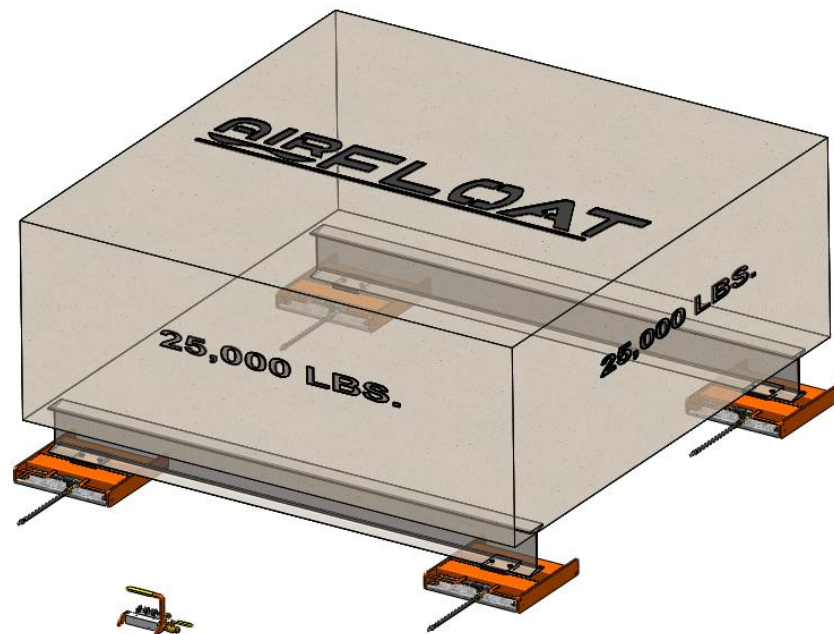




INNOVATION IN MOVEMENT

STANDARD OPERATING MANUAL SINGLE BEARING AIR SKIDS



ADDRESS

2230 Brush College Road

Decatur, Illinois 62526

1-800-888-0018

Phone: (217) 423-6001

Fax: (217) 422-1049

Website: www.airfloat.com

LAST REVISED ON: April 2011

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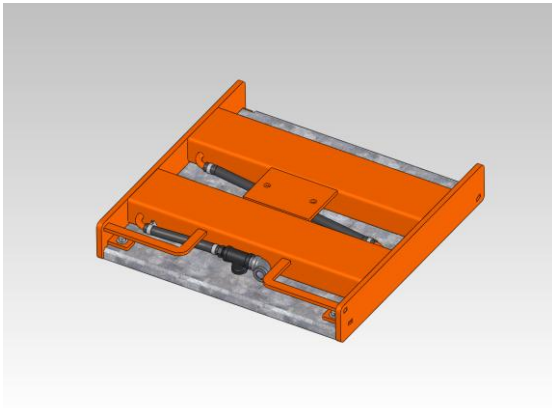
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I. SUGGESTIONS ON START UP

- A. Review the specifications section to become familiar with the features of this equipment.
- B. **CAUTION:** When removing from crate, carefully remove skids from crate and place on smooth, clean floor, free of any foreign objects.
- C. Inspect the equipment for possible damage in shipment or unpacking. Check especially for cuts or damage to air bearing diaphragms.
- D. Some skids are shipped with bearings removed and crated separately to avoid bearing damage. When applicable, install the air bearings by sliding the air bearing and tray assembly into the air skid frame at the opening provided. Fasten the tray in place with the retainer bolts. Connect the short hose from the inlet tee to the air skid chamber pipe and secure with the worm gear clamp.

NOTE: A Styrofoam spacer is used to protect the diaphragm in some shipments, and must be removed. Remove any tape residue left by the attachment tape.
- E. Please review the following information on skid placement under the load, air flow, and surfaces.

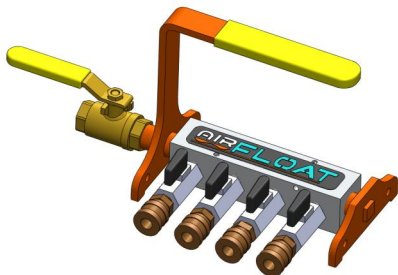
SKID TYPES:



STS model steel skid



CAS model cast aluminum skid



CP control unit



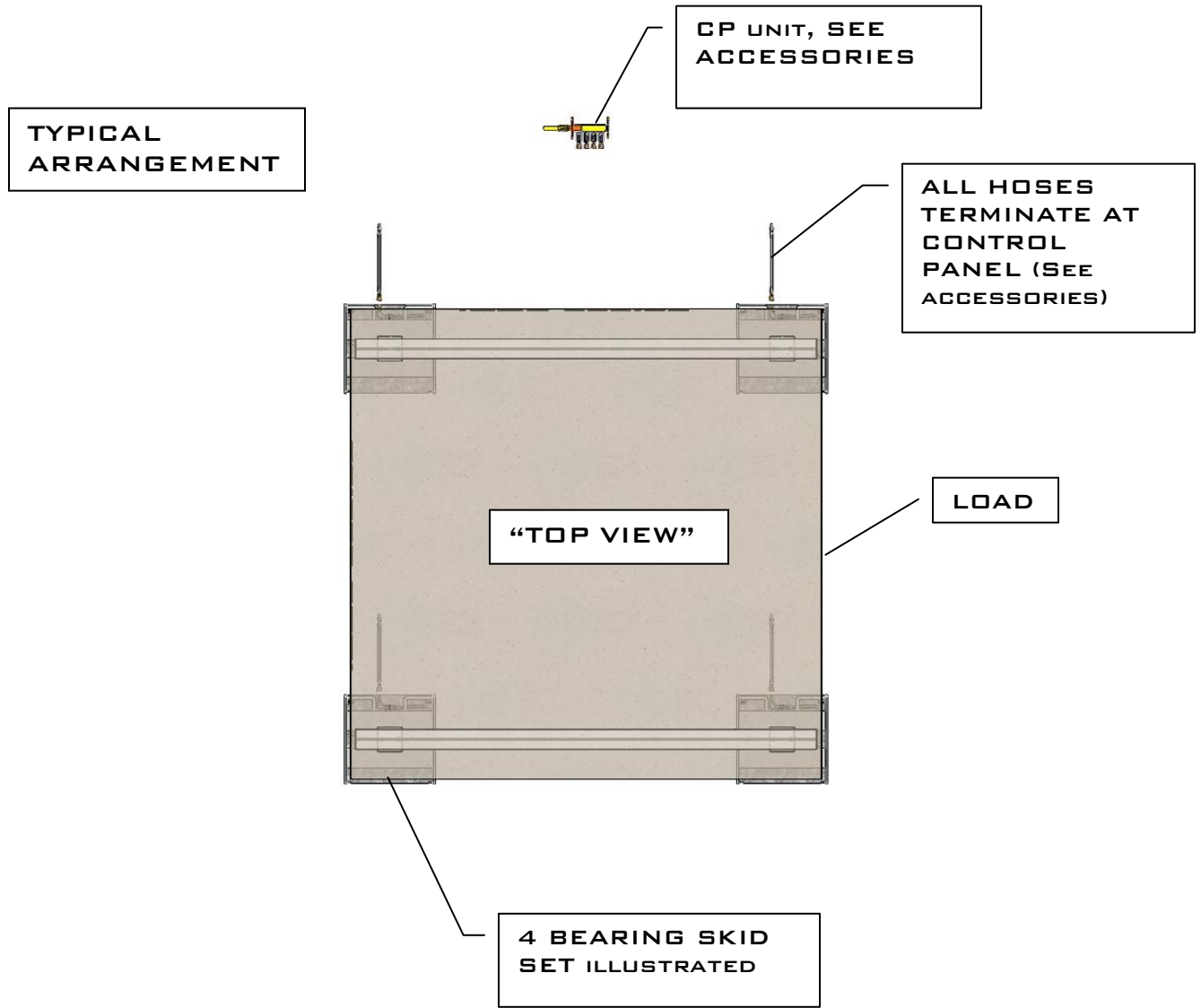
AHS hose assembly

II. SPECIFICATIONS SECTION

STEEL SKID MODEL	CAPACITY	DIMENSIONS A X B X H	MOUNTING HOLES	INLET SIZE NPT	LIFT	FLOW SCFM M3/MIN	BEARING NUMBER	MINIMUM LOAD AREA L X L	WT.
STS-12	3,000 LBS 1,360 KG	13 x 13 1/4 x 3 IN 330 x 330 x 76 MM	2 @ 3/8 - 16 ON 2 1/2" CTR.	1/4 IN	3/8 IN .95 CM	8-11 .22-.31	H-0012	4 X 4 IN. 10.2 X 10.2 CM	25 LBS 11.33 KG
STS-17	6,250 LBS 2,835 KG	18 1/2 x 18 1/4 x 2 7/8 IN 470 x 464 x 73 MM	2 @ 3/8 - 16 ON 3/12" CTR.	3/8 IN	1/2 IN 1.27 CM	12-16 .34-.45	H-0017	5 X 5 IN. 12.7 X 12.7 CM	45 LBS 20.41 KG
STS-20	8,250 LBS 3,970 KG	21 3/4 x 21 1/4 x 2 7/8 IN 552 x 540 x 73 MM	2 @ 3/8 - 16 ON 3/12" CTR.	3/8 IN	5/8 IN 1.58 CM	13-18 .37-.51	H-0020	6 X 6 IN 15.2 X 15.2 CM	70 LBS 31.7 KG
STS-24	12,500 LBS 5,670 KG	25 1/2 x 25 1/4 x 3 1/2 IN 648 x 641 x 89 MM	2 @ 3/8 - 16 ON 3/12" CTR.	3/8 IN	3/4 IN 1.9 CM	16-22 .45-.62	H-0024	6 X 6 IN 15.2 X 15.2 CM	90 LBS 40.8 KG
STS-30	21,250 LBS 9,640 KG	31 3/4 x 31 1/2 x 3 1/2 IN 806 x 800 x 89 MM	2 @ 1/2 - 13 ON 6" CTR.	3/8 IN	1 IN 2.54 CM	21-28 .59-.79	H-0030	7 X 7 IN 17.7 X 17.7 CM	120 LBS 54.4 KG
STS-36	31,250 LBS 14,175 KG	37 3/4 x 37 1/2 x 4 IN 959 x 953 x 102 MM	2 @ 1/2 - 13 ON 6" CTR.	1/2 IN	1 1/4 IN 3.175 CM	26-35 .73-.99	H-0036	8 X 8 IN 20.3 X 20.3 CM	195 LBS 88.4 KG
STS-48	52,500 LBS 23,815 KG	50 1/4 x 49 1/2 x 5 IN 1276 x 1257 x 127 MM	4 @ 1/2 - 13 ON 8" CTR.	1/2 IN	1 1/2 IN 3.81 CM	35-47 .99-1.33	H-0048	10 X 10 IN 25.4 X 25.4 CM	475 LBS 215.4 KG

