Microprocessor and Handy Terminal

Setup and Programming Manual

for Folding Door Systems

P/N 159384
October 13, 1999 Revision

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I. Product Introduction

A. The NABCO Entrances Microprocessor controller is on the leading edge of technology for automatic door operation and control. These units provide 20 operational functions with more than 150 different options. In addition, an auxiliary output signal is available to further customize door operation in accordance with applicable standards.

B. The companion Handy Terminal is used to make controller adjustments quick and easy. The Handy Terminal is powered directly from the Microprocessor, eliminating the need for batteries. (See Figure 1).

NOTE: The microprocessor can be used with the Handy Terminal for sliding, swinging and folding door applications. Since there are some specific differences in set-up procedures, and operation for each type of door, please continue to read the instruction manual for the unit being installed.

C. The Handy Terminal along with Microprocessor will do the following:

1. Count the number of times the Handy Terminal has been connected for service.

2. Count the number of opening and closing operations.

NOTE: The opening and closing counts are registered in increments of 100.

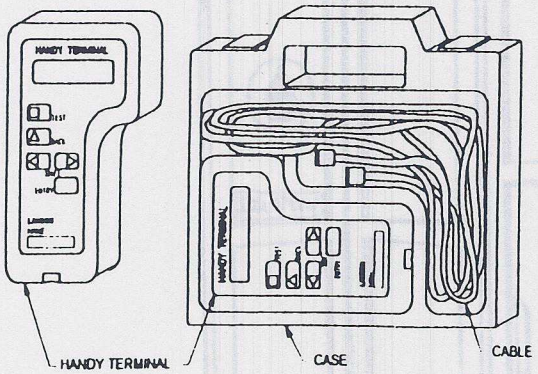
3. Count the number of times the door has recycled.

4. Maintain a runaway count.

D. Microprocessor Controller Specifications

1. The required power source is 115 VAC +/-10 %, 50/60 Hz.

2. The power available from the controller for auxiliary equipment is 12 VDC 0.5 amps.



PART No. 148903

HANDY TERMINAL

Figure 1

3. The recommended operating temperature range is -4° to 140° F (-20° to +60° Celsius).

4. The maximum recommended panel weight is 100 pounds.

5. The hold open time delay range can be set up to 67 seconds.

6. The back check and latch range for a folding door leaf is 5° to 15° of door path.

II. Signal Sensor Options

A. Wiring (All wires are labeled and identified by color)

1. Wire 9DC12V (brown) is an Acusensor power source. The output is 12 VDC with a maximum capacity of 0.5 amps.

2. Wire 7 (red) provides common ground for the 12 VDC power source.

3. Wire 61 (black) is the activation signal input and will open the door based on a signal from the Acusensor, mat or motion detectors.

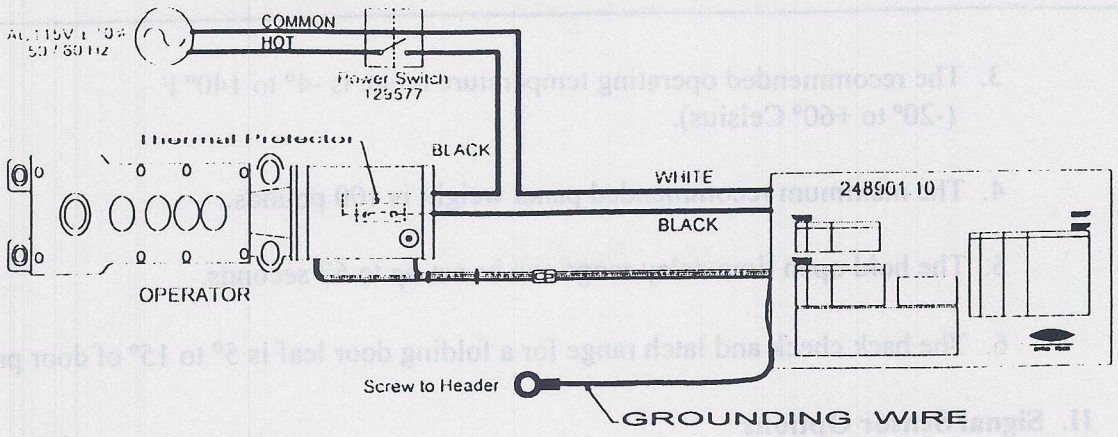
4. Wire 6B (white) is for holding beams.

