



# DORMA MODEL PS-406BB POWER SUPPLY INSTALLATION INSTRUCTIONS

## Features:

- Up to 1.95 Amps Load Capacity
- Class 2 Rated Outputs
- Overload, Over Voltage, and Short Circuit Protection
- Standby Battery Power with Supervised AC Fail and Low Battery Outputs
- Batteries Supplied with Unit
- Two Output Devices Controlled by One Input or Programmed for Independent Control
- Two Independent Outputs for Automatic Door Operator Interface
- Input for Connection to Fire Alarm
- Auxiliary Output for Powering Stand Alone Devices, Such as Keypads, Motion Detectors, and Status Indicators
- UL Listed and Tested to 294 Standard for Access Control System Units



## INSTALLATION

Install in accordance with NFPA 70.

The PS-406BB enclosure should be securely fastened to the wall using the four 1/4 inch diameter mounting holes located in the back of the box. Position the enclosure so that the battery compartment is located on the left-hand side. The PS-406BB must not be installed outdoors.

For the 120VAC power input, terminal block TB1 will accommodate up to 12 AWG wire (solid). Conduit must be used to provide an adequate earth ground to the enclosure.

NOTE: The maximum input current is 1.08A with a 12.6A inrush current.

The PS-406BB is designed to be used with all exit devices modified for ESB electric latch retraction. Use the chart below to determine the correct wire gauge per given length of two-

conductor cable that will be run from the PS-406BB to each exit device. Do not exceed the maximum length listed with each wire gauge.

WIRE GAUGE	MAXIMUM LENGTH OF TWO-CONDUCTOR CABLE
16 AWG	40 FEET
14 AWG	60 FEET
12 AWG	100 FEET

Up to two devices can be used with the PS-406BB. If only one device is to be used, wire to the "DEVICE ONE" location at TB3, terminals 5 and 6.

## STANDARD OPERATION

The PS-406BB provides a choice of two methods of electric latch retraction: Single System or Dual System.

### SINGLE SYSTEM LATCH RETRACTION

This method allows one input to control two devices sequentially. A momentary switch closure across terminals 1 and 2 of TB3 will retract DEVICE ONE first, followed by DEVICE TWO. Use this method for single door applications or on a pair of doors using a device on one or both leaves. The PS-406BB comes from the factory already set up for this method.

### DUAL SYSTEM LATCH RETRACTION (OPTIONAL)

This method allows independent control of DEVICE ONE and DEVICE TWO outputs by their own separate input. A momentary switch closure across terminals 1 and 2 of TB3 will retract DEVICE ONE only. A momentary switch closure across terminals 7 and 8 of TB3 will retract DEVICE TWO. No more than one device can be used per output. Use this option for applications requiring two single door systems or two pair door systems using one device on the active leaf of each pair of doors. To change over to the optional dual system latch retraction, move the program jumper PJ1 from between the middle post and the end post marked "S" (Single System) to between the middle post and the end post marked "D" (Dual System).

**NOTE:** When using the optional method, DEVICE ONE and DEVICE TWO can never be activated at the same time in the event that both input switches are actuated simultaneously. If this should occur, DEVICE ONE will always activate first, followed by DEVICE TWO.

When using a momentary, normally open switch for activating latch retraction, adjust pot R2 (for DEVICE ONE) or pot R4 (for DEVICE TWO) on the p.c. board to the desired latch retract delay time from 2 to 8 seconds. Turn the pot clockwise to increase the delay time.

When using normally open contacts from a keypad or card reader (with built-in time delay) or a maintain switch, turn pot R2 (or R4) fully counterclockwise to the minimum delay time (approx.

2 sec.). A contact closure will activate latch retraction. Upon opening of the timed or maintained contacts, the device will latch within 2 seconds.

## **SOLENOID ASSEMBLIES - THEORY OF OPERATION**

This device contains a powerful solenoid that performs both pulling and holding functions. An initial high current pulse occurs each time output voltage is applied to the device. After the pulse, the solenoid switches over to a "holding" state by way of frequency modulation which reduces the current to allow the solenoid to run at a cooler temperature.

