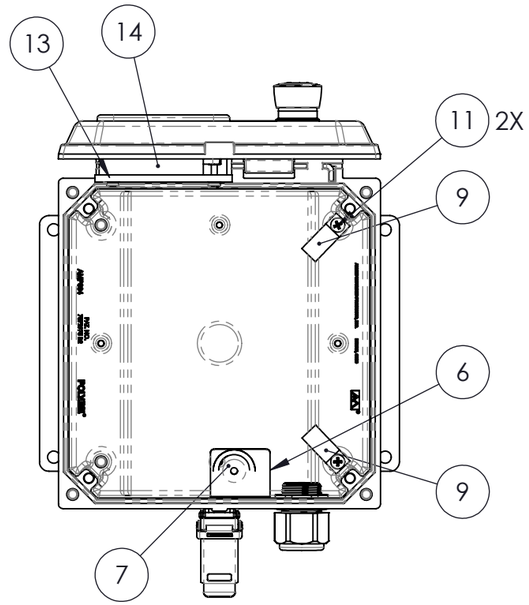
SIZE	PART NUMBER	REV
B	52-7388	-

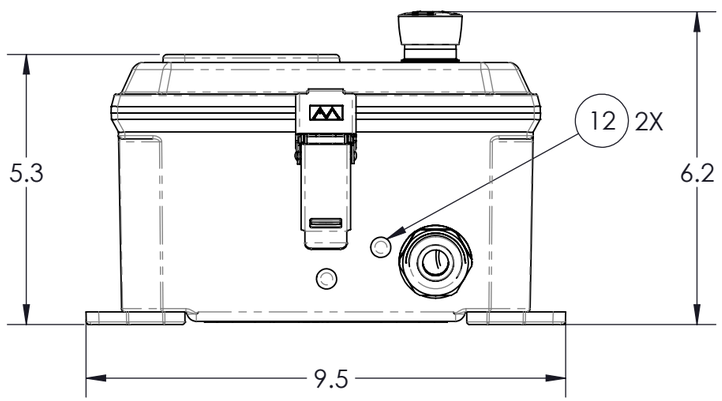
SCALE: 1:24 | 3OF3

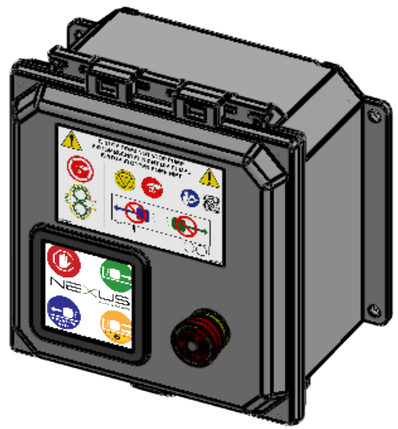
REVISIONS			
ZONE	REV.	DESCRIPTION	DATE
ALL	-	Initial Release	05-31-2019











MATERIAL:	UNSPECIFIED TOLERANCES	HALLCO INDUSTRIES, INC.	
MATERIAL FINISH: 125 Unless Other Note	FRAC: ± 1/32"	TITLE: Base Control Box Assembly, NEXUS	
MATERIAL PART #:	X.XX ± 0.010		
PROPRIETARY AND CONFIDENTIAL	X.XXX ± 0.005		
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF HALLCO INDUSTRIES, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF HALLCO INDUSTRIES, INC. IS PROHIBITED.	X.XXXX ± 0.0015	SIZE B	DWG. NO. 60-7528
	ANGLE ± 2°		REV -
NAME		SCALE: 1:4	0.000
DRAWN CBH			1OF1
CHECKED			
MFG APPR.			
APPROVED			
DATE			

NEXUS™ Series Limited Warranty

Hallco Industries hereby warrants, only to the first owner of a new **Hallco NEXUS™** series system from the factory or selling distributor, that the product shall be free from defects in material and workmanship for a period of **one year** after delivery to the first owner. **This warranty does not cover normal wear and tear and maintenance and is not to be construed as a service contract.**

Owner's Obligation:
To qualify for warranty coverage, a **Warranty Card** must be completed and returned to **Hallco Industries** within **ten (10) days** of delivery. The equipment must be subject to normal use and service only.

Definition of Normal Use and Service:
"Normal use and service" means the loading and/or unloading of uniformly distributed, **non-corrosive** material properly restrained and secured on properly maintained public roads, with gross vehicle weights not in excess of factory-rated capacity as stated in the vehicle owner's manual. For stationary installations, "normal use and service" means the conveying of uniformly distributed, **non-corrosive** material, with weights not in excess of factory-rated capacity.

