

ACCESSORY KIT INSTALLATION INSTRUCTIONS

IGNITION CONTROL P/N 331-01933-000

FOR USE WITH THE FOLLOWING FURNACE MODELS:

P1UK, PAKU, P2MP, P2MPV, P9MP, P2UR, , PBLU, P2LN, P2DP, P3UR, PCLU, P1CX, PACR, XED; P(1,2)CD, P(A,B)ND, XND, DGD, GDD; P3HU, P3GEB, GUD, DGU, PCUH, P1DU, FL8; P3UR, G9T; FG9, P3DN, P3DH; PCDF, P2DR, PBLD, PBKM, PBKD, P1CK, PACE

GENERAL

Ignition control P/N 031-01933-000 is a direct replacement for part numbers 031-01267-000, 031-01267-001, 031-00662-000 (50A50-209), 031-01250-000 (50A50-230), 031-01266-000 (50A50-241), and 031-01284-000 (50A55-241). FIGURE 1 shows the basic board layout with general component and safety circuit connections (Refer to the electrical wire diagram for the furnace being serviced for circuit connections specific to that model.)

SEQUENCE OF OPERATION

HEATING CYCLE

When the system is set on HEAT and the fan is set on AUTO, and the room thermostat calls for heat, a circuit is completed between the R and W terminals of the thermostat. When the proper amount of combustion air is being provided, a pressure switch activates the ignition control. If the pressure switch contacts are open, normal operation continues, if not lockout occurs and a FLASH CODE 2 appears (See FIGURE 2). The pressure switch is then tested for closure. If the pressure switch does not close within 5 seconds a lockout occurs and a FLASH CODE 3 appears.

Upon closure of the pressure switch the hot surface igniter (HSI) turns on. The HSI heats up for 17 seconds. At the end of the 17 seconds the gas valve (MV) opens for 7 seconds. The HSI remains on for 5 seconds more and then shuts off.

As gas starts to flow and ignition occurs, the flame sensor begins its sensing function. If a flame is detected within 7 seconds after ignition, normal furnace operation continues until the thermostat circuit between R and W is opened. If a flame is not detected within 2 seconds, the main valve is shut off and a retry operation begins. If 3 retries occur in a given ignition sequence the furnace shuts down for 1 hour and a FLASH CODE 7 appears. Flame detection must be lost for 2 seconds during flame stabilization for the main valve to be de-energized.

When the flame stabilization period has ended, a loss of flame will result in the main valve being de-energized and a recycle operation occurs. Five recycles may occur in a given call for heat before the furnace enters a one hour lockout. A FLASH CODE 8 appears after 5 recycles. The main blower energizes on heat speed 30 seconds after the main valve opens and a flame has been detected.

When the thermostat circuit opens, the ignition control and main gas valve is immediately de-energized. The ventor remains energized for a 15 second post-purge period and the main blower remains on for the preset delay off period of 60, 90, 120, or 180 seconds.

INSTALLATION

The required number of steps to remove the failed ignition control and install the new ignition control will vary depending on the furnace model. However the method of mounting and the wire connections will remain the same.

WARNING

Disconnect electrical power to the furnace before installing this control. Failure to cut power could result in an electrical shock or equipment damage.

CAUTION

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous furnace operation. Verify proper operation after servicing.

NOTE: All wiring must be in accordance with both the National Electric Code, latest edition, and all local electrical codes.