## **OPERATION WITH AUTOMATIC DOOR OPERATOR**

The PS-406BB is provided with two outputs (one output associated with DEVICE ONE and the other output associated with DEVICE TWO) for controlling separate automatic door operators. Each output consists of normally open relay contacts that are field wired directly to the "DOOR ACTIVATION" input of the automatic door operator. These outputs are activated within a moment after activation of their corresponding devices to allow time for the doors to be fully unlatched before automatic opening begins.

Time delay pots R2 and R4 are factory set at 5 seconds, which are appropriate when using this controller with automatic door operators. When the delay times out, power is removed from the exit device and the signal to the auto door operator input is terminated, thus allowing the operator's "DOOR HOLD OPEN" delay to time out and close the door.

**NOTE:** When using the single system latch retraction method with automatic door operator interface and both devices are being used, the operator control input must be wired to the PS-406BB automatic door operator output for DEVICE TWO (TB3, terminals 9 and 10).

## **OPERATION WITH FIRE ALARM**

The PS-406BB can be wired to the fire alarm relay normally closed contacts. When a fire alarm occurs, any door that is currently unlatched, whether by momentary time delay or by maintained switch, will immediately latch secure. During the time that the fire alarm is active, electronic control of the automatic door opening system by wall switch, card reader, keypad, etc., is disabled. The door can only be opened manually.

The PS-406BB comes from the factory set up for use without fire alarm interface. If the fire alarm is to be used with this unit, move program jumper PJ2 from between the middle post and the end post marked "FA DIS" (Fire Alarm Disabled), to between the middle post and the end post marked "FA EN" (Fire Alarm Enabled).

**NOTE:** The current drawn through fire alarm relay contacts will be 120mA @ 24VDC

## AUXILIARY POWER SOURCE OUTPUT

A constant, power limited auxiliary output is provided for powering a variety of load devices, such as keypads, motion sensors, annunciator panels, electromagnetic door holders, relays, LEDs, etc.

- Auxiliary Output Range:
  - 26.1V – 27.2V, Nominal (commercial power applied)
  - 15.4V – 22.5V, Standby Battery Power (85% nominal to full charge range)

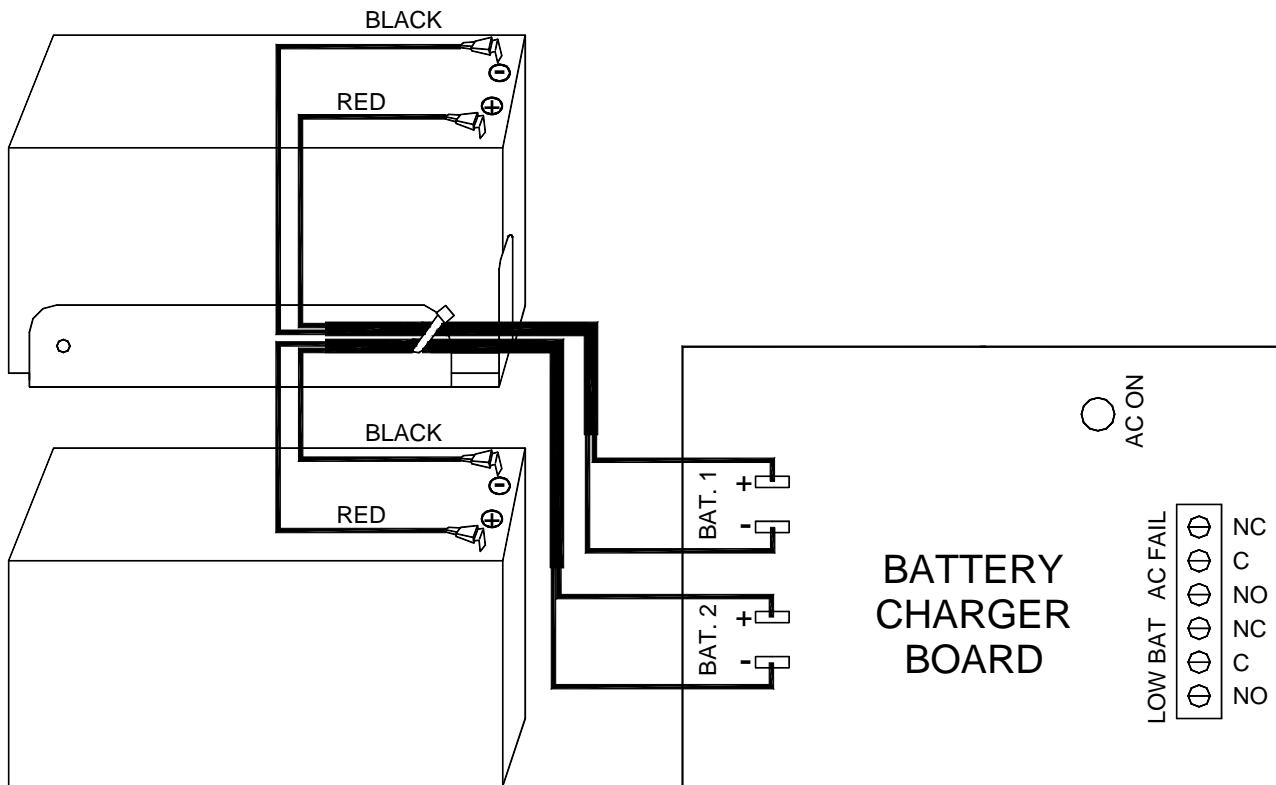
Due to the significantly lower voltage range resulting from the unit running on standby battery power, it is recommended to use load devices with a rated input of 12 – 24 volts DC (or AC/DC).