ALUMINUM SKID MODEL	CAPACITY	DIMENSIONS A X B X H	INLET SIZE NPT	LIFT	FLOW SCFM M3/MIN	BEARING NUMBER	WT.
ALS-12	3,000 LBS 1,360 KG	12 1/2 x 12 1/2 x 2 1/2 IN 317 x 317 x 64 MM	1/4 IN	3/8 IN .95 CM	8-11 .22-.31	H-0012	11 LBS 5 KG
ALS-17	6,250 LBS 2,835 KG	17 1/2 x 19 5/8 x 2 1/2 IN 444 x 498 x 64 MM	3/8 IN	1/2 IN 1.27 CM	12-16 .34-.45	H-0017	24 LBS 11 KG
ALS-20	8,250 LBS 3,970 KG	20 1/2 x 21 x 2 1/2 IN 520 x 533 x 64 MM	3/8 IN	5/8 IN 1.58 CM	13-18 .37-.51	H-0020	28 LBS 13 KG
ALS-24	12,500 LBS 5,670 KG	25 1/4 x 25 1/4 x 2 1/2 IN 641 x 641 x 64 MM	3/8 IN	3/4 IN 1.9 CM	16-22 .45-.62	H-0024	50 LBS 23 KG
ALS-30	21,250 LBS 9,640 KG	30 x 30 x 2 1/2 IN 762 x 762 x 64 MM	3/8 IN	1 IN 2.54 CM	21-28 .59-.79	H-0030	65 LBS 30 KG
ALS-36	31,250 LBS 14,175 KG	36 3/4 x 37 1/2 x 2 1/2 IN 933 x 952 x 64 MM	1/2 IN	1 1/4 IN 3.175 CM	26-35 .73-.99	H-0036	95 LBS 43 KG
ALS-48	52,500 LBS 23,815 KG	48 x 48 x 2 1/2 IN 1219 x 1219 x 64 MM	1/2 IN	1 1/2 IN 3.81 CM	35-47 .99-1.33	H-0048	145 LBS 66 KG

CAST ALUMINUM MODEL	CAPACITY	DIMENSIONS A X B X H	MOUNTING HOLES	INLET SIZE NPT	LIFT	FLOW SCFM M3/MIN	BEARING NUMBER	MINIMUM LOAD AREA L X L	WT.
CAS-17	6,250 LBS 2,835 KG	18 3/4 x 19 x 2 1/2 IN 476 x 483 x 64 MM	2 @ 3/8 - 16 ON 4" CTR.	1/4 IN	3/8 IN .95 CM	5-10 .22-.42	H-0017-74	6 X 6 IN. 15.2 X 15.2 CM	35 LBS 15.9 KG

