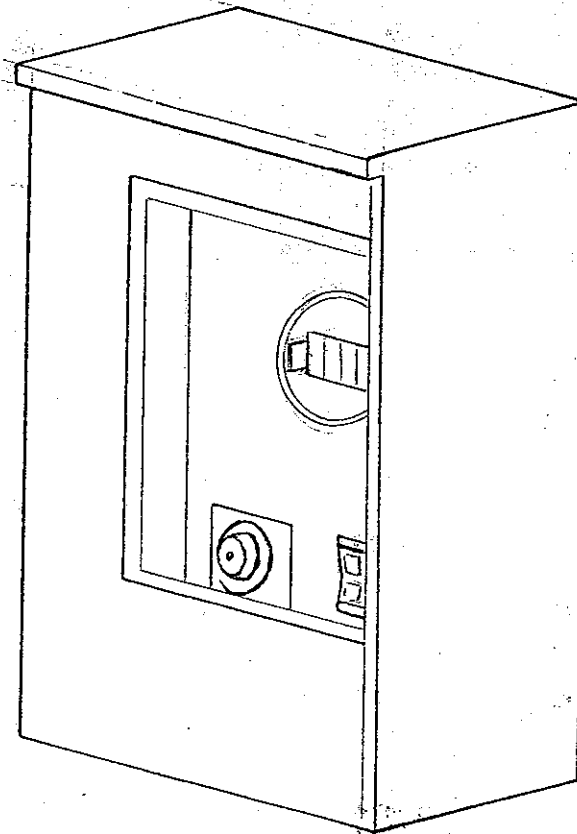


584 Series

# ECON-A-TROL PANEL

Installation Instructions



584A-001A 1 phase 5 HP. Max.

584B-001A 1 phase 7.5 HP. Max.

584C-001A 3 phase 7.5 HP. Max.

Shivers Inc. reserves the right to incorporate changes in designs or materials affecting product improvement without obligation of incorporating same on equipment of prior manufacturing.

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The 584-series Econ-A-Trol control panel is designed primarily for a single bin drying installation, with the dryer used in a recirculation mode. An optional separate control panel could be added at a later time to enable the Econ-A-Trol panel to be used to control a dryer in continuous flow operation.

The Econ-A-Trol Panel consists of a motor starter with overload relay, an on-off-automatic rocker switch, a grain thermostat with grain probe housing, and a resettable hour-meter (elapsed time indicator), all contained in a weather-proof galvanized box.

Required, but not included, is a master disconnect switch with lockout capability, a circuit breaker or fuse box for motor protection, and thermal units (overload heater strips) for the overload relay of the motor starter unit. One thermal unit will be required on a single phase unit, with three required for a three phase unit. These thermal units are available from Shivers but must be ordered separately, and sized according to the motor horsepower. The master disconnect switch and circuit breaker or fuse box should be locally obtained by the installing electrician.

All wiring must conform to all applicable electrical codes and should follow sound local practices.

## OPERATOR RESPONSIBILITY

The operator of this machinery must assume the responsibility for his own safety and that of those individuals who are working with him.

Factors that contribute to the overall safety of operation are proper use, maintenance, and frequent inspection of the equipment. All of these are in the operator's responsibility.



Take note anytime this symbol appears. Your safety, and that of persons around you, is at stake.

1. All units must be equipped with a master disconnect switch immediately ahead of the dryer control box. This switch must have the capability of being locked into the OFF position. It should be placed on the bin sidewall next to the grain bin's main entry.
2. Disconnect and lock off all electrical power before conducting any inspection, maintenance, repair, adjustment or cleaning of this unit—and most troubleshooting.

