Microprocessor and Handy Terminal

Setup and Programming Manual

U11 Version for Folding Door Systems

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).
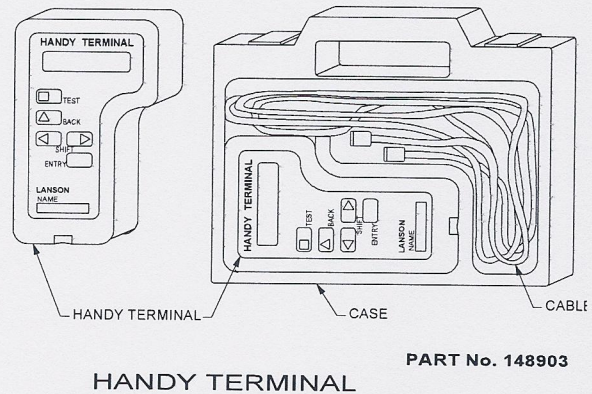

PART No. 148903

HANDY TERMINAL

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.

D. Microprocessor Controller Specifications

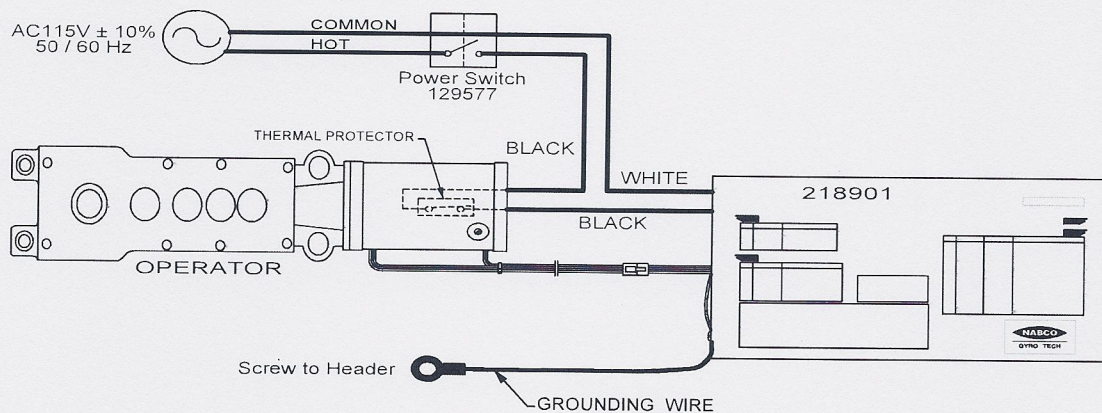1. The required power source is 115 VAC +/-10 %, 50/60 Hz.

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

3. The recommended operating temperature range is -4° to 140° F (-20° to +60° C)
    If the unit is sluggish, try warming the unit inside a jacket or warm building.

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.

9. Wire SQ (yellow) is for alternating door operation. Activate once to open and again to close the door. In the industry, it is sometimes referred to as sequential.

AC115V ± 10%
50 / 60 Hz

COMMON
HOT

Power Switch
129577

THERMAL PROTECTOR

BLACK

WHITE

218901

BLACK

OPERATOR

Screw to Header

GROUNDING WIRE

NABCO
GYRO TECH

Wiring Diagram for Power & Grounding
Figure 2

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).
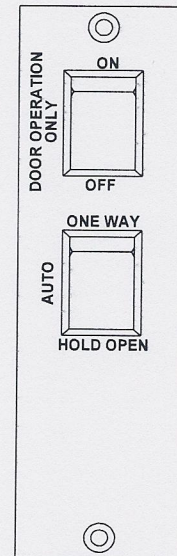
Figure 3

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, move the cursor to "Y" and 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**
> **Manual Open: 2**
> **If the settings are not corrected, the door at some point will incur intermittent 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	3	0 - 7
Check Power	6	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	N/A
Manual Opening	2	2 or 3
		(Do not use 0 or 1)
Signal Slow	N	N/A
Recycle	Y	Yes or No
Recycle Sensitivity	3	0 - 3
After Recycle	Y	Yes or No
Auxiliary Output**	3	0 - 3
(When used with the "Body Guard")		
Output Timer*	0	0 - 3
Extended Time Delay	7	0 - 7

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

**When electric lock is used, Auxiliary Output setting must be zero and holding beams or other similar devices must be used for safety.

NOTE: Adjustments must be made if the door is not operating in accordance with the applicable ANSI Standards.

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 2.
     Eight speeds are available. Slower speeds provide smoother operation.

> **NOTE: Per ANSI 156.10, the opening time of a folding door from closed to back check shall not be less than 1 ½ seconds.**

   - • **Closing Speed** - The message will read CLOSE SPEED 1.
     Eight speeds are available. Slower speeds provide smoother operation.

> **NOTE: Per ANSI 156.10, a folding door shall not close faster than 2 inches in 1 ½ seconds.**

   - • **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 go to the next section or move the cursor to Y & press entry to start Feeling Adjustments program.

2. There are five available feeling adjustments:

   - • **Start Power** - The message will read START POWER 3.
     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. 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 6.
  This adjusts braking power to reduce door speed to the check or latch speed. Eight options are shown, but the most this should be set to is 1.

- • **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 <u>N</u>. Press entry to go to the next section or move the cursor to Y and press entry to enter 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.

   - • **Door Operation with Safety Signal while door is closing**
     The message will read: SIG. AT CLOSING N.
     Choose Y and the door can be reopened by a safety beam connected to wire 6B (White) except when the door is in the latch check portion. Choose N and the door will continue to close even if the safety beam is interrupted.

   - • **Signal at Full Open** - The message will read: SIG. FULL OPEN Y.
     This is not addressed in the software of the folding door program. It has no affect on the door operation and should be ignored.

This next section is important in the operation of the door

   - • **Manual Open** - The message will read: MANUAL OPEN 2.
     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:

2 - The door will close slowly by motor power.

3 -Opening the door manually from a closed position will activate the door to power open. Not a push-to-go, but push-to-start since continued pushing may cause a recycle.

- - **Signal Slow** - The message will read: SIGNAL SLOW N.
  This is not addressed in the software of the folding door program. It has no affect on the door operation and should be ignored.

- - **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. 1.
  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 - This option enables the microprocessor to control the BEA Bodyguard® without retrofitting the operator with microswitches. Connect the violet (Out+) wire to brown (12VDC), the gray (OUT-) wire to the No. 7 pin of the Bodyguard®, and the red (GND) wire to the No. 6 pin of the Bodyguard®.

• •**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 <u>N</u>?.
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. It will record up to 255 connections.
- OPERATION CNT: Indicates the number of full door operations. It is updated every 100 door cycles. It will display up to 6,502,500 cycles.

- RECYCLE CNT: Indicates the number of times the door reversed direction after sensing an object was struck or the amount of friction surpassed the recycle sensitivity setting. The counter will display up to 255 recycles.
- RUNAWAY CNT: This is not addressed in the software of the folding door program. It will remain at 0.

> **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 reapplied, settings programmed into the microprocessor remain in effect. It is ready for operation.

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- they 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 and retest.

4. In some cases, resetting the microprocessor may solve some erratic or unusual operations. As a "last resort", follow the procedures on page 15 to reset the controller.

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

1. Check that the mode switch is installed and set to ON.

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.
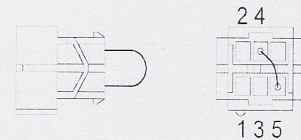
119826 Jumper Plug

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