ON-BOARD WEIGHING SYSTEMS

CONTENTS

ON-BOARD WEIGHING SYSTEMS

The PNT 9710 AccuWeigh digital on-board weighing system consists of a digital meter, load cells, transmitters, and cables designed for a variety of truck operations. The meter is optimized to be used with PNTechnologies transmitters and cables but will also function with other equipment.

Benefits of using the PNT 9710 include:

- Flexibility to read individual axle weights
- A reliable two-wire hookup between the transmitters and the meter
- An extremely bright weight display, visible even in bright sunlight
- Ability to calibrate the meter without having to have the truck loaded
- Measurements in increments of 10, 20, 50, or 100 pounds or kilograms
- Internal software that can be updated to include the latest enhancements.

A modern on-board weighing systems consists of load cells to sense the load's weight, transmitters and cables to send the load-cell output to the meter, and a meter to change the signals into information usable by the operator.

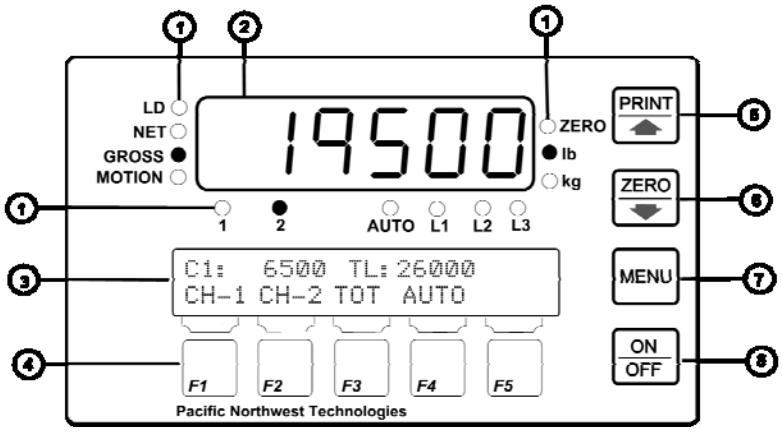
Load cells are precision-machined high-strength steel beams with strain gages bonded inside. The load cell is installed on the truck between the log load and the truck frame. When the logs are loaded on the truck, the strain gages sense the weight of the logs and send a small electrical signal to the meter by way of the transmitter.

The **transmitter** provides the voltage to the load cell to power the strain gages. A signal voltage from the load cell is returned to the transmitter where it is converted to a digital signal before being sent to the PN9710 meter through the two-wire cable.

The **PNT 9710 meter** receives the digital signal from the transmitter and interprets and displays it as a weight in pounds or kilograms. Two displays are used on the front of the meter. The top LED display shows the weight of the load and can easily be switched between truck, trailer, or total weight. The lower dot-matrix information display complements the top display by showing the two non-displayed weights. For example, if the top LED display is set to show the truck weight, the upper line of the information display will show the trailer weight and the total weight.

When the meter is in either the calibration or setup modes, the upper line of the information display will show a calibration or setup message. The lower line will show the appropriate legend for the blue "soft" keys, F1 through F5. The function of each of these keys changes depending on the mode that the PNT 9710 is in. The labels will change as various menus are selected during calibration or setup. During normal operation, the keys will select:

CH-1	[F1]	Channel 1 or truck weight
CH-2	[F2]	Channel 2 or trailer weight
TOT	[F3]	Total weight
AUTO	[F4]	Autocycle between Ch 1, Ch 2, and Total



1 LED indicator lights
2 LED weight display
3 Information display
4 Soft keys
5 Print, select submenus, or increase numbers
6 Zero display, select submenus or decrease numbers
7 Menu selection
8 On/Off

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CHAPTER 1 INTRODUCTION

The PNT 9710 meter has different menus used for setup and calibration of the meter.

The FUNCTION MENU is used to:

- reset the empty weight
- select a gross or net weight mode
- select the preferred speed for the auto-cycle mode

The SETUP MENU is used to:

- calibrate channel 1 or 2
- enable the advanced calibration feature
- select the proper weight unit, such as pounds or kilograms
- select the different weight increments, commonly called the grad size
- set the time in hours and minutes
- set the date

The ADVANCED SETUP MENU is used to:

- enable the filter
- select the number of load cells per channel
- enable the load and delivery feature
- enable the lift to weigh feature
- enable the sensor output feature
- enable the cal
- enable the accumulator feature
- select the transmitter models
- select the channel mode

The SETUP ID MENU is used to:

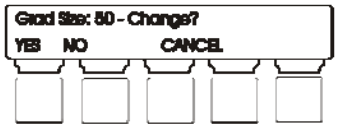
- establish ID numbers for the load and delivery feature

The SETUP SERIAL PORT MENU is used to:

- select the serial port baud rates
- set the serial ports to continuous output

The following chapters guide you through the setup and calibration of the meter. If a key on the right-hand side of the meter needs to be pressed, a small drawing of the key will be shown, like this: 

Messages displayed in the upper line of the information display will be shown in the format as they would be seen in the window and will be shown on the right-hand side of the page, like the example to the right of this paragraph.



The labels for the five blue soft keys along the bottom of the meter will be shown similarly in the bottom line of the information display, immediately above the key, like the example to the right of this paragraph.

Select the appropriate sub-menu with the up- or down-arrow keys on the right-hand side of the meter.