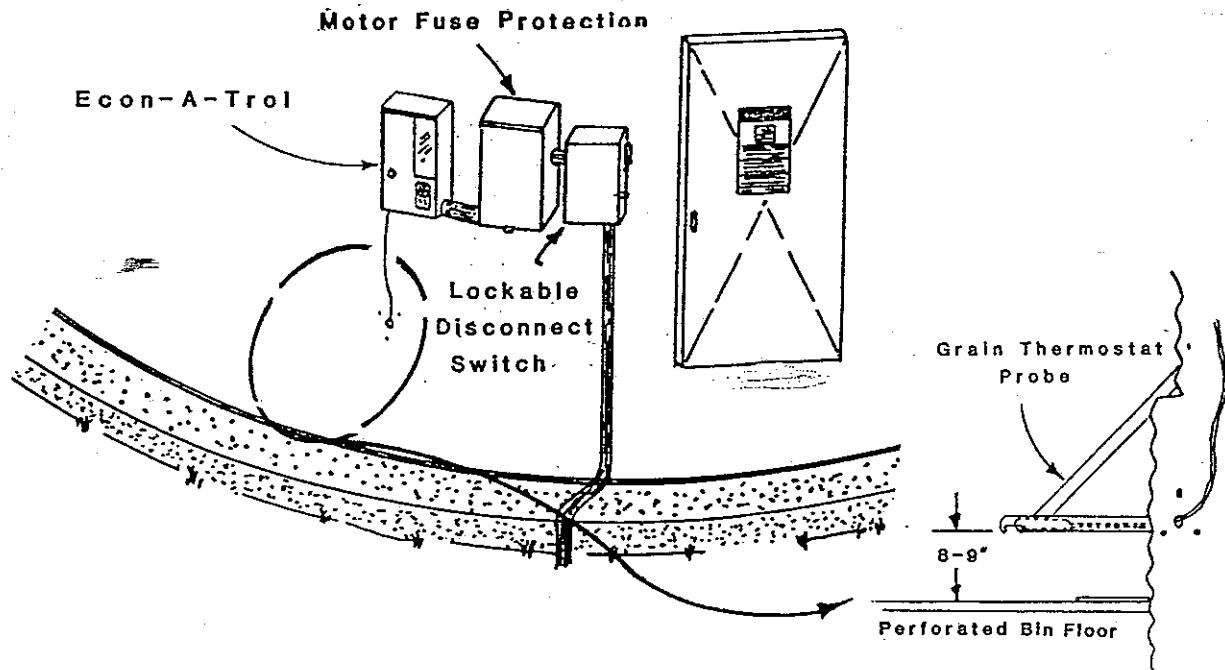
When you must have electrical power on to troubleshoot equipment inside the bin, do this from a safe distance — from outside the bin door.

3. Never enter this drying bin unless all power has been turned off and locked out at the main disconnect switch.
4. Prior to use, inspect all equipment to insure that it is in good operating condition. Do not operate with missing, damaged, or worn parts.
5. Be sure that all warning or danger decals are in place and easily readable. Do not operate with missing or illegible decals. If replacements are needed, contact the factory for free decals.
6. Always keep all shields and guards in place. If shields or guards must be removed for inspection or maintenance purposes, replace these components before starting machine.
7. Do not start this equipment without being sure everyone is clear of the unit.
8. Keep all children and bystanders away at all times.
9. Periodically review this safety manual with all personnel who are working with this equipment. Always train new employees before they operate this equipment. Insist that they read and understand this manual.

Shivvers is genuinely interested in providing the safest practical equipment to our customers. If you have a suggestion which you believe will enhance the safety of this product, please write us and let us know.

## PHYSICAL INSTALLATION

The Econ-A-Trol control panel should be mounted near the bin door at a convenient "using" height with four bolts or large screws fastening this box to the bin sidewall. Note that all electrical power must go through the master disconnect switch and circuit breaker or fuse box before being connected to the Econ-A-Trol panel.



Install the grain probe (thermostat bulb housing) directly below the Econ-A-Trol Panel with the bottom edge of the probe tube 8" to 9" above the perforated bin floor. This probe should be mounted from the inside of the bin wall, with a hole saw used to make a neat hole in the bin sidewall for the thermostat bulb. This should be a 3/4" to 1" hole, located "in the valley" of the corrugation, when viewed from the outside of the bin. Be sure to use some sealer or caulking between the bin sidewall and the probe to prevent leakage. Do not caulk or plug the probe tube—air must be exhausted through the probe for the thermostat to work! Insert the thermostat bulb fully into the probe.