Sole and Exclusive Remedy:
If the product covered hereby fails to conform to the above Warranty, **Hallco Industries** sole liability under this Warranty and the owner's sole and exclusive remedy is limited to repair or replacement of the defective part(s) at a facility authorized by **Hallco Industries**. Contact **Hallco Industries** for the closest Authorized Dealer. This is the owner's sole and exclusive remedy for all contract claims, and all tort claims including those based on strict liability in tort and/or negligence. Any defective part(s) must be shipped freight prepaid to **Hallco Industries**.

EXCEPT AS EXPRESSLY SET FORTH ABOVE, HALLCO INDUSTRIES MAKES NO WARRANTIES EXPRESS, IMPLIED OR STATUTORY, SPECIFICALLY: NO WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR WARRANTIES OF MERCHANTABILITY ARE MADE. FURTHER, HALLCO INDUSTRIES WILL NOT BE LIABLE FOR INCIDENTAL DAMAGES OR CONSEQUENTIAL DAMAGES SUCH AS, BUT NOT LIMITED TO, LOSS OF USE OF THE PRODUCT, DAMAGE TO THE PRODUCT, TOWING EXPENSES, LEGAL FEES AND THE LIABILITY YOU MAY HAVE IN RESPECT TO ANY OTHER CLAIM OR REASON.

Tort Disclaimer:
Hallco Industries shall not have any liability in tort with respect to the products, including any liability based on strict liability in tort and/or negligence, or any other theory.

NEXUS™ Series Warranty Conditions

Warranty conditions are as follows:

- The warranty period is for the first equipment owner only.
- A warranty period is one (1) year for the entire Hallco NEXUS™ system from the date of delivery to the first purchaser.
- A warranty period is one (1) year for any electrical component of the Hallco NEXUS™ system.
- The NEXUS™ series system must be installed by the trailer manufacturer according to Hallco installation procedures located in the Installation Manual.
- Purchaser must follow recommended maintenance and control procedures located in the Owners Manual.
- In the case of a malfunction, trailer manufacturer or Hallco Industries must be informed within 10 business days.

The following components are not covered by the warranty:

- Malfunction of equipment, or caused by equipment, which was not supplied by Hallco Industries.
- Malfunction caused by the use of dirty oil, or oil of the wrong type as stated in the owner's manual.
- Malfunction caused by overheated oil: maximum temperature of 82° C or 180° F.
- Malfunction caused by corrosive materials.
- Malfunction caused by repair work performed by an unauthorized third party. Contact Hallco Industries for the closest authorized dealer.
- Filter elements and components, which are subject to wear-and-tear.
- Defects in electrical components due to incorrect connection and/or incorrect voltage levels.

The Warranty is void if:

- The NEXUS™ series system is used for purposes which have not been recommended by Hallco Industries.
- The wet kit does not meet Hallco Industries system recommendations.
- The Hallco NEXUS™ series system is not installed properly.
- Loads in excess of legal limits are moved with the system without written permission from Hallco Industries.

NEXUS™ Series Warranty Registration

Warranty Registration Process:
Warranty registration will be the responsibility of the selling party to the end user, (The Dealer or Manufacturer of the trailer or bin).

The warranty registration card (below) must be completed and returned to Hallco Industries in order for the warranty period to begin on the date of delivery (date purchaser actually takes delivery of trailer). **The beginning of the warranty will be the date of manufacture if the warranty card is not completed and sent to Hallco Industries.**

Hallco Industries Warranty Registration Card

Purchaser:	**E-mail:**
Company:	**Phone:**
Address:	**State:**
City:	**Postal Code:**
Country:	**Trailer Manufacturer:**
Date of Delivery:	**Trailer VIN #:**
NEXUS™ Model Number:	**Dealer Name:**
NEXUS™ Serial Number:	**Dealer Location:**
Type of Material Unloaded:	**Trailer Leased or Owned:**

I have fully read the Hallco Industries warranty information and I/we fully understand and agree to the terms of the warranty.

Signature: _____ **Date:** _____

Please print or type

To validate the warranty, this registration card must be filled out completely and returned to Hallco Industries within ten (10) business days of delivery to the original end customer.

For your convenience this form is available online at www.hallco.eu

- Mail warranty card to:

  Hallco Industries
  Bramley House, Bramely Road, Long Eaton, NG10 3SX, UK

- E-mail warranty card to: warranty@hallco.eu

6605 Ammunition Way, PO Box 505, Tillamook, Oregon 97141
Toll Free: (800) 542-5526, Phone: (503) 842-8746, Fax: (503) 842-4866

EU Declaration of Incorporation

In accordance with EN ISO 17050-1:2010

1. Manufacturer:

Name	Hallco Industries, Inc.
Address	6605 Ammunition Rd., Tillamook OR 97141, USA

1a. Authorised Representative:

Name	Arran Leatherland
Business	Hallco Industries Limited
Address	Bramley House, Long Eaton, Long Eaton, NG10 3SX UK

2. Technical Representative:

Name	Arran Leatherland
Business	Hallco Industries Limited
Address	Bramley House, Long Eaton, Long Eaton, NG10 3SX UK

3. Product Identification:

Product	Hallco Moving Floor Conveyor System
Model/type	NEXUS™ Series
Version	HDS-M, Left Hand/Right Hand, Version 1

4. We hereby declare that the applicable EHSRs have been complied with in respect of the partly completed machinery to the extent indicated in the table below.

