This installation and storage manual only describes procedures for installation and storage of equipment. For procedures on operation and maintenance of equipment please refer to Operation and Maintenance Manual specific to your project.

Due to the custom nature of Energy Labs products there may be areas beyond the scope of this manual.

If there are any questions about a special application lacking coverage, please contact your local Energy Labs sales representative.
The customer is responsible for providing qualified and trained personnel to install and operate the equipment. Consult all local building, occupational safety, electrical, gas, and other codes applicable to the installation. It is the responsibility of the owner to determine if the unit is installed with all of the safety devices required for proper operation.

**Safety considerations include:**

1. The accessibility of the equipment to service personnel.
2. The provision of electrical lockout switches.

- Never open an access door while air handling unit is in operation.
- Equipment wired to automatic control devices may start without warning, resulting in personal injury or property damage. In many instances a unit will have multiple electrical and compressed-air connection points. To prevent unforeseen startup, prior to beginning work on an all equipment always lockout all power supplies.
- A fan, even though locked out electrically, can rotate in a seemingly insignificant air flow. During maintenance the impeller should be secured to restrict rotation, making sure that the restrictive device is removed before putting the fan back into service.
- Always replace any protective covers removed for servicing.
- Always replace bolt or lock on access door latch for doors that provide access to moving parts. This mechanical protection from moving parts is required by UL 1995. (See Images I-01a & I-01b).
- A number of additional safety issues are discussed throughout the manual. Please read the complete manual prior to installation of the equipment.
Upon receipt of every equipment, it is the customer's responsibility to:

- Inspect the units(s) for any damage that may have occurred during shipping.
- Verify receipt of all parts by comparing items in the shipment with those listed on the bill of lading. (See Image I-02)
- Indicate any problems such as shortage, damage, or breakage on the carrier's freight bill and obtain the signature of the driver or carrier's representative as verification.
- Immediately report any damage detected after delivery to the carrier and obtain a concealed damage inspection report upon their inspection of the shipment.
- Claims or loss or damage in shipment must not be deducted from the Energy Labs Invoice, nor should payment of invoice be withheld awaiting adjustment of such claims, as the carrier guarantees safe delivery.
- If considerable damage has been incurred and the situation is urgent, contact your sales representative for assistance. Please keep a written record of all communications.

To facilitate inspection by the customer, a list of items shipped with the unit is included and attached to the inside access door of the supply fan section. Among the items generally shipped loose are the following:

**Fan Section**
- Split unit reassembly hardware (Nuts, bolts, caulking)
- Replacement fan belts
- Installation and start-up manual
- Lifting lugs

(See Image I-03).

**Filter Section**
- Filters
- Filter clips

(See Image I-03).
Meeting Clearance Requirements

The location and clearance between the air handling unit and adjacent objects are particularly critical. **As required by the state, city or the national electrical code (NEC or CEC), the service space between the face of any electrical enclosure and wall or obstruction must be 42 inches minimum.** (See Image I-04).

Sufficient clearance is also needed to open doors and install piping and ductwork. Airflow through the louvers or hoods cannot be obstructed in any way. **The distance between the louver and any facing wall must be equal to the horizontal width of the louver.**

Space around the unit must be adequate to allow easy removal of the access panels and parts like the fan wheels, motors and belt guards. To facilitate removal of coils, fan shaft, and fan wheel, always allow a minimum clearance equal to the width of the unit on one side.

**NOTE I**
As required by the state, city or the national electrical code (NEC or CEC), the service space between the face of any electrical enclosure and wall or obstruction must be 42 inches minimum.

**NOTE II**
The distance between the louver and any facing wall must be equal to the horizontal width of the louver (dim. x).
To ensure safe lifting, estimate the unit's center of gravity, taking into account that the weight may be unevenly distributed due to the placement of internal components (for example, more weight in the coil and fan areas).

Prior to lifting, install the removable lifting lugs shipped in the fan section. (See Image I-05a).

During a lift, all lugs must be used. Spreader bars are required to prevent damage to the cabinet and protruding components. To distribute the load properly, the tension in each line also must be adjusted. (See Image I-05b).

