

# **HAMILTON AIR®**

3143 Production Drive • Fairfield, Ohio 45014 • 513-874-3733

## Model **E0873**

### Installation and Service Manual

# Customer Unit

## Control Board Component Description and Function

- SW1            Switch 1: **Blower Run Time Set.** “Off” is normal setting. Switching “On” enables blower “Time-Set” mode. See “Blower Run Time Set” for full instructions on setting blower run times.
- Activate “Turbine Test Mode” by holding SW4 while switching SW1 “On” if customer door is open and turbines are connected to this control board. Send and teller call will activate the pressure and vacuum turbines.
  - If SW3 is turned on before SW1, the unit will enter “Door Test Mode” which allows send and teller call buttons to operate the customer door motor open and closed.
- SW2            Switch 2: **Turbine Mode.** “Off” is normal setting with single stage turbine. “On” is normal setting with multi-blower turbine systems.
- SW3            Switch 3: **Unit Selection.** “Off” is normal setting for board mounted in customer unit.
- SW4            Switch 4: **Recall Switch.** Momentarily pressing switch recalls carrier to this end of the system.
- JP1            Jumper 1: **Multiple Board Jumper.** Jumper “On” for normal operation in system with Manual Teller Unit.
- Jumper “Off” when used in dual control board systems.
- JP2            Jumper 2: **Remote Input Jumper.** Jumper “On” for normal operation in system with Manual Teller Unit.
- Jumper “Off” when used in dual control board systems.
- JP3            Jumper 3: **Door Motor Auxiliary Thermal Protection Jumper.** Jumper “On” for normal operation in all systems except HA33.
- Jumper “Off” only if the door motor has auxiliary connections for thermal protection (HA33 Only).
- RY1            Control Relay 1: **Pressure Motor Relay.** Operates pressure motor.
- RY2            Control Relay 2: **Vacuum Motor Relay.** Operates vacuum motor.
- RY3            Control Relay 3: **Customer Door Close Relay.** Runs door motor closed.
- RY4            Control Relay 4: **Customer Door Open Relay.** Runs door motor open.
- RY5            Control Relay 5: **Spare Relay.** Not Used.
- RY6            Control Relay 6: **Spare Relay.** Not Used.

# Teller Unit

## Control Board Component Description and Function

- SW1            Switch 1: **Diagnostic Mode.** “Off” is normal setting. Switching “On” enables “Door Test Mode” which allows send and recall buttons to operate the teller door motor open and closed.
- Activate “Turbine Test Mode” by holding SW4 while switching SW1 “On” if teller door is open and turbines are connected to this control board. Send and recall will activate the pressure and vacuum turbines.
- SW2            Switch 2: **Turbine Mode.** “Off” is normal setting.
- “On” is normal setting for CM2 teller only.
- SW3            Switch 3: **Unit Selection.** “On” is normal setting for board mounted in teller unit.
- SW4            Switch 4: **Recall Switch.** Momentarily pressing switch recalls carrier to this end of the system.
- JP1            Jumper 1: **Multiple Board Jumper.** Jumper “Off” for normal operation.
- JP2            Jumper 2: **Remote Input Jumper.** Jumper “On” for normal operation
- JP3            Jumper 3: **Door Motor Auxiliary Thermal Protection Jumper.** Jumper “On” for normal operation in all systems except HA33.
- Jumper “Off” only if the door motor has auxiliary connections for thermal protection (HA33 Only).
- RY1            Control Relay 1: **Pressure Motor Relay.** Operates pressure motor.
- RY2            Control Relay 2: **Vacuum Motor Relay.** Operates vacuum motor.
- RY3            Control Relay 3: **Customer Door Close Relay.** Runs door motor closed.
- RY4            Control Relay 4: **Customer Door Open Relay.** Runs door motor open.
- RY5            Control Relay 5: **Spare Relay.** Not Used.
- RY6            Control Relay 6: **Spare Relay.** Not Used.