CHAPTER 2 METER SETUP

INTRODUCTION

This chapter will guide you through the meter setup prior to doing the calibration. Questions to ask yourself are:

1. Will you want the weight display to show in pounds (lbs) or kilograms (kgs)?

2. Do you want the weight shown in 10, 20, 50, or 100 lbs or kgs increments (grad size)? Selecting 10 or 20 will give better resolution but the display will appear unstable because the numbers will fluctuate more frequently when the truck slightly moves. A grad size of 50 is a good all-around selection.

3. Should the weights be shown as gross weight or net weight? Most operators want the display to show gross weight so they can see the same weight that any roadside platform scale or mill scale would see.

STARTING THE METER SETUP

Turn on the meter by firmly pressing the ON/OFF key. The information display will first show **POWER ON** and then show the

- meter model
- software version
- current time and date
- transmitter models
- number of load cells per channel.

During this time, the meter is also performing an internal self test which includes briefly lighting all of the small red indicator lights and all segments of the weight-display numbers. If the information display shows any error messages, refer to Chapter 8, *Troubleshooting.*

SETTING THE LOAD UNITS (LB OR KG)

It is important to see if the meter is displaying weights in kilograms (kg) or pounds (lb). Look at which of the small red LED lamps is on at the right of the weight display, next to the **lb** or **kg** label. If not correct, do the following:

1. Press the MENU key for 5 seconds

   until the information display shows

   After releasing the MENU key, the

   information display will show

2. Press the PRINT or ZERO key to

   select the **SET UNITS** menu.

3. Press the LB or KG key to select the desired unit.

4. Press the CANCEL key to store the change.

5. When finished, press the key CANCEL to exit the **SETUP MENU.**

SETTING THE GRAD SIZE

The grad size, or graduation, allows the meter to display the load weight in either 10, 20, 50, or 100 lb or kg increments.

1. Press the MENU key for 5 seconds

   until the information display shows 

   After releasing the MENU key, the

   information display will show 

2. Press the PRINT or ZERO key to

   select the **GRAD SIZE** menu. 

3. If no change is desired, press the RTRN key.

4. If you want to change, press the appropriate key for a grad size of

   10, 20, 50, or 100, followed by the RTRN key.

5. Press the CANCEL key to exit the **SETUP MENU.**

SETTING FOR NET, GROSS, OR LD

The **NET** weight refers to the weight of the load; it does not include the weight of the truck and/or trailer. **GROSS** weight, however, refers to the weight of both the load and the truck/trailer combination. Look at which of the small red LED lamps is on at the left of the weight display; **NET**, **GROSS** or **LD**. If not correct, do the following:

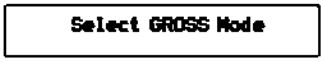
1. Press the MENU key to get the

If you do not continue with the operation within 15 seconds, the meter will reset to the normal weighing mode and you will need to press the MENU key again.

3. Press the MENU key again to show

4. Press the GROSS key to select **GROSS** weight.

The red **GROSS** LED lamp will turn on and the display will show



5. Press the NET key to select **NET** weight.

The red **NET** LED lamp will turn on and the display will show

6. Press the LD to select Load/Deliver

The red **LD** LED lamp will turn on and the display will show

6. Press the CANC key to exit the **FUNCTION MENU.**

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CHAPTER 3 CALIBRATION

INTRODUCTION

The calibration process allows you to fine tune your weighing system to provide the greatest degree of accuracy. The accuracy of the PNT 9710 AccuWeigh, however, depends on the accuracy of the information you provide. You will be required to have the weights of your truck and trailer when they are empty (tare weight) and when they are loaded (gross weight).

Find a certified platform scale of known accuracy, such as a state-operated weight-enforcement highway scale or a mill scale. Have your empty log truck and trailer weighed with the trailer down. Get the truck weight (including the steer axle and the drive axles) and the trailer weight. For future reference, record the weights here:

Truck (steer and drive axles): _____ LB KG

Trailer (trailer axles): _____ LB KG

Total weight: _____ LB K G

Not all platform scales read the same, so try to use the same scales whenever you need to recalibrate the meter or check the calibration. Use the same scales for recording loaded weights that you used for getting your empty weights.

ENTERING THE EMPTY WEIGHT INTO THE METER

Before entering the empty weights into the meter, make sure the meter display is set to **GROSS** (refer to *Setting For Net Or Gross0* in Chapter 2). Also, make sure the truck and trailer are empty and the trailer is on the ground with the meter cable connected.

1. Press the MENU key for 5 seconds until the information display shows

2. After releasing the MENU key, the information display will show

and the weight display will show

3. To enter the truck empty weight, press the PRINT or ZERO key until the information display shows

4. Press the EMPTY key.

The information display will briefly (for about 4 seconds) show

It will then show

5. The last number of the weight display will be flashing, telling you that number is ready to be changed.

   To change the number's value, press the PRINT or ZERO key.

   To select a different number, press the ◄ or ► key.

6. When the number on the weight display matches your truck (channel 1) empty weight, press the ENTER key to store the weight in the meter's memory.

   The information display will briefly show

   and then return to

   and the weight display will show

7. To enter the trailer empty weight, press the PRINT or ZERO key until the information display shows

8. Press the EMPTY key. The information display will briefly show

It will then show

9. The last number of the weight display will be flashing, telling you that number is ready to be changed.

   To change the number's value, press the PRINT or ZERO key.

