

L&L EASY-LOAD KILN INSTRUCTIONS

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CAUTIONS

See the *cautions.pdf* in the CAUTIONS section. **READ THESE CAUTIONS.** They will help protect you and your property. Not all of the cautions are obvious - even experienced operators will need to pay attention.

INSTALLATION

See the INSTALLATION section (*install.pdf*) in this Instruction Manual. There is important information on electrical hookup, ventilation requirements, clearances, codes, etc. You must pay attention to these issues or you could create a dangerous situation.

TEMPERATURE RATINGS

All Easy-Load kilns are rated for use to 2350°F (1287°C) (Cone 10) **DO NOT FIRE ANY HIGHER THAN THIS.** The elements, element holders and firebrick will melt above 2350°F.

PREPARATION & ASSEMBLY

No assembly is required for the Easy-Load kiln.

REMOVING THE DOOR

You may need to take the door off to get the kiln through an opening. If you need to do this remove the element connection wires from the element terminals on the door. Then support the door with 2x4's or a table so that it doesn't fall down. **CAUTION:** The door is very heavy and could cause injury to you or damage to the door if it falls. Remove the hinges and lower the door to the ground. This will take at least two people.

When you replace the door be sure to readjust it so that the seal is even all around the face of the kiln.

UNDERSTANDING THE DESIGN

BASIC CONCEPT OF THE KILN

An EL Series Easy-Load electric kiln is an insulated front loading kiln designed specifically for firing of ceramics. Coiled elements made of a special high

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temperature alloy (iron-aluminum-chrome) are mounted on the sides, back and door for even heating. Bottom elements are optional.

SEPARATE CONTROL BOX

The control panel is mounted on the right side with standoffs to keep it separate from the heat of the kiln for more reliable operation. The switches and other sensitive components last longer. The panel can be sent to factory for repairs if ever necessary.

STURDY INTEGRATED STEEL STAND

The stand is made from heavy-duty welded steel and is integral with the kiln case.

ADJUSTABLE DOOR

The door has thrust bearings to make it easy to open. It is adjustable so that you can maintain a proper seal with the front of the kiln over years of operation.

HEATING ELEMENTS IN CERAMIC HOLDERS

The heating elements are designed to have a low watt density (radiating watts per square inch of element surface area) and good stretch ratio (ratio of stretched length to original coiled length). These are supported in hard ceramic element holders (a unique L&L feature).

5" OF MULTI-LAYERED INSULATION

The insulation is a special hand picked lightweight firebrick, which is 3" thick. This firebrick resists temperatures up to about 2450°F. It is highly insulating. This is backed up with 2" of non-asbestos mineral wool which is also highly insulating. Note: larger models have 4-1/2" of brick and 1/2" of back up insulation).

After the heating elements are turned off the insulation will slowly lose its heat and the kiln and ware will cool down. L&L uses a special coating on the firebrick to help prevent brick dusting which can ruin your ware. This also helps energy reflect back into the kiln, which improves the energy efficiency and gradient uniformity.

LARGE DIAMETER PEEPHOLES

There is one 1" diameter peephole per zone for ventilation and cone sighting. These are full diameter all the way through the firebrick, which allows greater

visibility into kiln than with the tapered holes that are often used in other kilns. One ceramic peephole plug is supplied per hole.

AUTOMATIC CONTROL

The Easy-Load has one 50 amp power contactor per heating circuit. The contactors are controlled by the three outputs of the DynaTrol automatic temperature control. This system dynamically reads temperatures from two or three thermocouples (depending on whether there are two or three zones in the kiln) and adjusts the amount of output that goes to each zone. If there is a powered bottom (which is optional on some models), this is controlled on a separate output on the control. This is tied into the bottom zone of the control which allows you to adjust the percent of the time on that the powered bottom comes on relative to the rest of the bottom zone. A Dawson kiln sitter is optional as a back up shut off device.

OPTIONAL "KISS" SOFTWARE

(For automatic kilns) Software is available to provide communications between the DynaTrol and a PC. This is called KISS software. It does require some simple hardware modifications. See *kiss.pdf* in the ACCESSORIES section.

