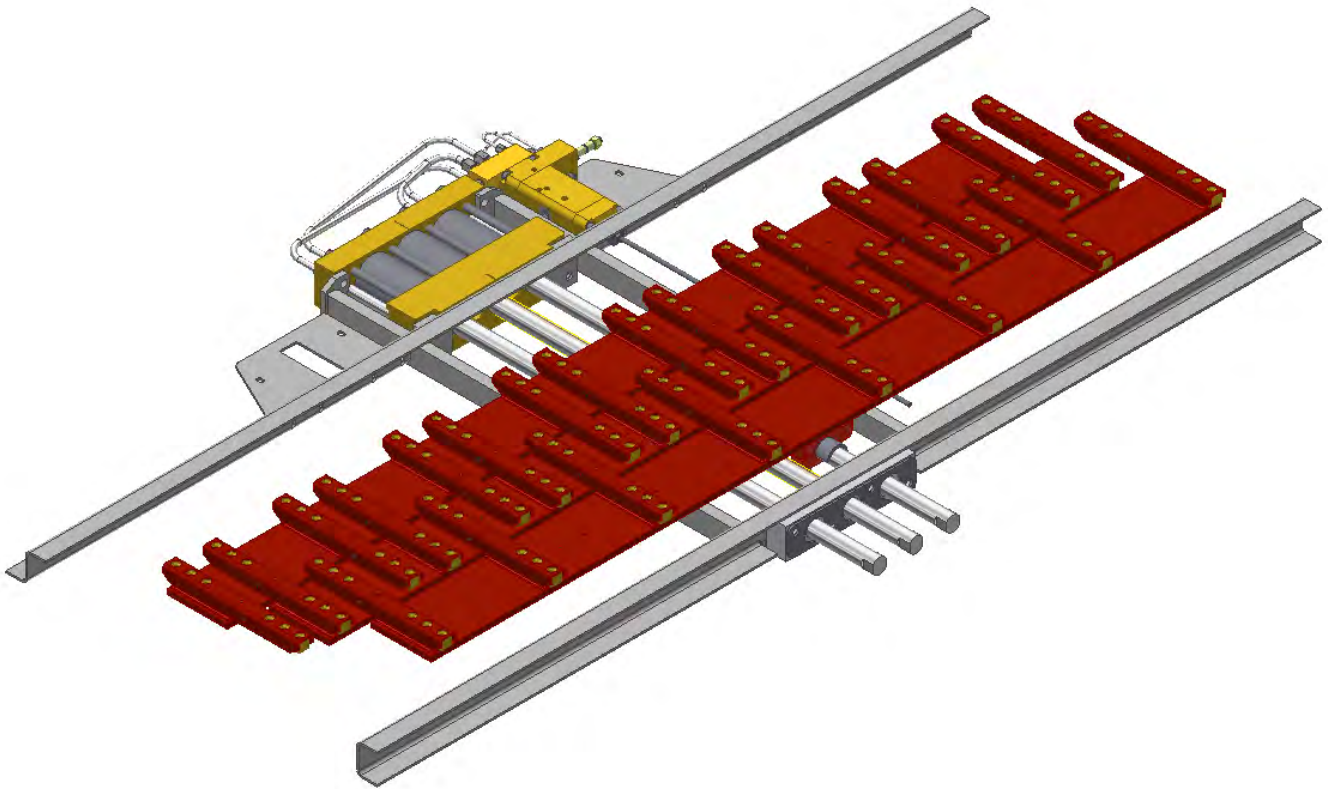


KEITH®

KMD 250 / KMD 300

KEITH Mfg. Co.
World headquarters
800-547-6161
541-475-3802
541-475-2169 fax



OWNER / OPERATOR MANUAL

Original Instructions

Low Profile Drive System
Durable and Dependable Construction
Compact Design

Interchangeable Cylinder Packs
Fast Unload Speed
No Hydraulic Hoses

© 2016, KEITH Mfg. Co. All rights reserved KEITH, WALKING FLOOR are registered trademarks of KEITH Mfg. Co. Equipment manufactured by KEITH Mfg. Co. is protected by numerous patents both domestic and foreign. WALKING FLOOR® is a product and brand of Keith Mfg. Co.

Revised: 3/6/2017

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Introduction

We at KEITH Mfg. Co. thank you for having chosen to equip your trailer with a KEITH® *WALKING FLOOR*® unloading system. We take great pride in the fact that we manufacture the simplest and lowest maintenance self-unloading systems available. Installing the KEITH® M-SERIES SYSTEM unloader in your trailer provides you with the versatility to load or unload virtually any type of material.

The following pages contain information on the operation of your KEITH® M-SERIES SYSTEM unloader, as well as a troubleshooting guide, and a variety of drawings and schematics of your system. In addition, we maintain a website at **www.keithwalkingfloor.com** which serves as a resource from which manuals can be downloaded.

We have provided information on the type of hydraulic wet kit that will be needed to operate your system. Please be sure to use the recommended specifications for your pumps, filters and pressure relief valves. It is critical to adhere to the outlined hydraulic wet kit specifications. Failure to follow the guidelines concerning required operation pressures can lead to your system operating improperly and voiding your warranty.

Please review the entire manual before operating the KEITH® M-SERIES SYSTEM unloading system. If you have any questions or concerns, do not hesitate to contact our factory toll-free at 800-547-6161 or via email at techdept@keithwalkingfloor.com and our trained personnel will be happy to assist you.

Thank you again for equipping your trailer with a KEITH® M-SERIES SYSTEM unloader.

Sincerely,



Keith Foster
Founder



Mark Foster
President

DECLARATION OF INCORPORATION

Manufacturer:

KEITH Manufacturing Company
401 NW Adler Street
Madras, OR 97741
USA

Hereby declares that the following partly complete machinery,

KMD 250/300 system mobile kit, serial numbers in year 2016

Complies with the following essential health and safety requirements of Directive 2006/42/EC: 1, 2, 3, 4, 1.1.1, 1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.1.7, 1.3.1, 1.3.2, 1.3.4, 1.3.6, 1.3.9, 1.5.3, 1.5.4, 1.5.5, 1.5.6, 1.5.8, 1.5.9, 1.5.15, 1.6.1, 1.6.2, 1.6.4, 1.7.1, 1.7.1.1, 1.7.2, 1.7.3, 1.7.4

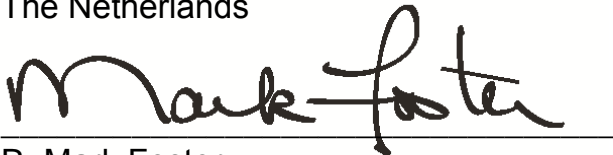
The relevant technical documentation is compiled in accordance with part B of annex VII.

In response to a reasoned request by national authorities, relevant information on the partly complete machinery will be transmitted as hard copies or digital files, unconstrained by intellectual property rights.

This partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC.

The person authorized to compile the technical file is:

KEITH Walking Floor Europe
Harselaarsweg 113
3771 MA Barneveld
The Netherlands



R. Mark Foster
President

Madras, Oregon, USA January 8, 2014

KEITH® M-SERIES SYSTEM Unloading System LIMITED WARRANTY

M-Series/KMD-175/250/300

Two Year Limited Hydraulic Warranty

A summary of the warranty conditions are as follows:

- The warranty period is for the first equipment owner only.
- A warranty card must be filled out and returned to KEITH.
- The standard warranty period is for (1) one year for the KMD system (all non-hydraulic components only such as electrical component, drive frame, floor shoes, flooring and cross drives and components from other suppliers) from date of sale by trailer manufacturer.
- A limited hydraulic warranty period is for (2) two years for the hydraulic parts and components from date of sale by trailer manufacturer.
- The KMD system must be installed by your trailer builder according to recommended KEITH installation instructions and procedures.
- KEITH maintenance and operating procedures have been properly followed.
- In the case of a malfunction, the trailer manufacturer, and KEITH must be informed immediately.

The following issues are not covered by the warranty:

- Malfunction of equipment, or problems caused by equipment, which was not supplied by KEITH.
- Malfunction caused by the use of dirty oil, or oil of the wrong type.
- Malfunction caused by overheated oil: maximum temperature 60 °C or 140° F.
- Malfunction caused by corrosive materials.
- Malfunction caused by overloading or improper use as stated in KEITH manuals.
- Malfunction caused by improper repair work, or repair work which is carried out by third parties.
- Filter elements and components are subject to normal wear-and-tear and are not warranty items.
- Defects in electrical components caused by incorrect connection and/or incorrect voltage levels.

The warranty is void if:

- The KMD system is used for purposes, which have not been recommended by KEITH.
- The wet kit is not as recommended in KEITH manuals.
- The KMD system is not installed properly.
- Load in excess of legal limits are moved as defined in KEITH manuals and operating instructions.
- Hydraulic components are damaged by excessive heat: 60 °C or 140° F.
- Heat damage caused by a bad hydraulic pump on the truck or hydraulic wet kit.
- Damage caused by using an end dump or dump truck wet kit.
- Heat damage caused by not fully opening and closing the ball valve.

Warranty Information:

Two Year Limited Hydraulic Warranty

KEITH Mfg. Co. hereby warrants, only to the first owner of a new KEITH® KMD-175/250/300 unloader from the factory or selling distributor, that the KMD hydraulic parts and hydraulic components shall be warranted as free from defects in material and workmanship for a period of two years to the first registered owner from the date of the sale.

This warranty does not cover normal wear and tear, maintenance, or heat damage. It is not to be construed as a service contract.

Owners Obligation: To qualify for warranty coverage, a warranty card must be completed and the equipment must be subject to normal use and service as described in KEITH manuals and warranty information.

Note: Prevention of excessive heat in the hydraulic system is the single most important factor for long system life. Bad pumps, improper wet kits and hydraulic restrictions cause excessive heat and will damage the hydraulic system. Heat damage will void the warranty.

One Year Limited Non-Hydraulic Component Warranty

KEITH Mfg. Co. hereby warrants, only to the first owner of a new **KEITH® KMD-175/250/300** unloader from the factory or selling distributor that the product (all non-hydraulic components such as electrical components, drive frame, cross drives, floor shoes and flooring) shall be free from defects in material and workmanship for a period of **one year** after delivery or sale to the first registered owner.

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. For stationary installations, normal use and service means the conveying of uniformly distributed, noncorrosive materials, with weights not in excess of factory rated capacity.

Sole and Exclusive Remedy: If the product covered hereby fails to conform to the above stated warranty, **KEITH Mfg. Co.'s** 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 **KEITH Mfg. Co.** This is the owner's sole and exclusive remedy for all contract claims, and all tort claims including those based on the strict liability in tort and negligence. Any defective part(s) must be shipped freight prepaid to the nearest **KEITH** North America/South America facility or nearest **KEITH Europe** facility. Please contact KEITH for additional information on proper locations.