When no lifting lugs are provided, use a belt-type sling to raise the unit from base carefully avoiding door handles, electrical boxes, coil connections, and other protrusions. (See Image I-05c).

Never lift units or subassemblies without a base by attaching bolts, clevis, pins, hooks, etc. to casing, casing hardware, flanges, angles, or tabs.

Only rig as shown in here.
Units can be lifted with forklifts as long as the forks are 40 inches and the end tips contact the bottom of the intermediate supports of the base rail. Additionally, a forklift may be used to lift small subassemblies or individual sections, but the forks must reach other side of the base rail. (See Image I-06b).

To avoid damaging the air handling unit, exercise extreme caution when using forklifts. Always lift in an upright position and never move or lift unit from a side or upside-down position.

**Split Units**

**Loosely Bolted, One-Piece**

To reduce freight costs, split units less than 102” wide may be shipped “loosely” assembled. Disassembly is required, *with each section being lifted individually*; as split sections are affixed using a minimum number of bolts for transit and cannot be lifted while fastened together. Use all lifting lugs to avoid unit damage and/or personal injury.
Improper storage will result in seriously reduced reliability of equipment. For an electric motor or a fan that does not experience regular usage while being exposed to normally humid atmospheric conditions is likely to cause the bearings to rust or rust particles from surrounding surfaces to contaminate the bearings. The electrical insulation may absorb an excessive amount of moisture leading to the motor winding failing to ground. The following preparations should be followed:

- Minimize condensation in and around the fan and motor by humidity controls.
- Coat all external machined surfaces with a material to prevent corrosion. An acceptable product for this is Exxon rust Ban #392.
- Measure and record the motor electrical resistance of insulation with a megger or a resistance meter. The insulation resistance kv rating + 1 Megohm.

Whenever possible, store equipment indoors in dry area and protect fan shaft, bearings, and fan wheel from dust and corrosion.

If outdoor storage is necessary, be sure to close latches on all access doors to prevent potential water and air leakage. You must also use a tarp or similar weatherproof cover to protect cabinet exterior against dust, dirt, moisture, and corrosion (See Image I-07). Doing so will prevent the weather from entering through louvers and other openings, as well as protect internal components should any access door happen to be left open.

To protect against excessive vibration and accidental impact, never store other equipment inside or on top of the unit. **If unit must be stored for an extended period, be sure to protect against bearing damage by manually rotating the fan wheels and motors (see Operation and Maintenance Manuals for additional information).**
Installing the Unit

**Housekeeping Pad**
The foundation and floor should be level (shim when necessary), rigid, and strong enough to support the weight of the entire unit. *It is the installer’s responsibility to secure the unit to the housekeeping pad in accordance with all applicable building and earthquake codes.* After the unit has been installed, the base rail should be inspected for paint damage from chains in the tie down brackets, use of the lifting lugs and fastening the unit down. This damage must be repaired by cleaning down to bare metal, and two heavy coats of matching paint applied to stop corrosion and rust.

**Ceiling Suspended Units**
Ceiling suspended units must be supported from the base. To fully support the unit, four or more suspension points are required, exact number of support points is function of the unit length and weight. Refer to submittal drawings for lift locations.

The casing is NOT a support component.
The installer is responsible for installing in accordance with applicable building and earthquake codes.

**Roof Curb**
Energy Labs ships roof curbs either fully welded or in pieces. Bolt together if roof curb is bolted construction.

- Check to ensure that the curb is level and securely attached to structure.
- Check for sufficient height between the unit base and the roof to allow for drain trapping.
- Use polyurethane caulking on top of the curb, to form a seal between the unit base and the roof curb.
- Safely lift the unit into place.
- The installer is responsible for installing roof curb in accordance with local building and earthquake codes.
Reassembly of Split Units

To prevent air and water leaks; all units shipped in sections must be carefully assembled and installed on a proper foundation. Energy Labs units are assembled in one piece in our factory to make sure all pieces match, and bolt holes line up, then split prior to shipping.

- For proper reassembly, house keeping pad or roof curb MUST BE LEVEL.
- All nuts, bolts, washers, and caulking required for assembly of the unit are shipped in the supply fan section.
- Place all sections on level surface.
- Caulk where indicated on both sides of split panels, roof flanges and bolt the base together (See Image I-10).
- A come-along or hand operated winch can be used to tighten the space between unit sections.