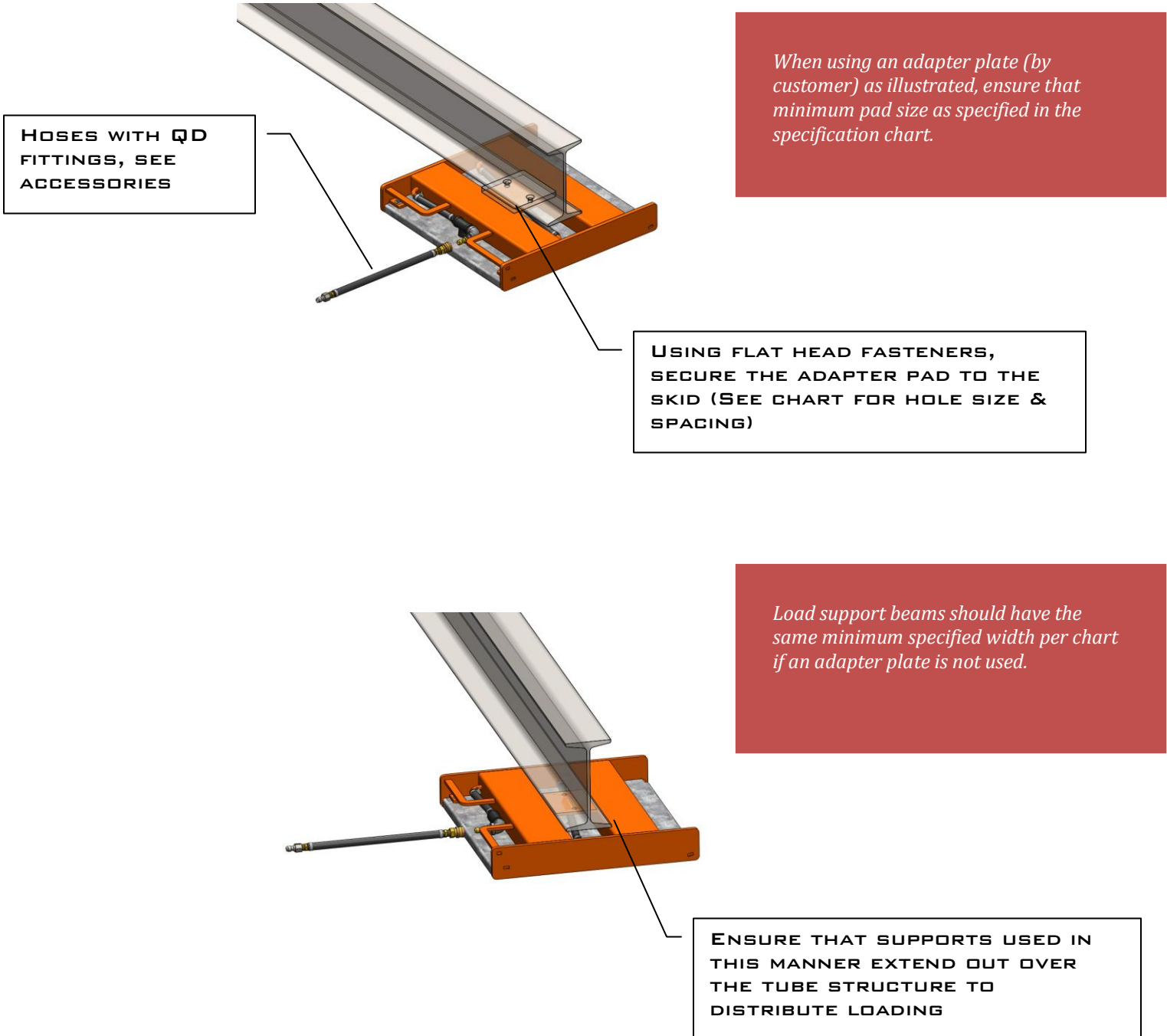


III. SINGLE BEARING AIR SKIDS AND THE LOAD

- A. Care should be taken so that capacities of individual air skids are not exceeded (see specifications section for air skid capacities). Although a set of skids may have a combined capacity to carry a load, if the load is not distributed equally (i.e., one end is heavier than the other), the capacity of individual air skids may be exceeded.

Where possible, position the air skids to give equal weight distribution on each air skid. If equal weight distribution is not possible, and individual air skid capacity will not be exceeded, the load may be moved by simply adjusting the individual flow control valves until approximately the same amount of lift is attained at each air skid.

- B. For bolted attachment of skids to load, use mounting holes provided or use an adapter plate as shown below. For simple placement under load, check specifications section to verify that load contact with skid meets or exceeds minimum.
- C. **CAUTION:** Do not drill holes in the tube frame of the steel skids, or the sealed compartments of the aluminum skids. These areas act as damping chambers to prevent vertical “hop” in the air bearings when air flow is high and the load is light.