5. We undertake to transmit, in response to a reasoned request by the appropriate national authorities, relevant information on the partly completed machinery identified above. The method of transmission shall be either, CD/DVD-ROM or USB storage device sent by post. Method to be determined at the time of request by Hallco Industries, Inc. and/or Hallco Industries Limited.

6. **The machinery is incomplete and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive**.

7. Place and Date of Declaration:

Place of Issue	Hallco Industries, Inc.
Address	6605 Ammunition Rd., Tillamook OR 97141, USA
Date of Issue	2019-06-01

8. Responsible Authority:

Signed on behalf of	Hallco Industries, Inc.
Name	Ron McMurphy
Position	C.O.O. Hallco Industries, Inc.
Signature	****Signature on file at Hallco Industries, Inc.****

EHSRS Compliance Table

Key:
C: PCM complies with the requirement
N/A: Requirement is not applicable to the PCM
I: PCM does not comply – The installer must assess the finished machinery to the requirement.

EHSR	Title	C	N/A	I
1.1	**General remarks**			
1.1.2	Principles of Safety Integration	C		
1.1.3	Materials and products	C		
1.1.4	Lighting		N/A	
1.1.5	Design of machinery to facilitate its handling	C		
1.1.6.	Ergonomics	C		
1.1.7.	Operating positions	C		
1.1.8.	Seating		N/A	
1.2.	**Control systems**			
1.2.1.	Safety and reliability of control systems			I
1.2.2.	Control devices			I
1.2.3.	Starting			I
1.2.4.	Stopping	C		
1.2.5.	Selection of control or operating modes	C		
1.2.6.	Failure of the power supply			I
1.3.	**Protection against mechanical hazard**			
1.3.1.	Risk of loss of stability	C		
1.3.2.	Risk of break-up during operation	C		
1.3.3.	Risks due to falling or ejected objects			I
1.3.4.	Risks due to surfaces, edges or angles	C		
1.3.5.	Risks related to combined machinery		N/A	
1.3.6.	Variations in operating conditions		N/A	
1.3.7.	Risks related to moving parts			I
1.3.8.	Choice of protection against moving parts risks			I
1.3.9.	Risks of uncontrolled movements	C		
1.4.	**Requirements for guards and protective devices**			
1.4.1.	General requirements			I
1.4.2.	Special requirements for guards			I
1.4.3.	Special requirements for protective devices			I
1.5.	**Risks due to other hazards**			
1.5.1.	Electricity supply	C		
1.5.2.	Static electricity	C		
1.5.3.	Energy supply other than electricity	C		
1.5.4.	Errors of fitting	C		
1.5.5.	Extreme temperatures	C		
1.5.6.	Fire	C		
1.5.7.	Explosion	C		

1.5.8.	Noise	C		
1.5.9.	Vibrations	C		
1.5.10	Radiation		N/A	
1.5.11	External radiation		N/A	
1.5.12	Laser radiation		N/A	
1.5.13	Emissions of hazardous substances		N/A	
1.5.14	Risk of being trapped in a machine			I
1.5.15	Risk of slipping, tripping or falling			I
1.5.16	Lightning		N/A	
1.6.	**Maintenance**			
1.6.1.	Machinery maintenance			I
1.6.2.	Access to operating and servicing positions	C		
1.6.3.	Isolation of energy sources			I
1.6.4.	Operator intervention	C		
1.6.5.	Cleaning of internal parts	C		
1.7.	**Information**			
1.7.1.	Information and warnings on the machinery	C		
1.7.2.	Warning of residual risks	C		
1.7.3.	Marking of machinery	C		
1.7.4.	Instructions	C		
2.	**Requirements for certain categories of machinery**			
2.1.	Machinery for foodstuffs, cosmetics or pharmaceutical products		N/A	
2.2.	Portable hand-held and/or hand-guided machinery		N/A	
2.3.	Machinery for working wood, etc.		N/A	
3.	Hazards due to the mobility of machinery		N/A	
4.	Hazards due to lifting operations		N/A	
5.	Machinery intended for underground work		N/A	
6.	Hazards due to the lifting of persons		N/A	