5. Wire H (green) is the safety mat signal and lockout for fold-side sensors.

6. Wire M0 (orange) is the mode input switch one (SW1), used to achieve special functions (See Section II.B.).

7. Wire M1 (orange) is the mode input for switch two (SW2), used to achieve special functions (See Section II.B.). If an electric lock is used, the wire will signal the lock to engage or retract (one or two-way mode).

8. Wire 62 (orange) is the exterior activation signal to open or reopen the door from any position until the door is fully closed. Note: This feature is used for one way traffic only.



WIRING DIAGRAM FOR POWER AND GROUNDING
Figure 2

9. Wire SQ (yellow) is for sequential door operation. Activate once to open and once to close the door.

10. Wire BA (blue) will stop door operation if the door is broken or panicked open (when disconnected from wire 7 red).

CAUTION: Do not unplug blue jumper-plugs when panic switches are not used. Unplugging these will stop the door's operation.

11. Wire OUT+ (violet) is the positive auxiliary output, used as a switch with a maximum rating of 24VDC and 50mA for an outside power source. When listed with wires one, two and twelve, it can supply 12 VDC and a maximum of 50mA of power.

12. Wire OUT- (gray) is the negative auxiliary output, rated to a maximum of 24 VDC and 50mA. This is the ground negative for output wire OUT+ (violet). CAUTION: This wire must be used with wire OUT+ (violet). Incorrect wiring will cause auxiliary signal output failure.

OUT+ and OUT- are limited in output current. Do not connect devices that exceed a total of 50 mA.

B. Modes

NOTE: All references to the mode switches are made in connection w/ ground (red)

1. With the rocker switch in the **ON** mode, the blue wires are closed throughout the circuit. This is a closed-loop circuit. If the blue wires are at any time open, the door operation stops.

2. With the rocker switch in the **OFF** mode, the blue loop is open. The door operation will stop.

3. The door is in **ONE WAY** mode when MO is on , but M1 is off. The approach sensor is active, the fold side sensor is only active as threshold safety.

4. The door is in **AUTO** mode when both M0 and M1 are not connected to red wire #7. The approach and approach-through signals are available.

5. The door is in **HOLD OPEN** mode when M0 and M1 are on. No activation is needed when this selection is made. (See Figure 3).

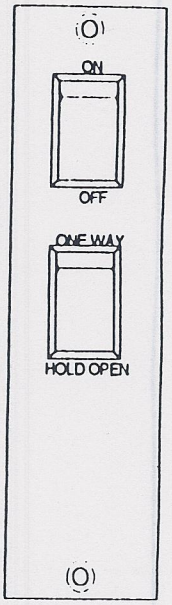


Figure 3

C. Before turning on power....

1. Make sure all parts are wired properly. (See Figure 2).

2. Mode switches are set to "ON" and "AUTO"

3. Make sure the power source is 115 VAC +/- 10 percent.

4. The controller will be damaged if the power is switched on and off too quickly. After switching off the power, wait 10 seconds before switching it on.

5. Long term exposure to temperatures colder than - 4° Fahrenheit, without power should be avoided. Temperatures below -20° Fahrenheit may cause erratic behavior.

6. In the event of a power surge, which may cause a fuse failure, the fuse can be replaced. The power should be disconnected before removing the cover to replace the fuse. Do not attempt to repair the Microprocessor.