## Quick Reference Settings

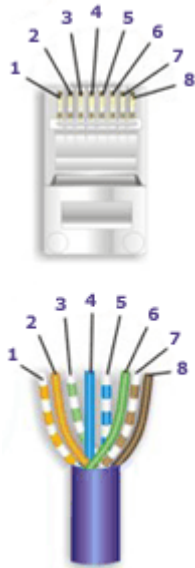
| Description  | Unit         | Boards/Sys | Switch #1 | Switch #2 | Switch #3 | JP1 | JP2 | JP3 |
|--------------|--------------|------------|-----------|-----------|-----------|-----|-----|-----|
| HA1000/45/50 | Customer     | Single     | OFF       | OFF       | OFF       | ON  | ON  | ON  |
| HA1000/45/50 | Customer     | Dual       | OFF       | OFF       | OFF       | OFF | OFF | ON  |
| HA1000       | Teller       | Dual       | OFF       | OFF       | ON        | OFF | ON  | ON  |
| HA47         | Customer     | Single     | OFF       | ON        | OFF       | ON  | ON  | ON  |
| HA33         | Customer     | Dual       | OFF       | ON        | OFF       | OFF | OFF | OFF |
| HA33         | Teller       | Dual       | OFF       | OFF       | ON        | OFF | ON  | OFF |
| IRT5000      | Customer     | Single     | OFF       | OFF       | OFF       | ON  | ON  | ON  |
| IRT5000      | Customer     | Dual       | OFF       | OFF       | OFF       | OFF | OFF | ON  |
| IRT5000      | Teller       | Dual       | OFF       | OFF       | ON        | OFF | ON  | ON  |
| HT19         | Control Unit | Single     | OFF       | OFF       | OFF       | ON  | ON  | ON  |
| HT19         | Teller       | Single     | OFF       | OFF       | OFF       | ON  | ON  | ON  |

Single = One control board in the tube system, typically in the customer unit.

Dual = Two control boards in the tube system, one in teller and one in customer unit.

## **CAT5 Interconnect Cable Wiring**

The I/O system requires an interconnect cable to connect the manual teller unit to the control board located in the customer unit and/or the control board located in the teller unit to the control board located in the customer unit. This cable is a category 5 (CAT5) cable with male RJ-45 connectors on both ends. The connectors should be wired in the straight through design as shown below on both ends. There are commercially available testers that can be used to verify correct connector installation and function.



| Wire         | Pin # | Teller Connections        |
|--------------|-------|---------------------------|
| White/Orange | 1     | Spare                     |
| Orange       | 2     | Teller Nigh Lock          |
| White/Green  | 3     | Teller Carrier Arrival    |
| Blue         | 4     | Teller Recall             |
| White/Blue   | 5     | Door Closed / Teller Send |
| Green        | 6     | Common                    |
| White/Brown  | 7     | RS485 A                   |
| Brown        | 8     | RS485 B                   |

## **Blower Run Time Set**

The “blower run time” is set using switch number one (SW1), which is located on the control board in the customer unit. The unit is shipped with a default time stored of about 3 seconds. This procedure will overwrite any existing times set in system. This time can be reset as often as necessary. **Power failure will NOT affect the times stored.**

### **To restore default blower run times:**

- 1) Turn power “OFF” to unit.
- 2) Turn SW1 “ON”.
- 3) Turn power “ON” to unit.
- 4) Return SW1 to “OFF”.
- 5) Default blower run time is restored.

The blower run time can be set with both directions of carrier travel using the same time or in a three stage cycle. The three stage cycle includes individual times for the two directions of carrier travel along with a third time for the carrier to free fall in the clear acrylic tube after the blowers stop and before the customer door opens.

### **Setting procedure for blower run time. (Single time for both directions)**

- 1) Restore default times as described above.
- 2) Before beginning, the carrier must be in customer unit with customer door open.
- 3) Turn SW1 to the “ON” position. (LED indicator will light)
- 4) Push and hold either “Customer Send” or “Teller Recall” button until carrier arrives in the teller unit. Releasing button stores the time for this cycle.
  - Note:** For systems with carrier arrival switches at both ends, when the carrier arrives at the teller unit and activates the carrier arrival switch, the blowers will automatically turn off.
- 5) Turn SW1 to the “OFF” position to store the cycle time for both directions.
  - Note:** For systems with carrier arrival switches at both ends, the system will now run until it arrives and activates the carrier arrival switches at both customer and teller.