## INCOMING POWER CONNECTION

All wiring must conform to all applicable electrical codes and should follow sound local practices.

Motor power must be wired from the fuse or circuit breaker panel to the top of the motor starter contactor. This wire and fusing must be sized for the motor horsepower. A separate wire harness should be brought from the fuse box for the control power in this panel. The control power harness should be capable of handling a 10 amp load, with a neutral wire and ground included. The "hot" wire of the control harness will be connected to terminal P of the Econ-A-Trol terminal strip, and the neutral wire connected to the N2 terminal of the same terminal strip. There is a bare lug mounted in the lower corner of the panel for connection of the ground wire.

## CIRCUIT DESCRIPTIONS



DO NOT OPEN THIS CONTROL BOX, ATTEMPT TO TROUBLE-SHOOT, OR TRACE THESE CIRCUITS UNTIL ALL POWER HAS BEEN DISCONNECTED AND LOCKED OFF AT THE MAIN DISCONNECT SWITCH. ALL TESTING OR TRACING SHOULD BE DONE WITH A CONTINUITY TESTER OR METER WITH NO POWER IN THE CONTROL BOX. FAILURE TO HEED COULD RESULT IN SERIOUS OR FATAL ELECTRICAL SHOCK!

### Incoming Control Power Circuit

Incoming power will be connected at terminal P, for the "hot" wire and to terminal N2 for the neutral wire. Wire 1 is connected from terminal P to the line side of the 5 Amp Fuse. Wire 10 is connected from the load side of the fuse to terminal P2. Wire 2 is connected from P2 to the center, or common, terminal of the rocker switch. When the control power is available at the common (center) terminal of the rocker switch, it may be switched to operate the machine in either a manual or an automatic mode. In manual mode, the machine should start and run immediately. In the automatic mode, the grain thermostat will control the power to the motor starter.





DO NOT OPEN THIS PANEL, ATTEMPT TO MAKE CONNECTIONS, TRACE, OR TROUBLESHOOT THIS CIRCUIT UNTIL ALL POWER HAS BEEN DISCONNECTED AND LOCKED OFF AT THE MAIN DISCONNECT SWITCH. FAILURE TO HEED COULD RESULT IN SERIOUS OR FATAL ELECTRICAL SHOCK!

When this unit is switched to the manual mode of operation, connection will be made internally in the switch between the center terminal and the manual (ON) terminal of the switch. Wire 3 is connected from the ON terminal of the rocker switch to terminal 2 of the main terminal strip. Terminal 2 is connected to one of the interlock switch terminals on the overload relay of the motor starter unit by wire 6. The power is allowed to pass through the interlock switch, then to one of the coil terminals of the contactor of the motor starter unit via the jumper mounted on the starter unit. The other coil terminal is connected to terminal N2 by wire 9. Also connected at the "hot" coil terminal is wire 7, connected to the hour-meter. The other lead of this hour-meter is connected to the N2 terminal with wire 8. This wiring will allow the motor starter to operate and the hour-meter to record the total time the contactor is engaged. NOTE: If the overload relay has "tripped", the power will not pass through the interlock switch to engage the contactor.

Be sure that the adjustment tab on the end of the overload relay is in the manual reset position. Do not operate this control with the overload relays in the automatic reset position!

## AUTOMATIC OPERATION



DO NOT OPEN THIS BOX, ATTEMPT TO MAKE CONNECTIONS, TRACE, OR TROUBLE-SHOOT THIS CIRCUIT UNTIL ALL POWER HAS BEEN DISCONNECTED AND LOCKED OFF AT THE MAIN DISCONNECT SWITCH. FAILURE TO HEED COULD RESULT IN SERIOUS OR FATAL ELECTRICAL SHOCK!