- Bolt holes may not align as a result of racking during transit to the job site. In such instances, lift one side with jack to align holes on wall of the opposite side. After bolting this wall, remove jack. Then proceed with bolting of other side, base, floor, and roof. Any racking that is out of square should realign as the unit settles. (See Image I-11).

- Check to make sure that all bolts are properly secured.
- Caulk roof exterior seams (See Image I-12).
- Caulk and bolt standing seam and install the roof cleat. (See Image I-13a & I-13b).

- Check all splits to ensure proper bolting and caulking.
- Check all splits to ensure that all electrical and piping connections are correct and complete.
Reassembly of Stacked-unit
Horizontal Splits

- For unit that is split both vertically and horizontally, complete the assembly of lower section first. Then join upper sections to lower section (See Image I-14).
- Caulk underneath clips, behind lifting lugs, and behind upper base channel.
- Wherever possible, secure base anchor clips / holding brackets in bolt holes.
- Check all splits to ensure proper bolting and caulking.
- Check all splits to ensure that all electrical and piping connections are correct and complete.
- If equipment is not properly installed the cabinet will leak air under pressure or water may leak into the cabinet from split joints.

Removable Lifting Lugs

For units wider than any split section’s airway length, removable lifting lugs are provided along the width of unit. After closely positioning the splits, remove the inner lifting lugs. During final bolting, a come-along or hand-operated winch can be used to tighten the space between unit sections. (See Image I-15)
Take the following steps before starting the fan for first time, these steps must be followed for each spring isolator.

- For shipment, the fan spring isolators are bolted down rigidly to the fan frame and unit base.

- Loosen both lock nuts E-02 (B) and (C), and adjust the bolt E-02 (A) until the spring isolator frame has clearance of 1/4” Min. to 3/8” Max.) from Base pad.
- After adjustment tighten lock nut (C).

- Adjust nut E-03 until there is 1/4” clearance between nuts and spring frame tighten lock nuts against each other.

- Check to ensure the fan assembly is free of obstruction and floating freely on spring isolators.
It is essential that all condensate drain connections and floor drains be trapped on the job site by others. Improper drain trapping can cause the drain pan to flood and potentially damage the air handling unit and surrounding facilities. (See Images I-16a & I-16b).

TSP = Total Static Pressure inside plenum/drain pan. Refer to submittals for TSP value

Units are inches of water.

When making brazed DX connections feed nitrogen inside the coil to prevent internal oxidation and scale from forming inside the coil.

Use a backup wrench on all threaded coil connections. Be careful not to “oval out” or distort coil nipples. Do not over tighten connections by using a pipe wrench extension.

It is necessary to use a combination of an open-end or box-end wrench to hold the hex adapter stationary while loosening the square cap screw with a ratchet wrench.

To install simply reverse the process and tighten the square cap screw.
When connecting flanged ducts directly to the casing, use self-tapping sheet metal screws. (See Image I-17).

For duct connections to collar-type openings, use s-cleats or overlapping joints. To prevent air leakage and eliminate system performance problems, caulk around all duct connections to form tight seals.

Connecting the Rain Hood

- Apply caulking to the hood flange or unit. (See Image I-18a).
- Carefully align hood over the opening, allowing adequate clearance to doors and other openings on the unit.
- Use sheet metal screws to fasten the hood to the casing of the air handling unit. For openings requiring multiple hoods, follow this same procedure for each hood. (See Image I-18b).
- Carefully remove any excess caulking from around the hood flange.
All wiring shall be installed in accordance with the requirements of the authorities having jurisdiction. **Do not cut holes in the bottom of outdoor units, as the bottom of the unit has been made waterproof.** Both field wiring and internal wiring diagrams are included in the control cabinet of the unit. The power requirements are indicated on the unit nameplate. Where field wiring of the control circuit is required, take care to size the field wiring for a maximum 10% voltage drop. The VA rating of the transformer can be assumed to be the maximum load. **The disconnect must be mounted properly and adequately grounded.** All field wiring outside the electrical enclosure must be rigid or flexible conduit.

Reconnect all disconnected wiring on the units that were split in 2 or more sections for shipment.