### **Setting procedure for blower run time. (Three stage cycle time)**

- 1) Before beginning, the carrier must be in customer unit with customer door open.
  - 2) Turn SW1 to the “ON” position. (LED indicator will light)
  - 3) Push and hold either “Customer Send” or “Teller Recall” button until carrier arrives in the teller unit. Releasing button stores the time for this cycle.
  - 4) Push and hold either “Teller Send” or “Teller Call” button until carrier arrives in the clear acrylic tube on the customer unit. Releasing the button stores the time held for this cycle. (Turbines will shut off, customer door stays closed)
  - 5) When carrier lands in customer unit, press and release “Teller Call” button to open the door. This stores a third time for carrier free fall time in the clear acrylic tubing.
- Turn SW1 to the “Off” position for normal operation.

## **Blower Run Time Set with CM2 Motorized Teller Unit**

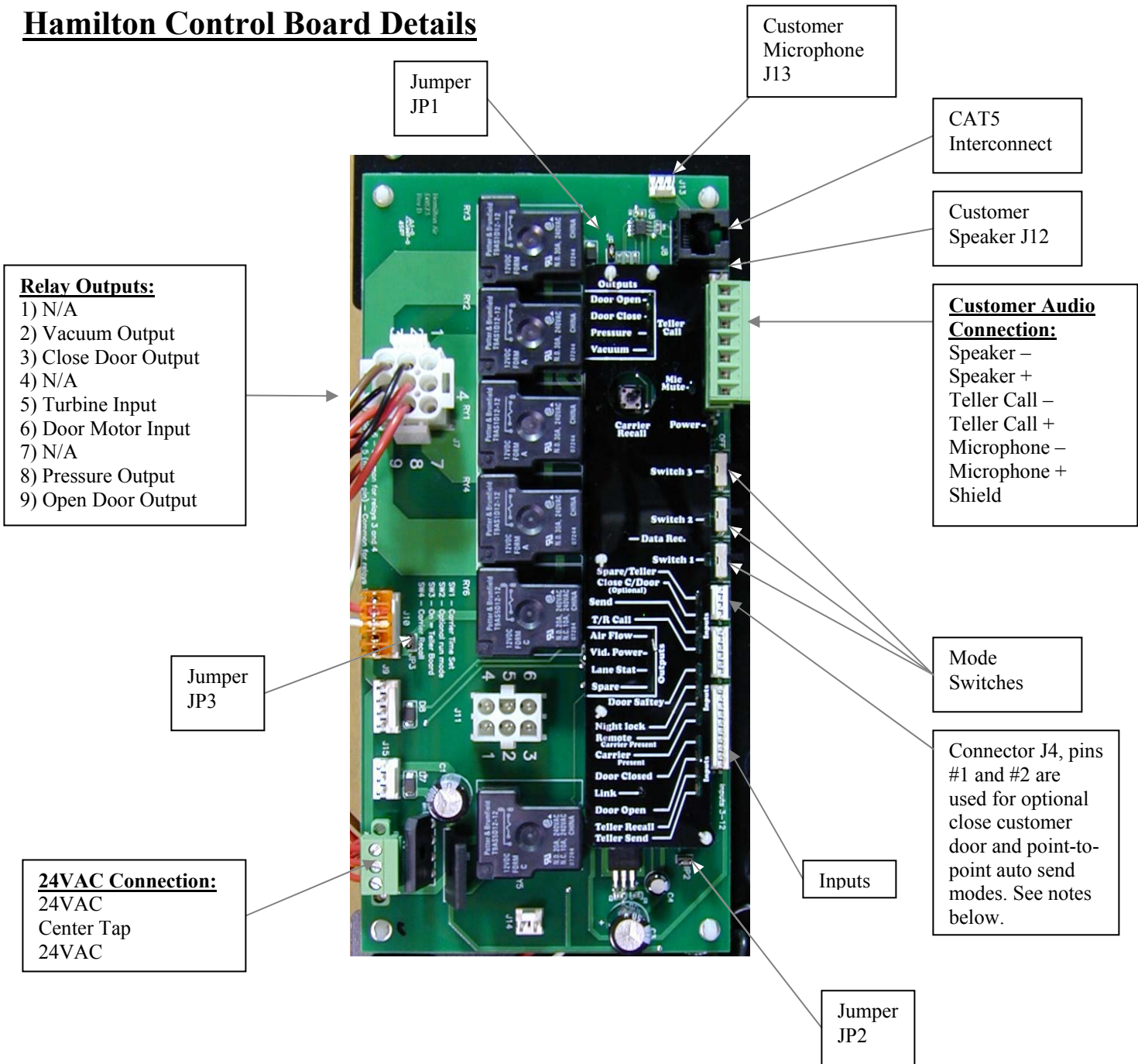
The CM2 teller unit has a pressure switch that will act like a carrier arrival switch turning off the turbine motors. The pressure switch should be activated after the carrier passes the air relief valve in the teller bend turning off the turbines. The platform will remain closed until the carrier lands and the pressure is equalized releasing the pressure switch. This action is to ensure the platform does not open while the carrier is falling in the tube.