Except As Expressly Set Forth Above, KEITH Mfg. Co. Makes No Warranties:

Express, implied or statutory, specifically: No warranties of fitness for a particular purpose or warranties of merchantability are made. Further, **KEITH Mfg. Co.** 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, attorney's fees and the liability you may have in respect to any other reason.

Tort Disclaimer: **KEITH Mfg. Co.** shall not have any liability in tort with respect to the products, including any liability based on strict liability in tort and negligence.

If This Warranty Violates Law: To the extent any provision of this warranty, contravenes the law of any jurisdiction, that provision shall be inapplicable in such jurisdiction and the remainder of the warranty shall not be affected thereby.

Warranty Return Policy

1. Contact KEITH Mfg. Co. at 1-800-547-6161 or techdept@keithwalkingfloor.com for a "Returned Goods Authorization" (RGA) number before returning any item for repair or replacement. The following information is needed to ensure parts are returned as quickly as possible.

a. Company name	e. Part number
b. Contact name	f. Quantity
c. Address	g. Reason for return
d. Phone number	h. Customer's account number
2. Prior approval and a RGA number is needed when returning any unused product for credit. Make sure the RGA number is on the outside of the shipping carton and all paperwork is included. Return all material on a Freight Prepaid Basis.

Warranty Registration Card

The warranty registration card must be completed and on file at KEITH Mfg. Co. in order for the warranty period to begin on the purchase date. If no purchase date is registered, the beginning of the warranty will automatically revert to the manufacture date.

NAME: _____

ADDRESS: _____

CITY, STATE/PROV.: _____ POSTAL CODE: _____

COUNTRY: _____

TEL: _____ FAX: _____

E-MAIL: _____

SYSTEM DATA:

DATE OF PURCHASE: _____

MODEL / SERIAL NUMBER: _____

PURCHASED FROM: _____

TYPE OF MATERIAL LOADED/UNLOADED: _____

I have fully read the KEITH Mfg. Co. warranty information and fully understand and agree to the terms of the warranty.

COMPANY DATE SIGNATURE

Note: To validate the warranty, this registration card must be filled out completely and returned to KEITH Mfg. Co. within ten (10) days of purchase and/or installation.

Please fax, mail or email warranty registration to KEITH Mfg. Co. at:
KEITH Mfg. Co.
P.O. Box 1
Madras, OR 97741-0001
Fax: 541-475-2169
techdept@keithwalkingfloor.com

1.0 Safety

1.1 General Safety

1.1.1 Intended function and expected use:

- 1.1.1.1. The KEITH® M-SERIES SYSTEM is a reciprocating slat conveyor intended to hold, load, or unload primarily bulk materials. It can also handle unit loads such as pallets by using special handling techniques and possibly additional safety controls. The system is supplied as a kit primarily intended for installation into mobile trailers or truck bodies. The floor is often loaded through an open trailer top, or through the rear doors. The floor typically discharges material out the rear door. It is hydraulically actuated, powered by a pump mounted either to a PTO or an electric motor. The basic system is controlled by mechanically actuated valves, and there is an option for electrically actuated valves. The system is compatible with options and accessories to improve performance. For example it can be electrically controlled by hardwired switches, or a wireless remote. A CleanSweep® device can improve clean out. Floor slat styles are selected based on the materials to be conveyed. The standard system handles a wide array of materials in a non-hazardous, non-explosive environment. Special modifications may be required for special environments like food-grade applications or explosive conditions.

1.1.2 Improper use:

- 1.1.2.1. This equipment has been manufactured in accordance with state-of-the-art technology and the acknowledged safety regulations. Nevertheless, dangerous situations could arise from improper use, which could endanger life and limbs of personnel and cause severe damage to the equipment and other assets. This equipment may only be used for its intended purpose. It may only be operated in impeccable technical condition and in accordance with the proper use and this user manual. Problems, which could affect safety, must be resolved immediately. The manufacturer is not liable for any damage caused by improper use or arbitrary modifications. The installation, commissioning, operation, and maintenance instructions described in this manual must be followed.
- 1.1.2.2. Personnel must not enter the danger zone(s) when the system is enabled. Specifically, nobody should be inside the trailer, under the trailer, or behind the trailer in the unloading zone during operation. Also, nobody should be in a full trailer or a filling trailer. Lock-out and tag-out procedures must be followed before accessing these areas.
- 1.1.2.3. The maximum load capacity must not be exceeded. See Section 2.0 for specifications.
- 1.1.2.4. The hydraulic power source must not exceed the pressure and flow ratings. Install a relief valve to insure the maximum pressure is not exceeded.
- 1.1.2.5. Control circuitry must not be altered or bypassed
- 1.1.2.6. Safeguards must not be altered or bypassed.
- 1.1.2.7. The floor structure must not be altered.
- 1.1.2.8. The floor should not be used to handle any material other than specified.
- 1.1.2.9. The user and system designer must understand the characteristics and safe handling requirements of the material that is being conveyed.

1.1.2.10. Bulk materials are by nature unstable and flowable. Avoid burial by avoiding contact with the material.

1.1.3 Training

1.1.3.1. Operators must read and understand this manual before operating or maintaining the machine. Only qualified, trained personnel may execute commissioning, operation, and maintenance.

1.1.4 Personal protective equipment.

1.1.4.1. Always wear protective equipment appropriate for risks associated with each phase of the system's life, including transportation, installation, assembly, operation, inspection, maintenance, and dismantling, disabling, and scrapping. As a minimum, this includes the following personal protective equipment:

- Safety glasses
- Gloves
- Welding/grinding protection
- Thermal protection such as coats
- Protective / traction shoes
- Helmets
- Hearing Protection

1.1.5 Airborne noise emission:

1.1.5.1. There is not a defined workstation so sound pressure emitted by the WALKING FLOOR® modules were measured at a height of 1.6 meters from the floor surface and a distance of 1 meter from the surface of the WALKING FLOOR® system at the drive area.

- The maximum A-weighted emission sound pressure level = 74.8 dB
- The peak C-weighted instantaneous sound pressure value = below 63 Pa.

1.1.5.2. Slower floor speeds result in less noise.

1.1.6 Temperature

1.1.6.1. Operation of the system generates heat in the hydraulic oil. Hot oil can damage the internal seals, resulting in failure to operate.

1.1.6.2. Overheated oil can degrade rapidly. Hot oil and the resulting hot surfaces can cause burns. Do not allow the oil temperature to exceed 140 degrees Fahrenheit (60 degrees Celsius).

1.1.6.3. KEITH recommends some or all of the following temperature control measures depending on the circumstances. High duty cycle systems and hot environments will require more control measures.

- Maintain adequate oil level in the reservoir.
- Install a thermometer or sensor to monitor oil temperature.
- Install a cooler.
- Set a sensor to automatically shut down the system if oil temperature exceeds 140 degrees Fahrenheit (60 degrees Celsius).

1.1.7 Lighting

- 1.1.7.1. Do not use or service the system in an environment of insufficient light.

1.1.8 1.1.8 Movement around the system

- 1.1.8.1. Hydraulic oil can be slippery. Clean up oil spills immediately.

1.1.9 Hydraulic Oil Safety

- 1.1.9.1. See the MSDS for the oil used in your system for further information about hydraulic oil safety.
- 1.1.9.2. In an accident involving high pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.
- 1.1.9.3. Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas.
- 1.1.9.4. Use only designated appropriate fill and drain ports for the oil.

1.2 Design / Installation Safety

1.2.1 Kit Components

- 1.2.1.1. The kit consists of a drive unit, flooring, and miscellaneous boxed parts. These modules are intended to be anchored in a shipping frame or stacked flat and braced with dunnage for shipping and storage.

1.2.2 Installation

- 1.2.2.1. Use designated lifting points as provided.
- 1.2.2.2. Only use equipment with appropriate capacity ratings to lift and handle components.
- 1.2.2.3. Use appropriate lifting procedures when handling components or boxed components.
- 1.2.2.4. The floor must be installed far enough away from other equipment or fixtures to prevent the moving parts of the floor module from creating a crush or pinch hazard.

1.2.3 Danger Zones

- 1.2.3.1. The reciprocating action of the floor creates pinch and shear points by nature. Specifically, drive area cylinder, cross-drive, and slats approaching each other, frame components, or walls. These and any other relevant exposed areas must be guarded.
- 1.2.3.2. The floor must be incorporated into surroundings such that movement of the material on the floor does not create crushing, burial, drawing in, or entrapment hazards. The system must be designed to limit access to the material flow path.

1.2.4 Electric Components and Installation

- 1.2.4.1. KEITH recommends connecting to earth ground (when possible).
- 1.2.4.2. Wiring must be connected consistent with local codes and regulations, including electromagnetic interference regulations.
- 1.2.4.3. Adequate electric overcurrent protection must be provided.

1.2.5 Hydraulics

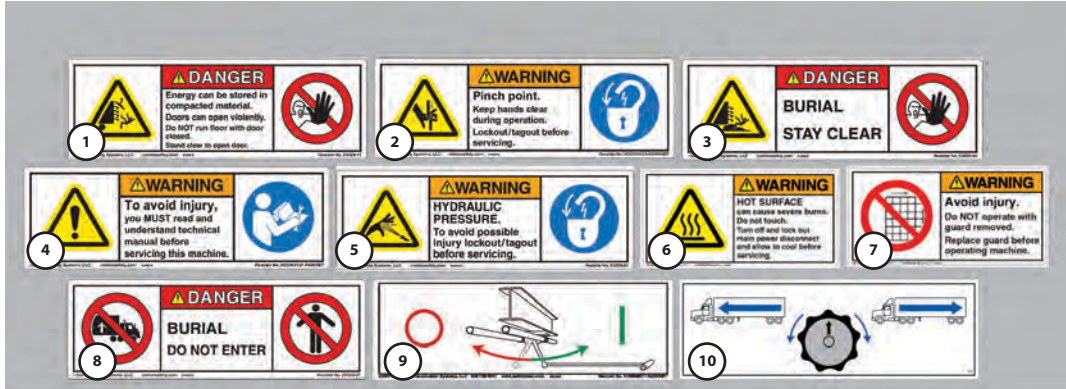
- 1.2.5.1. Hydraulic piping and components that must be constructed of materials that are rated for system pressures, and must be installed with best industry practices. Follow all pipe, tubing, fitting, and hose manufacturer installation and routing guidelines.
- 1.2.5.2. Hydraulic piping should be supported and isolated from vibration. Contact a KEITH representative for recommendations on installation.
- 1.2.5.3. Place protective shrouds around the hydraulic tubing in any areas that may have operators or people frequently nearby.

