



Main Hoisting Unit and Accessory Transfer Decks

Load Lifting Transfer Deck (HOISTING PLATFORM) and Accessory Transfer Deck (Material Platform)

LTD® SERIES OPERATIONS MANUAL



WWW.AIROIND.COM

Index

Serial Numbers.....	3
Overview.....	4
Inspection.....	4
Positioning Accessory Decks.....	5
Preparing the LTD® SERIES and Decks for Positioning.....	6
Post Shore Jacks.....	6
Building Load Illustration.....	7
Hoisting the LTD® SERIES and Decks into Position.....	9
Rooftop Application.....	11
The First Lift.....	13
Side Loading and Up/Down Movement.....	15
Safety Drop Zone Area.....	17

OPERATOR MANUAL

FOR: LTD® SERIES Hoisting Platform & Accessory Transfer Decks

SERIAL #: _____

DATE: _____

NOTE: The instructions and information contained in these manuals are not intended to be an instruction course on how to become an Operating Engineer or operator of this or any other piece of equipment.

The purpose here is to give you the experienced operator and your supervisors an overview of what the LTD® SERIES is designed to do and how to do it in a safe efficient way.

It is the responsibility of the contractor to insure that anyone that operates this equipment be in compliance with all federal, state and local laws and regulations regarding operator qualifications.

If you are not 100% sure that you understand and are in compliance with these requirements, do not operate this equipment until you are. This manual must always be on hand and available for review. This is (2) of (2) important manuals, the other (1) is the Safety Manual.

This is considered part of the machine!

It is expected that the operator of the LTD® SERIES be a qualified operator. Compared to many other types of cranes and lifting devices, the LTD® SERIES is relatively simple in its concept and design; however this does not reduce the needs for qualifications, proper training, skill and experience. The number one priority has always been and shall remain

safety!

OVERVIEW

By designing and developing the **fully patented** independent hoisting platform with transfer deck(s) the crane is now free to build the top of the building. Additionally, the thousands of lifts that would normally be made and flown all over the job is confined to a vertical column or lifting area, a much safer situation overall.

Today, workers do not have to venture out onto a platform to unload materials. The load is easily transferred back inside the building to be unloaded while the LTD® SERIES is busy bringing up another load.

This Manual of the operation of the LTD® SERIES is written from an operator's view.

INSPECTION

Two 12' X 10' X 10" boards will be needed on a very level ground surface area. You will need to have enough height for the 6" X 6" center cross support angle iron to clear the ground. The assembly manual will provide all required details. Be sure nothing is damaged during shipping. Account for all materials before accepting shipment.

After the machine is fully and correctly assembled, all fluids, etc. should be at correct levels. All connections, fittings and bolts should be double checked for correct torque and settings. **Assemble and test as much as you can on the ground!**

It is highly recommended that the area directly under the LTD® SERIES be restricted as the **"LIFTING ZONE"**. The area should be roped off around the **"DROP ZONE"** for safety.

POSITIONING ACCESSORY DECKS

Practice lifts with the crane that will be used to lift the LTD® SERIES and Accessory Decks prior to positioning on building. This procedure may seem a little out of step here, but will be made clear later.

Long four-way spreaders, slings or chains are used. Make sure no hoses, fittings, etc. are touching the rigging. The corner eye lugs can be used to keep everything level. With the deck in the extended position, use the center and forward lugs for hoisting the LTD® SERIES and Decks into position on the building.

Please note, the LTD® has the ability to lift the Accessory Platform Decks into position when they are placed directly under the main LTD® Hoisting Unit. The center eye lugs are used in this operation. **Also, it is very important to secure and lock the travel movement of the deck! Do not allow deck to travel while getting it into its proper resting position!**

A bolt is installed through each side of the I-beams into the deck. This is indicated near the holes. This will allow the **Lower Decks ONLY** to be lifted by the LTD® **at an angle, allowing the decks to be raised or lowered past each floor. It is a tight fit.**

The distance from the hoist outside drum diameter to the building's deck edge is the clearance required when figuring the angle for lifting. Again, it is much easier to figure this out on the ground first. The amount of cable, handrails, chain size, etc. makes a difference from job to job. Proper come-alongs on one end of rigging have always worked for making things balance in odd situations.

REMEMBER TO REMOVE THE TWO DECK BOLTS AFTER MOVING DECKS INTO POSITION! KEEP EVERYONE CLEAR FROM UNDER THE PLATFORMS!