IV. AIR SUPPLY

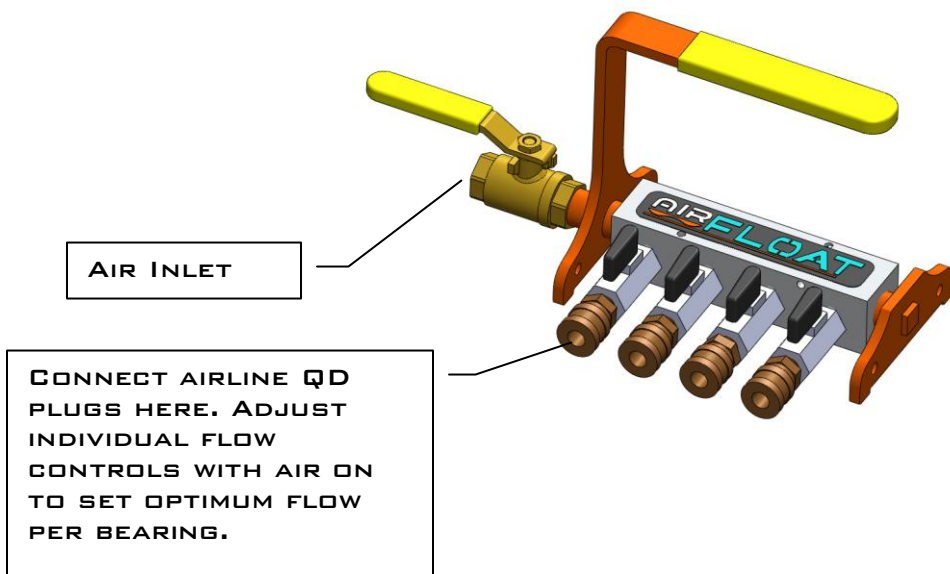
A. It is important that an adequate volume of air be supplied to the air skids. The table below shows the volume required for operation on a smooth surface, and the recommended "Supply" hose size required for that flow.

AIR BEARING SIZE	AIR FLOW (SCFM) SET OF (4) FOUR	SUPPLY HOSE SIZE (I. D.) TO 50'	SUPPLY HOSE SIZE (I. D.) 50' TO 100'
12	12-24	3/8"	1/2"
17	32-60	1/2"	3/4"
20	48-80	1/2"	3/4"
24	60-100	3/4"	3/4"
30	80-120	3/4"	1"
36	100-160	1"	1-1/4"
48	160-200	1-1/4"	1-1/4"

NOTE: Air flow requirements for air bearings vary greatly with the quality of the floor. Under excellent conditions, it may be possible to use one hose size smaller than shown.

If unsure of compressor capacity, multiply compressor horsepower x 4 to obtain an approximate capacity (SCFM).

B. Connect main air supply to control package or manifold assembly.



Typical four outlet hand held control package. See spare parts chart for Model number.

NOTE: OSHA requires a safety excess flow check valve for hoses larger than 1/2" I.D. The check valve will shut off air flow in the event of a severed hose. Consult factory if required.

- C. Connect all hoses to the air skids.
- D. To float the load, first set each of the individual flow control valves approximately $\frac{1}{2}$ of a turn open.
 - 1. If a pressure regulator is used, set the regulator at zero and fully open the main on/off ball valve. Slowly increase pressure at the regulator until the load floats free. If the load becomes unstable, reduce the air pressure until the load stabilizes. Loads not centered may cause variations in the lift height of individual skids. Increase or decrease the air flow at the individual flow control valves to approximately equalize lift.
 - 2. If a pressure regulator is not used, slowly open the main valve until the load is floating free. Increase or decrease the air flow at the individual flow control valves to approximately equalize lift.
- E. If the load is very tall and/or the air skids must be positioned close together, greatest stability can be achieved when individual flow controls are opened completely and the main regulator or main valve is throttled. This setting however, will not work with off-center loads.

V. FLOOR RECOMMENDATIONS

A. FLATNESS AND LEVELNESS:

Air bearing equipment requires a flat and level floor for best operation for three reasons. First, any slopes significantly add to the force needed to move or guide the equipment. Second, floor undulations can exceed bearing lift and equipment can “run aground” or hang up on raised portions of uneven floors. Third, when air bearings are deflated, the frame or landing skids contact the floor. If the load is very large, heavy, and rigid, floor loading can be extremely high on raised portions of the floor.

On a flat, level, and smooth floor, the force required to move air bearing equipment is very low, often in the range of 1 to 5 lbs. per 1000 lbs. of weight (.5 to .1% friction). With this low friction, even a small amount of floor slope strongly affects moving force and guiding effort.

For example, a slope of $\frac{1}{2}$ ” in 10 feet requires an added force of 4 lbs. per 1,000 pounds of load.

A floor can be generally level over its entire area, but have local undulations that strongly affect movement. For example, a load depression of only $\frac{1}{4}$ ” in 3 feet can add 7 lbs. moving force per 1000 lbs. for the bearing or bearings moving in the depression.

B. SMOOTHNESS:

Air bearings operate with a very thin air film between the diaphragm and floor. Minute floor projections greater than a few thousandths of an inch high will cause increased drag and air consumption. The surface must be clean and free of debris such as metal chips or shavings and other objects that may disrupt the air flow, causing the platform to ground out or otherwise damage the air bearing diaphragm.

Floor cracks or expansion joints must be filled or bridged to provide a continuous floor surface.

The ideal floor surface would be smooth, level, flat, non-porous, and have low friction characteristics. Polished sheet metal is a good example. Some commonly used floor

surfaces that come close to being ideal (when in good condition) are; rubber, asphalt or vinyl floor tile with tight joints, roll flooring in non-textured types, terrazzo, and machine troweled concrete with a dense polish finish and smooth epoxy.