POWERED BOTTOM OPTION

These are useful if you need to fire faster, have a heavy load or are going to very high fire (they will improve overall element life because the elements won't have to work as hard to get there). The powered bottoms also offer more control over the accuracy of the temperature at the bottom of the kiln.

KILN FURNITURE

L&L supplies ceramic kiln furniture for all our kilns. See the Price List for details about what is included. The post supplied with all Easy-Load kilns are strong fluted square tubes approximately 1-1/2" square.

VENT-SURE VENT OPTION

The Vent-Sure kiln ventilation system by L&L vents harmful fumes away from a kiln to the outside. Carbonaceous materials in clay, china paints and glazes containing oils, glue from decals, and certain glazes and other miscellaneous products generate

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fumes. Each vent is capable of handling 20 cubic feet of kiln. They can be easily added. See the separate installation and operation instructions (*venture-instruct.pdf*) in the VENT section.

POWER SUPPLY

VOLTAGE

Easy-Load Series kilns are normally wired to work on either 240 Volt Single Phase, 240 Volt three Phase, 208 Volt Single Phase or 208 Volt Three Phase. (Some non-US kilns work on 220 Single Phase or 380 volts, 3 phase "Wye"). It is important that the kiln be hooked up to the proper voltage. 208-volt kilns hooked up to 240-volt power supplies will generate too many amps. 240 volt kilns hooked up to a 208-volt power supply will heat up about 25% slower than they should and may not reach the higher temperatures. Although it is possible to hook a single-phase kiln to two legs of a three-phase supply it will cause an unbalanced load on your electrical supply. **CHECK WITH A QUALIFIED ELECTRICIAN.** It is best to get a three-phase kiln for a three-phase power supply. In addition to the power wires there is, on all L&L kilns, a ground wire. The ground wire is not used as a neutral (i.e. no electricity normally flows through the ground). **BE SURE TO GROUND THE KILN PROPERLY USING THE GROUND WIRE.**

WIRING DIAGRAM

See your specific wiring diagram and data nameplate which has all electrical connection information for your kiln listed.

480 VOLTS OPTION

480 volts is available as an option. The voltage of the elements is 240 volts (two elements are in series) and the connection is "Delta" 3 phase. The control box is a special NEMA rated box and connections between the kiln sections and the control box are hard wired. See your wiring diagram for more information.

WHY PROPER GROUNDING IS IMPORTANT

All electrical appliances should be properly grounded. This can be to either a cold water pipe or proper system ground in your building. If there is ever a short

circuit (where the electricity flows through to the case or control panel and where you might touch it) you could be electrocuted if the kiln is not grounded. This is especially important with the high line voltage used on kilns. The higher the voltage the more easily it could flow through your body. In addition, because of the heat generated in a kiln, wires are subject to potential deterioration over time and expansion and contraction can move insulators and cause short circuits. **BE SURE TO REPLACE ANY DETERIORATED WIRES!**

ELEMENT VOLTAGE

The elements on all Easy-Load Series kilns work on line voltage (208, 220 or 240). Elements may be wired in series or parallel depending on the kiln. See your wiring diagram.

POWER HOOK UP

All Easy-Load kilns are direct hook up. Be sure that your fuse ampere capacity is enough to carry the electrical load required. Also, ensure that your power lines are heavy enough to carry the required electrical load. Anticipate future needs (such as adding an extension) to save yourself from future electrical installation costs. If this is being used in an industrial application or environment be sure to follow lock out/tag out requirements and procedures. Be sure to ground kiln properly. **DO NOT USE ALUMINUM WIRE FOR HOOKING UP A KILN.**

FUSING YOUR CIRCUIT

The National Electrical says that you should fuse a resistance circuit (kilns are a resistive load rather than an inductive load like a motor) for 125% of their rated full load amps. The full load amps are listed on the data nameplate of the kiln. **CHECK WITH A QUALIFIED ELECTRICIAN.** See *hotkilns.com/volts.pdf* for a complete description of fuses.