PREPARING THE LTD® AND DECKS FOR POSITIONING

Once everything is fully assembled and checked. Be sure the building power (electrical) has been installed and is operational, have the unit connected by qualified electricians. Our power system has a built in stop/start switch for operator use. The electric motor should never be hooked directly to the main power supply. A lock out with key should always be used and the system locked out by the operator or supervisor when not in use!

POST SHORE JACKS

Most buildings have an abundance of jacks on hand. We do not include them as standard equipment with the LTD® SERIES and Accessory Decks. If jacks are requested, we can quote them for use with our equipment.

The “Engineer of Record” has the final say as to where the jacks are to be placed, how many, etc. for the building of which it is intended.

The following illustration will help give a basic understanding of the path dynamic loads forces follow as they are generated with the LTD® SERIES and Accessory Transfer Decks.

The illustration on page 7 shows the LTD® in position on a building. The same effects apply to Accessory Decks. As load forces are introduced to the platform by lifting, lowering or holding a load, these actions are transferred to the building's floors and ceilings by way of jacks. As it is lifted upward or lowered downward kinetic energy is created just like a conventional crane.

If we were to use a conventional crane to place a load from 2,000 lb. to 10,000 lb. on a 30 or 40 story building, the same forces would also apply to the crane. The big difference here however, is the support structure. To do this job with a conventional crane requires a 150-250 ton machine. This 250 ton rated machine with a short basic boom suddenly is reduced to a 5 ton capacity machine once the 400' plus boom is installed. This is to say nothing of the fleet support and mobilization factors involved. These factors apply to static tower cranes as well.

The LTD® itself does not weigh much more than the loads it lifts. In part and in effect, the building becomes the LTD® boom along with the jacks that extend from the front edge of the building floor downwards. These jack requirements are reduced the further down you go. This is called the LTD® “VANISHING BOOM EFFECT”! The building is the boom.

On the other end of the LTD® are the rear upward supporting jacks. The jack placement is confined to 6 pockets bordered on the upper rear of each I-Beam.

You may have seen standard outrigger or material platforms on jobs where the jacks are spaced in two sets of three, usually near the floor edge, center and rear towards the extreme back end of the beams. On the LTD® SERIES and Accessory Transfer Decks, the jacks are to be positioned in the pockets. **JACK PLACEMENT AND QUANTITY ARE TO BE DETERMINED ON EVERY FLOOR OF EVERY BUILDING BY “ENGINEERING of RECORD” FOR EACH JOB SITE.**

Illustration on page 7 shows the upper floors with additional jacks in position. That is because the load forces are transferred upward like a teeter-totter, a lever on fulcrum. Blue arrows are shown on the illustration, representing the diminishing load forces as they move away from the floor being serviced.

HOISTING THE LTD® SERIES AND DECKS INTO POSITION

Attach the 4 way spreaders to the LTD® SERIES or Accessory Platform Deck and check everything for clearance as previously mentioned. Be aware of your 4-way angle in relation to the ceiling you are about to place the unit on. Lift the LTD® SERIES / Deck with the crane a few feet and check for level. It is Ok if the back end is a few inches lower. When the LTD® SERIES / Deck is being placed into the building, the LTD® SERIES / Deck can be lowered by the crane until the I-Beams make full contact with the floor. If the front is low, the only way you can make full contact with the floor is by using the jacks to push the beams downward. This is awkward and may create an unsafe condition. **Do Not Do It!**

Install the jacks as covered previously in manufacturer's instructions. Slowly slack off of the 4-ways after double checking everything is correct. Disconnect the 4-ways and rigging loose and be sure that nothing is caught as the crane raises the hook away from the installed LTD® SERIES / Deck.

Remove two lock bolts, holding the retractable deck in place. Attach power and control cords to the rear cover guard. The Transfer Deck is now operational. Test for proper Deck action and electric safety stop at inside rear/front of ramp for correct operation.

Now that the Deck is operational, all handrails and safety chains are checked to see that load rated tags and ratings etc. are present.

If you have just installed the LTD®, rather than the Accessory Transfer Deck, the power system / ramps are now ready to be received and installed. Consider using a long pennant or sling attached to the crane hook so that it does not interfere with the A-Frame when placing these components on the deck.

The ramp can simply be lowered directly onto the Accessory Decks without the A-Frame attached. Lift the ramp and land it on the deck of the LTD®.

Safety chains are designed to be unsnapped and hang out of the way when necessary. Re-attach safety chains after completion of lift. Be sure to follow all regulations covering personnel tying off while on material platform etc. **With personnel off of the transfer deck, retract the deck fully. It is very important not to ram the deck against the rear or front stop positions.**

Lift the power system from the ground by crane onto the LTD® Transfer Deck. Unhook and retract platform in a position that will allow for removal by forks.