Since wood is porous, seal coating of wood floors is essential. Care must be taken to avoid sealing down any grit which might make a smooth surface rough. Wood grains vary and some have textures which will produce high drag. Application of a sealer that will fill the wood grain will greatly reduce drag. Air flow lost through many cracks in a poorly fit together wood floor will waste air, which could otherwise be available to float the load.

VI. TEMPORARY FLOOR REPAIRS

Temporary floor repairs are intended to be an inexpensive upgrading of a poor floor surface, quickly rendering a floor suitable for air bearing traffic. Normally the following methods are intended to work well for one time or infrequent moves.

The repairs will quickly deteriorate with repeated air bearing or wheeled traffic use.

A. SHEET MATERIAL OVERLAYMENT

Use of an overlayment material is probably the fastest way to get air film equipment over rough or porous floor surfaces. Just about any smooth sheet material will work well as an overlayment.

Some materials that have been used successfully for air bearing pathway surfaces are sheet steel, plastic, tempered Masonite and un-textured linoleum.

Thinner materials less than .030" are easier for air bearings to get up on.

Thicker materials may require a ramp up, which can be made by breaking the edge of the material or by making a ramp with tape or another thinner material.

Thinner compliant materials such as .005" to .010" polyethylene film are not effective air bearing pathways. The air pressure causes the material to conform too well to the floor and the imperfections show through. Also the material tends to wrinkle and overlap upon itself when traversed. Compliant materials such as .015 to .030" vinyl or linoleum work well in most instances; however, they will not bridge large floor gaps.

Semi rigid materials such as sheet steel (24-18 gauge), stiffer plastics such as .040" to .060" polyethylene or polypropylene or 1/8" or thicker tempered Masonite are flexible enough to conform to rolling concrete floors and work well in bridging gaps or ramping up or down to different slab levels. Sheet metal is the most durable, however, it will normally take a permanent set when crossed.

Certain plastics such as polyethylene or polypropylene will normally spring back and will only deform if the load rest bars exert high point loading when the air bearings are turned off. Masonite may break or fray if bent too sharply. If long runways require that multi-sheets be used, thicker materials should be butted together with joints taped.

Thin sheets may be overlapped so that the air film equipment steps down in the direction of movement. This only helps avoid movement of the next consecutive sheet. The extra drag forces encountered in stepping up or down on a sheet are about the same. Taping of the joints helps to reduce drag by providing a ramp.

Expansion joints, floor cracks, or sheet overlayments present problems for air bearings. When an air bearing traverses these, the ridge blocks the air film lubrication to the leading or trailing edge of the air bearing causing increased drag. Therefore if an overlayment must be used to bridge a floor joint, best operation will occur if the overlayment is at least as long as the air bearing. Then each air bearing will only have to contend with one ridge at a time.

B. TAPE

Tape may be used to bridge floor cracks and small expansion joints and also form ramps.

Thinner tapes such as 3" wide cellophane package sealing tape or a wide vinyl tape work well. Duct tape is less desirable because it tends to roll up when crossed by air bearings. After a few crossings, the tape will get pressed down into the joint. Its effectiveness lessens and it must be stripped and reapplied.

C. FILLERS

Plastic auto body filler can be used as a good, quick, temporary floor repair material for eliminating floor crack crevices.

Common sense should be used to achieve good adhesion. Body filler should be pressed into the floor depressions with a wide blade putty knife or plastic spreader and the excess scraped away. Floor pits as well as rough areas can be repaired by the same method.

Once the filler has hardened, a flexible disc sander held flat to the floor will quickly smooth the surface without digging in.

VII. TROUBLESHOOTING

PROBLEM	CAUSE	REMEDY
Load doesn't lift or lifts but doesn't move easily	Supply hose quick disconnect too restrictive	Supply hose quick disconnect too restrictive
	Supply hose too small for its length	Increase hose size
	Load is too heavy	Try lighter load
	Surface too rough for the air supply (insufficient air flow)	Test on smooth surface to verify
One corner of the load is low, or drags	Too much restriction to that bearing	Increase flow control valve setting
	Torn or damaged diaphragm.	Replace bearing
	Dirt or object clinging to diaphragm	Clean diaphragm
	Bearing over a hole or porous floor section.	Check on good surface
	Low corner more heavily loaded than others	Increase air flow to low corner or reduce flow to other corners
Skid tips or tends to Ground out on one edge	Skid not centered under load contact surface	Center skid
	Insufficient contact area	Increase contact area.
	Low corner more heavily loaded than others	Increase air flow to low corner or reduce air flow to other corners
Load rocks	Individual flow controls too restricted	Open individual flow controls & reduce inlet pressure
	Skids too close together	Space skids further apart, use beams if required
Load hops	Excess air is being supplied	Decrease air flow