   To select a different number, press the ◄ or ► key.

10. When the number on the weight display matches your trailer

    (channel 2) empty weight, press the ENTER key to store the weight in the meter's memory.

    The information display will show

    then return to

11. At any time, you can exit the calibration process by pressing

    the CANCEL key.

    The information display will briefly show

ENTERING THE LOADED WEIGHT INTO THE METER

The following steps can be completed only after having your loaded truck weighed at a certified and accurate platform scale. The accuracy of your meter will completely depend upon the accuracy of the platform scale. For best results, use the same scales you used for getting your empty weights.

The steps involved are similar to those used for entering the empty weights.

1. Press the MENU key for 5 seconds

   until the information display shows

2. After releasing the MENU key, the

   information display will show

   and the weight display will show

3. To enter the truck's loaded weight,

   press the PRINT ▲ or ZERO ▼ key until

   the information display shows

4. Press the FULL key. The information

   display will briefly show

   It will then show

Unplug the connector from the back of the meter before jump-starting, battery-charging, or welding on the truck

5. The last number of the weight display will be flashing, telling you that number is ready to be changed.

   To change the number's value, press the PRINT or ZERO key.

   To select a different number, press the ← or → key.

6. When the number on the weight display matches your truck

   (channel 1) loaded weight, press the ENTER key to store the weight in the meter's memory.

   The information display will briefly show

   and then return to

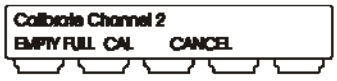
   and the weight display will show

7. To enter the trailer's loaded weight,

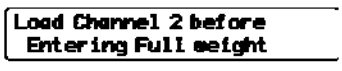
   press the PRINT or ZERO key until

   the information display shows

8. Press the FULL key.

   The information display will briefly show

It will then show

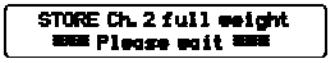
9. The last number of the weight display will be flashing, telling you that number is ready to be changed.

   To change the number's value, press the PRINT or ZERO key.

   To select a different number, press the ◄ or ► key.

10. When the number on the weight display matches your trailer's (channel 2) loaded weight, press the ENTER key to store the weight in the meter's memory.

    The information display will show



    then return to

11. At any time, you can exit the calibration process by pressing the CANCEL key.

    The information display will briefly show

ADVANCED CALIBRATION

Another way to enter the loaded weight into the meter is with the **advanced calibration** feature. This method allows the calibration of several trucks to be centrally controlled. The driver does not have to enter the setup mode of the meter, even for calibration. After setting in the tare weight, the driver need only record two sets of numbers:

1. the truck and trailer loaded weight shown by the platform scale, and
2. the channel 1 and channel 2 weights recorded on the PNT9710 while the truck is on the platform scale.

The following steps are used for the advanced calibration, which can be done on an empty truck, if necessary.

1. Press the MENU key for 5 seconds

   until the information display shows

   After releasing the MENU key, the

   information display will show

   and the weight display will show

2. Press the PRINT or ZERO key until

   the information display shows

3. Select the channel to calibrate by pressing

   the CH-1 key or CH-2 the key.

   For this example, we will assume

   you selected CH-1

4. Enter the number that was earlier recorded as the number shown on the meter's weight display for channel 1 while sitting on the platform scale. Change the numbers in the same manner as setting the original loaded-weight calibration (shown in the previous section of this chapter). Press the 

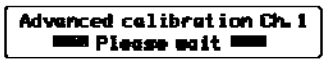
key when completed.

5. The information display will show 

6. Enter the number that was earlier recorded as the legal truck weight from the platform scale. Change the numbers in the same manner as in Step 4, above.

   Press the 

key when completed.

7. The information display will show 

   and then show 

8. Press the 

key to return to normal operation.

9. Channel 2 is calibrated in a similar manner.

CHAPTER 4 OPERATING THE METER

INTRODUCTION

Now that the meter is set up and calibrated, it will continuously monitor the truck's load. The operator can lock the weight display to always show the truck or trailer weight or the total weight while viewing the other two channels in the information-display window. Auto-cycling can also be selected to continuously and automatically switch the weight display between the three channels.

SELECTING THE WEIGHT DISPLAY CHANNEL

1. Press the 

key to have the red LED weight-display window show the channel 1 weight. The information display will show the weight for channel 2 and the total weight.

2. Pressing the 

key or the 

key will similarly change both displays.

SELECTING THE AUTO-CYCLE FUNCTION

The auto-cycle function lets the meter continuously change the weight display from the channel 1 weight to the channel 2 weight to the the total weight, then repeats the cycle

1. Press the 

key to continuously cycle the weight display through the three channels.

2. The weight-display window will momentarily show

then switch to the appropriate weight. The red LED lamp labeled **AUTO** will turn on and the LED lamps labeled **1** and **2** will alternately turn on, depending on which channel is being displayed.

3. To leave the **AUTO CYCLE** function,

press either the CH-1 or CH-2 or TOT key.

The weight display will then show whichever channel you selected and the information display will show the other two weights.

CHANGING THE AUTO-CYCLE SPEED

The time that the meter dwells on each channel display when in auto cycle can be selected by the operator. Three times are available:

SLOW	10 seconds
MID	6 seconds
FAST	3 seconds

1. Press the MENU key to get the

If you do not continue with the operation within 15 seconds, the meter will reset to the normal weighing mode and you will need to press the MENU key again.