Install power system in the predetermined location. If electric, the electrical contractor should be on hand to complete the final electrical installation from building power to our power system. After completion and everything is up to required specs and codes, the hydraulic connections can be made following the assembly instructions included with the system.

If a gas, diesel or propane powered system is being used until electric power is available, be sure to vent exhaust outward and away from workers. Check all regulations covering such operations and comply with them. Follow all manufacturer's operating guide lines for use to insure safety and dependable operation with all systems.

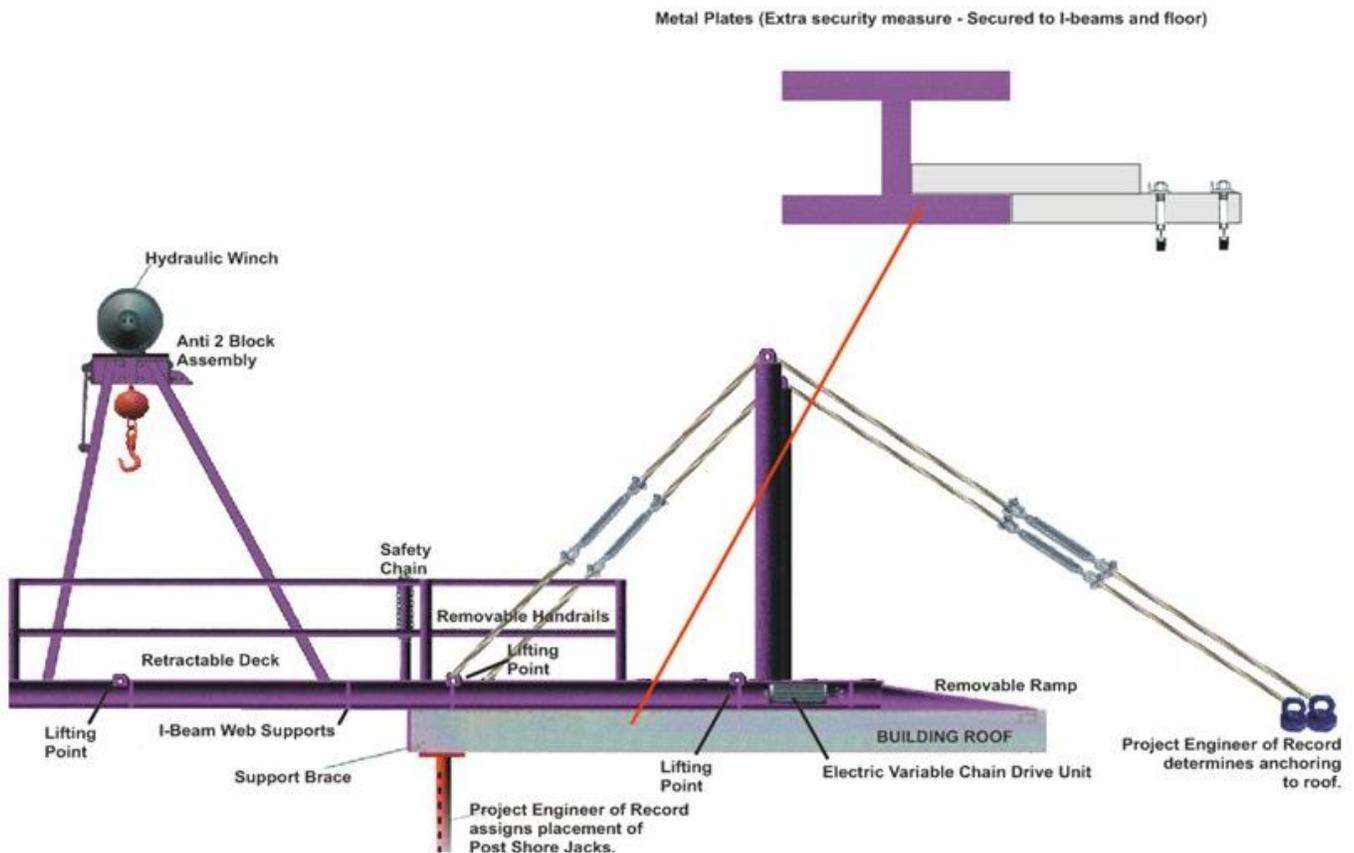
The operator control station is positioned at some point between the LTD® and power system. This allows for better "depth perception" with distant loads. The operator will need to monitor loads that pass between lower Accessory Platforms on lower floors. A signal man should be present at each deck as the load passes.