The “blower run time” is set using switch number one (SW1), which is located on the control board in the customer unit. The unit is shipped with a default time stored of about 3 seconds. This procedure will overwrite any existing times set in system. This time can be reset as often as necessary. **Power failure will NOT affect the times stored.**

### **Setting procedure for blower run time with CM2 Motorized Teller Unit.**

- 1) Restore default times as described above.
- 2) Before beginning, the carrier must be in customer unit with customer door open.
- 3) Turn SW1 to the “ON” position. (LED indicator will light)
- 4) Push and hold the “Customer Send” button until carrier arrives in the teller unit. The carrier will activate the carrier arrival switch, and the blowers will automatically turn off.
- 5) Wait for the teller platform to drop open with the carrier. This will happen after the carrier lands and pressure is equalized in the teller unit.
- 6) Push and hold the “Teller Call” button until carrier arrives in the clear acrylic tube on the customer unit. Releasing the button stores the time held for this carrier travel cycle. (Turbines will shut off when button is released, but the customer door will stay closed)
- 7) After carrier lands in customer unit, press and release “Teller Call” button to open the door. This stores a third time for carrier free fall time in the clear acrylic tubing.
- 8) Turn SW1 to the “Off” position for normal operation.

# Hamilton Control Board Details





## **Additional Functions of E0873**

### **Microphone Muting:**

The E0873 control board can be set-up to mute the microphone during blower operation with certain systems that have the blowers located close to the microphone in the customer unit. The control board can also be set-up not to mute the customer microphone during blower operation for systems that are not affected by the blowers.

- 1) Recall carrier to customer unit. (Press SW4 “Recall” located on control board)
- 2) Press and hold SW4 and press the teller call button on customer unit. The output LED for microphone mute will flash.

One flash = the microphone is set to mute.

Two flashes = the microphone is set to NOT mute.

- (Note: the input LED for the teller call button will light when the button is pressed. This is NOT the output LED for microphone mute and therefore NOT the LED that will signal the setting of microphone muting.)
- 3) Repeat step #3 to toggle between settings as needed.
    - (Note: SW4 and teller call must be released to toggle setting.)
  - 4) System is now functional as normal with the new setting for muting the microphone.

### **Point-to-point systems**

The E0873 control board is designed to work with multiple types of systems. If the control board is powered with nothing connected to the door closed, door open, or safety bar inputs, it will default to the point-to-point settings. If this happens with the control board connected to a remote system, the door function will not operate. To regain normal settings after this happens, correct the connections and adjustments of the door closed, door open, and safety bar switches to insure that they are activating the correct inputs before powering the control board.