2. The information display will show

3. Press the MENU key one more time

and the information display will show

4. Press the appropriate key to select the desired time.

5. Press the CANCEL key if you decide not to change the time. If no keys are pressed within 15 seconds, the meter will return to normal operation.

RECALLING THE TARE WEIGHT

During normal day-to-day operations, one or both of the channels may slightly drift from the originally-set empty-weight (tare-weight) calibration. Various reasons can explain a small drift, for example:

1. large changes in outdoor temperature from morning to mid-day,
2. dropping a log on the front or rear bunks,
3. mud or snow accumulations.

To recall the tare weight, perform the following steps:

1. Press the MENU key to get the 

   If you do not continue with the operation within 15 seconds, the meter will reset to the normal weighing mode and you will need to press the MENU key again.

2. The information display will show 

   Select the appropriate channel by pressing the CH-1 key or the CH-2 key. The meter will return to the previously set tare weight for the channel selected and will be ready for normal operation.

3. An error message may be shown for 5 seconds in the information display if the tare weight of channel 1, for example, has drifted more than 3000 lbs

or 2500 kgs.

The display will change to show

and the weight display will return to the tare weight shown before the attempted change.

RECORDING THE CAL FACTOR

The cal factor is a number related to the calibration of each channel of the meter. Should you need to change meters, using the cal factor will considerably speed the process. By entering the cal factors from the old meter into the new meter, the new meter will have the same calibration. Use the space below to record your meter's cal factor.

Truck (channel 1) cal factor _____

Trailer (channel 2) cal factor _____

1. Press and hold the MENU key

   about 5 seconds until the information display shows

2. After releasing the MENU key,

   the information display will show

and the weight display will show

3. To find the cal factor for the truck (channel 1) channel, press the PRINT or ZERO key until the

   information display shows

4. Press the CAL key.

   The information display will show

5. The last number of the weight display will be flashing, telling you that number is ready to be changed. If you are only recording the number and not changing it, record it on the previous page and

   then press the ENTER key.

6. If you are installing a replacement meter and want to enter the truck (channel 1) channel cal factor from the previous meter,

   press ◄ or ► to select the number for changing.

7. When the number on the weight display matches your truck

   (channel 1) cal factor, press the ENTER key to store the cal factor in the meter's memory.

   The information display will show

   and then return to

and the weight display will show 

8. To find the cal factor for the trailer (channel 2) channel,

   press the PRINT or ZERO key

   until the information display shows 

9. Press the CAL key.

   The information display will show 

10. The last number of the weight display will be flashing, telling you that number is ready to be changed. If you are only recording the number and not changing it, record it on the previous page and then press the ENTER key.

11. If you are installing a replacement meter and want to enter the trailer (channel 2) channel cal factor from the previous meter

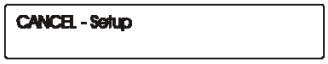
    press the ◄ or ► key to select the number for changing.

12. To change the value of the number, press PRINT or ZERO key

13. When the number on the weight display matches your trailer (channel 2) cal factor, press the ENTER key to store the cal factor in the meter's memory.

After recording or resetting the cal factor numbers, press the CANCEL key.

The information display will briefly show



and then return to normal operation.

SETTING THE TIME AND DATE

Having the correct time and date entered into the PNT9710 is important if you will be using the meter's printer function or if you will be downloading weight information to another computer. Setting the time will be shown first, followed by setting the date.

1. Press the MENU key for 5 seconds until the information display shows

2. After releasing the MENU key, the information display will show

and the weight display will show

3. To enter the correct time, press the PRINT or ZERO key until the information display shows

4. Press the YES key to set the time.

   The information display will show 

   and the weight display will be flashing the minutes.

5. To change the minutes, press the PRINT or ZERO key.

6. Press the ENTER key to save the minutes setting.

7. To select the hours, press the ← key.

   The information display will show 

   and the weight display will be flashing the hours.

8. To change the hours, press the PRINT or ZERO key.

9. Press the ENTER key to save the hours setting.

10. To select AM or PM, press the ← key.

    The information display will show 

    and the weight display will be flashing AM or PM.

11. To change the setting, press the PRINT or ZERO key.

12. Press the ENTER key to save the setting.

13. Press the CANCEL key at any time to return to the setup menu.

14. To enter the correct date, press the PRINT ▲ or ZERO ▼ key until the information display shows

15. Press the MMDDYY or DDMMYY key to select the date format.

The information display will show

16. Press the ◄ or ► key to select the day, month, or year for changing. Press the PRINT ▲ or ZERO ▼ key for the correct number.

17. Press the ENTER key to save each changed setting.

18. Press the CANCEL key to return to the setup menu.

19. Press the CANCEL key again to return to normal operation.

CHAPTER 5 CUSTOMER OR PRODUCT ID

INTRODUCTION

When the **Load / Deliver** mode has been enabled (see Chapter 12, Advanced Setup), each customer account or product being loaded or delivered will need a unique identification (ID) number. The ID number can be selected prior to pickup or delivery by using either the meter keypad, an external keypad, or an optional bar-code scanner.