1.2.6 Controls

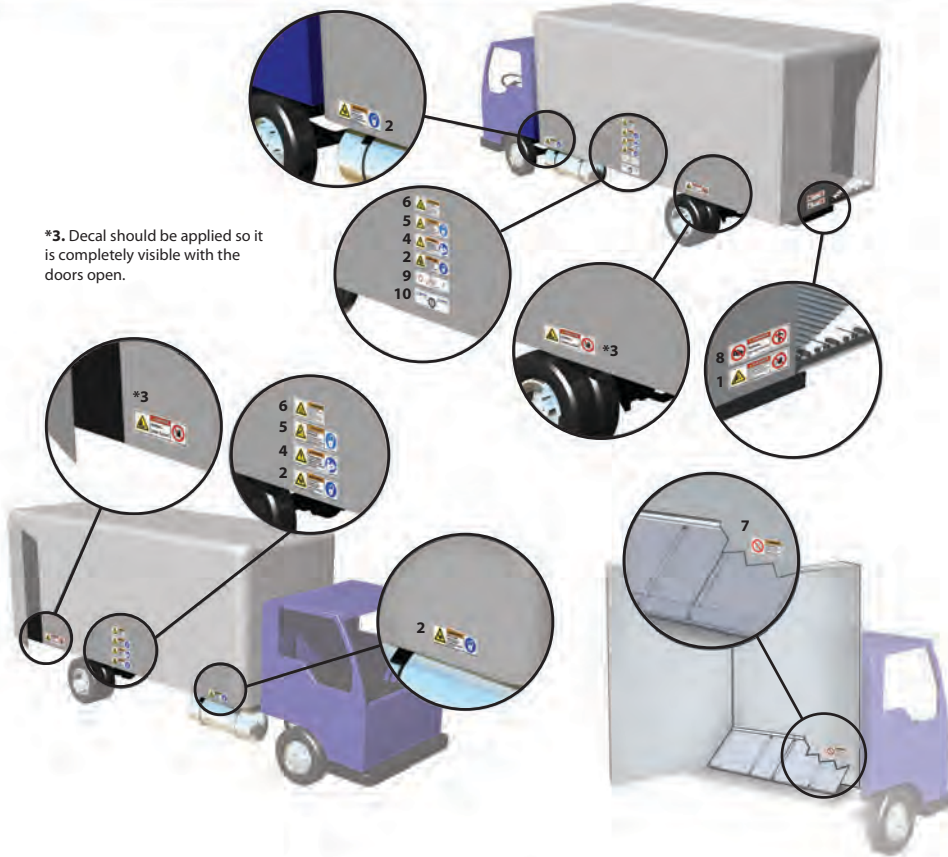
- 1.2.6.1. The control panel must be located such that it is easily accessible for all sizes and capacities of people, and allows the operator to move freely (when applicable).
- 1.2.6.2. Control devices must be located outside of danger zones, such that any exposed persons in danger zones are visible from the control station.
- 1.2.6.3. An acceptable means must be provided to monitor the status and movement of the load.
- 1.2.6.4. The floor can generate enormous horizontal force which can destroy improperly designed surroundings. The floor module must not be allowed to compact material against an end wall or door, or end walls and doors must be designed to absorb these forces.
- 1.2.6.5. Do not allow the floor to move material toward the front of the trailer when material is contacting the front wall. KEITH recommends installing limit switches to prevent this. In absence of a sensor switch, the operator must be keenly aware of the load position, and the control system must require the operator to hold the run signal in the on position to continue running, such that releasing the run signal causes the floor to stop (momentary signal).
- 1.2.6.6. Material compacted against closed doors can force the doors open dangerously fast when the door latch is released. The impact can cause serious injury or death. Do not allow the floor to run when the doors are closed. And do not open a door when it is possible that material may be compacted against it. KEITH strongly recommends installing a control interlock switch to prevent the floor from running when the door is closed. KEITH also recommends a door latch that can be remotely actuated by someone away from the door area unload zone.

1.3 Marking of Machinery

Left Hand Decal Placement

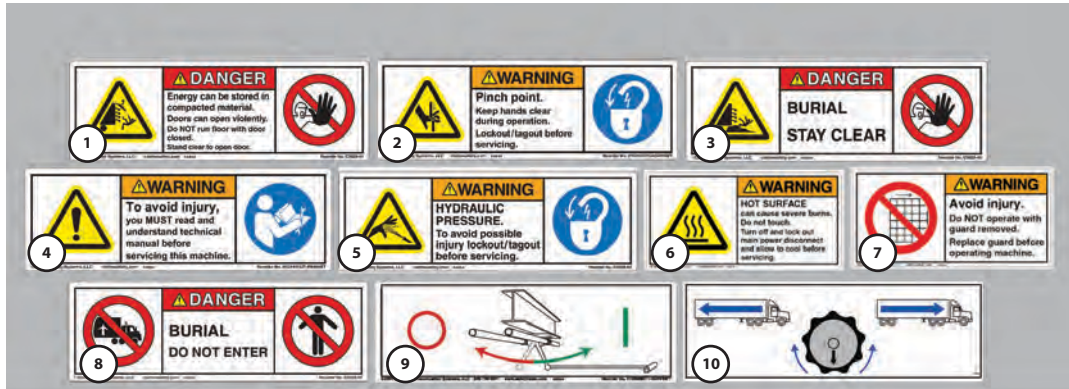


*3. Decal should be applied so it is completely visible with the doors open.

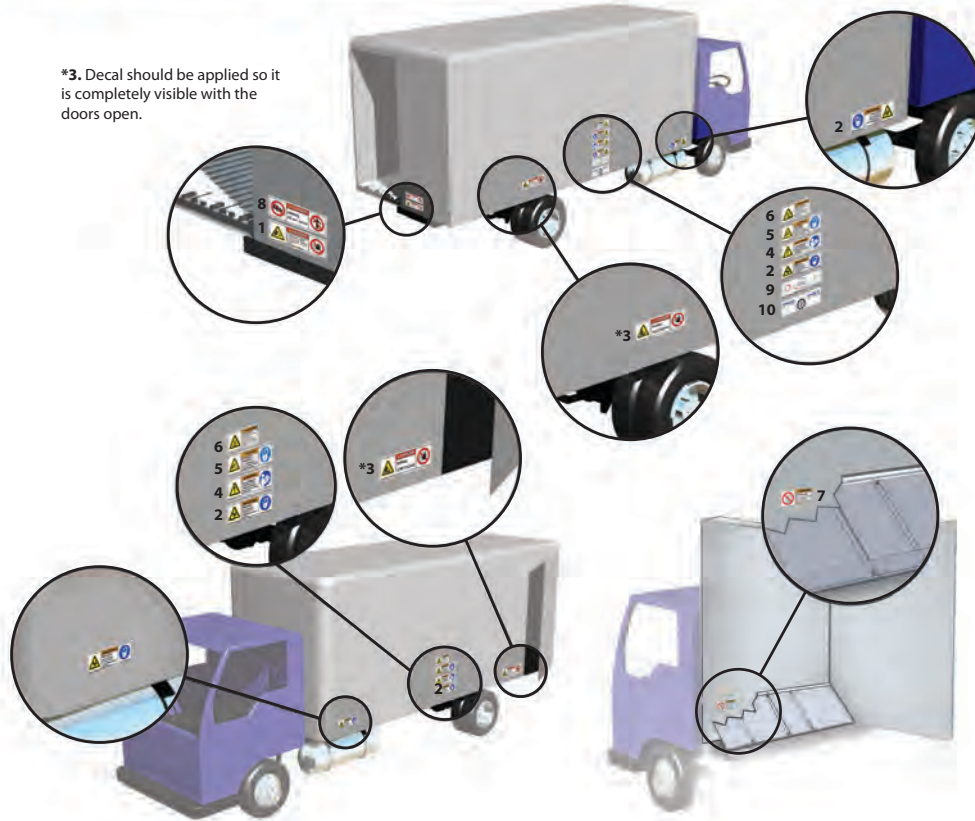


KMD DECAL KIT #84804009	SIZE	QUANTITY PER KIT	ITEM #
1. Danger/Stored Energy (English)	6" x 2"	1	84804101
2. Pinch Point (English)	6" x 2"	4	84804124
3. Danger/Burial (English)	6" x 2"	2	84804100
4. Read Manual (English)	6" x 2"	2	84804123
5. Hydraulic Pressure (English)	6" x 2"	2	84804128
6. Warning Hot Surface (English)	4" x 2"	2	84804127
7. Guard (English)	4" x 2"	1	84804126
8. Danger/Burial Do Not Enter (English)	6" x 2"	1	84804132
9. Ball Valve	6" x 2"	1	84804129
10. Control Valve (LH)	6" x 2"	1	84803904
N.A. Placement Instruction Guide	N.A.	1	84803901

Right Hand Decal Placement



*3. Decal should be applied so it is completely visible with the doors open.



KMD DECAL KIT: #84803902	SIZE	QUANTITY PER KIT	ITEM #
1. Danger/Stored Energy (English)	6" x 2"	1	84804101
2. Pinch Point (English)	6" x 2"	4	84804124
3. Danger/Burial (English)	6" x 2"	2	84804100
4. Read Manual (English)	6" x 2"	2	84804123
5. Hydraulic Pressure (English)	6" x 2"	2	84804128
6. Warning Hot Surface (English)	4" x 2"	2	84804127
7. Guard (English)	4" x 2"	1	84804126
8. Danger/Burial Do Not Enter (English)	6" x 2"	1	84804132
9. Ball Valve	6" x 2"	1	84804129
10. Control Valve (RH)	6" x 2"	1	84803905
N.A. Placement Instruction Guide	N.A.	1	84803903

KMD 250 Serial Plate

KEITH Mfg. Co. - Since 1973 - www.keithwalkingfloor.com

KEITH WORLD HEADQUARTERS
401 NW ADLER ST
MADRAS OREGON USA

KEITH WALKING FLOOR EUROPE
HARSELAARSEWEG 113
3771 MA BARNEVELD
THE NETHERLANDS

○ MODEL: KMD-250 SERIAL# 123456789 ○

D.O.M: JANUARY 2016 TESTED BY

LOAD CAPACITY: 8 tons/7.2 tonnes MAX PRESSURE: 3000 psi/210 bar

WEIGHT: 550-650 lbs/250-295 kg MAX FLOW: 11 gpm/42 lpm

WALKING FLOOR and KEITH are registered trademarks of KEITH Mfg. Co.

KMD 300 Serial Plate

KEITH Mfg. Co. - Since 1973 - www.keithwalkingfloor.com

KEITH WORLD HEADQUARTERS
401 NW ADLER ST
MADRAS OREGON USA

KEITH WALKING FLOOR EUROPE
HARSELAARSEWEG 113
3771 MA BARNEVELD
THE NETHERLANDS

○ MODEL: KMD-300 SERIAL# 123456789 ○

D.O.M: JANUARY 2016 TESTED BY

LOAD CAPACITY: 16 tons / 14.5 tonnes MAX PRESSURE: 3000 psi / 210 bar

WEIGHT: 550-650lbs / 250-295kg MAX FLOW: 15 gpm / 57 lpm

WALKING FLOOR and KEITH are registered trademarks of KEITH Mfg. Co.