- **When connecting a power supply to a three-phase motor, take care that the three-phase wiring gives you the correct motor and blower rotation.**
- Replacement wiring must be equivalent to original wire size.
- Compare FLA of motor with VFD’s. Motor value must be lower.
- If connections to VFD’s are done in the field, vacuum out the VFD enclosure.
- It is recommended that, when interior lighting and convenience outlets are provided they should be wired to a separate power supply.
- **In all cases the unit must be properly grounded and all electrical connections should be checked and tightened if required before starting up the equipment.**
- See field-wiring diagram for requirements for shielded or twisted wire for solid state devices.
- **When you cut holes in the control panel or unit for conduit penetration make sure it is sealed to be air and water tight.** (See Image I-19b).
- Lock all the latches on the electrical and control panels.

**IMPORTANT:** On ETL labeled units supplied with door interlock switches, these switches must be wired to the motor starter control circuit in order to maintain ETL approval.

Wires are color coded and/or numbered to identify those to be joined at each split. The installer is responsible for reconnecting all internal and external electrical and/or piping splits.
Warranty Policy

Dx Package Air Cooled
And
Evaporatively Cooled Units

Energy Labs warrants that the products engineered and manufactured by Energy Labs are free of all defects in material and workmanship and will perform and comply with the specifications as noted in the original order and submittal. The warranty shall be in effect for a period of (12) months from the documented date of start-up. For this policy to be in affect an Energy Labs factory service technician must do a start-up. The conditions of the start-up must be conducive to the requirements necessary to assure proper operation of the DX system. Sufficient time must be given for the scheduling of this start-up. The exception to these warranty terms shall only be for extended warranty coverage negotiated at the time of the order and included in the original purchase order. The warranty for controls, components and accessories furnished and installed by Energy Labs shall be covered only by the terms of warranty of the control, component or accessory manufacturer. This warranty covers parts only, and does not include labor for the replacement of any parts.

In the case of a defect, failure or non-compliance with the submittals, the buyer shall notify Energy Labs in writing within (30) days of discovery of the defect, failure or non-compliance. Upon proof of the defect, failure or non-compliance, Energy Labs retains the right to either repair, replace, modify, exchange or refund the purchase price as necessary to correct the defect, failure or non-compliance. If Energy Labs equipment has been improperly installed, started-up, operated, maintained, modified or repaired then Energy Labs accepts no responsibility for any damage or failure resulting from the fore mentioned.

Energy Labs reserves the exclusive right to authorize and issue any warranty action. No warranty action or policy may be issued by any agency representing Energy Labs, without the express written authorization of Energy Labs. Energy Labs neither accepts nor assumes any contingent liability in connection with any of its products. This represents Energy Labs sole responsibility and obligation and the buyers sole and exclusive remedy for any claim. This warranty policy is effective January 1, 2001 and supersedes and is in lieu of all other warranties expressed or implied.
Energy Labs warrants that the products engineered and manufactured by Energy Labs are free of all defects in material and workmanship and will perform and comply with the specifications as noted in the original order and submittal. The warranty shall be in effect for a period of (12) months from the documented date of start-up or (18) months from the date of shipment, whichever occurs first. The exception to these warranty terms shall only be for extended warranty coverage negotiated at the time of the order and included in the original purchase order. The warranty for controls, components and accessories furnished and installed by Energy Labs shall be covered only by the terms of warranty of the control, component or accessory manufacturer. This warranty covers parts only, and does not include labor for the replacement of any parts.

In the case of a defect, failure or non-compliance with the submittals, the buyer shall notify Energy Labs in writing within (30) days of discovery of the defect, failure or non-compliance. Upon proof of the defect, failure or non compliance, Energy Labs retains the right to either repair, replace, modify, exchange or refund the purchase price as necessary to correct the defect, failure or non compliance. If Energy Labs equipment has been improperly installed, started-up, operated, maintained, modified or repaired then Energy Labs accepts no responsibility for any damage or failure resulting from the fore mentioned.