**CAUTION: CHECK WITH THE MANUFACTURER TO MAKE SURE THE LOAD DEVICE WILL OPERATE PROPERLY AND SAFELY WITHIN THE HIGHER VOLTAGE RANGE WHEN THE PS-406BB IS RUNNING ON COMMERCIAL POWER.**

## STANDBY BATTERY INSTALLATION

Refer to the figure below for connecting the leads from the battery charger p.c. board to the battery terminals. It does not matter which 2-conductor cable with positive/negative leads is connected to either battery.

**CAUTION: OBSERVE POLARITY WHEN MAKING CONNECTIONS: RED BATTERY LEADS CONNECT TO BATTERY “+” TERMINALS. BLACK BATTERY LEADS CONNECT TO BATTERY “-“ TERMINALS.**



Place one of the two supplied batteries in the lower-left corner of the enclosure. Place the second battery on the shelf above the other battery. Tilt the top of each battery forward to gain access to the terminals. Connect the two pre-assembled 2-conductor cable leads to the battery terminals as shown above.

**WARNING! USE DORMA ACC. NO. 95061619 REPLACEMENT BATTERIES (UL RECOGNIZED). THESE BATTERIES UNDERGO A SAFE FLOAT CHARGING CYCLE WHILE THE PS- 406BB IS OPERATING ON COMMERCIAL POWER, AND CAN BE EXPECTED TO HAVE AN AVERAGE LIFE SPAN OF 5 YEARS.**

The batteries are internally connected in series at the battery charger board for 24 volt operation. An onboard, self-resetting PTC protects the batteries during discharge and acts as a secondary backup to the power limited outputs from Terminal Block TB3 of power supply p.c. board 301-56-01.

**NOTE:** This power supply is UL verified for 4 hours of standby operation under 100% load. Longer standby times can be expected when applying smaller loads, but were not tested by UL.

## **SUPERVISED OUTPUTS**

Two supervised Form “C” outputs are provided for monitoring commercial/battery power status. Contacts are rated 1 Amp @ 28VDC. The contacts shown as “NC” and “NO” in the figure above are what state they will be in when the relays are de-energized.

### AC Fail Supervision

With commercial power applied to the PS-406BB, the relay will be energized. A loss of commercial power will de-energize the relay and change state of the contacts to the supervised “AC Fail” position.

### Low Battery Supervision

Battery voltage is constantly monitored while batteries are charging and discharging. The supervisory relay remains energized while the battery voltage remains above the cut-off voltage of a full discharge (approx. 21 volts). When the voltage drops to near this value, the relay de-energizes and changes state of the contacts to the supervised “Low Battery” position. It is recommended to consider replacing batteries when a low battery notification occurs.

## **STATUS INDICATORS**

A red indicator, visible from the outside of the PS-406BB enclosure, identifies DC power “ON”. This means that the unit is operating on either commercial or standby battery power. Commercial power can be verified by observing the green “AC ON” indicator located on the battery charger board inside the PS-406BB enclosure. This indicator is turned on when commercial power is applied to the unit.

If the red indicator is turned off, there is no commercial power to the unit, and the batteries are either disconnected from the battery charger board or missing. A lack of battery power will signal a supervised “Low Battery” condition.