SPARE PARTS

SKID SIZE, STEEL & ALUMINUM	AIR BEARING #	INDIVIDUAL HOSE ASSEMBLY	CONTROL BOX
12	H-0012	AHS-232 – (*)	CPS-42 – (**)
17	H-0017	AHS-233 – (*)	CPS-42 – (**)
20	H-0020	AHS-233 – (*)	CPS-42 – (**)
24	H-0024	AHS-343 – (*)	CPS-63 – (**)
30	H-0030	AHS-343 – (*)	CPS-63 – (**)
36	H-0036	AHS-664 – (*)	CPS-106 – (**)
48	H-0048	AHS-664 – (*)	CPS-106 – (**)

* DASH NUMBER DESIGNATES HOSE LENGTH, 16 FT. IS STANDARD LENGTH.

** DASH NUMBER DESIGNATES MAXIMUM QUANTITY OF SKIDS IT CAN CONTROL (4 OR 6)

VIII. MAINTENANCE

A. CLEANING AND INSPECTION

Air skids require very little maintenance. The air bearings should be periodically inspected for tears and dirt build up. The air bearings should be thoroughly cleaned before inspection. Dirt build up on the air bearing diaphragm will cause the air bearing to produce high drag forces. The air bearings may be cleaned with any household cleaner. If the use of a solvent is required, either mineral spirits or naphthalene may be used.

If the air skid has fixed mounted air bearings (aluminum skids), the skid must be turned over for inspection and cleaning.

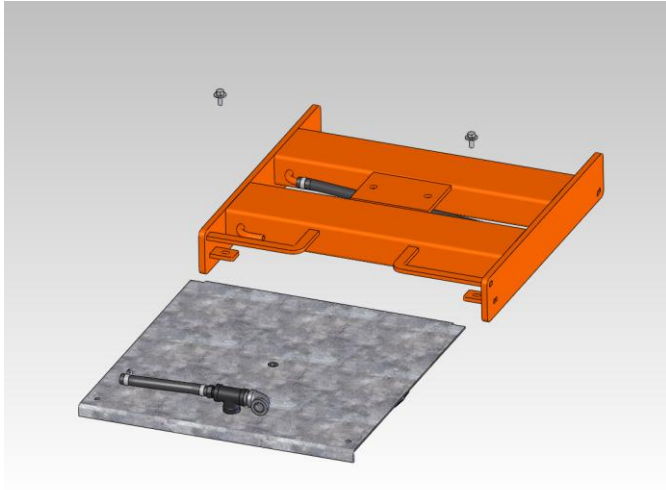
If the air skid is provided with tray mounted air bearings (steel skids), the bearings may be removed for inspection and cleaning without lifting, inverting or removing the load from the skid. Simply remove the two ¼"-20 tray retainer bolts located just under the lifting handle. Loosen the worm gear hose clamp on the hose connected to the skid frame inlet tube. Pull the hose from the inlet tube. A quick twist of the hose on the tube helps to break the hose loose for easier removal.

The air bearing and tray assembly should now be free to be slid out from under the skid. The air bearing diaphragms should be carefully inspected for cuts, tears or punctures. Often a cut in the air bearing diaphragm is not very obvious. Cuts around the outer perimeter of the air bearing are the most detrimental. This location of cut will cause the air bearing to waste air, lose lift height and prevent movement. The air bearing must be replaced.

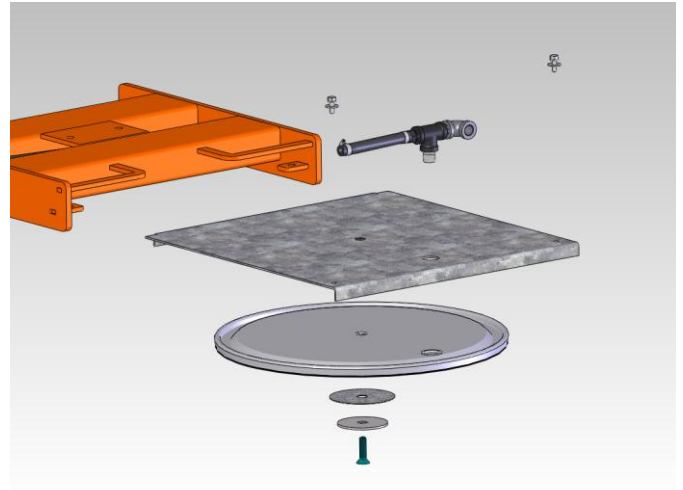
However, if the cut is away from the air bearing footprint, duct tape sometimes works as a temporary repair to get by. If the cut is under the air bearing, the air bearing will most likely still function, but may have some stability problems. The air bearing should still be replaced.