The standard operation of a point-to-point system is for the operator to push a button on the unit to send the carrier to the other end station. The carrier does not automatically send when the door is closed in this configuration.

With the control board, a choice can be made during set-up to have the carrier automatically send when the door is closed and to have the recall function.

Install a jumper on connector J4, Pins #3 and #4 to set automatic send and recall mode. Removal of this jumper sets operation to normal point-to-point mode where the recall button becomes the send button and the door does not automatically send carrier.

## **Additional Functions of E0873**

### **Airflow operation:**

The E0873 control board can be set-up to run an airflow kit for reducing condensation buildup in the tubes. Note: A separate airflow kit must be added to the tube system for this function to operate. The airflow function runs the pressure turbine motor on a larger 24VAC transformer. The airflow function is triggered three (3) minutes after the customer has closed and/or the blowers have stop running.

The airflow function can be turned on or off depending on the weather and need.

- 1) Recall the carrier to the customer unit. (Make sure customer door is open)
- 2) Press and hold the carrier recall button (SW4) on the control board while pressing the customer send button on the customer unit.

The airflow LED indicator will flash to indicate if the airflow function is on or off.  
One flash = ON, Two flashes = OFF

Note: to toggle the function on and off, both SW4 and customer send must be released.

## **Troubleshooting the E0873**

### **Motorized Door Test (Automatic):**

- 1) Disconnect the interconnection cable from the board.
- 2) If the door is open, turn SW3 “ON”, if door is closed, turn SW3 “OFF”.
- 3) Cycle power “OFF” and back “ON”.
- 4) Door should open or close depending on the setting of SW3.
- 5) Repeat test in both directions and on both tube stations if applicable.

### **Motorized Door Test (Manual):**

- 1) Turn SW3 “ON” if not already “ON”
- 2) Turn SW1 “ON”
- 3) Send and Call or Recall activates the door manually. Releasing the button stops the door as well as tripping the limit switches.
- 4) Turn SW1 “OFF” and SW3 “OFF” for customer or “ON” for teller for normal operation.