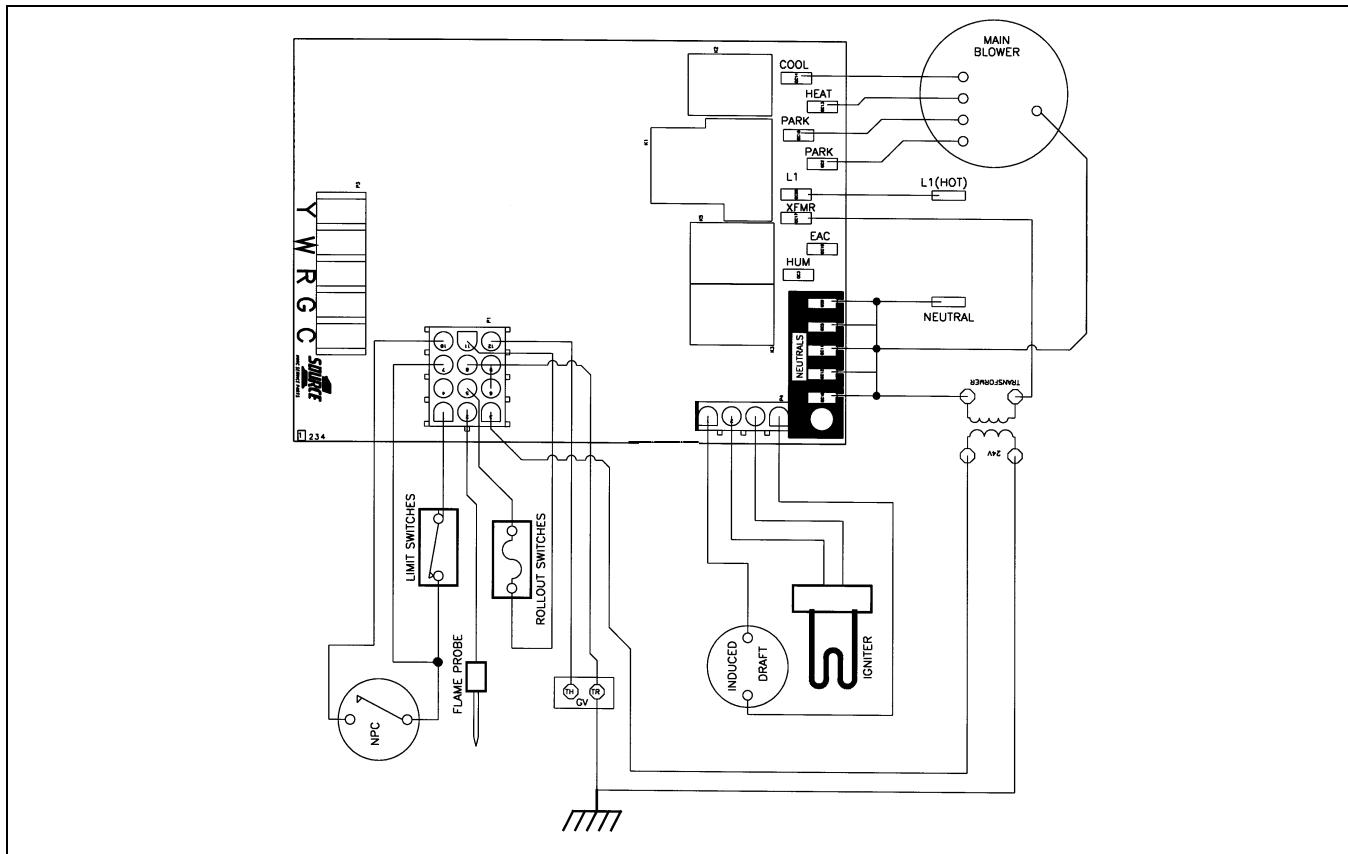


FIGURE 1: BOARD LAYOUT

REMOVAL OF FAILED IGNITION CONTROL

1. Turn off electrical power.
2. Remove furnace vest and blower access panels.
3. Remove electrical box cover, if required.
4. Label all wires prior to disconnection.
5. Disconnect all wires to failed ignition control.
6. Remove screws fastening ignition control to electrical panel.
7. Fasten hole template, included with this installation instruction, to electrical panel and drill new mounting holes. (If required)

INSTALLATION OF IGNITION CONTROL

1. Orient the control with the thermostat terminal board up.
2. Align the plastic mounting feet with the mounting holes in the electric panel and press on each corner of the control board to seat the mounting feet.

CAUTION

Apply only enough pressure to seat the mounting foot or the ignition control may be damaged.