2.0 Specifications

2.1 Drive Specifications

Hydraulic Drive Unit Specifications: M-SERIES SYSTEM Unloading System		
Drive Style	KMD 250	KMD 300
Cylinder Bore:	2.5" [64 mm]	3.0" [76 mm]
Cylinder Stroke:	5.0" [127 mm]	5.0" [127 mm]
Required Relief Valve Pressure Range:	Min.: 2,800 PSI [195 bar] Max: 3,000 PSI [210 bar]	Min.: 2,800 PSI [195 bar] Max: 3,000 PSI [210 bar]
Load Capacity:	8 Ton [7257 kg]	16 Ton [14515 kg]
Minimum Pump Flow:	4 gallon/min [15 liter/min] (May vary with pressure)	4 gallon/min [15 liter/min] (May vary with pressure)
Maximum Pump Flow:	11 gallon/min [42 liter/min]	15 gallon/min [57 liter/min]
Maximum Temperature	140° F [60° C]	140° F [60° C]
Maximum Floor Speed*:	8 ft/min [2.4 meter/min]	8 ft/min [2.4 meter/min]
Drive Weight:	550-650 lbs [250-295 kg]	550-650 lbs [250-295 kg]

*May vary with length of trailer, material type, or environmental variables.

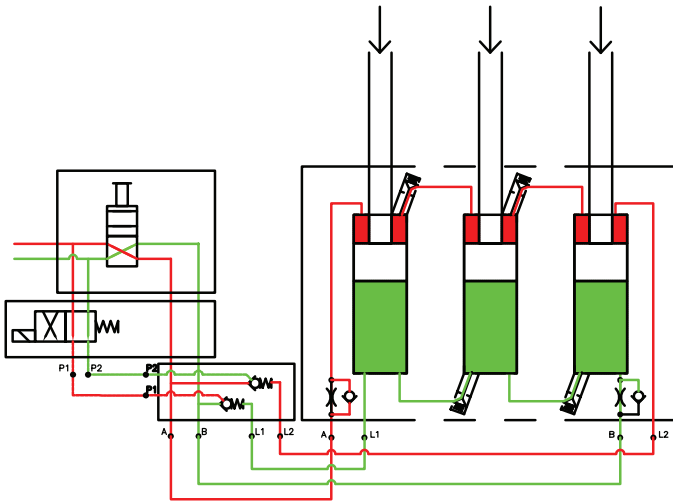
2.2 Bolt Torque Values

Bolt Description	Bolt Size	Amount	Bolt Torque Values
Barrel Clamp Bolts	M16x55mm HCS Grade 10.9	2 per barrel clamp	135 ft.-lbs. [183 N·m]
Rod Bearing Block Bolts	M16x90mm HCS Grade 10.9	4 per bearing block	80 ft.-lbs. [108 N·m]
Cylinder Rod End Bolts	M16x120mm HCS Grade 10.9	8 per cylinder pack	135 ft.-lbs. [183 N·m]
Floor Bolts (90° flat head)	M12x35mm HCS Grade 10.9	Varies	110 ft.-lbs. [150 N·m]

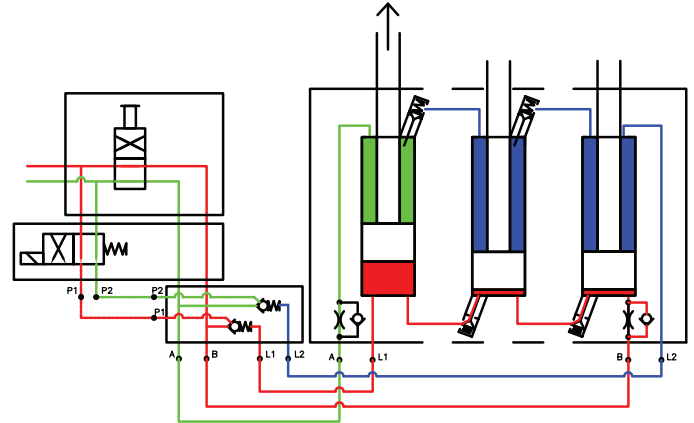
2.3 Wet Kit Specifications

Oil:	ISO-L-HM 46 hydraulic oil (As per ISO 11158).
P.T.O. and Pump:	<p>The P.T.O. and Pump must be capable of outputting a flow rate of at minimum 4 GPM at 3000 P.S.I. [15 l/min at 210 bar] to make the system run.</p> <p>Contact a KEITH Mfg. Co. representative for specific recommendations on selecting a wet kit.</p> <p>Do not exceed the maximum flow rate.</p> <p>Do not exceed the maximum pressure.</p>
Filter:	<p>Filter should be double element, 10 to 25 micron, on the return line. (The filter element should be changed after 6 operating hours initially, and then every 6 months thereafter. This may vary with the operating environment).</p> <p>KEITH recommends installing an inline pressure filter to increase the life of the system. Please contact the parts and service office in your region for advice.</p>
Hydraulic Reservoir:	<p>Size to desired flow rate, minimum 20 gallons [75 liters].</p> <p>Contact a KEITH Mfg. Co. representative for specific recommendations on selecting a wet kit.</p>
Suction Line:	<p>Suction line from the tank to the pump should be no more than 5' [1.5m] in length and a minimum of 1-1/2" [38 mm] inside diameter.</p> <p>KEITH recommends using SAE100R4.</p>
Pressure Line:	Hose from truck to trailer should be minimum 1/2" SAE-100R2.
Return Line:	<p>Hose from trailer to filter should be minimum 3/4" (-12) SAE-100R1.</p> <p>Hose from filter to tank should be 1" (-16) SAE-100R1.</p>
Pressure Relief Valve:	<p>High quality valve, capable of relieving pressure at 3000 P.S.I. [210 bar]</p> <p>Relief valve must be set above 2800 P.S.I. [195 bar] and no higher than 3000 P.S.I. [210 bar]</p>

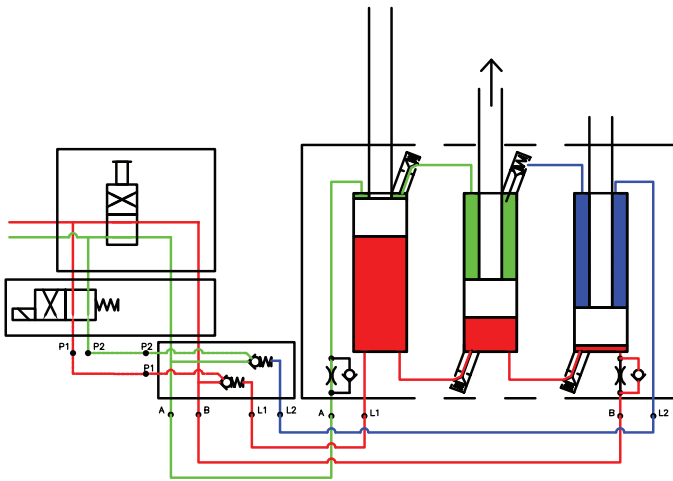
2.4 Oil Flow Diagram



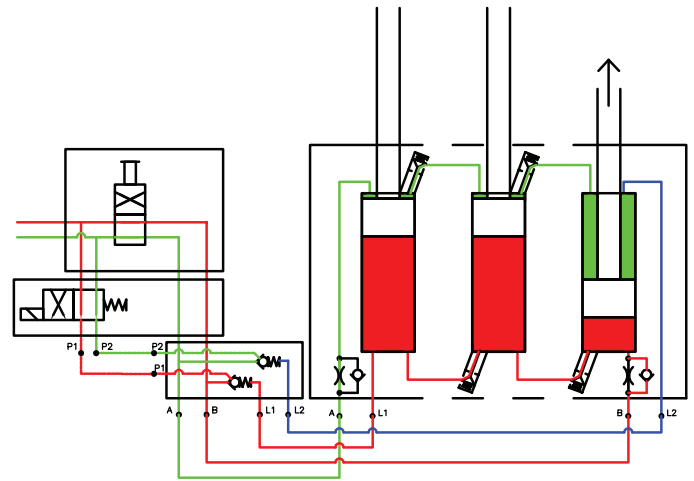
Step 1: Pressure (Red) is supplied to the cylinders, and all cylinders travel together. The floor is conveying material. The switching valve is actuated, which sends the oil pressure to the other side of the cylinders.



Step 2: Pressure is now supplied to the opposite side of the cylinders. Return oil (Green) is blocked (Blue) in all but one of the cylinders. Unblocked cylinder travels until end of stroke and actuates check valve, thereby unblocking the next cylinder.