III. Normal Setup and Programming Procedures

Note: The factory settings are reasonable, but not mandatory, for door operation. Each option should be reviewed carefully. Be sure the door is operating according to applicable ANSI controlling standards before releasing the entrance to the owner.

A. Microprocessor setup involves correct wiring of the unit followed by door operation setup, door stroke and speed settings.

The door path must be clear of objects before the power for the sensors or controller(s) is turned on. Use the Handy Terminal to set up the controller. After the power is turned on, the Handy Terminal will act as a guide for set-up procedures and Microprocessor programming. There will be a series of displayed messages and a list of acceptable options.

1. Plug the Handy Terminal into the Microprocessor connector.

2. Turn on the power and note the direction of movement. The door should stay closed.

3. If the door opens slowly, it has been set up with the wrong hand. If this is the case, turn off the power and insert the handing harness (p/n 119208) between the Microprocessor and motor. Turn the power back on and note the general direction of movement. The door should now stay closed.

4. Choose an option by placing the cursor over the option and pressing the ENTRY button. Follow these four steps as prompted by Handy Terminal messages to initially set up the door.

    a. When the message reads SLIDE/SWING/STRK Y N, it is asking if you want to set the stroke on a sliding or swinging door. Folding doors are a hybrid of a swing door. Move the cursor to the Y position and press the ENTRY button.

    b. When the message reads SWING DOOR Y, press the ENTRY button.

    c. When the message reads PUSH TEST, press the TEST button. The Handy Terminal will provide the message ADJUSTING NOW JUST A MOMENT.

NOTE: The door should be moving slowly from closed to full open to closed position, measuring the stroke while it moves. Make sure there are no obstacles which would cause incorrect measurement.

d. When the unit has completed the initial setup, the message will read STD FUNCTION Y N. To see the door in action with the memorized settings, press TEST. The door will operate at the factory speeds and slow down at the latch check and back check points. After the test is completed, the display will again read "STD FUNCTION Y N".

This concludes the initial setup to factory settings. These settings are shown on the table on the next page. The Handy Terminal can be disconnected per the following section and the building owner instructed on the doors operation. However, there are a multitude of options available for the door's operation. Skip to Section V to learn about these options.

NOTE: All of the factory settings are reasonable, but most are not mandatory for door operation. These settings are shown in the table on the next page. Each option should be reviewed carefully before releasing the entrance to the owner.

Factory Settings are different than the microprocessor default for swing door settings. If the system is ever "reset" by selecting slide and then swing (see appendix), the following must be changed to put the system back to "factory settings":

Opening Speed: 2

Closing Speed: 1

Start Power: 1

Check Power: 1

Sig. At Closing: N

Recycle Sensitivity: 3

If the settings are not corrected, the door at some point will incur haphazard recycling and other erratic behavior!

IV. Disconnecting the Handy Terminal

A. The Handy Terminal can be disconnected after the last test has been completed and the display has been stabilized. This process normally takes a few seconds after the display indicates it is ready to accept new input from the Handy Terminal. After the time lapse, the Handy Terminal can be disconnected.

B. If power to the Microprocessor needs to be cut off, wait an additional 5 seconds after the Handy Terminal has been disconnected.

C. The door should now operate based on the pre-set settings shown in the following table. If changes are desired, go to Section V.

Factory Settings of Adjustable Functions Table

Adjustable Function	Factory Setting	Range
Standard Function Adjustments		
Opening Speed*	2	0 - 7
Closing Speed *	1	0 - 7
Time Delay	2	0 - 7
Feeling Adjustments		
Start Power	1	0 - 7
Check Power	1	0 - 7
Reaction Power	4	0 - 7
Back Check Speed	1	0 - 3
Latch Check Speed	1	0 - 3
Special Function Adjustments		
Hold Close	N	Yes or No
Signal at Closing	N	Yes or No
Signal at Full Open	Y	Yes or No
Manual Opening	3	0 - 3
Signal Slow	N	Yes or No
Recycle	Y	Yes or No
Recycle Sensitivity	1	0 - 3
After Recycle	Y	Yes or No
Auxiliary Output	0	0 - 3
Output Timer**	0	0 - 3
Extended Time Delay	7	0 - 7

* To comply with ANSI Standards and UL requirements, the following settings are required:

Opening Speed: 0 thru 4

Closing Speed: 0 only

Recycle Sensitivity: 0 or 1.