Energy Labs reserves the exclusive right to authorize and issue any warranty action. No warranty action or policy may be issued by any agency representing Energy Labs, without the express written authorization of Energy Labs. Energy Labs neither accepts nor assumes any contingent liability in connection with any of its products. This represents Energy Labs sole responsibility and obligation and the buyers sole and exclusive remedy for any claim. This warranty policy is effective January 1, 2001 and supersedes and is in lieu of all other warranties expressed or implied.
Energy Labs, Inc units are guaranteed to be free from defects in material and workmanship for a period of 18 months from date of shipment or 12 months from documented date of startup which ever comes first.

*Energy Labs Warranty is VOID if:*

1. Equipment is not started per attached startup form by qualified personnel. A copy of startup form must be returned to service department for warranty to be in effect. Upon receipt of startup form, Energy Labs will provide a signed copy of warranty agreement.

2. Field wiring is not in accordance with the wiring diagram furnished with the unit.

3. Proper maintenance is not provided on a regular basis as outlined in Energy Labs maintenance and operation.

4. The unit is allowed to operate during the building construction period.

5. Power is not supplied to crankcase heaters for at least 24 hours prior to compressor start-up.

6. The start-up is not done in accordance with safe practice.
This checklist is to provide a quick summary of items covered in this manual. Please read the complete manual prior to installing, operating, or servicing your equipment.

**Safety**
- Lock out all power supplies prior to opening access doors.
- Prevent wheel rotation during fan servicing
- Replace belt guards or fan safety screen after maintenance is completed

**Receiving & Inspection**
- Inspect for shipping damage
- Compare items on bill of loading with items received

**Clearance Requirements**
- Follow local codes requirements for clearance and electrical control
- Allow clearance for fan, coil, filter, etc. “Replacement & Removal”

**Lifting & Handling**
- Provide adequate lifting equipment for size and weight of equipment
- Split sections should be individually handled
- Air handler should only be lifted from lifting lugs
- Removable lifting lugs are located in the fan section for shipment
- Use lifting lugs on the base channel

**Location Considerations**
- Size the structure to support the equipment
- Is roof curb gasketing placed on roof curb prior to equipment placement
- Is equipment secured in accordance with the local building and earthquake code

**Split Unit Reassembly**
- Are all bolts in place and tightened
- Are exterior seam caulked?

**Connection Hook-up**
- Confirm all external hookups have been made?
- Duct connections
- Power
- Water supply
- Coil Connection
- Weather hood connection
- Humidifiers
- Wiring
- Actuators
- Sensors
- Drain Pans
- Sumps
- Others

**Storage**
- Store indoors
- Tarp if stored outdoors
- Close all doors if stored
- Grease fan bearings and rotate shaft monthly while storage
- Grease motor bearings and rotate shaft monthly while in storage
CEC  City Electrical Code
ETL  Environmental Testing Laboratories
NEC  National Electrical Code
NFPA National Fire Protection Association
TSP  Total Static Pressure
UL   Underwriters Laboratory Inc.
NEMA National Electrical Manufacturers Association
1.- ☐ CHECK FOR ANY FREIGHT OR RIGGING DAMAGES.

2.- ☐ CHECK THE UNIT FOR ANY MISSING OR INCOMPLETE WORK.

3.- ☐ VERIFY THAT THE POWER LINES AND GROUND ARE PROPERLY CONNECTED. THE GROUND MUST BE PROPERLY CONNECTED AT BOTH ENDS.

4.- ☐ CHECK TO SEE THAT ALL FUSES ARE INSTALLED AND ARE OF CORRECT VALUE. (CHECK WIRING DIAGRAM FOR FUSE INFORMATION.)

5.- ☐ BE SURE THAT ALL INSULATION IS FASTENED SECURELY TO THE UNIT CASING.

6.- ☐ BE SURE THAT ALL THE FANS COMPARTMENTS ARE CLEAN, VACUUM ENTIRE UNIT, INCLUDING DUCT POINT OF CONNECTION TO THE UNIT. PICKUP ANY LOOSE CONSTRUCTION DEBRIS, SCREWS, ETC.

7.- ☐ REMOVE ANY SHIPPING BLOCK FROM UNITS. MAKE SURE THE SPRINGS ARE IN PLACE AND HAVE PRELOAD (NOT LOOSE).

8.- ☐ REVIEW OPERATION AND MAINTENANCE MANUAL.