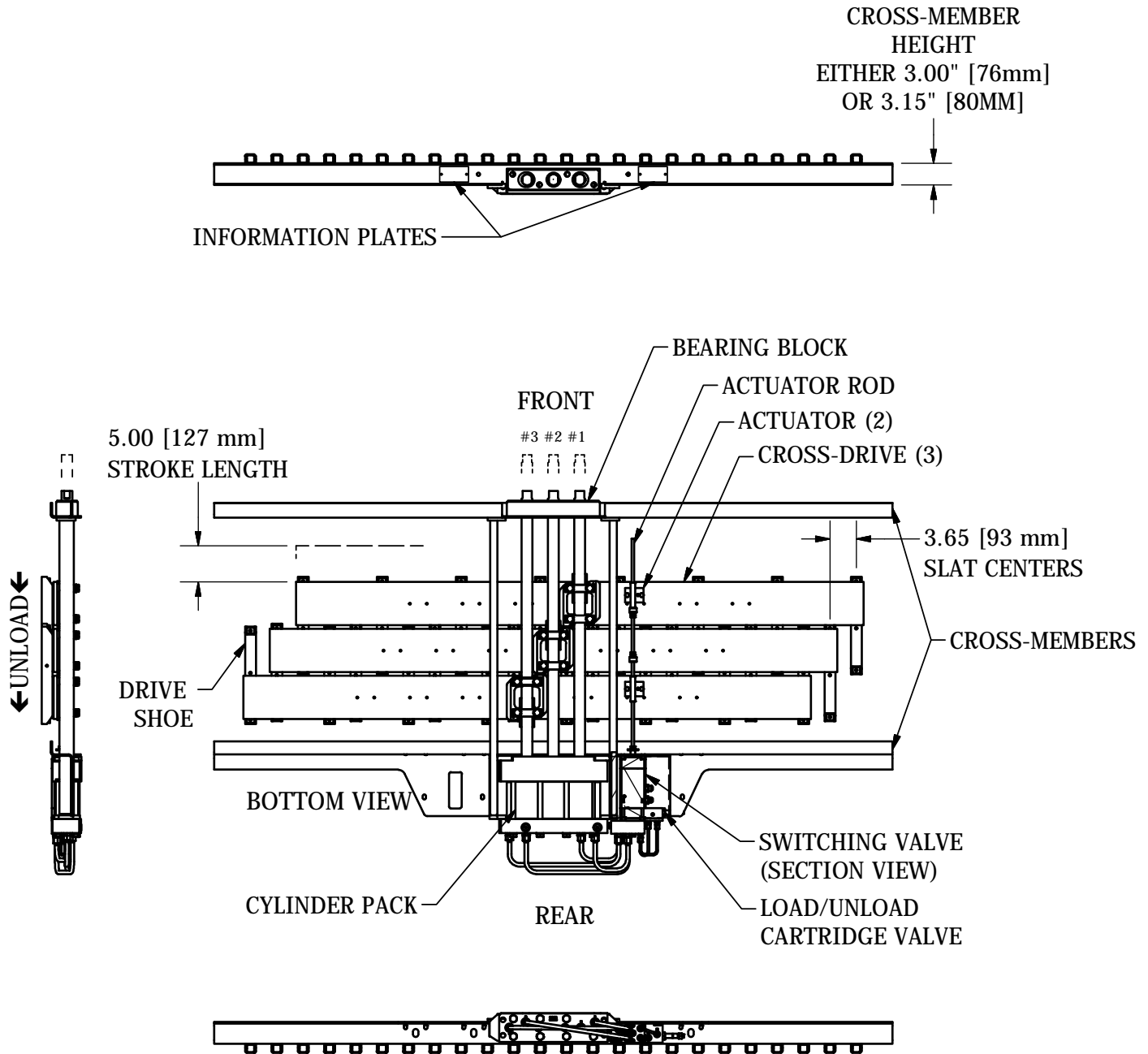


Step 3: Second cylinder travels to end of stroke, where it actuates the next check valve. This unblocks the third cylinder, which allows blocked oil to return to tank.



Step 4: Third cylinder travels until the end of stroke, where it actuates the switching valve. This changes where the pressure is sent to the other side of the cylinders. Step 1 repeats.

Basic KMD Drive Unit Components

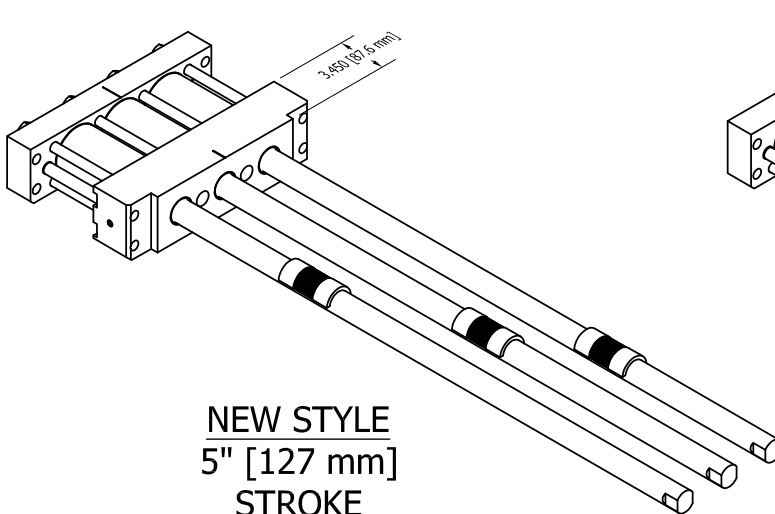


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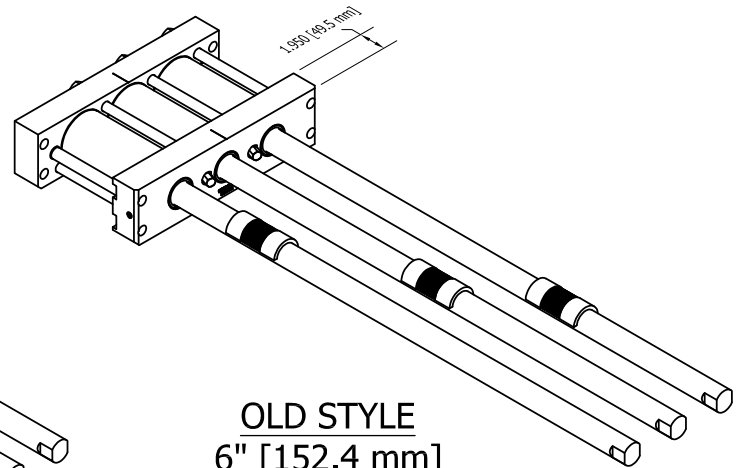
Basic KMD Drive Unit Component Descriptions

Cylinder Pack	The cylinders move the floor slats. Each KMD drive has three hydraulic cylinders. The KMD 250 uses cylinders with 2.50" [64 mm] ID. The KMD 300 uses cylinders with 3.00" [76 mm] ID. Controls are available in manual and electric options. Remote controls may be available for the electric option. Contact your local representative for more information about available options.
Switching Valve	The switching valve determines the direction of oil flow to the cylinders and also determines the movement of the floor, in the load or unload direction.
Load Unload Cartridge	The direction of floor movement can be controlled with an electric or manual load/unload cartridge.
Cross-Drive	Three cross-drives are connected to the cylinder rods, allowing each cylinder to move multiple floor slats.
Drive Shoe	The drive shoes connect the cross-drives to the floor slats. Slat centers vary.
Cross-Drive Support	The cross-drive support tubes help maintain the position of the cross-drives over the mainframe rails.
Actuator / Rod	The actuator rod allows the stroke to be adjusted between the actuators and is important for the efficient movement of the drive unit.
Bearing Block	The bearing block supports the cylinder rods.
Serial Plate	The information contained on the serial plate includes the drive unit's serial number and contact information for KEITH Mfg. Co.

KMD Identification Guide



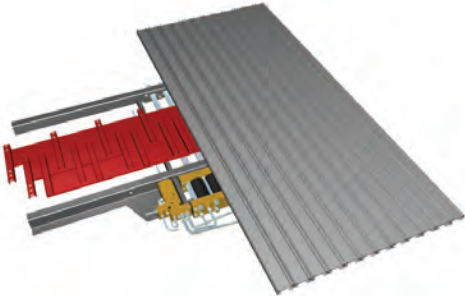
NEW STYLE
5" [127 mm]
STROKE
POST-2012



OLD STYLE
6" [152.4 mm]
STROKE
PRE-2012

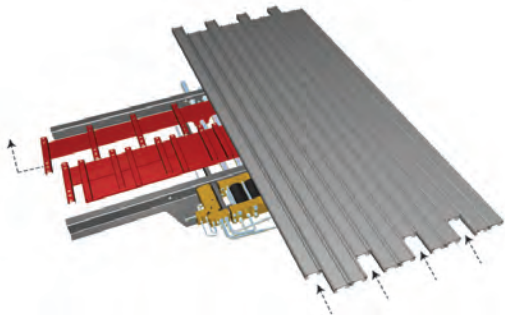
3.0 Operation

3.1 How It Works



Initial Stage

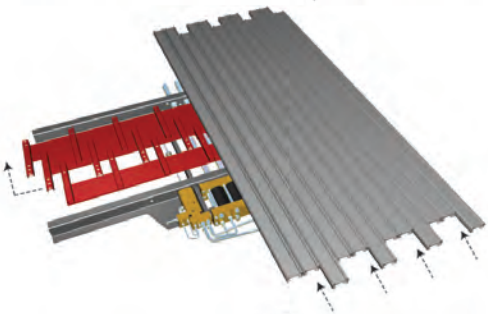
All Slats are staged together toward the direction of material travel (discharge end).



Stage 1

The first group of slats/planks, approximately every 3rd slat, moves under the load.

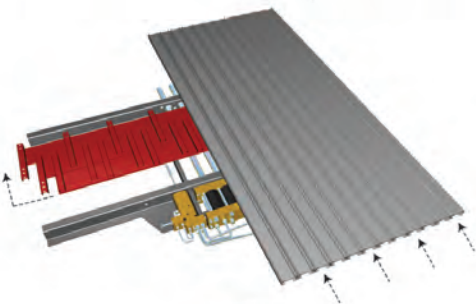
Load does not move.



Stage 3

The second group of slats/planks moves under the load.

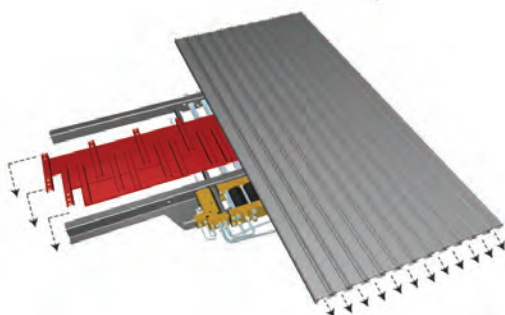
Load does not move.



Stage 4

The final group of slats/planks moves under the load.

Load does not move.



Stage 5

All slats/planks move together.

Load moves with the floor toward the discharge end.

3.2 Start-up Operation

3.2.1 Before initial start-up:

- Read through this manual. If there is any confusion, contact a KEITH representative and resolve any concerns before operation of this system (see end page for contact info).
- Ensure that the hydraulic reservoir has the recommended amount of oil, as well as the correct type of oil (see Specifications section of this manual for details about your system).
- Check floor bolt torque. Floor bolts coming loose can severely damage floor slats (see the Specifications section of this manual for bolt torque values).
- Familiarize yourself with the Preventative Maintenance section of this manual. Following the maintenance schedule will significantly improve the life of the system.

3.2.2 After 6 working hours OR one week:

- Visually inspect the system for hydraulic leaks. If any leaks are found, retighten fittings.
- Change oil filters. This will ensure that any contamination that was flushed out in the start-up will not prematurely wear out your system.
- Check floor bolt torque. Floor bolts coming loose can severely damage floor slats. If any bolts were loose during this check, check bolt torques twice as often as recommended in the Maintenance section of this manual.

3.3 Pre-trip Checklist

- ✓ Inspect hoses and connectors for damage and contamination. Clean all dirt and water from connectors before hooking up (if applicable).
- ✓ Inspect drive unit for leaking fittings, or hoses, and visible damage.
- ✓ Open truck or trailer doors and inspect flooring for damage. Inspect flooring at the rear of the truck or trailer for loose or bent slats that may have popped up.
- ✓ Hook up hydraulic connectors if applicable and operate the floor. Inspect for leaks while operating. Engage and disengage ball valve to check for proper operation. Check control valve for proper operation (Load, Unload).
- ✓ If problems are found, report them to the maintenance shop as soon as possible.
- ✓ Secure truck or trailer doors and proceed.