B. AIR BEARING REPLACEMENT (SEE ILLUSTRATIONS ON PAGE 13)

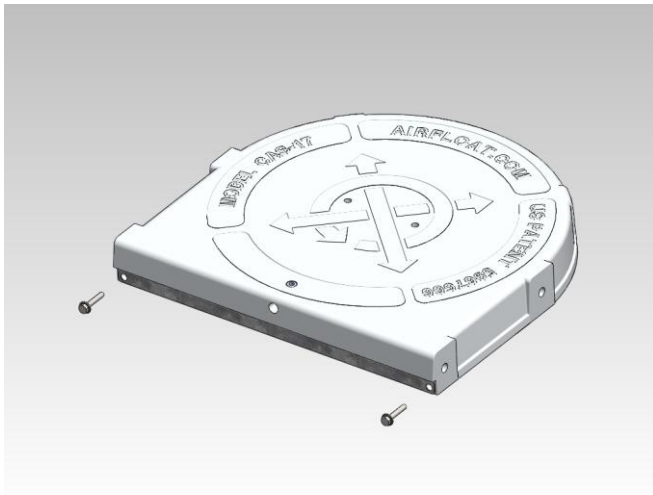
1. Air bearings on cast aluminum skids are replaced by first removing the 2 fasteners holding the tray in place.
2. Slide the tray outward. Remove the fasteners that retain the air bearing to the removable tray. When attaching replacement bearing ensure that the two seals are properly positioned and that the larger hole in the bearing backing is positioned toward the front lip of the tray. Reverse procedure to replace.
3. Air bearings on steel skids are replaced by first unscrewing the two bolts that retain the tray to the skid. Simply remove the two ¼"-20 tray retainer bolts located just under the lifting handle. Loosen the worm gear hose clamp on the hose connected to the skid frame inlet tube. Pull the hose from the inlet tube. Slide the tray outward as illustrated below. Remove inlet tee from the air bearing inlet. The air bearing center bolt and washers are then removed. The air bearing is then free to be lifted off of the bearing tray. If the pipe nipple remains in the old air bearing, it will need to be switched to the replacement air bearing.



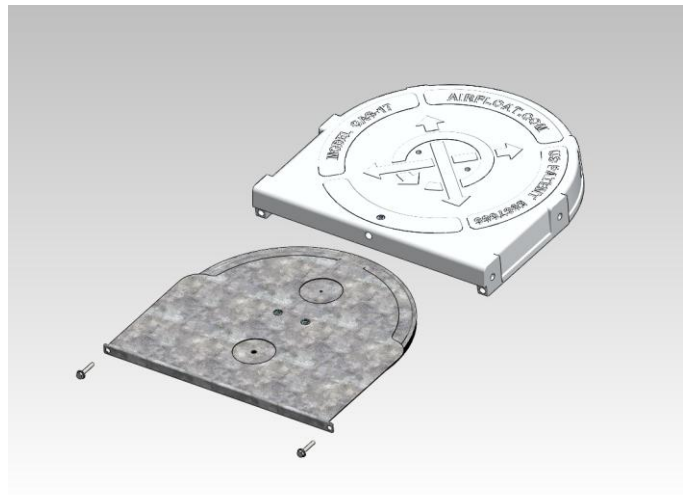
Tray removed from steel skid



Air bearing & inlet plumbing removed from tray



Fasteners removed from Cast aluminum skid



Tray & bearing removed from Cast skid

LIMITED WARRANTY



INNOVATION IN MOVEMENT

Airfloat LLC warrants all of its products to be free of defects in material and workmanship for a period of one (1) year from date of shipment to the original purchaser or 2,000 operating hours, whichever comes first, provided purchaser gives Airfloat LLC prompt notice of the alleged defect(s) and, if requested by Airfloat LLC, returns the defective items, freight prepaid (F.O.B. Airfloat LLC's plant in Decatur, Illinois). THE WARRANTIES SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, ALL OF WHICH ARE EXPRESSLY DISCLAIMED.

For any claim under warranty, Airfloat LLC may elect to repair or replace the defective component or components. All claims for warranty must be accompanied by a Return Goods Authorization number, which may be obtained from Airfloat LLC. This warranty does not cover, and Airfloat LLC is not responsible for, any labor or other expense for inspections, removal or reinstallation of components or products.

This warranty does not cover, among other things, damages resulting from foreign matter or water, negligence, accident, unreasonable use, abuse or misuse, alterations not authorized by Airfloat LLC, failure to provide reasonable and necessary maintenance or failure to follow operating instructions or load limits. IN ADDITION, IN NO EVENT SHALL AIRFLOAT LLC BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES, WHETHER OR NOT IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Airfloat LLC makes no representation that the product complies with local, state or federal safety/product standards codes. If the product fails to comply in any way with those codes, it shall not be considered a defect in materials or workmanship, and Airfloat LLC shall not be liable for any damages resulting from noncompliance. This limited warranty is provided to the original purchaser (meaning the original end user) and is nontransferable. This limited warranty constitutes the complete and final agreement regarding Airfloat LLC warranty obligations for the product.

Q76 Rev. 4 09/15/06