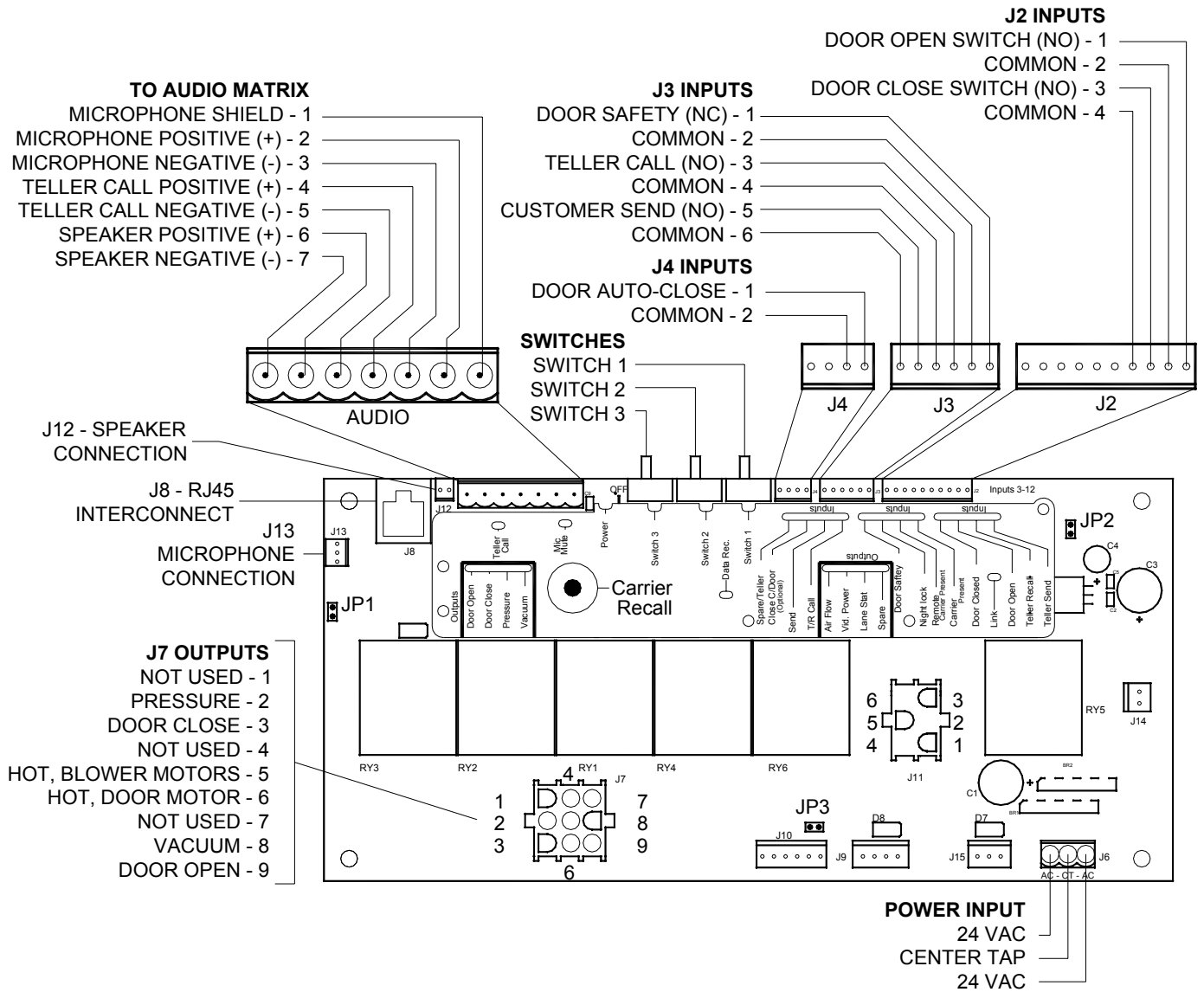
### **Blower Run Test:**

- 1) Test is performed on terminal that turbines are controlled from. This could be on either customer or teller station on a two board system.
- 2) Recall carrier to station that has turbines connected so that door will open.
- 3) Hold SW4 while switching SW1 “ON”.
- 4) Pressing send and teller call or recall will activate the pressure and vacuum turbines.
- 5) Turn SW1 “OFF” to return to normal operation.

### **Restore Default Blower Run Times:**

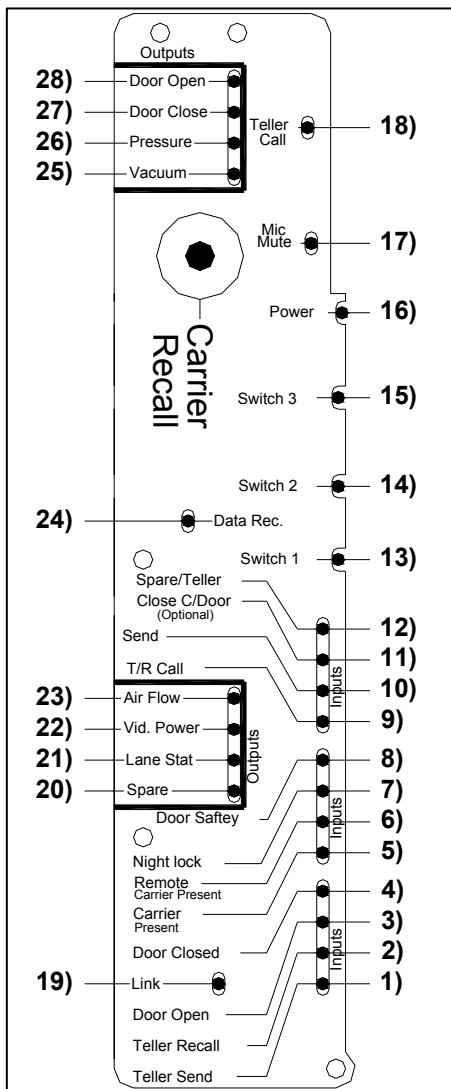
- 1) Turn power “OFF” to unit.
- 2) Turn SW1 “ON”.
- 3) Turn power “ON” to unit.
- 4) Return SW1 to “OFF”.
- 5) Default blower run time is restored.