6605 Ammunition Way, PO Box 505, Tillamook, Oregon 97141
Toll Free: (800) 542-5526, Phone: (503) 842-8746, Fax: (503) 842-4866

EU Declaration of Incorporation

In accordance with EN ISO 17050-1:2010

1. Manufacturer:

Name	Hallco Industries, Inc.
Address	6605 Ammunition Rd., Tillamook OR 97141, USA

1a. Authorised Representative:

Name	Arran Leatherland
Business	Hallco Industries Limited
Address	Bramley House, Long Eaton, Long Eaton, NG10 3SX UK

2. Technical Representative:

Name	Arran Leatherland
Business	Hallco Industries Limited
Address	Bramley House, Long Eaton, Long Eaton, NG10 3SX UK

3. Product Identification:

Product	Hallco Moving Floor Conveyor System
Model/type	NEXUS™ Series
Version	HDS-H & HDS-E, Left Hand/Right Hand, Version 1

4. We hereby declare that the applicable EHSRs have been complied with in respect of the partly completed machinery to the extent indicated in the table below.

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7. Place and Date of Declaration:

Place of Issue	Hallco Industries, Inc.
Address	6605 Ammunition Rd., Tillamook OR 97141, USA
Date of Issue	2019-06-01

8. Responsible Authority:

Signed on behalf of	Hallco Industries, Inc.
Name	Ron McMurphy
Position	C.O.O. Hallco Industries, Inc.
Signature	****Signature on file at Hallco Industries, Inc.****

EHSRS Compliance Table

Key:
C: PCM complies with the requirement
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EHSR	Title	C	N/A	I
1.1	**General remarks**			
1.1.2	Principles of Safety Integration	C		
1.1.3	Materials and products	C		
1.1.4	Lighting		N/A	
1.1.5	Design of machinery to facilitate its handling	C		
1.1.6.	Ergonomics	C		
1.1.7.	Operating positions	C		
1.1.8.	Seating		N/A	
1.2.	**Control systems**			
1.2.1.	Safety and reliability of control systems	C		
1.2.2.	Control devices			I
1.2.3.	Starting	C		
1.2.4.	Stopping	C		
1.2.5.	Selection of control or operating modes	C		
1.2.6.	Failure of the power supply	C		
1.3.	**Protection against mechanical hazard**			
1.3.1.	Risk of loss of stability	C		
1.3.2.	Risk of break-up during operation	C		
1.3.3.	Risks due to falling or ejected objects			I
1.3.4.	Risks due to surfaces, edges or angles	C		
1.3.5.	Risks related to combined machinery		N/A	
1.3.6.	Variations in operating conditions		N/A	
1.3.7.	Risks related to moving parts			I
1.3.8.	Choice of protection against moving parts risks			I
1.3.9.	Risks of uncontrolled movements	C		
1.4.	**Requirements for guards and protective devices**			
1.4.1.	General requirements			I
1.4.2.	Special requirements for guards			I
1.4.3.	Special requirements for protective devices			I
1.5.	**Risks due to other hazards**			
1.5.1.	Electricity supply	C		
1.5.2.	Static electricity	C		
1.5.3.	Energy supply other than electricity	C		
1.5.4.	Errors of fitting	C		
1.5.5.	Extreme temperatures	C		
1.5.6.	Fire	C		

1.5.7.	Explosion	C		
1.5.8.	Noise	C		
1.5.9.	Vibrations	C		
1.5.10	Radiation		N/A	
1.5.11	External radiation		N/A	
1.5.12	Laser radiation		N/A	
1.5.13	Emissions of hazardous substances		N/A	
1.5.14	Risk of being trapped in a machine			I
1.5.15	Risk of slipping, tripping or falling			I
1.5.16	Lightning		N/A	
1.6.	**Maintenance**			
1.6.1.	Machinery maintenance			I
1.6.2.	Access to operating and servicing positions	C		
1.6.3.	Isolation of energy sources			I
1.6.4.	Operator intervention	C		
1.6.5.	Cleaning of internal parts	C		
1.7.	**Information**			
1.7.1.	Information and warnings on the machinery	C		
1.7.2.	Warning of residual risks	C		
1.7.3.	Marking of machinery	C		
1.7.4.	Instructions	C		
2.	**Requirements for certain categories of machinery**			
2.1.	Machinery for foodstuffs, cosmetics or pharmaceutical products		N/A	
2.2.	Portable hand-held and/or hand-guided machinery		N/A	
2.3.	Machinery for working wood, etc.		N/A	
3.	Hazards due to the mobility of machinery		N/A	
4.	Hazards due to lifting operations		N/A	
5.	Machinery intended for underground work		N/A	
6.	Hazards due to the lifting of persons		N/A	