SETTING THE CUSTOMER OR PRODUCT ID

1. Press the MENU key for about 7 seconds

   until the information display shows 

2. After releasing the MENU key,

   the information display will show 

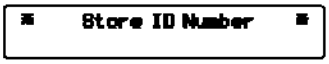
3. Press the ADD key to add an ID number.

   The information display will show 

   and the last number of the weight display will be flashing, telling you that number is ready to be changed. To change the number's value, press the PRINT or ZERO key.

   To select a different number, press the ◄ or ► key.

4. Press the ENTER key when finished.

   The information display will show 

5. If the entered number has already been selected, the information display will show

and you should enter a different number.

6. When the correct number has been entered, press the CANCEL key.

The information display will show

7. Press the key CANC again to return to normal operation.

USING THE CUSTOMER OR PRODUCT ID WITH LOAD/DELIVER

Calibrate the PNT9710 meter as outlined in Chapter 3, Calibration, using 00000 for EMPTY weights. Enter the net payload values obtained from a certified scale for the FULL values. When calibrating the system, fill the trailer with payload to no less than 80% of the maximum full load. Since the empty weights are set at 00000 during calibration, the gross-weight reading will be the same as the net-weight reading.

In the single-channel mode, the **Accumulator** function can be used to add (or subtract, if delivering) each individual pickup to previous pickups and store the accumulated total in the meter's internal memory. At the end of the job, a grand total of all pickups is available.

A paper ticket can also be printed for each individual pickup or delivery if a printer is attached and enabled through the serial port at the back of the meter (see Chapter 6, *Using the Serial Ports*). The paper ticket will show

- ID number
- weights
- date
- time of day

```
==============================
ID: 000002
Gross Weight
CH-1:  15000 lb.
CH-2:  12500 lb.
TOTAL: 27500 lb.
Time: 11:05 am  Date: 02/12/05
==============================
```

The **Accumulator** function is not available in the 2-channel mode but paper tickets may be printed with a properly attached and enabled printer.

*The following steps will guide you in using the customer or product ID in the **Load/Deliver** mode.*

For single-channel operation, make sure **Accumulator** (if desired) and **Load/Deliver** have been enabled (see Chapter 12, Advanced Setup).

1. Select Load/Deliver by pressing the LD key. The red LED labeled LD at the left of the weight display should be lit and the information display should show

2. Select the correct customer or product ID by pressing the ID key. The information display will briefly show

and then show

Use the ZERO and PRINT keys until the correct ID shows in the weight display and then press the SELECT key.

3. Before picking up or delivering each load, press the ZERO key.

   As each load or delivery is made, the net weight shown in the information display will increase or decrease to show the total of all the pickups or deliveries.

4. At any time between or after incremental loading or delivering, the NET mode is accessible for viewing the total net payload on the truck.

   Press the NET key. The weight display will show the total NET payload weight.

5. Press the PRINT key to print a paper ticket for the load and, if the Accumulator function has been enabled, the current load will be added to the meter's internal memory for retrieval at a later time.

For two-channel operation, make sure **Load/Deliver** has been enabled (see Chapter 12, *Advanced Setup*) and the meter is in **Total**. **The meter must be in TOTAL for Load/Deliver to operate correctly.** The **Accumulator** function is not available.

1. Press the MENU key to get the 

   If you do not continue with the operation within 15 seconds, the meter will reset to the normal weighing mode and you will need to press the MENU key again.

2. Select Load/Deliver by pressing the LD key. The red LED labeled LD at the left of the weight display should be lit.

3. Select the customer or product ID by pressing the ID key.

   The information display will briefly show 

   and then show 

5. Press the ZERO or PRINT key for the appropriate product or customer ID, then press the SELECT key.

6. Before picking up or delivering each load, press the ZERO ZERO key

7. Press the PRINT key tp print a paper ticket for the load.

CHAPTER 6 USING THE SERIAL PORTS

INTRODUCTION

The rear panel of the PNT9710 meter has connectors to provide RS232 serial output for printers, remote displays, remote keypads, an on-board computer, or other peripherals. Two communication ports are available, COM1 and COM3. Both COM ports have the following specifications:

- Baud rates: 1200, 2400, 4800, and 9600 baud
- Parity: None
- Stop bit: 1
- Data: 8 bits

Only the baud rates are selectable. The default baud rate is 9600.

COM1 is used for output to a printer or to accept input from a bar-code scanner or external keypad.

COM3 is used for a large-digit remote readout (scoreboard) or a wireless remote handheld display.

SETTING THE SERIAL PORTS

Two options are available when setting the serial ports, the baud rate and whether or not continuous output is needed. If you are using the PL6050 printer, do not change the default of 9600 baud.

1. Press the MENU key for about 10 seconds

   until the information display shows 

2. After releasing the MENU key,

   the information display will show 

   and the weight display will show 

3. To set the COM1 baud rate, press the PRINT key until the

   information display shows

   If you need a baud rate other than the default 9600, press the appropriate blue key. The selected baud rate will show at the end of the first line in the display.

4. Press the CANCEL key to complete

   the selection and return to

5. To set the COM3 baud rate, press the PRINT key until the

   information display shows

   Select the proper baud rate.

6. To set up COM1 for continuous ouput, press the PRINT key until

   the information display shows

   Press the appropriate blue key for YES or NO. The selection will show at the end of the first line in the display.