# Troubleshooting the E0873



# Troubleshooting the E0873

## LED Light identification



- 1) Teller Send – Lights when manual teller door is closed, off when manual teller door is open. Lights when teller send is pressed.
- 2) Teller Recall – Lights when teller recall is pressed.
- 3) Customer Door Open – Lights when door is NOT open, off when door is open.
- 4) Customer Door Closed – Lights when door is NOT closed, off when door is closed.
- 5) Carrier Present – Lights when customer carrier present switch is activated.
- 6) Remote Carrier Present – Lights when teller carrier present switch is activated.
- 7) Nightlock – Lights when night lock switch is activated.
- 8) Door Safety – Lights normally, off when customer door safety bar is activated.
- 9) T/R Call – Lights when call teller button is pressed.
- 10) Send – Lights when customer send is pressed.
- 11) Close C/Door (Optional) – Lights when jumper is applied to pins #3 & #4 on J4, off when jumper is removed.
- 12) Spare/Teller – Lights when spare teller input is activated.
- 13) Switch #1 – Lights when Switch #1 is on.
- 14) Switch #2 – Lights when Switch #2 is on.
- 15) Switch #3 – Lights when Switch #3 is on.
- 16) Power – Lights when power is on.
- 17) Mic Mute – Lights when the microphone mute option is on and the system is running a carrier send cycle.
- 18) Teller Call – Lights when teller call is activated.
- 19) Link – Lights when manual teller door is closed, off when manual teller door is open. Lights when dual boards are connected and communicating properly.

- 20) Spare – Lights when spare output is activated.
- 21) Lane Stat – Lights when lane status output is activated.
- 22) Vid. Power – Lights when night lock is off and activates video power output to turn on the video monitor. When night lock feature is activated, video power is turned off to the monitor on this lane. Power to trigger video power is sent out J15.
- 23) Air Flow – Lights when airflow kit is triggered to operate.
- 24) Data Rec. – Not Used in single board system. Lights when dual boards communicate.
- 25) Vacuum – Output lights when vacuum motor is running.
- 26) Pressure – Output lights when pressure motor is running.
- 27) Door Close – Output lights when customer door motor is running closed.
- 28) Door Open – Output lights when customer door motor is running open.

## Troubleshooting the E0873

### LED Status, Customer Single Board System

Normal LED status for single board system (manual teller) with the teller door closed and customer door closed. E0873 control board mounted in the customer unit only..

- 1) Teller Send
- 2) Link
- 3) Door Open
- 4) Door Safety
- 5) Vid. Power
- 6) Close C/Door Optional (only if jumper in place for this option)
- 7) Power

Data Rec. may or may not be lit but is not important to this system configuration.

| <b>LED</b>            | <b>Possible Problems</b>   | <b>Possible Solutions</b>   |
|-----------------------|--|---|
| Teller Send OFF       | Teller door open, bad CAT5 cable or connections, Teller door switch misadjusted,             | Close teller door, test and repair CAT5 cable, Connect CAT5 cable, Adjust teller door switch  |
| Link OFF              | Teller door open, bad CAT5 cable or connections, Teller door switch misadjusted,             | Close teller door, test and repair CAT5 cable, Connect CAT5 cable, Adjust teller door switch  |
| Door Open OFF         | Door completely open, Door open limit switch not on door cam, bad switch, switch misadjusted | Close customer door, test and adjust lower door open limit switch                             |
| Door Closed ON        | Door not completely closed, Door closed limit switch misadjusted, bad switch                 | Close customer door, test and adjust upper door closed limit switch                           |
| Door Safety OFF       | Door safety bar stuck up, safety switch bad or misadjusted                                   | Free safety bar, test and adjust safety bar switch  |
| Vid. Power OFF        | Night lock is turned on  | Turn night lock feature off   |
| Close C/Door Optional | Option, jumper on J4 pins #3 & #4 turns on function  | Option, jumper on J4 pins #3 & #4 turns on function   |
| Power OFF             | No power to unit, no power from transformer, transformer unplugged from board J6             | Test and restore power to unit, test and replace transformer, connect transformer to board J6 |

# Troubleshooting the E0873

## LED Status, Customer Dual Board System

Normal LED status for customer board with the customer door closed. E0873 control board mounted in the customer unit..