OPTIONAL 120 VOLT CONTROL SUPPLY

Some automatic kilns are supplied with an optional 120-volt power supply for the control circuit. This 120-volt cord plugs into a grounded 120-volt outlet. Ideally it should be plugged into a UPS (Uninterruptable Power Supply) or computer surge protector because the whole point of this option is to allow you to protect your

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electronics from power surges and outages. The 120-volt supply is filtered through an electrical noise filter located within the cabinet. See *hotkilns.com/noise.pdf* for a complete sales information. This is an option that can be retrofitted into your system if ever needed.

INSTRUMENT PANEL

All models have a power connection board (with grounding lug) in the instrument/control panel. An electrician needs to wire these kilns direct to a fused power circuit. See electrical specifications and wiring diagram for details. Each section is controlled with a separate "branch circuit" which includes fusing both legs of the power. The zone switch or the output from the DynaTrol actually controls a separate power contactor. The power does not go directly through the zone switches or the DynaTrol. The Dawson kiln sitter/timer breaks the power to the coils of the contactors or the line voltage to the DynaTrol rather than breaking the main power line coming in.

REPAIRING OR REPLACING THE INSTRUMENT PANEL

The entire instrument panel is separate from the kiln. This is a unique L&L Kiln design feature and allows easy factory repair of your instrument panel. Just disconnect wiring (best to do this at the outputs of the power contactors) and thermocouples and disconnect the wires from the Dawson kiln sitter (or physically remove the Dawson kiln sitter from the kiln while keeping it attached to the panel), pack it carefully in a box with protective cushioning, and send it to L&L Kiln for inspection and/or repair. There is a nominal charge for inspection (only if the kiln is out of warranty). (see the *part.pdf* in the PARTS section). Complete instrument panels can be ordered for replacement.

FUSES

The fuses for all models are located in the main instrument/control panel. Remove the cover to see the fuses and fuse blocks. The fuse blocks and fuses vary with the model. See the wiring diagram for specific information on your model. See *volts.pdf* for a complete description of fuses.

DYNATROL AUTOMATIC CONTROL

When ordered with the DynaTrol the Easy-Load kilns are automatically controlled. Please see the separate Basic DynaTrol Operation instructions (*dynatrol-basic-operation.pdf*) in the OPERATION section and the complete DynaTrol instructions in the CONTROL Section (*dynatrol-instruct.pdf*) concerning this control and its operation.

THERMOCOUPLES

The standard thermocouple used on the Easy-Load an 8 gauge Type K thermocouple protected with an industrial grade mullite thermocouple protection tube.

These work by creating a slight millivoltage at the junction of the two dissimilar metals. This millivoltage varies proportionately with temperature. The thermocouple ends insert into a ceramic junction block.

When testing a thermocouple that has a mullite protection tube do not heat up with a torch. Heat shock could crack the mullite tube.

METALLIC THERMOCOUPLE OPTION

Note that there is also a Pyrocil metallic sheathed thermocouple option which allows you to remove the thermocouple offsets but has the disadvantage of shorter life in the high temperature ranges and metal spalling in the kiln. See *tc-protect.pdf* in the ACCESSORIES section. Also see *hotkilns.com/tc-metallic.pdf*. (Type S thermocouples are also optional).

PROPER INSERTION OF THERMOCOUPLES

The thermocouples must be inserted at least 1" into the interior of the kiln. Keep a few things in mind. First: the thermocouple end is where the sensing takes place. Second: the thermocouple end must never be inside the kiln wall insulation (this will cause the kiln to overfire because of an incorrectly low reading).

KILN SITTER/TIMER

NOTE: This is an option of automatic kilns in which case it is used as a safety back up control.

L&L Kiln Mfg. Inc. cannot assume any responsibility for a kiln sitter. We purchase this item. We install it, and supply you with the material to test it, prior to

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doing your regular firings. (All kiln manufacturers purchase the kiln sitter). It is a safety back up device; however, they can and do fail. L&L does not recommend unattended firings. See *cautions.pdf* in the CAUTIONS section.

Put kiln wash on the cone support (not sensing rod) for accurate cone action. Clean off the old wash and reapply new wash each time you fire.

Read your Dawson Kiln Sitter manual CAREFULLY AND COMPLETELY BEFORE USING YOUR NEW KILN. This control is the shut-off system for your kiln, and must be properly set to prevent over-fire of your kiln. With your kiln you have received two (2) 020 test cones for the initial test. You do not have to use 020 cones for the test but these are the ones that are provided.