As the driver, you will see damage or operational problems before anyone else. Please report it as soon as possible.

Do not attempt to make adjustments or repairs without consulting with a trained service technician from your company or KEITH Mfg. Co. See the Trouble Shooting section for contact information.

3.4 Unloading or Loading

1. Set parking brake on truck and trailer.
2. Open truck or trailer doors fully and secure doors with provided chains or loop rings.

! CAUTION: ALWAYS have doors fully open! Do not, under any circumstances, engage the Power Take Off / Pump (P.T.O.) or WALKING FLOOR® unloader with the doors of the truck or trailer closed. Catastrophic failure to the trailer may occur. !

3. Place control valve in the required position for the desired direction.
 - If you have a drive unit with a manual load/unload option, gently twist the knob connected to the cartridge valve until it stops.
 - If you have a drive unit with an electric load/unload option, the coil should not be energized for unload, and should be energized for load.
4. Open the ball valve, located between the pressure and return lines. This ball valve is used as an emergency shut-off.
5. Connect hydraulic hoses to truck (If applicable).
6. Engage the P.T.O., then bring the truck engine up to the RPM to achieve desired flow rate from the wet kit.
7. Close the ball valve. Your truck or trailer floor should now be operating.

! CAUTION: While unloading, NEVER leave truck and trailer unattended. !

!! WARNING: Do not go under the truck or trailer body or enter the truck or trailer while the system is in operation, nor allow anyone to stand or move through the area where the load is being discharged. Burial, loss of limb or life may occur. !!

8. After unloading has been completed, stop the floor with all slats in the forward position by placing the ball valve in the open position.
9. Disengage P.T.O. and return the truck engine to idle.
10. Close and secure the truck or trailer doors.
11. Disconnect and secure the hydraulic hoses (If applicable).
12. If a problem should arise while unloading, promptly do one of the following:
 - a. Disengage P.T.O. system.
 - b. Open ball valve.

! CAUTION: Observations may be made while system is operating for troubleshooting purposes, but NEVER touch any moving part or attempt to make any adjustments to the system with the Power Take Off/Pumping system engaged or the WALKING FLOOR® unloader operating. !

4.0 Maintenance

!! WARNING: The extreme forces exerted by the floor when in operation can result in damage to equipment, as well as cause serious injury or death. Always switch off the pump and turn the manual ball valve to the open position during maintenance and/or service work. !!

4.1 Life Extending Conditions

- Follow the Start-up procedures in the Operation section of this manual.
- Use only clean oil, free from contamination.
- Use required torque on all bolts. The cross-drive clamp bolts and the floor bolts attaching the slats must be checked regularly. Loose floor bolts will cause serious damage to the floor slats.

4.2 Preventative Maintenance

4.2.1 Monthly Service (25 operating hours)

- Check the system for hydraulic leaks.
- Check the operating temperature. No single component should be warmer than 140°F [60°C] while the system is running.
- Check and torque all floor bolts attaching the floor slats.
- Check and torque the cylinder clamp bolts.
- Pressure wash drive unit, sub-deck, and slats (recommended quarterly, minimum twice per year).

4.2.2 6-month Service (150 operating hours)

- Change the pressure and/or return oil filters.
- Cycle the system unloaded in both directions and observe to ensure proper operation.
- Inspect cross-drive support bearings for wear. Replace as needed.
- Inspect cross-drive tubes and shoes for damage. Replace as needed.
- Inspect floor bearings for excessive wear, especially above the tires. Replace as needed.
- Inspect floor slats for wear. If discharge end of slat is worn more than $\frac{3}{4}$ " of original thickness, rotate slat end for end to increase life of the slat. If slat has already been rotated, contact KEITH for a replacement slat.

5.0 Trouble Shooting

5.1 Technical Support

Before contacting KEITH Mfg. Co. for support, please review:

- ✓ The troubleshooting check list below.
- ✓ The specific trouble shooting situations below.

Please have the following information readily available before contacting KEITH Mfg. Co. for support:

- Model Number (Located on the Information Plate of the drive unit)
- Serial Number (Located on the Information Plate on the drive unit)
- Number of floor slats
- Cylinder bore size
- Drive unit model
- Vehicle make and unit installer

Problems and Trouble-Shooting Contact Information for United States:

KEITH Mfg. Co. web site: www.keithwalkingfloor.com

KEITH Mfg. Co. email: techdept@keithwalkingfloor.com

KEITH Mfg. Co. toll-free: (800) 547-6161

KEITH Mfg. Co. telephone: (541) 475-3802

KEITH Mfg. Co. fax: (541) 475-2169

See the contact information at the end of this manual if you are outside of the United States.

5.2 Troubleshooting Check List

Before requesting technical assistance please verify the following:

- ✓ Is your entire system plumbed per the plumbing diagram?
- ✓ Pump: Will it pump 15 GPM [57 liter/min] at 3000 PSI [210 bar]?
- ✓ Relief Valve: Is it set at 2800-3000 PSI [195-210 bar]?
- ✓ Oil: Is the oil reservoir full?
- ✓ Power Take Off: Is the P.T.O. engaged?
- ✓ Quick Disconnects (If applicable): Are they completely engaged?
- ✓ Ball Valve: Is the ball valve that controls the drive unit closed?
- ✓ Manual Control Valve: Is the control valve fully engaged in the correct direction?
- ✓ Electrical Operation: Is there sufficient voltage?
- ✓ E-Stop: Is the emergency stop button pulled out?
- ✓ Is the pressure line on the trailer attached to the pressure line on the tractor and the return line on the trailer attached to the return line on the tractor?
- ✓ Be sure that your entire wet kit system meets the requirements of the hydraulic wet kit specifications in this manual.

5.3 Problem/Solution Trouble Shooting

General Trouble Shooting	
Problem:	The cycle begins, then the floor stops.
<i>Specific Trouble:</i>	Driver's side cross-drive (#1) moves forward to the front of the vehicle, center cross-drive (#2) moves forward, passenger side cross-drive (#3) moves forward, then the system stops.
<i>Possible Cause:</i>	The switching valve is not switching correctly.
<i>Solution:</i>	The threaded rod nuts on the discharge end of the threaded actuator rod are not adjusted correctly. Break the two nuts apart and adjust toward the rear of the vehicle. Re-lock the nuts together.
<i>Specific Trouble:</i>	All cylinders move toward the rear of the vehicle, then the system stops.
<i>Possible Cause #1:</i>	The switching valve is not switching correctly.
<i>Solution:</i>	The threaded rod nuts on the forward end of the threaded actuator rod are not adjusted correctly. Break the two nuts apart and adjust toward the front of the vehicle. Re-lock the nuts together.
<i>Possible Cause #2:</i>	Insufficient pressure.
<i>Solution:</i>	Check the pressure and adjust the pressure relief valve, if necessary. If the floor stops in the full rear position and the switching valve has switched, the oil pressure may not be high enough. Less pressure is required to move the load than to pull the slats individually (1/3 at a time) under the load.
<i>Specific Trouble:</i>	The floor functions perfectly without a load or with a light load, but not with a heavy load.
<i>Possible Cause #1:</i>	Insufficient pressure.
<i>Solution:</i>	Check the pressure and adjust the pressure relief valve, if necessary.
<i>Possible Cause #2:</i>	The switching valve is not switching correctly.
<i>Solution:</i>	Check the adjustment of the nuts on the threaded actuator rod as detailed above.
Problem:	Drive cycles incorrectly when unloading.
<i>Specific Trouble:</i>	Cylinders #1 and #2 extend together toward the front of the vehicle.
<i>Possible Cause:</i>	The check valve at the front end of cylinder #1 has malfunctioned.
<i>Solution:</i>	Replace the check valve.

General Trouble Shooting

<i>Specific Problem:</i>	Cylinders #2 and #3 extend together toward the front of the vehicle.
<i>Possible Cause:</i>	The check valve at the front end of cylinder #2 has malfunctioned.
<i>Solution:</i>	Replace the check valve.
<i>Specific Trouble:</i>	All cylinders extend together toward the front of the vehicle.
<i>Possible Cause #1:</i>	The load/unload cartridge valve has malfunctioned.
<i>Solution:</i>	Replace the load/unload cartridge valve.
<i>Possible Cause #2:</i>	The check valves at the front end of cylinders #1 and #2 have malfunctioned.
<i>Solution:</i>	Replace the check valves.
Problem:	Drive cycles incorrectly when loading.
<i>Specific Trouble:</i>	Cylinders #2 and #3 extend together toward the rear of the vehicle.
<i>Possible Cause:</i>	The check valve at the rear end of cylinder #3 has malfunctioned.
<i>Solution:</i>	Replace the check valve.
<i>Specific Trouble:</i>	Cylinders #1 and #2 extend together toward the rear of the vehicle.
<i>Possible Cause:</i>	The check valve at the rear end of cylinder #2 has malfunctioned.
<i>Solution:</i>	Replace the check valve.
<i>Specific Trouble:</i>	All cylinders extend together to the rear of the vehicle.
<i>Possible Cause #1:</i>	The load/unload cartridge valve has malfunctioned.
<i>Solution:</i>	Replace the load/unload cartridge valve.
<i>Possible Cause #2:</i>	The check valves at the front end of cylinders #2 and #3 have malfunctioned.
<i>Solution:</i>	Replace the check valves.

6.0 Adjustments and Replacements

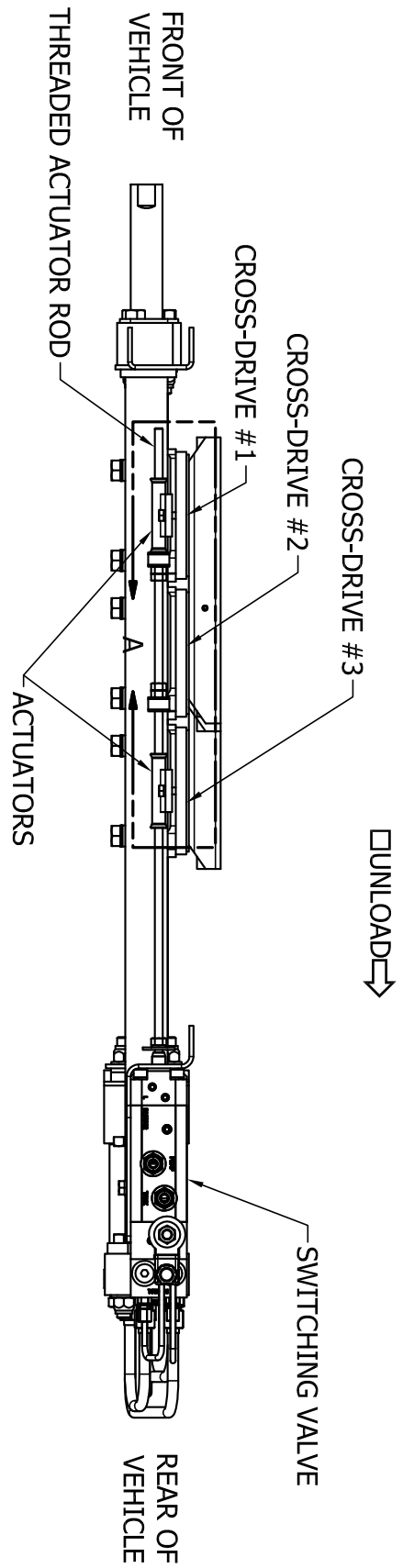
6.1 Switching Valve Adjustment

Tools needed: (2) 9/16 inch [15mm] open-end wrenches.