**The output timer selection is required only when selecting 0 or 2 on the auxiliary output.

V. Adjustment Procedures

A. Standard Function Adjustments

1. Make sure the Handy Terminal is in the standard functions program located after normal setup. The message STD FUNCTION Y N will appear. Press entry to proceed to the next section or move the cursor to Y and press entry to start the Standard Functions program.

2. There are three categories of standard functions

- **Opening Speed** - The message will read OPEN SPEED 1.
  Eight speeds are shown, but the folding door should be set at 0, 1 or 2.

NOTE: Set all door speeds to comply with ANSI standards.

- **Closing Speed** - The message will read CLOSE SPEED 1.
  Eight speeds are shown, but the folding door should be set at 0 or 1.

- **Time Delay** - The message TIME DELAY 2 will appear.
  This determines the number of seconds the door will stay open after both the activating and safety signals are cleared. Eight options are offered with time delays of 0 to 7 seconds. Longer time delays are possible through Special Function adjustments.

B. Feeling Adjustments

1. The message FEELING ADJUST? Y N will appear. Press entry to proceed to the next section or move the cursor to Y and press entry to start the Feeling Adjustments program.

2. There are five available feeling adjustments:

- **Start Power** - The message will read START POWER 1.
  This is the power used to accelerate the door at the start of the opening and closing cycles. Eight options are offered. Zero(0) is the slowest acceleration and should be used with very narrow or light doors. On folding doors, the highest we recommend is 1. If the customer complains that the door occasionally recycles for no apparent reason, we recommend this be reduced by 1 and retested.

- **Check Power** - The message will read CHECK POWER 1.
  This adjusts braking power to reduce door speed to the check or latch

speed. Eight options are offered. Zero provides gradual braking, and 7 provides abrupt braking.

- **Reaction power** - The message will read REACTION POWER 4. It controls how fast the door will react to an activating signal (i.e., how long it takes the closing door to reverse direction. Eight options are offered. Zero (0) provides the slowest reaction, 7 the fastest.

- **Back Check Speed** - The message will read BACK C. SPEED 1. This is the speed of the door just before the fully open position. Four speeds are offered. The 0 is the slowest speed and 3 is the fastest.

- **Latch Check Speed** - The message will read LATCH C. SPEED 1. This is the speed of the door just before the fully closed position. Four speeds are offered. The 0 is the slowest speed and 3 is the fastest.

C. Special Function Adjustments

1. The message will read: SPECIAL FUNCTION Y N. Press entry to proceed to the next section or move the cursor to Y and press entry to start the Special Functions program.

2. There are 10 adjustments:

- **Using Motor Power to hold the door closed**
  The message will read HOLD CLOSE N.
  When using the motor the spring force assists to keep the door closed. Option N closes the door only with spring force.

NOTE: Spring force may not be enough to keep the door closed in windy conditions.

- **Door Operation with Safety Signal while door is closing**
  The message will read: SIG. AT CLOSING N.
  This must be set at N. If a safety signal is received during the closing cycle, the door will reopen. If it is incorrectly set, the door will continue to close, an undesirable situation.

- **Door Operation with Safety Signal while door is open**
  Message will read: SIG. FULL OPEN Y.
  Choose Y and the door will remain open until the fold side sensor is inactive. Choose N and the door will close after the time delay if the activating signal is lost.