1. Connect all wires according to the electrical wire diagram. Refer to FIGURE 1 for the locations of the terminals to be connected.
2. Check to see that all wire connections were made properly before applying power.
3. Affix DIAGNOSTIC FLASH CODE label to blower housing, electrical box or cover, or the front blower deck.
4. Apply power and test furnace operation.

PARTS LIST

1. Ignition control P/N 031-01933-000 or 031-01267-001
2. Hole template
3. Installation Instruction P/N 035-14592-000
4. Label/DIAGNOSTIC FLASH CODE

DIAGNOSTICS

The electronic furnace control supplied on this furnace is equipped with a diagnostic light, which flashes when there is a service problem with the furnace. The number of times the light flashes indicates the location of the problem, as listed below:

Steady off - Normal operation

One flash - False flame sense - Check for stuck open gas valve.

Two flashes - Pressure switch stuck closed. Check for shorted wires, bad pressure switch.

Three flashes - Pressure switch failed to close - Check vent blower, pressure switch, vent blockage, disconnected pressure hose.

Four flashes - Limit switch open - Check for open limit switch, loose connections in limit circuit.

Five flashes - Rollout switch open - Check for open rollout switches, loose connections in rollout switch circuit.

Six flashes - One hour pressure switch lockout - Pressure switch has cycled four times in a single call for heat - Check for vent blockage, loose connections in pressure switch circuit.

Seven flashes - One-hour ignition lockout - Burner failed to light in three tries - Check gas flow, gas pressure, gas valve operation, flame sensor.

Eight flashes - One-hour ignition lockout - Five recycles in a single call for heat. Check gas flow, gas pressure, and gas valve operation, flame sensor.

Nine flashes - Reversed line voltage polarity - Check incoming power wiring for proper polarity.

Eleven flashes - (031-01267-001 board only) This fault will be indicated if the rollout jumper wire connection soldered into the board, is broken. If this fault occurs the control will have to be replaced. This fault may also occur in installations where an improper ground is present. Prior to replacing control, verify that unit is properly grounded.

Steady on - Gas valve energized with no call for heat from thermostat, or, control failure.

TWINNING

GENERAL

In applications where more heating capacity or more airflow capacity is needed than what one furnace can deliver, twinning can be used to make two furnaces operate in tandem, using one duct system and one room thermostat. When one duct system is used for two furnaces, it is necessary that the two blowers operate in unison. The twinning function of this board ensures that both blowers turn on and off simultaneously, and operate on the same blower speed.

SINGLE-WIRE TWINNING

This control has the single-wire twinning feature. With this feature, a single wire is connected between the TWIN terminal on one furnace board to the TWIN terminal on the second furnace board. The board then communicates the blower status from one furnace to the other along this wire. This communication makes the second furnace blower come on at the same time, and on the same speed, as the first furnace blower.

2TC03700124 TWINNING CONTROL

Older furnace control boards were not equipped with the single-wire twinning feature, so when twinning was necessary, use of a separate twinning kit was required. This twinning kit, P/N 2TC03700124, used current-sensing relays to detect blower operation in one furnace and then turn on the blower in the second furnace.

REPLACEMENT OF THE CONTROL BOARD IN A SINGLE-WIRE TWINNED FURNACE

The communications link between the two furnaces that is used for single-wire twinning is unique to each control board manufacturer. So the control boards on both furnaces must be the same part number. So if this replacement control board is being used to replace a board in a twinning application using single-wire twinning, it will be necessary to make sure that both control boards are the same part number.

REPLACEMENT OF THE CONTROL BOARD IN A FURNACE USING THE 2TC03700124 TWINNING KIT

The 031-01933-000 control board is not compatible with the 2TC03700124 twinning kit. So if the control board must be replaced in a twinned furnace using the 2TC03700124 Twinning Control, it will be necessary to do one of two things: (1) replace the board with one of the older control boards listed above, or (2) replace both control boards with this 331-01933-000 board and use the single-wire twinning feature. Instructions for using the single-wire twinning are shown below.

SINGLE-WIRE TWINNING INSTRUCTIONS

Connect the control wiring as shown in the diagram below.