## **TROUBLESHOOTING**

Before proceeding through the troubleshooting section, ensure that all device latches are not binding against their corresponding strikes. A bound latch can cause sluggish electric retraction or prevent retraction entirely.

### Power Limited Outputs

All outputs to the PS-406BB are power limited. Depending on the output, if a short circuit or an over load condition should occur, the output will either shut off entirely or go into a safe current limiting state.

**IMPORTANT!: THE MAXIMUM RATED LOAD FOR ALL OUTPUTS COMBINED IS 1.95 AMPS, INCLUDING 200mA (MAX.) FOR THE AUXILIARY OUTPUT.**

The outputs to ESB Device One (TB3, terminals 5 & 6) and ESB Device Two (TB3, terminals 11 & 12) will completely shut down to 0 volts when a short circuit across the output occurs or when the load exceeds 5 amps. To reset the output, the short circuit or overload must first be located and removed. Next, momentarily switch off the outputs by opening the contacts across input terminals 1 & 2 or 7 & 8, whichever is used. Before switching outputs back on, ensure the load does not exceed the maximum current ratings.

The auxiliary output will go into a current limiting state if the load applied across it exceeds approximately 2.0 amps or in the event of a short circuit. The current is reduced to a safe level when either of these conditions occur. The output voltage will automatically return to its normal level when the short circuit or overload condition is removed and replaced by a load falling under the maximum current rating.

**Symptom:**

Neither DEVICE ONE nor DEVICE TWO retracts after the control switch is activated.

Possible Causes:

1. The power limited output to Device 1 or Device 2 (or both) may have shut down. When this happens, the field wires that are run to the exit device are probably shorted together against the conduit, door frame or electric hinge.
2. An open connection in the field wiring between the power supply and control switch used for activating latch retraction.
3. A defective control switch.
4. An open connection in the field wiring between the power supply and exit device.
5. There may be no pulse. To check for pulses, prop the door open and connect a voltmeter across the blue leads of ESB device. Next, connect a jumper wire across terminals 1 and 2 of TB3 to keep DEVICE ONE in a continuous retracted state. If the voltmeter measures between 30 and 40 VDC at the moment the jumper wire was installed, but the latch did not budge, then no initial pulse was generated.

**Symptom:**

When 120 volts is applied to TB1, the exit devices immediately retract, even though the control switch had not been activated.

Possible Causes:

1. Field wiring between the power supply and control switch are shorted together against the conduit or switch mounting box.
2. A maintain switch is being used and is in the closed position.

3. A defective control switch.

**For Service or Technical Support, call DORMA Architectural Inc.  
(800) 523-8483.**

**NOTE 1: THIS UNIT IS LISTED AS AN EXIT DEVICE CONTROL UNIT TO UL294 REQUIREMENTS.**

**NOTE 2: THE POWER OUTPUT OF THE CONTROLLER IS OF A FAIL SECURE DESIGN. THE EXIT DEVICE REMAINS LATCHED DURING A COMPLETE POWER FAILURE, BUT ALWAYS ALLOWS FREE MECHANICAL EGRESS. LISTED PANIC HARDWARE MAY BE REQUIRED TO ALLOW EMERGENCY EXIT. CONSULT LOCAL AUTHORITY HAVING JURISDICTION.**

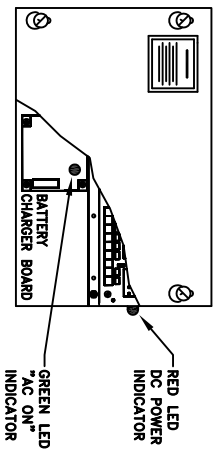
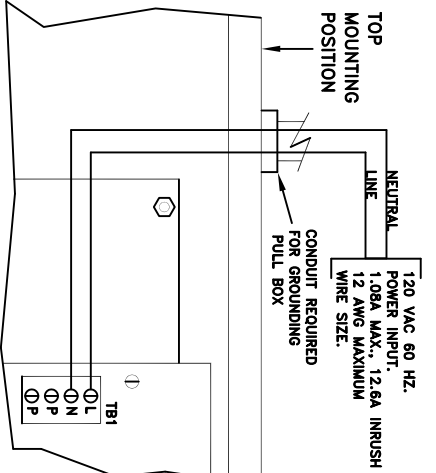