7. Press the CANCEL key to complete

   the selection and return to

8. To set up COM3 for continuous ouput, press the PRINT key until

   the information display shows

9. Press the CANCEL key to complete the selection and return to

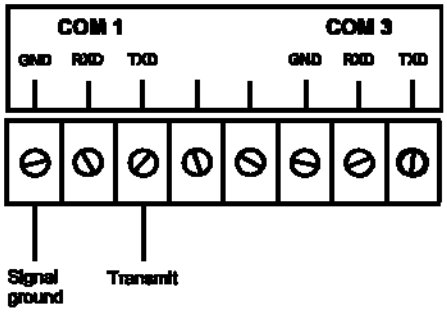
10. Press the CANCEL key again to return to normal operation.

CONNECTING A SERIAL PRINTER

A serial printer has a two-wire cable which connects to the back of the PNT9710 meter at the COM1 serial port. The **power** wire attaches to the **12VDC** positive (+) terminal, the **ground** wire connects to the **GND** (-) terminal, and the **signal** wire connects to the **TXD** terminal. Consult the printer operator's manual for the ground and signal wire colors.

NOTE: *For the printer to operate properly, the COM1 baud rate must be set to 9600 baud (Step 3 on the previous page).*

NOTE: *The COM1 serial port should not be set for continuous output (Step 6 on the previous page) if a printer is connected. Continuous output will cause the printer to print a ticket each time the meter's weight display is updated. With continuous output set to NO, the printer will print a ticket only when the PRINT key is pressed on the meter's front panel.*

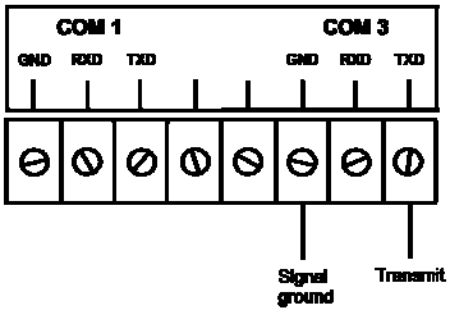


CONNECTING A WIRELESS REMOTE DISPLAY SYSTEM

The transmitter for a wireless remote display system is connected to the COM3 port on the back of the PNT9710 meter. The red **power** wire attaches to the **12VDC positive (+) terminal**, the **ground** wire attached to the COM3 **GND** terminal, and the **signal** wire attached to the COM3 **TXD** terminal. Consult the remote display operator's manual for the ground and signal wire colors.

NOTE: *For the printer to operate properly, the COM3 baud rate must be set to 9600 baud (Step 5 of the previous section).*

NOTE:*The COM3 serial port should be set for continuous output (Step 8 of the previous section) if a wireless remote display is connected. Continuous output will allow the remote display to show the same as the meter's weight display.*



CONNECTING A REMOTE (SCOREBOARD) DISPLAY

A remote hard-wired display, sometimes called a scoreboard display, is connected the same as described above for the transmitter of a wireless remote display.

CHAPTER 7 LIFT-TO-WEIGH

INTRODUCTION

Some tipping-body applications for on-board scales are best done utilizing the Lift-To-Weigh program. The lifting ram(s) can be scaled using a pin, load cells, or pressure transducer to measure the load once the ram is activated. These installations require that the body be elevated only slightly (about 4 to 6 inches) for accurate payload weights to be displayed.

USING LIFT-TO-WEIGH

1. Make sure Lift-To-Weigh has been enabled (see Chapter 12, Advanced Setup).
2. Make sure the display is set to show NET, not GROSS.
3. The meter's weight display will show bars along the bottom of the main display when the body is in the down (relaxed) position.

4. Use the standard calibration procedure (Chapter 3, Calibration) for calibrating the empty and loaded weights, except that the body must be raised slightly for each calibration.
5. The Lift-To-Weigh program places a +/-500 lb/kg threshold around the empty weight entered. This threshold requires that a minimum of 500 lb/kg of material be present in the body for the scale to display payload weight.

CHAPTER 8 TROUBLESHOOTING

Troubleshooting is a systematic process of testing, identifying, and eliminating areas of the weighing system that are causing problems or malfunctions. The PNT9710 is designed to aid in troubleshooting by providing error codes which identify problems. Many of the error codes will show either channel 1, the truck channel, or channel 2, the trailer channel, whichever is applicable.

The PNT9710 system has two wires going from each transmitter to their respective load cells. One wire has a red band next to the load-cell connector and is called the **red side** and the plain black wire, to the other load cell, is called the **black side**. The PNT9700 will sometimes refer to the **red side** or the **black side** in the error messages.

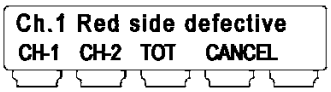
An effective and easy troubleshooting method is called substitution. For example, if the error message says the red side is defective, swap the red and black wires at the load cells. If the error message remains the same, then the trouble is with the wire. If the message changes to say the black side is defective, then the load cell is the problem. The same idea can be used with the channel 1 and channel 2 wires at the back of the meter.

The weight display will show  if there is a problem with channel 1 or,

if channel 2 is not working,  will be displayed.

Additional details to aid in troubleshooting will be shown in the information display window.

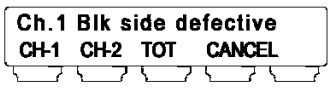
The following sections will show how the error codes are displayed, list the possible causes, and some troubleshooting hints.