When servicing lower decks, a signal man must be present to land and monitor lifts.

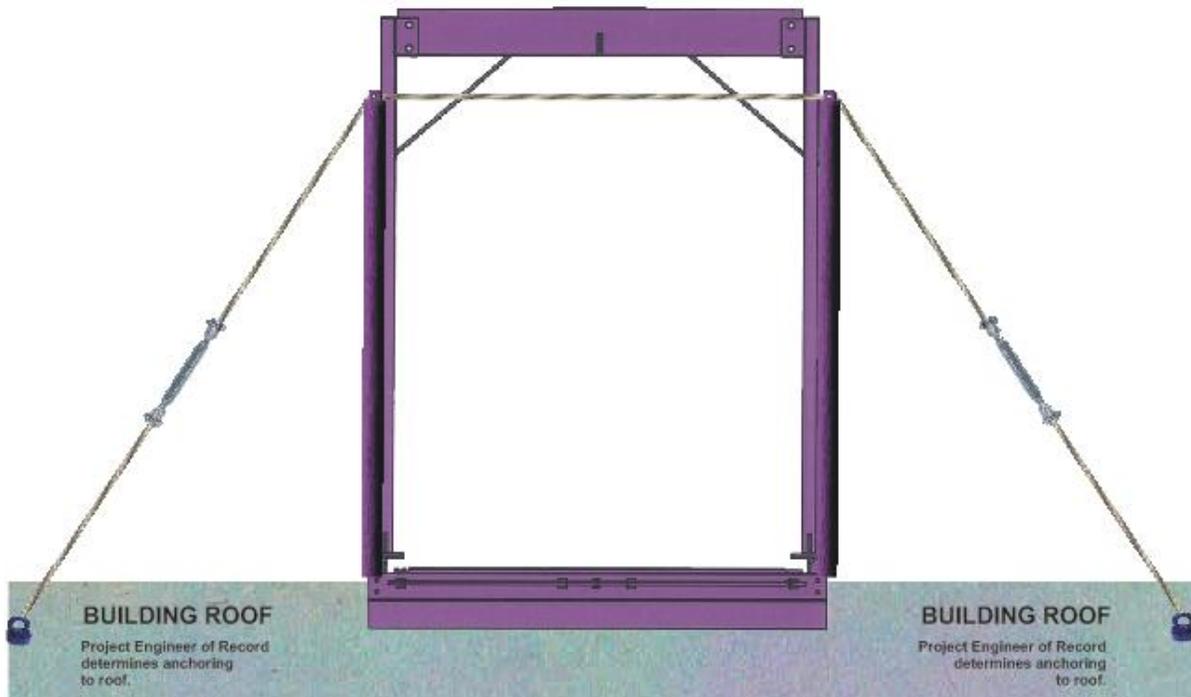
ROOFTOP APPLICATION

If the LTD® hoist will be mounted on the roof rather than on a building floor, follow the same precautions described above. Mounting the hoist on the roof will require different securing methods due to the obvious fact that post shore jacks will have no effect on a roof.

The Engineer of Record will determine the specific anchoring method. Additional anchoring method of securing metal plate to I-beam and floor is also available (as seen below). Daily inspection must be performed, checking mounting cable tension at turnbuckle.



Above is side view for roof mount.



Above is back view for roof mount, showing wire cables to secure unit.

THE FIRST LIFT!

After correctly connecting all hydraulic hose connections and fittings, be sure that all fluid levels are where they need to be and that the correct types of fluids are used. **Never add or mix the wrong types of fluids to existing fluids! See parts catalog.**

Reminder: test and re-check all items installed at ground level.

Be sure that the ground area is designated as a dedicated lifting area. A safe “Drop Zone” directly under the LTD® is a great safety feature. A bright, strong, well defined area commands respect if properly designed.

- **SEE FINAL PAGE FOR ADDITIONAL INFORMATION**

After checking the provided “daily safety check list” start the power system and observe all gauges. The single hoisting lever will lower the load when pushed forward and will hoist when pulled back.

It is wise to have an electrician present when checking system to correct any improper connections.

Get the feel of the machine by operating the hoist several times. All machines have their own “feel”. Take the time to get use to it. **The anti-two block feature is a safety feature only; it is not to be used to conveniently stop the load!!!** Test to be sure the device is working properly daily by slowly hoisting the hook upwards until it stops. It should kick out after one inch or so. If it doesn't, have it checked and corrected before operating the machine. **Allow a comfortable operating stop distance between the top of the load hook and anti-two block weight. Measure the area between the hook and deck. This is your maximum load size including rigging!**

Always have the safety chains in place when possible. To make your first lift, be sure the hook is above the chains and depress the deck button on the hand control that retracts the transfer deck. **Do not ram the deck into the rear stop angle. With someone below signaling you, lower the hook slowly by pushing the hoist lever forward.** The further the lever is pushed the faster the line moves.