- **Manual Open** - The message will read: MANUAL OPEN 3.
  After the unit has been completely set up and is operating, a choice is offered on how the door will act if manually opened. This may occur because the activating device was not used or did not operate properly. There are four options:
  0 - The door will close slowly by spring power.
  1 - Opening the door manually from a closed position will activate the door to power open. Not a push-to-go, but push to start.
  2 - Same as 0. The door will close slowly by spring power.
  3 - The door will close slowly by motor power.

- **Signal Slow** - The message will read: SIGNAL SLOW N.
  Choose Y and the door slows down when 6B (white) is signaled during an opening cycle. Choose N and the door stops when signaled. After the signal runs out, the door opens slowly.

- **Recycle** - The message will read: RECYCLE? Y.
  This allows adjustment when the door encounters an obstacle during the closing cycle. Choose Y and the door opens, choose N and the door stops and remain in that position until the next activating signal. The operation when the door reaches full open position is governed by "After Recycle".

- **Recycle Sensitivity** -The message will read: RECYCLE SENS. 3.
  It adjusts the sensitivity of force causing the door to recycle. Four options: 0 is softest, 3 is hardest.

- **After Recycle** - The message will read: AFTER RECYCLE Y.
  This adjusts for operation after the door reaches the full open position caused by the recycle. Choose Y and the door will close after the time delay expires. Choose N and door stays in the open position; another activating signal is necessary for it to time out and close.

- **Auxiliary Output** - The message will read: AUX. OUTPUT 0.
  This will determine when a signal (from wires OUT+ and OUT-) is sent for the operation of an electric lock, another controller, relay or other device. There are four options:
  0 - The electric lock option enables operation of the electric lock and time delay between release of the lock and door movement. The message will read: OUTPUT TIMER 0.

Note: The time delay selected for the lock release will also be used as the time delay to set the lock after arriving at closed position.

This option has several sub options should be selected from four options:

- 0 - ¼ second
- 1 - ½ second
- 2 - 3/4 second
- 3 - 1 second

Currently, NABCO Entrances does not have an electric lock available for the Folding Door.

1 - The air lock option will instruct the Microprocessor to prevent the second door from opening until the first door is closed. The microprocessors need to be connected by a custom harness.

2 - The sequential door operation option requires selecting the time delay between the first and second door operations. The message will read: Output Timer - 0. Four sub options are offered:

- 0 - Two seconds
- 1 - Four seconds
- 2 - Six seconds
- 3 - Eight seconds

3 - Not used.

♦ **Extended Time Delay** - The message will read: EXT. TIME DELAY 7. It enables an extended time delay beyond the zero to seven seconds standard. Time delay is measured after the loss of the activation signal.

0- The standard 0 to 7 second delay
1 - 10 seconds longer than standard (10-17 seconds)
2- 20 seconds longer (20-27 seconds)
3- 30 seconds longer (30-37 seconds)
4 - 40 seconds longer (40-47 seconds)
5 - 50 seconds longer (50 - 57 seconds)
6 - 60 seconds longer (60 - 67 seconds)
7 - The door will open to the full open point before closing even if the time delay has expired during the opening cycle. The standard time delay of 0 to 7 seconds applies after the door reaches the open position.

♦ **History Data** - The message will read: HISTORY DATA Y N?. Press entry to proceed to complete the programming or move the cursor to Y and press entry to review the History Data.

- MAINTENANCE CNT: Indicates the number of times a handy terminal has been connected to the unit. Any number of connections and reconnections within a span of 30 minutes will be counted as only one maintenance count.
- OPERATION CNT: Indicates the number of full door operations in hundreds of cycles. Multiply the number on the screen by 100 to get the actual count.

direction after sensing an object was struck or the amount of friction surpassed the recycle sensitivity setting.

- RUNAWAY CNT: The number of times the Microprocessor became "confused". Higher values than 2 on this counter and the microprocessor should become suspect.