The red-banded wire may be damaged between the load cell and the channel 1 transmitter.

a. The load cell connected to the red-banded wire of channel 1 may be defective.

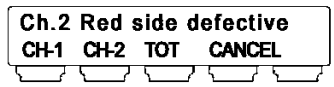
b. Swap the two load-cell cables. If the message is the same, the red -banded wire is damaged, possibly pinched or cut. If the message changes to say the black side is defective, then the load cell is the problem.

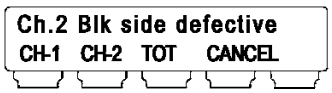


The black wire may be damaged between the load cell and the channel 1 transmitter.

a. The load cell connected to the black wire of channel 1 may be defective.

b. Swap the two load-cell cables. If the message is the same, the black wire is damaged, possibly pinched or cut. If the message changes to say the red side is defective, then the load cell is the problem.



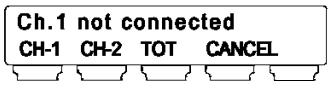


These two are the same as the channel 1 examples above except they apply to channel 2.

The preceeding error messages and troubleshooting hints were written for 2-channel systems with 2 load cells per channel. Similar error messages apply for other systems that have 4, 5, or 6 load cells per channel. Those systems will have PNT transmitters with part numbers of PNT71xx, with the xx refering to the load cell count.

Those transmitters will also have numbers on the transmitter next to each cable signifying which load cell the cables uses. The cables will also have a corresponding number next to the load-cell connector.

A typical error message may be:
Ch 1 LoadCell 4 Defective or *Ch 2 LoadCell 6 Defective.*



Channel 1 is not connected to its transmitter.

a. The channel 1 wire may have been disconnected at the back of the meter.

b. The channel 1 wire may be damaged between the channel 1 transmitter and the meter. Disconnect the channel 1 wires from the meter. Connect the channel 2 * wires to the channel 1 terminals. If the message stays the same, the meter is defective. If the message goes away and channel 1 works again, then the wire is the problem. Check for a cut wire or a connector unplugged.

**** Assuming channel 2 is working.***

Channel 2 is not connected to its transmitter.

a. The channel 2 wire may have been disconnected at the back of the meter.

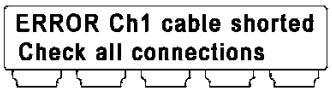
b. The channel 2 wire may be damaged between the channel 2 transmitter and the meter. Disconnect the channel 2 wires from the meter. Connect the channel 1 * wires to the channel 2 terminals. If the message stays the same, the meter is defective. If the message goes away and channel 2 works again, then the wire is the problem. Check for a cut wire or a connector unplugged.

**** Assuming channel 1 is working.***

The difference between the original empty weight and the current empty weight is too large for the* RECALL EMPTY WEIGHT *command to function. The difference is limited to 3000 lbs or 2500 kgs.

Check for other problems, such as:

a. bent or distorted load cell
b. damaged load-cell mounting
c. bent truck or trailer frame
d. defective load cell



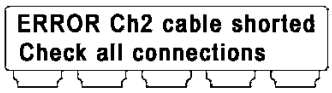
The channel 1 wires are shorted together or shorted to the truck frame.

a. Disconnect the channel 1 wires from the back of the meter. If the error message remains, the meter is defective. If the message goes away, check the channel 1 wire.

b. The channel 1 wires may be damaged between the load cell and the transmitter or between the transmitter and the meter.

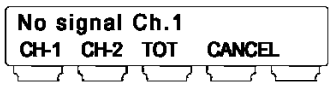
c. Check all wires for cuts or for pinched areas.

d. Check for worn insulation where the wire could be shorted to the truck or trailer frame.



The channel 2 wires are shorted together or shorted to the truck frame.

This error message is the same as the one above except is applies to Channel 2.

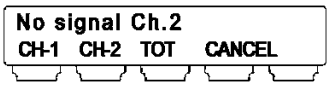


The signal from the channel 1 transmitter is not being received at the meter.

a. Disconnect the black and white channel 1 wires from the back of the meter. Move the black and white channel 2* wires from channel 2 to the channel 1 terminals. If the error message remains, then the meter is defective.

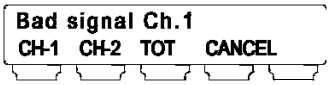
b. If the error message goes away and channel 1 again works, check for a cut wire between the meter and the channel 1 transmitter. Check also for a good connection at the channel 1 transmitter.

**** Assuming channel 2 is working.***



The signal from the channel 2 transmitter is not being received at the meter.

This error message is the same as the one above except is applies to Channel 2.



The quality of the signal from the channel 1 transmitter is poor.

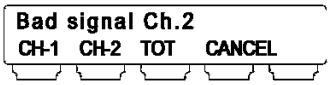
a. Disconnect the channel 1 wires from the back of the meter. Move the channel 2* wires from the channel 2 terminals to the channel 1 terminals. If the error message remains, then check the voltage at the power cable. It should be between 11.5 and 16 volts.

b. If the voltage is good, then make sure the power lead is connected directly to the battery. Power from any other source may be too "noisy".

c. If the error message still remains, then the meter may be defective.

d. If the message is gone when the channel 2 wires are substituted for channel 1, then the channel 1 transmitter is defective or the connector may not be plugged in correctly.