NOTE: The Timer must be set so that it is not on "0" (Off). If it is the Dawson Kiln Sitter will not engage and the kiln will not turn on.

Be sure to read the section in the Dawson instruction book about Witness Cones. This is the most accurate method of determining temperature in the kiln.

TESTING THE DAWSON BACK-UP

The whole point of having this option is to act as a back up safety to shut off the kiln in the event of a control failure. It is not meant to actually control the kiln temperature. Use a cone that is one to two cones higher than where you set your automatic control.

To test the operation of the system, simply program the DynaTrol for a higher cone than the cone you put in the Dawson. This way, if you use witness cones also, the Dawson kiln sitter will shut off the kiln BEFORE the DynaTrol and you can compare the kiln sitter cone to the witness cones. That way you can see if adjustments are needed on the kiln sitter. (See the kiln sitter instructions for more details on adjustments).

OPTIONAL POWERED BOTTOM

Some Easy-Load models have optional powered bottoms available. These are useful if you need to fire faster, have a heavy load or are going to very high fire (they will improve overall element life because the

elements won't have to work as hard to get there). The powered bottoms also offer more control over the accuracy of the temperature at the bottom of the kiln. There should be a 1" to 1-1/2" air space between the bottom and the first hearth shelf (in other words, set the first hearth shelf on 1" or 1-1/2" ceramic spacers). Keep spacers at least 1/2" away from the edge of the element grooves on the bottom. Be sure to read the section on programming powered bottoms in the DynaTrol Manual (*dynatrol-instruct-blue.pdf*) in the CONTROL section. Read chapter 4.4 (HIDDEN "OTHER MENU & Programming the Powered Bottom).

FIRST FIRING OF THE KILN

Follow the FIRST FIRING INSTRUCTIONS in the *first-firing.pdf* in this OPERATION section.

SERVICE AND MAINTENANCE

REGULAR KILN MAINTENANCE

See *maintain.pdf* in the MAINTENANCE Section. NOTE: Failure to properly maintain your kiln could lead to a dangerous condition and could lead to premature aging of the kiln (like elements burning out).

WARRANTY

Easy-Load kilns carry a three year limited warranty. See *warranty.pdf* in the SERVICE Section.

SERVICE FOR YOUR KILN

See *service.pdf* in the SERVICE Section.

TROUBLESHOOTING

See the separate TROUBLESHOOTING SECTION.

REPLACEMENT ELEMENTS

See *parts.pdf* in the PARTS Section. Also see the *troubleshoot-elements.pdf* in the TROUBLESHOOTING Section.

CRACKS IN THE BRICKS

It is quite normal to get hairline cracks in firebricks. They are caused by the expansion and contraction of the firebrick as it heats and cools. It generally does not

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make sense to cement these hairline cracks.

SPARE PARTS

WHERE TO BUY PARTS

See *parts.pdf* in the PARTS Section.

PARTS TO KEEP ON HAND

If you are operating in a production environment it is imperative that you stock certain spare parts if you must prevent down time. While we do our best to ship parts quickly and to keep all parts in stock we cannot be responsible for your downtime. We recommend the following parts be kept on hand:

Complete set of elements

Complete set of fuses

One power contactor

Set of spare thermocouples

Several element holders

Brick Repair kit (See *brickrepair.pdf*)

PYROMETRIC CONES

See *the* LOG, CONES & CERAMIC PROCESS section.

WHERE TO LEARN MORE ABOUT CONES

Visit the Orton Website at *ortonceramics.com*. There is lots of great information on how to use cones and troubleshooting cone problems. See the Orton Cone Chart in the ORTON TIPS section. Note that the kilns tend to slow down considerably in the higher temperature ranges to 50°F to 100°F per hour.

FIRING LOG

We recommend keeping a firing log. Keep track of firing times, approximate load weight, firing temperatures and notes on results of the firing. There is a template in the LOG, CONES & CERAMIC PROCESS section of your instruction manual (*log.pdf*)

MORE ABOUT FIRING CERAMICS

See the sheet called *ceramic-firing.pdf* in the LOG, CONES & CERAMIC PROCESS section.