1. Connect the low voltage wiring from the wall thermostat to the terminal strip on the control board of Furnace #1.
2. Connect a wire from the TWIN terminal of Furnace #1 to the TWIN terminal of Furnace #2.
3. Install a separate 24V relay as shown in the diagram below. Use of this relay is required, as it ensures that the transformers of the two furnaces are isolated, thus preventing the possibility of any safety devices being bypassed.

SINGLE-WIRE TWINNING OPERATION

Heating - On a call for heat (W signal) from the wall thermostat, both furnaces will start the ignition sequence and the burners on both furnaces will light. About thirty seconds after the burners light, the blowers on both furnaces will come on in heating speed. When the thermostat is satisfied, the burners will all shut off and, after the selected blower off delay time, both blowers will shut off at the same time. The twinning control ensures that both blowers come on and shut off at the same time.

Cooling - On a call for cooling (Y signal) from the wall thermostat, both furnace blowers will come on at the same time in cooling speed. When the thermostat is satisfied, both blowers will stay on for 60 seconds, then will shut off at the same time.

Continuous Fan - On a thermostat call for continuous fan (G signal), both furnace blowers will come on at the same time in cooling speed and will stay on until the G signal is removed.

031-01933-000 Board Only - If there is a call for heat during the continuous fan operation, both blowers will shut off and will stay off until the burners have lit and the 30-second heating blower delay has elapsed. Then the blowers will both come on in heating speed.

031-01267-001 Board Only - If there is a call for heat during the continuous fan operation, the blowers will immediately switch to heating speed and will stay there until the call for heat has been satisfied.

When the call for heat is satisfied, the blowers will switch back to cooling speed.