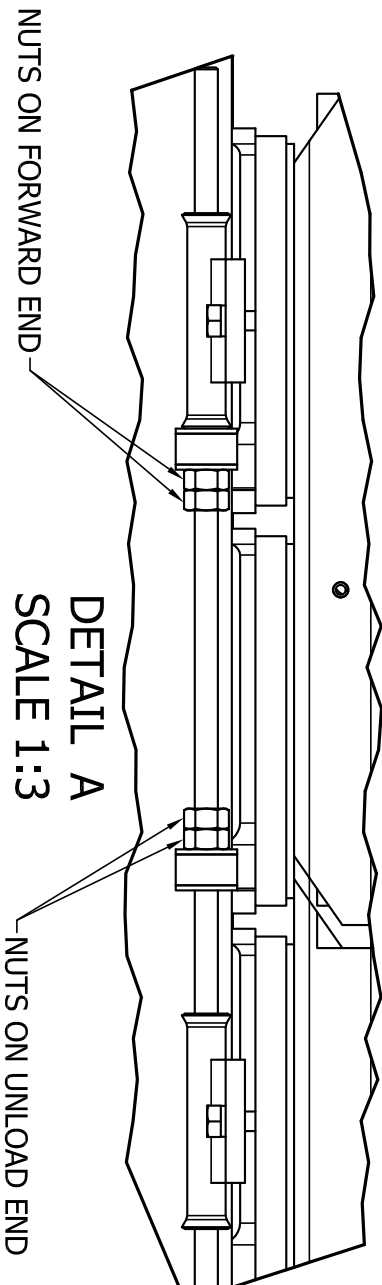
Most switching valves are incorrectly replaced because they are out of adjustment.

Always adjust the switching valve as described below.

1. **Use the ball valve to stop the drive unit.** The ball valve is located toward the front of the drive unit, in front of the hydraulic cylinders. Move the ball valve handle toward the center of the trailer, which will allow the hydraulic oil to by-pass the drive unit.
2. **Loosen the 3/8" jam nuts located on the threaded rods on each end of the switching valve.** On each threaded rod there are two flat washers and a grommet. The 3/8" jam nuts are located between the switching valve and the washers. After loosening the nuts, adjust them toward the switching valve. Doing this will throw the switching valve out of adjustment. Repeat the process at the other end of the switching valve.
3. **Start the truck engine and engage the P.T.O. Let the clutch out slowly.** Pull the ball valve handle toward the driver's side. The drive unit will move to the load or unload direction. The system will lock up and be under high pressure when the cylinders reach the end of the stroke. Immediately push the ball valve handle toward the center of the trailer. This will allow the hydraulic oil to bypass the system. At this point, the cylinders will be at maximum stroke.
4. **Disengage P.T.O.**
5. **Push the threaded rod in the direction that the cylinders are bottomed.** Slide the washers and rubber grommet out toward the loop on the cross drive. Turn the 3/8" jam nuts out until they are tight against the washers. Then turn the first nut one extra turn. Bring the second nut up to the first nut and tighten the two together, setting the jam nuts.
6. **Engage P.T.O.**
7. **Move the ball valve handle slowly, causing the hydraulic cylinders to travel to the opposite direction.** Let the cylinders travel until they lock up. Then push the ball valve handle to the center.
8. **Disengage P.T.O.**
9. **Push the threaded rod in the direction that the cylinders are bottomed.** Slide the washers and rubber grommet out toward the loop on the other cross drive. Turn the 3/8" jam nuts out until they are tight against the washers. Then turn the first nut one extra turn. Bring the second nut up to the first nut and tighten the two together, setting the jam nuts.
10. **The switching valve adjustment is completed.**



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NOTE: THESE ARE 10mm NUTS
REQUIRING (2) 16mm OR 5/8"
OPEN END WRENCHES.

6.2 Replacing a Check Valve

Replacing a KEITH® M-SERIES SYSTEM check valve is a simple procedure.

The tools required to do this are:

- (1) 11/16" [18mm] x 3/8" drive socket
- (1) 3/8" drive ratchet
- (1) Small magnet
- (1) Flash light
- (1) Bucket
- Shop towels

NOTE: The check valves at the rear of the cylinders (discharge end) do nothing when you are unloading and are used for loading only.

6.2.1 To disassemble a check valve:

1. Run the cylinder away from the check valve in order to free it.
2. Place the bucket under the check valve to be removed.
3. Clean the area with a shop towel.
4. Remove the check valve with the 11/16" socket and ratchet.
5. Use the magnet to remove the spring and check valve.
6. Inspect the valve seat for damage. Use the flash light as necessary.

6.2.2 To assemble a check valve

1. Ensure all of the surfaces are clean.
2. Place the supplied O-Ring on the check valve cap, if necessary.
3. Insert the check valve and place the spring on the check valve stem.
4. Place the check valve cap over the spring and carefully thread it into the manifold body. Be careful not to cross thread, which will cause the manifold to permanently leak.
5. Tighten the cap to 18 ft-lb [24 Nm]. **DO NOT OVER TIGHTEN!**
6. Run the floor and check for leaks.

6.3 Replacing the Cylinder Pack

The tools required to do this are:

- (1) 15/16" [24mm] x 1/2" drive socket
- (1) 1/2" drive impact wrench
- (1) 6" x 1/2" drive extension
- (1) 1/2" drive torque wrench
- (1) 15/16" [24mm] open-end wrench
- (2) 7/8" [23mm] open-end wrenches
- (1) Pry bar
- (1) Bucket and shop towels

6.3.1 To uninstall a cylinder pack:

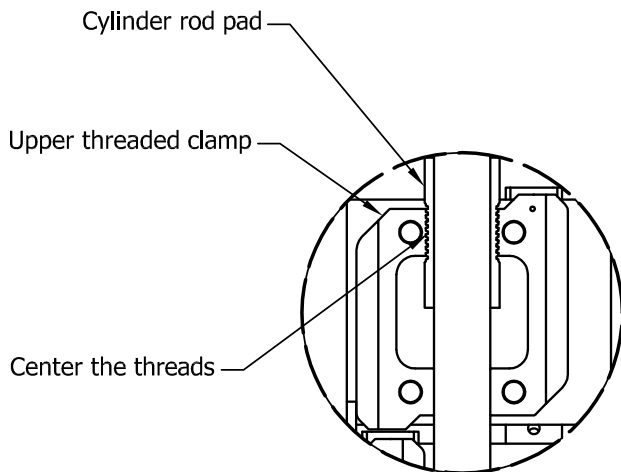
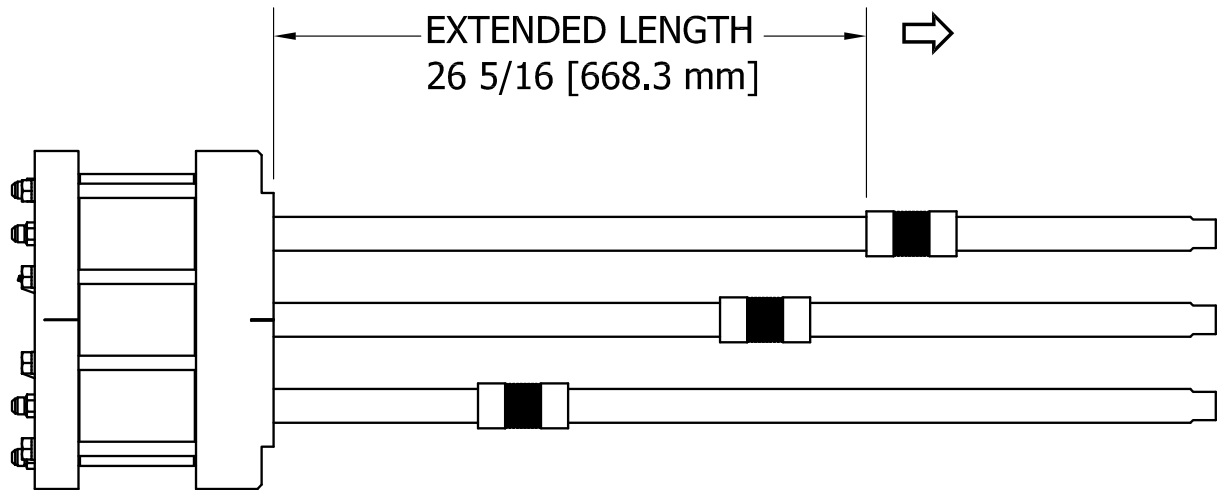
1. Run all of the cylinders toward the load end, if possible.
2. Place the bucket under the 1/2" tubes to be removed and clean the area with shop towels.
3. Remove the 1/2" tubes with the 7/8" open-end wrenches.
4. Remove the rod bearing.
5. Remove the lower cross-drive clamps.
6. Remove the manifold mounting nuts. Do not remove all the bolts, as they will support the cylinder pack.
7. Pry the drive rod pads from the cross-drives.
8. Remove the manifold mounting bolts. The cylinder pack should be free to lower out of the frame.