A flow chart can be found at the back of the manual identifying the path to all of the functions and setting choices.

VI. Troubleshooting

A. *The door is recycling on its own.*

1. Check if the Acusensors are sensing (seeing) something causing reactivation.

2. With the rocker switch selected to STOP mode, be sure that the door moves freely open and closed without obstructions or binding.

B. *There was a power failure.*

1. A power failure lasting less than one second will not affect operation.

2. A power failure of one second or more will cause the Microprocessor to brake the door fully. The door will stop in the position it's at when the power failed and close slowly under spring return.

3. When the power is turned on, the door will make one full cycle in slow mode. Settings to the door operation remain in effect. One activation is required to start the sequence.

C. *There was trouble detected by the controller.*

1. For the following problems, the door will stop operating and the Microprocessor will memorize the nature of the trouble. The Handy Terminal must be used to clear the problem. When the Handy Terminal is connected, there will be a message:

   Error Check Y - N

   Choose Y to clear

   I. The message may read: **STROKE ERROR**. This means the microprocessor has sensed movement longer than the adjusted stroke or the motors' encoder has an failed. Check the motor coupler for tightness and readjust the door stroke. Check the linkages for free movement. If re-stroke fails, replace the motor.

II. The message may read: **RAM ERROR Y - N**. Select Y, Entry, to clear error message. Try normal operation. If operation fails, the Microprocessor needs to be replaced.

III. The message may read: **EEPROM ERROR Y- N**. The unit can't read or write data. Select Y, Entry, to clear error message. Try normal operation. If operation fails, the Microprocessor needs to be replaced.

2. If the Microprocessor does not operate at all, check the wiring, connections, and activation devices. Connect the Handy Terminal for an error message, clear and repair. Check the power supply, fuse and motor wiring/encoder, or change out the motor. The final option would be to change the Microprocessor.

D. *There are problems with the general door operation.*

1. If the door does not open at all, check the sensor wiring, actuating sensor, and breakout circuitry if so equipped. Connect the Handy Terminal and try TEST key.

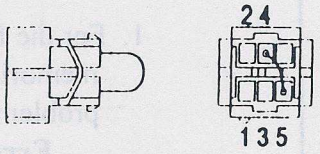
2. On a new installation, if there is abnormal door operation, the motor wiring may need to be reversed. Check or reset the stroke and install the handing harness where needed. Check the Handy Terminal settings. The settings may not have been received by the Microprocessor or the door may have been set up as a slider instead of a swinger. Reprogram the Microprocessor by starting over at the beginning of Section III.

3. If the customer complains that the door occasionally recycles for no apparent reason, reduce the Start Power and Check Power by 1 and retest.