Be certain that the load to be lifted falls within the maximum allowed lifting capacity for your machine. All loads must include the hook, ball or block and also rigging weight. Cable on winch (above 250') in length is also to be considered part of the load.

For example, if the hook and ball weigh 100 lbs. And the cable on the drums totals 350' and the rigging is 50 lbs.; assume that the extra 100' of cable weighs 50lbs. for a total of 200 lbs. The LTD® is designed for load capacities of 2,000 lb, 4,000 lbs, 6,000 lb, 8,000 and 10,000 lb. Example: For the 4,000 lb: Subtract 200 lbs. from 4,000 lbs. and you have a 3,800 lb. capacity. There is also the option for a 6,000 lb. capacity unit as well as 8,000 or 10,000 lb.

The hoist speeds can be set at the factory to travel as much as 200 Feet Per Minute (FPM) depending on customer requirements. As with most cranes, the drum can lift more with the first on the drum than with each additional wrap. The hoist's ability to pick up a load decreases with each additional wrap.

It is the operator's responsibility to insure that the load limits are never exceeded and the load is exactly centered directly under the winch of the LTD®!

When a typical crane is in operation, the moving (dynamic) forces that are involved create a multiple set of circumstances that come complete with its own set of variables. Booms move up and down and with the load it carries, usually with the intention of increasing or decreasing the radius from the center of rotation of the cranes.

Swinging the crane left or right is usually intended to move the load sideways; however, if you swing fast you will also develop centrifugal force. This will cause the load to increase its distance away from the cranes center of rotation and at the same time it may or may not rise higher from the ground level because of the boom tip's stationary fixed point of rotation. There is an exception to this rule when the crane tips over because it is operated beyond the allowable radius with a given load. At this point, the load travels outward until gravity causes it to make contact with the ground.

SIDE LOADING AND UP/DOWN MOVEMENT

AVOID side loading! Be aware of your “TARGET AREA”. This is directly where the hook hangs. **Place a small 18” circle on the ground and have everyone understand that this is where the center of the load is to be placed.** If a load is picked up off center it will act like a swing. You will have to wait for it to stop. Please address these points in weekly safety meetings.

Up and down movement is determined by the speed at which you choose to operate the hoist. When loads are increased with any machine, operator judgment and common sense comes into play.

As loads increase it is wise to reduce hoisting and lowering speeds and make all moves slowly when starting and stopping!

It is suggested that when operating the LTD® for the first time, allow time to operate it and look it over completely.

Be sure that all lower transfer decks are fully retracted and that your transfer deck is also fully retracted. Never operate the hoist and transfer deck at the same time.

At this point you are ready to lower the hook and make your first pick up.

A set weight of 500 – 1,000 pounds should be used. The drum cable should be watched to insure that it wraps tight and true the first time. When signaled, take up the slack slowly and hoist the load up to and through any lower Accessory Decks. Continue to lift the load and slowly to reduce the hoist speed as it nears your floor level.

After the load is clear of the deck, stop the hoist by slowly returning the hoist lever to center position. With safety chains removed, depress the out button on the control to bring the deck **FULLY** forward under the load.

As the deck nears the end of its travel, back off of the “OUT” button. You may have to quickly depress the button a few times to bring it to the end. When fully extended, the load lever can slowly be pushed forward until the load is safely lowered on the deck. The hook can then be lowered and the load unhooked. **The person entering the platform MUST ALWAYS be tied off while performing this operation.**

With the hook and load free and the worker off of the platform, depress the “IN” button on the hand control, bringing the deck back safely into the building. Remember to slow the deck down before it reaches the end of travel. The safety chains can now be re-attached and the load can be removed from the deck area. If material is being lowered to the ground, simply reverse this process.

Congratulations!
You have just completed your first lift with a LTD®.

Place two orange safety cones near the ramp ends if available. Lock out the power supply after all safety precautions are in place and have a safe job experience.

SAFETY DROP ZONE

* Because job sites vary, we suggest that **management and safety supervisors be consulted** as to the size and type of area to be designated as a Safety Drop Zone Area under the LTD®. The feedback and advice we have received was in the 10' to 15' range beyond the hoist area.

Mark Pruskauer
Airo Industries, Inc.
P. O. Box 62022
Fort Myers, FL 33906
Mark@airoind.com
www.AiroInd.com