GENERAL WIRING DIAGRAM  
 DORMA PS-406BB  
 ELECTRIC LATCH RETRACTION  
 CONTROLLER  
 USE INSTALLATION INSTRUCTIONS  
 PART NO. 95061340

CLASS 2 OUTPUTS



ACCESS CONTROL POWER SUPPLY ACCESS CONTROL  
 ELECTRIC LATCH RETRACTION (ELR) CONTROLLER



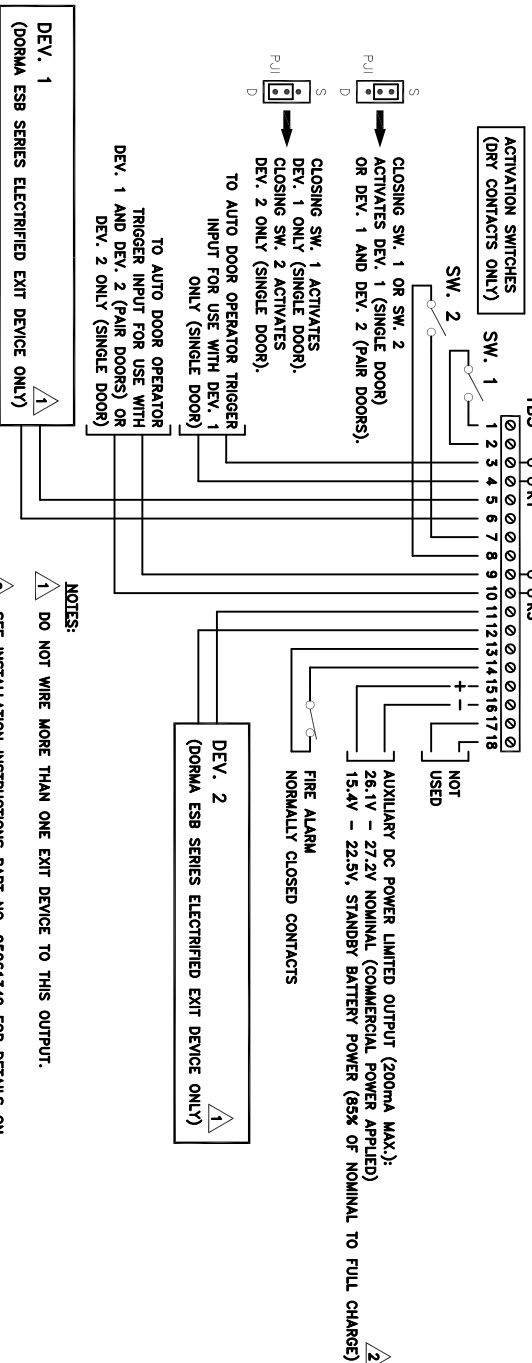
CONTROLLER INTENDED FOR INDOOR USE ONLY.

USED FOR ADJUSTING UNLOCK DELAY TIME WHEN SW. 2, R2 ADJUSTS DEV. 1 (SINGLE DOOR) OR DEV. 1 & DEV. 2 (PAIR DOORS) TIME DELAY. R4 ADJUSTS DEV. 2 (SINGLE DOOR) TIME DELAY. 8 SEC. MAX. DELAY TIME.

MFG. DATE:

R2 R4  
 INC. INC.  
 DEVICE ACTIVATION MODE SELECTOR  
 DEFAULT POSITION SHOWN.  
 SEE BELOW FOR DETAILS.

FA EN FA  
 FIRE ALARM INPUT ENABLE/DISABLE SELECTOR  
 DEFAULT POSITION SHOWN WHEN FIRE ALARM IS NOT USED. TO ENABLE INPUT FOR FIRE ALARM INTERFACE, MOVE JUMPER TO "FA EN" POSITION.



- NOTES:
- 1 DO NOT WIRE MORE THAN ONE EXIT DEVICE TO THIS OUTPUT.
  - 2 SEE INSTALLATION INSTRUCTIONS PART NO. 95061340 FOR DETAILS ON BATTERY INSTALLATION, REPLACEMENT AND AVAILABLE SUPERVISORY OUTPUTS.

FOR SERVICE OR TECHNICAL SUPPORT,  
 CONTACT DORMA ARCHITECTURAL HARDWARE  
 (800) 523-8483