E. *Handy Terminal message, GYRO TECH HANDY TERMINAL does not change.*

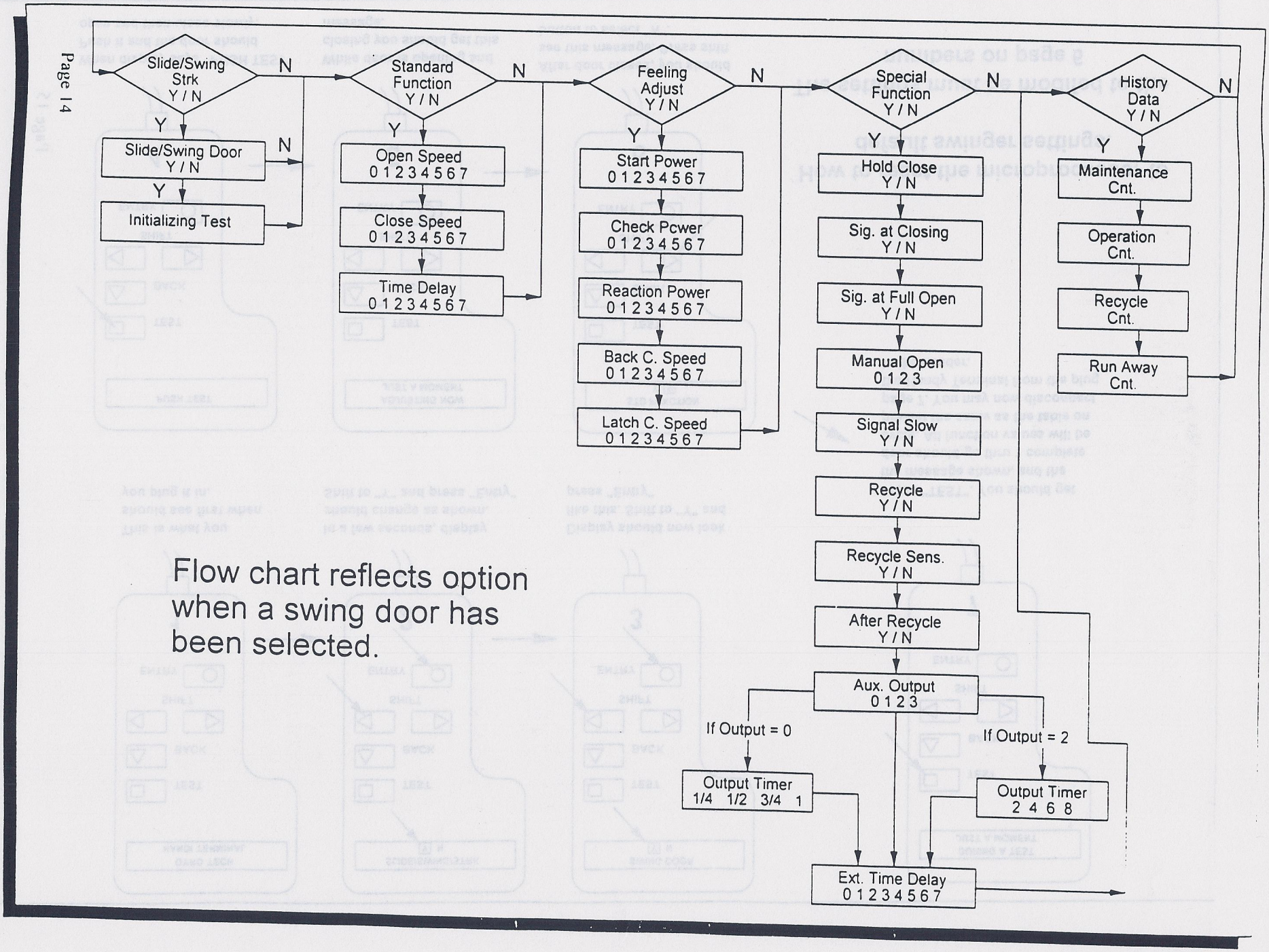
1. Check if you have the mode switch installed and set to ON position.

2. Check the normally closed (N.C.) panic switch for correct operation. Normally closed when the door is in normal operation. If the unit was ordered or setup as non-panic, ensure the jumpers are installed in place of the panic switch. It is a BLUE jumper plug used in three locations on the harness. There should be one plug for each position.

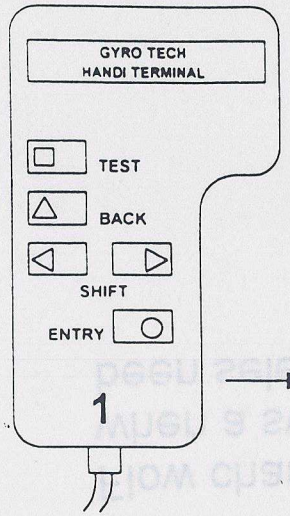


119826 Jumper Plug

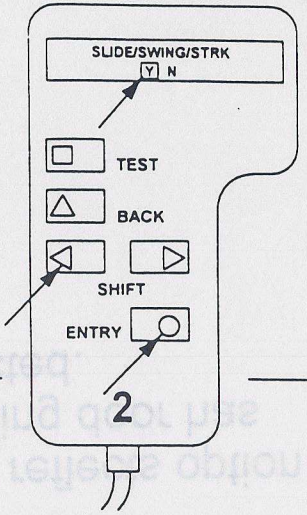
For additional assistance, contact NABCO Entrances, Inc at 1-877-NABCO WI (622-2647)