9.- ☐ CHECK BLOWER ASSEMBLY TO INSURE FREEDOM OF SHAFT ROTATION AND PROPER BELT TENSION AND BEARING LUBRICATION.

10.- ☐ CHECK BLOWER ASSEMBLY TO INSURE THAT PULLEYS ARE ALIGNED AND SECURE.

11.- ☐ CHECK FILTERS FOR CLEANLINESS. IF DIRTY, DAMAGED OR LOOSE, REPLACE IF NECESSARY.

12.- ☐ MAKE SURE THAT ALL DAMPER LINKAGES ARE FREE TO MOVE AND THAT NO BINDING WILL OCCUR. REMOVE ANY SHIPMENT TIE DOWNS.

13.- ☐ CHECK THE AIR SUPPLY AND RETURN OPENINGS, MAKE SURE THE DUCTS HAVE NO OBSTRUCTIONS, CHECK THAT THE FIRE DAMPERS ARE OPEN.

14.- ☐ REMOVE ALL THE CARDBOARDS OR ANY POSSIBLE AIR OBSTRUCTION FROM THE COILS BEFORE STARTING THE FANS.

15.- ☐ CHECK FOR LEAKS IN COILS AND PIPING.

16.- ☐ MAKE SURE ALL JOINTS WHERE UNIT WAS SPLIT ARE PROPERLY CAULKED, ROOF CLEATS ARE IN PLACE AND CAULKED AND FLOOR CONNECTIONS ARE CAULKED AND PROPERLY CONNECTED.

17.- ☐ VERIFY THE DRAINAGE "P" TRAPS ARE INSTALLED ACCORDING WITH THE ENERGY LABS EQUIPMENT INSTALLATION MANUAL.

18.- ☐ VERIFY THAT EVERY DOOR IN THE UNIT HAS EVEN GASKET, IS CLOSED AND FULLY SECURED BEFORE STARTING THE FANS.

19.- ☐ VERIFY THAT ALL DOOR SAFETY SWITCHES WORK.

20.- ☐ READ AND FOLLOW THE VFD START UP MANUFACTURER PROCEDURES BEFORE ATTEMPT START THE FANS.

21.- ☐ MEASURE THE SUPPLY VOLTAGE AND MAKE SURE IT IS THE SAME AS SPECIFIED ON THE UNIT NAMEPLATE.

22.- ☐ VERIFY THE PROPER ROTATION OF THE SUPPLY FANS.

23.- ☐ VERIFY THE PROPER ROTATION OF THE RETURN FANS.
21.- □ VERIFY THAT ALL FLOW RINGS AND STATIC TIPS ARE CONNECTED AND WORKING PROPERLY □ DOES NOT APPLY

22.- □ CHECK THAT ALL CONDUIT CONNECTIONS TO ELECTRICAL PANELS ARE SEALED. CONFIRM THAT THE PANEL IS CLOSED AND PROPERLY LATCHED

23.- □ VERIFY THAT ALL RAIN HOODS, FURNANCE FLUES AND ATTACHMENTS ARE INSTALLED AND SEALED. □ DOES NOT APPLY

24.- □ CHECK ALL FLOW GAUGES AND COVERS ARE INSTALLED AND OPERATIONAL. □ DOES NOT APPLY

25.- □ CHECK FOR DAMAGED, BLISTERED OR MISMATCHED PAINT.

26.- □ ARE ALL SAFETY AND OPERATIONAL LABELS IN PLACE.

### ELECTRIC MOTORS FIELD STARTUP RECORD

**Voltage Running**

<table>
<thead>
<tr>
<th>Voltage Running</th>
<th>L1-L2</th>
<th>L2-L3</th>
<th>L3-L1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>MOTOR</th>
<th>DATA FROM MOTOR NAME PLATE</th>
<th>MEASURE THE AMPS AND RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HP</td>
<td>AMPS</td>
</tr>
<tr>
<td>SUPPLY FAN 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUPPLY FAN 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RETURN FAN 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RETURN FAN 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXHAUST FAN 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXHAUST FAN 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To assure full warranty coverage, this report should be signed and returned by the manufacturer's representative to the Energy Labs service department. Fax:(619) 671-0158