6.3.2 To install a cylinder pack:

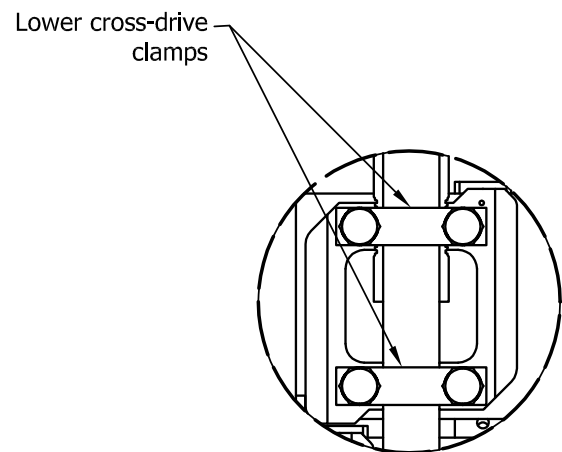
1. Make sure that the replacement cylinder pack has the same cylinder centers as the cross drive clamps being used in the vehicle (compare the description written on the old cylinder pack manifolds with the new one). If the cross-drives were left in their fully forward position, carefully tap the cylinder rods to their fully extended position.
2. Ensure all of the surfaces are clean.
3. Loosely place the replacement cylinder pack into position in the drive frame, putting the M16x120mm bolts and M16x90mm bolts back in to hold it in place.
4. Center the cylinder rod pads on the upper threaded clamps on the cross-drives.
5. Reinstall the lower cross-drive clamps. Torque the 16x55mm bolts (with lock washers) to 135 ft-lb [183 Nm].
6. Replace the rod bearing and cover plate (preferably with a new one). Evenly torque the M16x90mm bolts to 80 ft-lb [108 Nm].
7. Evenly torque the (4) front M16x120mm manifold mounting bolts to 135 ft-lb [183 Nm].
8. Evenly torque the (4) rear M16x90mm manifold mounting bolts to 135 ft-lb [183 Nm].
9. Reinstall the (4) 1/2" hydraulic tube between the switching valve and manifold. Note the tube positions are labeled on both the switching valve and the rear manifold.
10. Run the floor and check for leaks.

Step #1

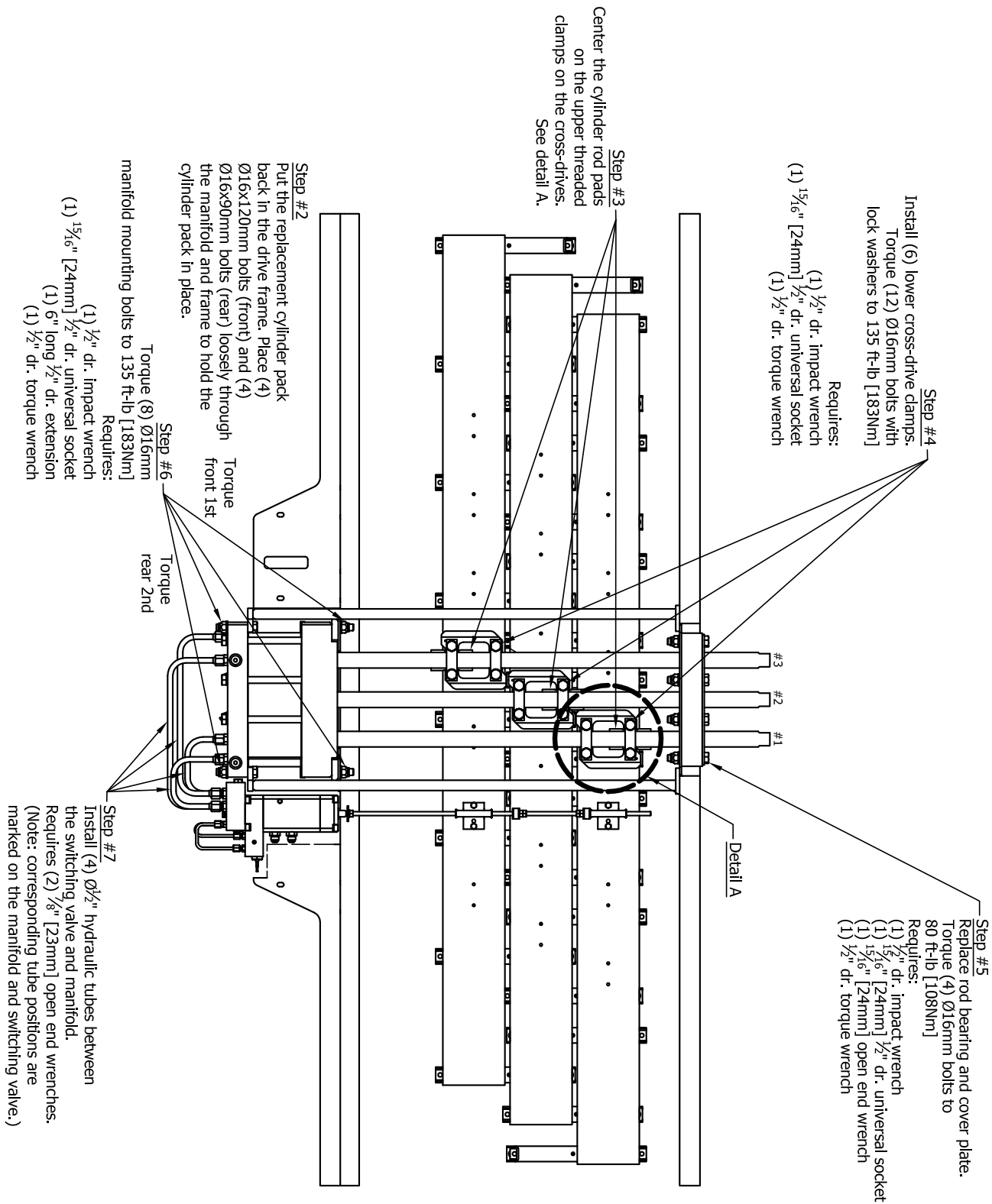
If all three cross-drives were cycled fully forward in the load direction before removing the old cylinder pack then begin by tapping the cylinder rods on the replacement cylinder pack to their fully extended position with a rubber mallet.

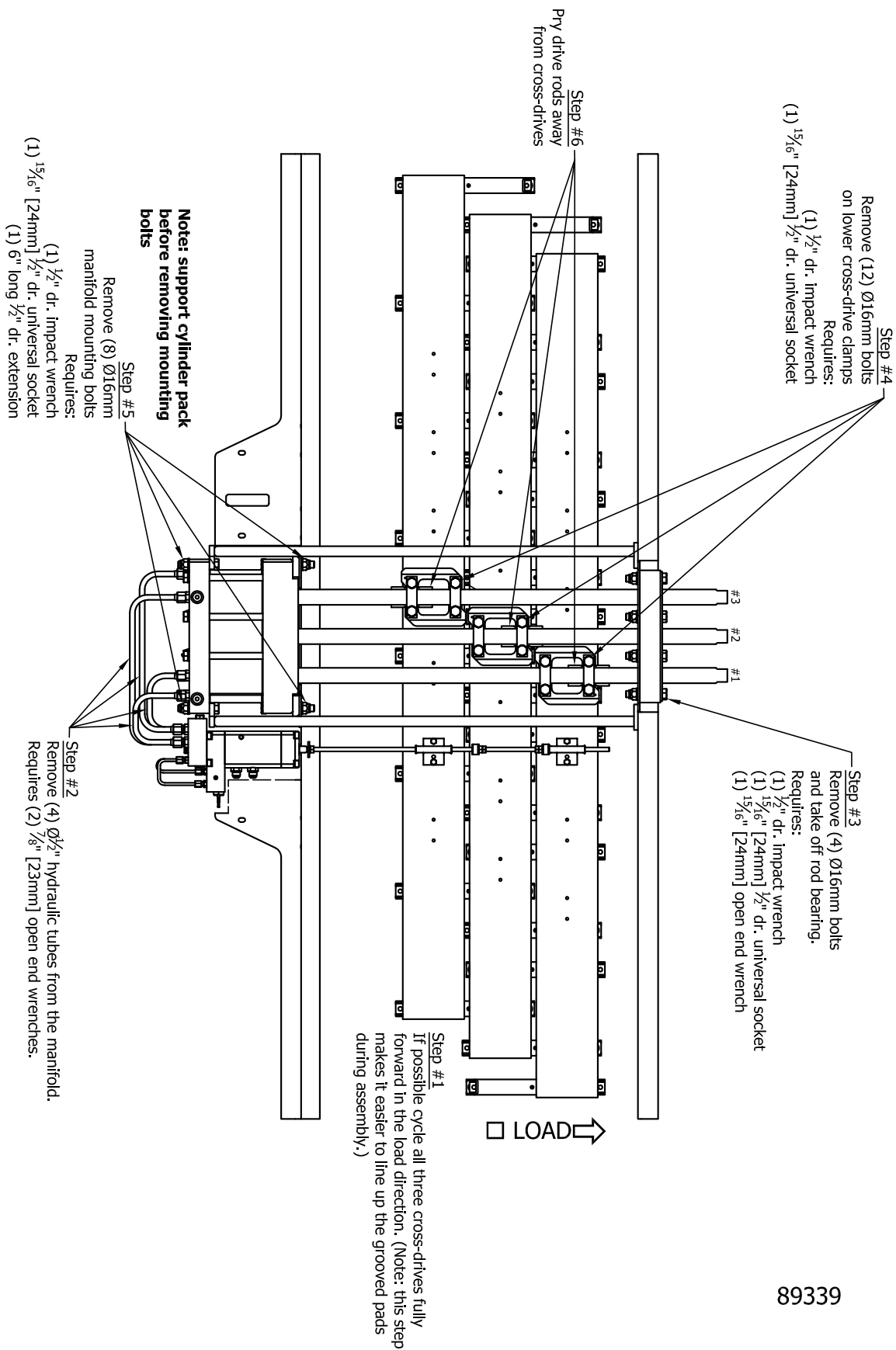


Detail A
Step #3



Detail A
Step #4





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6.4 Replacing a 1/2" Tube Set

The tools required to do this are:

- (2) 7/8" [23mm] open-end wrenches
- (1) Bucket
- Shop towels

6.4.1 To remove the tube set:

1. Place the bucket under the 1/2" tubes to be removed.
2. Clean the area with a shop towel.
3. Remove the tubes with 7/8" open-end wrenches.

6.4.2 To install the tube set:

1. Make sure that the replacement tube set corresponds with the switching valve placement in the customers system.
2. Make sure all the surface are clean.
3. Replace the (4) 1/2" hydraulic tubes between the switching valve and manifold. Note that tube positions are labeled on both the switching valve and rear manifold.
4. Run the floor and check for leaks.

7.0 Contact Information

KEITH Mfg. Co.
World Headquarters
Parts & Service
401 NW Adler St.
P.O. Box 1
Madras, OR 97741
800-547-6161
541-475-3802
541-475-2169 fax
sales@keithwalkingfloor.com

WALKING FLOOR International/Canada
Parts & Service
65 Bury Ct.
Brantford, ON N3S 0A9
800-514-6085
519-756-9178
519-756-0687 fax
canadasales@keithwalkingfloor.com

WALKING FLOOR International México, S.A. de C.V.
Parts & Service
Av. Emiliano Zapata No. 69, Bodega 7
Col. San José, San Vicente Chicoloapán
Edo. de México C.P. 56370
52-55-8112-8000
52-55-8112-9100 fax
kmc_mexico@keithwalkingfloor.com

KEITH WALKING FLOOR Europe
Netherlands
Parts & Service
Harselaarseweg 113
3771 MA Barneveld
31-342-422007
31-342-422180 fax
eurosales@keithwalkingfloor.com