When the rocker switch is put into the automatic mode, connection will be made internally between the common terminal and the "auto" terminal. Wire 4 is connected from the auto terminal to terminal T of the main terminal strip. Terminal T is connected to terminal R of the grain thermostat by wire 11. If the temperature of the air exhausting through the grain probe is higher than the setting of the grain thermostat, the thermostat will make connection between terminals R and W of the thermostat. If the air temperature is less than the setting of the thermostat, the power will be stopped at terminal R of the thermostat, so that the unit will not operate.

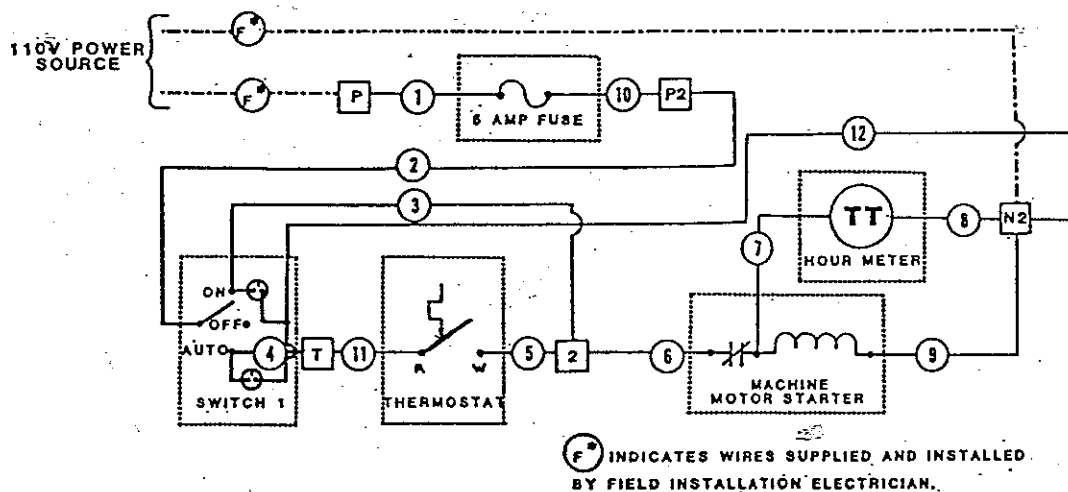
When the grain thermostat switch is closed, the power will be connected to terminal W of the thermostat where wire 5 is connected. Wire 5 is also connected to terminal 2. Wire 6 will carry the power from terminal 2 to one of the interlock switch terminals of the overload relay. If the overload relay has not been tripped, the power will pass through the interlock switch and be carried to the contactor coil terminal by an unmarked jumper on the starter unit. If the overload has opened, the power will be stopped at the interlock switch.

The "hot" terminal of the contactor will also have wire 7 connected, leading to the hour-meter. The other coil terminal will have wire 9 connected, leading to the N2 neutral terminal. The neutral lead (wire 8) from the hour-meter will connect to terminal N2.

This completes the wiring for the Econ-A-Trol Panel in the automatic mode of operation. Note that the grain thermostat will control the flow of power to the motor starter contactor.

## 584 Series ECON-A-TROL

### Control Wiring Diagram



## Automatic Operation

In automatic operation, the grain thermostat will control the flow of power to the contactor will be controlled by the grain thermostat. When the air exhausting through the grain thermostat is cooler than the setting of the grain thermostat, the switch of the thermostat will be open so the contactor will not have power to be engaged. When the temperature of the air reaches the temperature set on the thermostat, the switch of the thermostat will close, allowing power to reach the contactor coil to engage the contactor. As this is a temperature switch, the "incoming" temperature must remain relatively constant to sense the change in grain temperature under the grain thermostat probe. In simpler terms, the plenum temperature must remain steady or constant. If the plenum temperature is allowed to vary with the changing ambient conditions, the grain thermostat can not provide even moisture control of the dryer. This is especially noticable in the change from warm day operation to cooler night temperatures. The pressure available to the burner must be adjusted to provide a steady plenum temperature. This is the most common reason for poor moisture control with this control system.