- 1) Link
- 2) Door Open
- 3) Door Safety
- 4) Vid. Power
- 5) Close C/Door Optional (only if jumper in place for this option)
- 6) Power
- 7) Data Rec. may or may not be lit at idle, but should flash when button or switch changes.

| LED                   | Possible Problems   | Possible Solutions  |
|-----------------------|---|---|
| Link OFF              | Bad CAT5 cable or connections, mismatched firmware in teller and customer, poor communication between teller and customer                   | Test and repair CAT5 cable, Connect CAT5 cable, change firmware chip to latest available in both customer and teller units                                    |
| Door Open OFF         | Door completely open, Door open limit switch not on door cam, bad switch, switch misadjusted  | Close customer door, test and adjust lower door open limit switch   |
| Door Closed ON        | Door not completely closed, Door closed limit switch misadjusted, bad switch  | Close customer door, test and adjust upper door closed limit switch   |
| Door Safety OFF       | Door safety bar stuck up, safety switch bad or misadjusted  | Free safety bar, test and adjust safety bar switch  |
| Vid. Power OFF        | Night lock is turned on   | Turn night lock feature off   |
| Close C/Door Optional | Option, jumper on J4 pins #3 & #4 turns on function   | Option, jumper on J4 pins #3 & #4 turns on function   |
| Power OFF             | No power to unit, no power from transformer, transformer unplugged from board J6  | Test and restore power to unit, test and replace transformer, connect transformer to board J6   |
| Data Rec.             | Light flashes or flickers when teller and customer boards are communicating. This may result in the LED being ON or OFF when system is idle | If LED does not flash or flicker when buttons are pressed or switches are moved, check: power to both units, CAT5 communication cable, firmware in both units |

## Troubleshooting the E0873

### LED Status, Teller Dual Board System

Normal light status for teller board with the teller door closed. E0873 control board mounted in the teller unit..

- 1) Link
- 2) Door Open
- 3) Switch #3
- 4) Door Safety
- 5) Power
- 6) Data Rec. may or may not be lit at idle, but should flash when button or switch changes.

| <b>LED</b>      | <b>Possible Problems</b>  | <b>Possible Solutions</b>   |
|-----------------|---|---|
| Link OFF        | Bad CAT5 cable or connections, mismatched firmware in teller and customer, poor communication between teller and customer                   | Test and repair CAT5 cable, Connect CAT5 cable, change firmware chip to latest available in both customer and teller units                                    |
| Door Open OFF   | Teller door in fully open position, door open limit switch misadjusted or bad   | Test and adjust door open limit switch, Check power and connections to door motor   |
| Door Closed ON  | Teller door not in fully closed position, door closed limit switch not on cam, bad switch, switch misadjusted                               | Test and adjust door closed limit switch, Check power and connections to door motor   |
| Switch #3 OFF   | Switch #3 in OFF position   | Move Switch #3 to ON position   |
| Door Safety OFF | Door safety mechanism activated or stuck, door safety switch bad, switch misadjusted  | Test and adjust door safety mechanism, test and replace or adjust door safety switch  |
| Power OFF       | No power to teller unit, no power from transformer, transformer unplugged from board J6   | Test and restore power to teller unit, test and replace transformer, connect transformer to board J6  |
| Data Rec.       | Light flashes or flickers when teller and customer boards are communicating. This may result in the LED being ON or OFF when system is idle | If LED does not flash or flicker when buttons are pressed or switches are moved, check: power to both units, CAT5 communication cable, firmware in both units |