

## **781N ELECTRIC LATCH PULLBACK CONTROLLER INSTALLATION INSTRUCTIONS**

### **INSTALLATION**

The 781N enclosure should be securely fastened to the wall using the four ¼ inch diameter mounting holes located in the back of the box. Position the enclosure so that the transformer is located on the left-hand side. The 781N must not be installed outdoors.

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

Note: The maximum input current is 750mA.

The 781N is designed to be used with electric latch pullback exit devices. Use the chart below to determine the correct wire gauge per given length of two-conductor cable that will run from the 781N 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 781N. If only one device is to be used, wire to the "DEVICE ONE" location at TB3, terminals 5 and 6.

Note: Be sure to observe polarity when connecting devices 1 and 2 to TB3.  
(Refer to the wiring diagram located on the lid of the controller.)

### **STANDARD OPERATION**

The 781N provides a choice of two methods of electric latch pullback: Single System or Dual System.

## **SINGLE SYSTEM LATCH PULLBACK**

This method allows one input to control two devices sequentially. A momentary switch closure across terminals 1 and 2 of TB3 will pull back 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 781N comes from the factory already set up for this method.

## **DUAL SYSTEM LATCH PULLBACK (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 pull back DEVICE ONE only. A momentary switch closure across terminals 7 and 8 of TB3 will pull back 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 each pair of doors. To change over to the optional dual system latch pullback, move the program jumper PJ1 from between the middle post and the end post, marked "S" (Single System), to 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 pullback, adjust pot R2 (for DEVICE ONE) or pot R4 (for DEVICE TWO) on the p.c. board to the desired latch pullback delay time from 1 to 20 seconds. Turn the pot clockwise to increase the delay time.

When using normally open contacts from a keypad, card reader or a maintain switch, turn pot R2 (or R4) fully counterclockwise to the minimum delay time. A contact closure will activate latch pullback. Upon opening the contacts, the device will latch within one second.

Each modified exit device contains a pulse module which delivers a pulse at 24VDC to a high current coil inside the exit device every 6 seconds until the latch is finally pulled back all the way. At this point, a control rod passes over a reflective sensor and signals the module to stop pulsing. There is always an initial pulse that occurs at the moment the system is activated. During the period the system remains activated, 24VDC is applied to a low current secondary coil.

This coil is responsible for holding the latch on the “pulled back” position until instructed to return to the “fail secure” position. (See note 2 on page 4.)

### **OPERATION WITH AUTOMATIC DOOR OPERATOR**

The 781N 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 in 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 pullback method with automatic door operator interface and both devices are being used, the operator control input must be wired to the 781N automatic door operator output for DEVICE TWO (TB3, terminals 9 and 10).

### **OPERATION WITH FIRE ALARM**

The 781N can be wired to the fire alarm relay normally closed contacts. When a fire alarm occurs, any door this 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 then can only be opened manually.

The 781N comes from the factory set up for the use without fire alarm interface. If the fire alarm is to be used with the controller, move the program jumper PJ2 from between the middle post and the end post, marked “FA DIS” (Fire Alarm Disabled), to the middle post and the end post, marked “FA EN” (Fire Alarm Enabled).

NOTE: Maximum current through fire alarm relay contacts is 120mA @ 24VDC

### **AUXILIARY POWER SOURCE OUTPUTS**

Two unregulated/unfiltered constant DC power sources are provided for powering keypads, motion sensors, annunciator panels, electromagnetic door holders, relays, LEDs, etc. Choose between auxiliary output #1 or auxiliary output #2. Refer to the charts on the next page for determining which output will

be appropriate for the application. The various no load/full load voltages are what can be expected at 85%, 100% and 110% of the rated input voltage.

Auxiliary Output #1: 26.7V – 28.0V Nominal, 250mA (Max.)

Input Voltage	No Load	Full Load
102	23.8	22.5
120	28.2	26.9
132	31.1	29.4

Auxiliary Output #2: 12.6V – 16.5V Nominal, 250mA (Max.)

Input Voltage	No Load	Full Load
102	14.8	10.4
120	16.8	12.6
132	18.1	13.9

NOTE: Both auxiliary outputs can be used at the same time for loads requiring different voltages (for a combined maximum load current of 500mA). However, do not tie the aux. Output #2 ground (TB3, terminal 18) common to the aux. Output #1 ground (TB3, terminal 16). Both of these power sources must be isolated from each other.

WARNING: THESE AUXILIARY POWER SOURCES CANNOT BE USED WITH EQUIPMENT REQUIRING A REGULATED OR FILTERED POWER SOURCE. TO DO SO MAY CAUSE INADEQUATE OPERATION OF OR POSSIBLE DAMAGE TO THE EQUIPMENT. ALWAYS CHECK THE MANUFACTURER'S SPECIFICATION FOR THE TYPE OF POWER SOURCE REQUIRED FOR THE EQUIPMENT TO BE USED WITH THE 781N.

## **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 pullback or prevent pullback entirely.

Symptom:

Neither DEVICE ONE or DEVICE TWO pulls back after the control switch is activated.

Possible Causes:

1. Fuse F1 (MDL 4), located on the p.c. board inside the controller may have Blown. 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. The slow blow 4 amp fuse (Littlefuse #239.004) inside the exit device has blown. The most likely cause would be reversed polarity of the exit device red and black leads: RED = "+"; BLACK = "-". (Refer to the wiring diagram for proper connection.) Other possible causes may be shorted wires in the solenoid assembly or a defective pulse module.
3. An open connection in the field wiring between the power supply and control switch used for activating latch pullback.
4. A defective control switch.
5. An open connection in the field wiring between the power supply and exit device.
6. There may be no pulse. To check for pulses, prop the door open and Connect a voltmeter across the red and black leads coming from the exit device (red lead is positive). Next, connect a jumper wire across terminals 1 and 2 of TB3 to keep DEVICE ONE in a continuous pulled back state. If the voltmeter measures approximately 24VDC at the moment the jumper wire was installed, but the latch did not budge, then no initial pulse was generated. Check for a series of timed pulses that will occur approximately every six seconds. (Make sure the control rod is not positioned over the reflective sensor on the pulse module when making the next check.) Wait for about 20 seconds to see if the latch pulls back. If it still does not respond, then it indicates the pulse module is inoperative and the entire solenoid/module assembly must be replaced.

Symptom:

When 120 volts is applied to TB1, the exit devices immediately pull back, 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.

Symptom:

A noticeable buzzing sound at equal intervals is coming from inside the exit Device while in its pulled back state.

Possible Causes:

1. The latch is binding against its corresponding strike and preventing it from pulling back fully, due to misalignment between the latch and strike opening.
2. A defective pulse module.

**WARNING: ALWAYS REPLACE WITH MDL 4 SIZE FUSE INSIDE CONTROLLER. INSTALLING A FUSE THAT EXCEEDS THE RATING OF THE ORIGINAL FUSE WILL BLOW THE INTERNAL FUSE OF THE TRANSFORMER AND VOID THE WARRANTY. THE TRANSFORMER CAN NO LONGER BE USES AND MUST BE SENT BACK TO THE FACTORY FOR REPLACEMENT.**

**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.**