TWINNING WIRING DIAGRAM

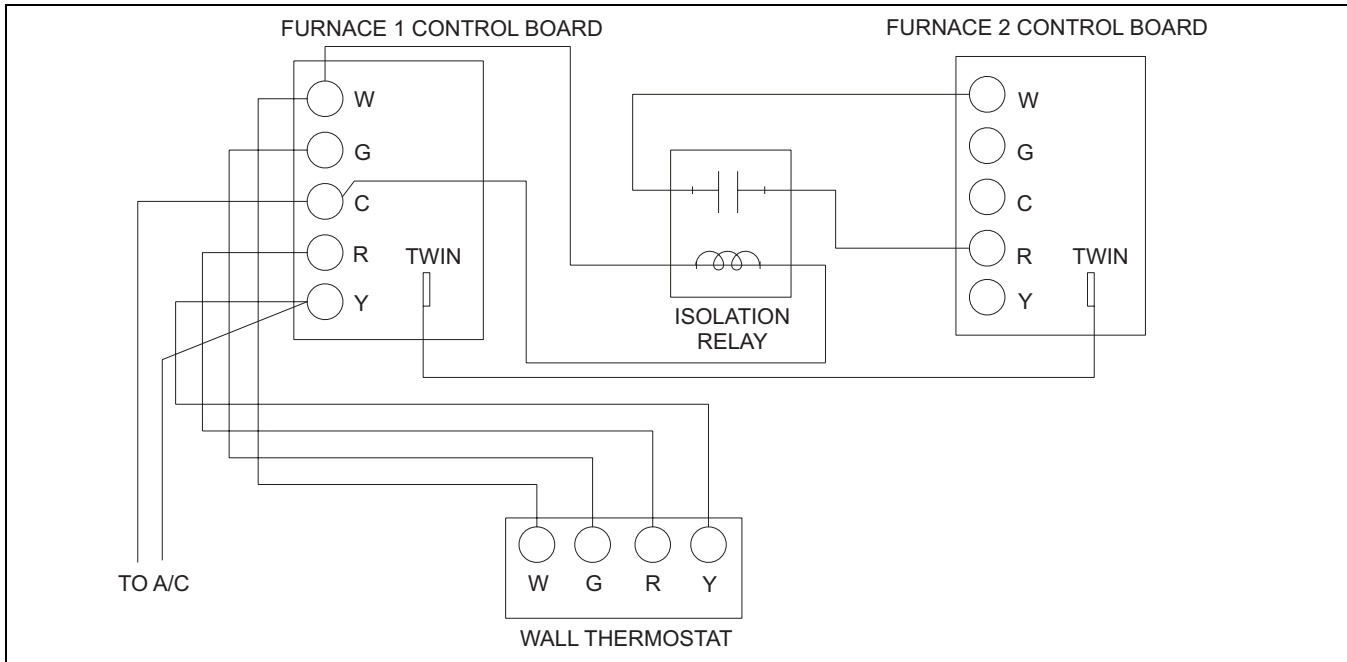


FIGURE 2 - TWIN CONNECTION DIAGRAM

STAGING

GENERAL

In applications where more heating capacity or more airflow capacity is needed than what one furnace can deliver, twinning can be used to make two furnaces operate in tandem, using one duct system and one room thermostat. This control can also be used along with a two-stage wall thermostat to stage two twinned furnaces, making them operate like a single two-stage furnace. This allows only one furnace to supply heat during times when the heat output from one furnace is sufficient to satisfy the demand. When one duct system is used for two furnaces, it is necessary that the two blowers operate in unison. The twinning function of this board ensures that both blowers turn on and off simultaneously, and operate on the same blower speed. Even when only one furnace is supplying heat, both furnace blowers must run.

SINGLE-WIRE STAGING

The single-wire twinning feature of this board can also be used for staging of two furnaces. With this feature, a single wire is connected between the TWIN terminal on one furnace board to the TWIN terminal on the second furnace board. The board then communicates the blower status from one furnace to the other along this wire. This communication makes the second furnace blower come on at the same time, and on the same speed, as the first furnace blower.

2TC03700124 TWINNING CONTROL

Older furnace control boards were not equipped with the single-wire twinning feature, so when staging was necessary, use of a separate kit was required. This twinning kit, P/N 2TC03700124, used current-sensing relays to detect blower operation in one furnace and then turn on the blower in the second furnace. This twinning control could also be used for staging two furnaces.

REPLACEMENT OF THE CONTROL BOARD IN A SINGLE-WIRE STAGED FURNACE

The communications link between the two furnaces that is used for single-wire twinning and staging is unique to each control board manufacturer. So the control boards on both furnaces must be the same part number. If this replacement control board is being used to replace a control board in a twinning or staging application using single-wire twinning, it will be necessary to make sure that both control boards are the same part number.

REPLACEMENT OF THE CONTROL BOARD IN A FURNACE USING THE 2TC03700124 TWINNING KIT

This 031-01933-000 control board is not compatible with the 2TC03700124 twinning kit. So if the control board must be replaced in a staged furnace using the 2TC03700124 Twinning Control, it will be necessary to do one of two things: (1) replace the board with one of the older control boards listed above, or (2) replace both control boards with this 331-01933-000 board and use the single-wire twinning feature. Instructions for using single-wire staging are shown below.

SINGLE-WIRE STAGING INSTRUCTIONS

Connect the control wiring as shown in the diagram below.

1. Connect the low voltage wiring from the wall thermostat to the terminal strip on the control board of Furnace #1. For staging applications, the wire from thermostat W1 is connected to the W connection on the board on Furnace #1. The wire from thermostat W2 is connected to Furnace #2 through a separate relay, as described below.
2. Connect a wire from the TWIN terminal of Furnace #1 to the TWIN terminal of Furnace #2.
3. Install a separate 24V relay as shown in the diagram below. Use of this relay is required, as it ensures that the transformers of the two furnaces are isolated, thus preventing the possibility of any safety devices being bypassed.

SINGLE-WIRE STAGING OPERATION

Heating - On a call for first-stage heat (W1 signal) from the wall thermostat, Furnace #1 will start the ignition sequence and the burners will light. About thirty seconds after the burners light, the blowers on both furnaces will come on in heating speed. When the thermostat is satisfied, the burners will shut off and, after the selected blower off delay time, both blowers will shut off at the same time. On a call for second stage of heat, the burners of Furnace #2 will also light and both blowers will run. The twinning control ensures that both blowers come on and shut off at the same time.