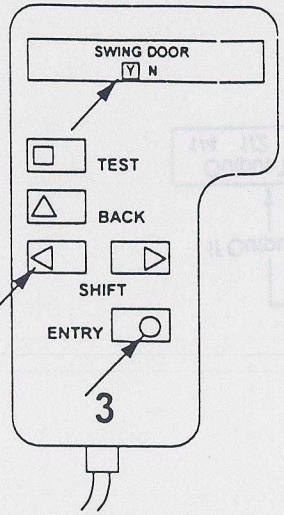
Flow chart reflects option when a swing door has been selected.



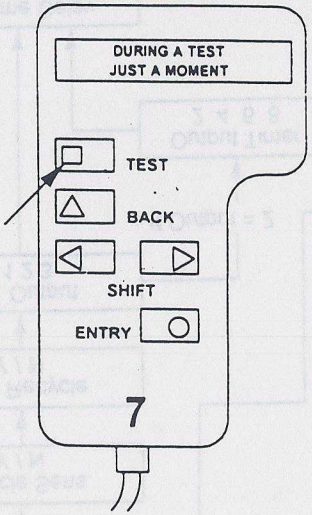
This is what you should see first when you plug it in.



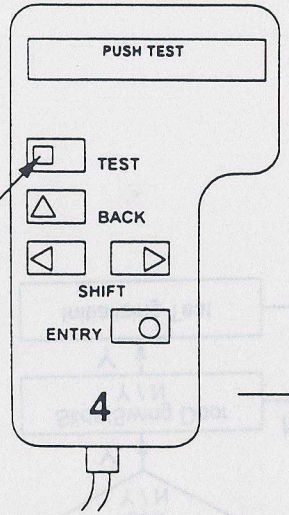
In a few seconds, display should change as shown. Shift to "Y" and press "Entry"



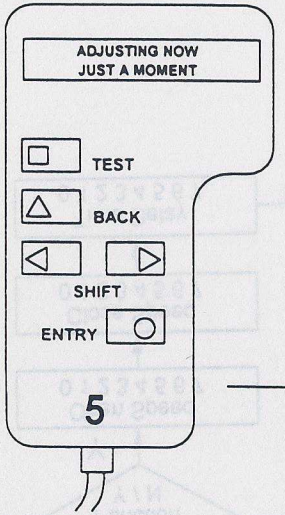
Display should now look like this. Shift to "Y" and press "Entry"



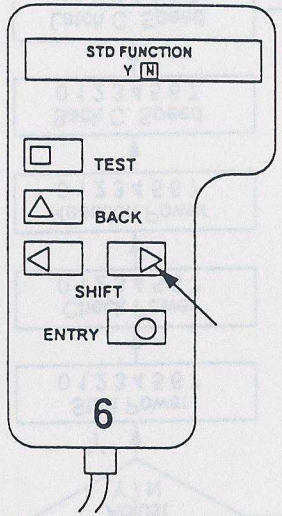
Press "TEST". You should get the message shown, and the door should go thru 1 complete cycle. All function values will be pre-set the same as the table on page 7. You may now disconnect the Handy Terminal from the plug in the header.



When display says "PUSH TEST" Push it and the door should open and then close slowly.



While door is opening and closing you should get this message.



After door closes, you should see this message. Press shift button to select "N".

How to reset the microprocessor to default swinger settings.

The settings must be modifed to the numbers on page 6