Cooling - On a call for cooling (Y signal) from the wall thermostat, both furnace blowers will come on at the same time. When the thermostat is satisfied, both blowers will stay on for 60 seconds, then will shut off at the same time.

Continuous Fan - On a thermostat call for continuous fan (G signal), both furnace blowers will come on at the same time in cooling speed and will stay on until the G signal is removed.

031-01933-000 Board Only - If there is a call for heat during the continuous fan operation, both blowers will shut off and will stay off until the burners have lit and the 30-second heating blower delay has elapsed. Then the blowers will both come on in heating speed.

031-01267-001 Board Only - If there is a call for heat during the continuous fan operation, the blowers will immediately switch to heating speed and will stay there until the call for heat has been satisfied.

When the call for heat is satisfied, the blowers will switch back to cooling speed.

STAGING WIRING DIAGRAM

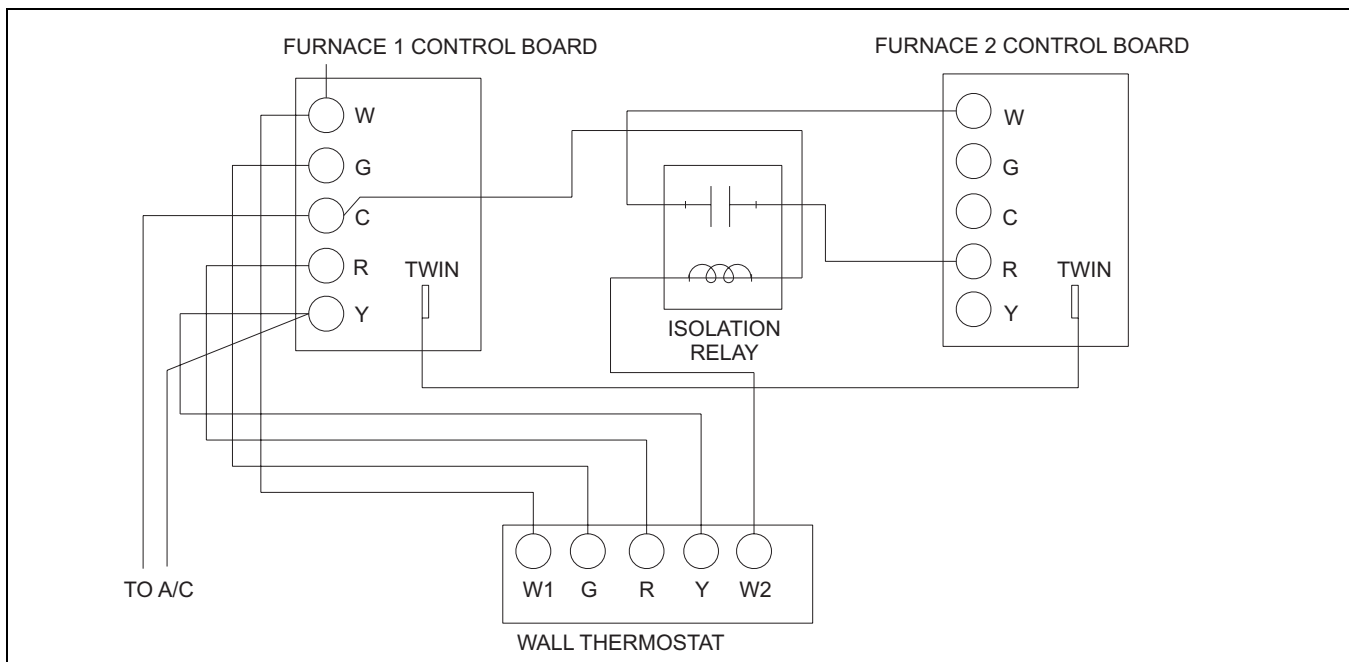


FIGURE 3 - STAGING CONNECTION DIAGRAM

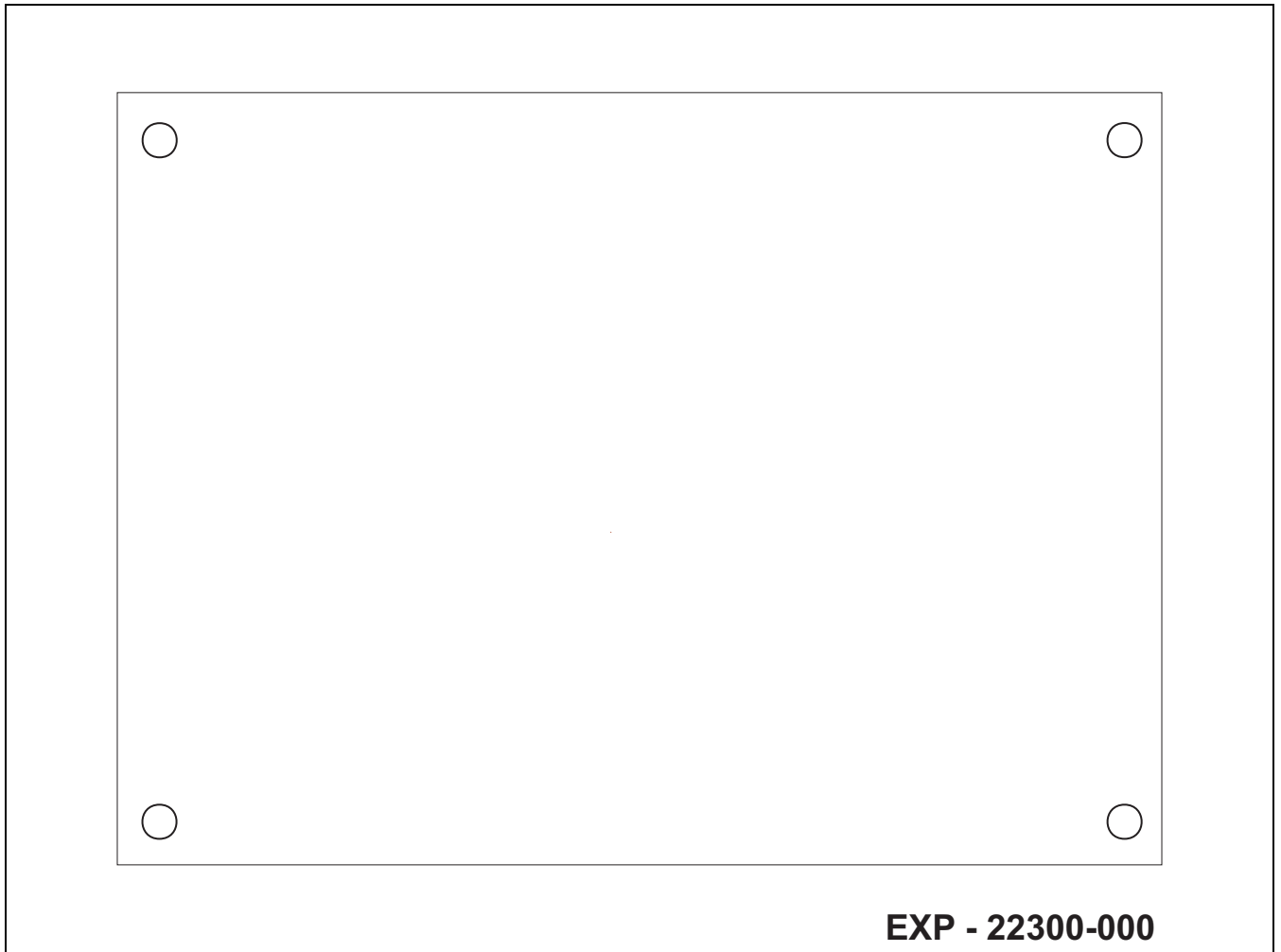


FIGURE 4: HOLE TEMPLATE

NOTES

Subject to change without notice. Printed in U.S.A.
Copyright © by York International Corp. 2002. All rights reserved.

035-14592-001 Rev. A (1202)
Supersedes: 035-14592-000 Rev. C (0802)

**Unitary
Products
Group**

**5005
York
Drive**

**Norman
OK
73069**