**** Assuming channel 2 is working***



The quality of the signal from the channel 2 transmitter is poor.

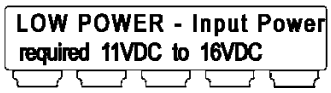
a. Disconnect the channel 2 wires from the back of the meter. Move the channel 1* wires from the channel 1 terminals to the channel 2 terminals. If the error message remains, then check the voltage at the power cable. It should be between 11.5 and 16 volts.

b. If the voltage is good, then make sure the power lead is connected directly to the battery. Power from any other source may be too "noisy".

c. If the error message still remains, then the meter may be defective.

d. If the message is gone when the channel 1 wires are substituted for channel 2, then the channel 2 transmitter is defective or the connector may not be plugged in correctly.

**** Assuming channel 1 is working***



The power voltage to the meter from the battery is less than 11 volts or greater than 16 volts.

a. Make sure the power cable is adequately connected at the terminal strip on the back of the meter.

b. Measure the voltage at the power cable at the back of the meter. It should be between 11 volts and 16 volts. If not, measure the voltage where the power cable is connected to the battery. If the voltage is greater than 16 volts, check the charging system of the truck.

c. Make sure the power-cable connections at the battery are clean and tight. The cable must be connected directly to the batteries and not to an accessory, ignition, or other connection in the dash.

CHAPTER 9 TEST MODE

INTRODUCTION

Test numbers provide a way to verify that your system's load cells are working as they should. Since the test number is related to the actual output of the load cell, it will also give you a warning of impending load-cell failure. With a properly working system, the test numbers for all the load cells should be similar. Load cells that are perfectly balanced (meaning no offset) will have test numbers very close to 32,767 when the truck is unloaded. Many load cells are not perfectly balanced, however, which means the test numbers will be someplace between 25,000 and 39,000. If you record a test number outside of the 25,000 to 39,000 range, the load cell has an abnormal offset and may be ready to fail.

As the truck is loaded, the test numbers should increase proportionately. For example, suppose the channel 1 test numbers were 32,546 (black) and 33,275 (red) when the truck was empty. When loaded, the test numbers should increase and the test number for the red load cell should still be slightly larger than the black load cell test number.

If you notice one of the test numbers slowly increasing or decreasing but the load is stable, that load cell output may be drifting and the load cell may be failing. Another sign of impending failure would be if one of the test numbers increases much greater or less than the other for that channel.

The following steps will show you how to get test numbers for each load cell. If your system is working properly, record the empty-weight test numbers for future reference. If you change load cells, be sure to change the appropriate test number.

For 2 load cells per channel:

Channel 1 Red = _____ Black = _____

Channel 2 Red = _____ Black = _____

For 4, 5, or 6 load cells per channel:

Channel 1 Load cell 1 = _____ Load cell 2 = _____

Load cell 3 = _____ Load cell 4 = _____

Load cell 5 = _____ Load cell 6 = _____

Channel 2 Load cell 1 = _____ Load cell 2 = _____

Load cell 3 = _____ Load cell 4 = _____

Load cell 5 = _____ Load cell 6 = _____

RECORDING TEST NUMBERS

1. Press the MENU key to get the

If you do not continue with the operation within 15 seconds, the meter will reset to the normal

weighing mode and you will need to press the MENU key again.

2. The information display will show

3. Press the MENU key again to show

4. Press the TEST key to select the test mode.

   The display will briefly show

   The weight display will show

   during all of the following steps.

5. Press the CH-1 key to display the channel 1 test numbers.

   The numbers shown here are examples only. Your test numbers will be different.

   Record your test numbers in the spaces provided on the first two pages of this chapter.

6. Press the CH-2 key to display the channel 2 test numbers.

   The numbers shown here are examples only. Your test numbers will be different.

   Record your test numbers in the space provided on the first two pages of this chapter.

7. If one of the channels has more than 2 load cells, the information display will show the test numbers for each load cell with its corresponding number, such as Lc1, Lc2, Lc3, etc.

8. Press the 

key to return to the normal weighing mode.

The display will briefly show

CHAPTER 10 INSTALLATION

INTRODUCTION

The PNT 9710 meter system includes the meter, two transmitters with cables to connect to the load cells, one single-piece cable for the truck (channel 1), a two-piece cable for the trailer (channel 2), and a power cable. Items to be supplied by the operator include a plug and socket for the trailer (channel 2) cable, mounting hardware for the meter and transmitters, and an inline fuse holder with a 3-amp slow-blow fuse.

Before starting the installation, tape over the ends of the connectors to keep them free of dirt and grease. Small plastic bags, like sandwich bags, could also be used for protection.

Plan the location of the meter to minimize exposure to direct sunlight on the meter face. Even though the weight display has super-bright numbers, direct sunlight makes them more difficult to view.

The transmitters should be mounted in a location protected from road debris. The typical mounting areas are inside the frame rails or on the back-side of a crossmember. Remember to keep cable loops to a minimum to avoid having them snagged on debris or tools.

INSTALLING THE METER

1. Find a suitable location where the meter will be convenient to the operator.
2. Remove the U-bracket from the meter and use it as a template to mark the drilling locations for the four mounting screws.
3. Use four #10 or #12 screws to mount the U-bracket.
4. Install the meter back into the U-bracket and verify that the meter is in a desirable location.
5. Unplug the cable connector from the back of the meter by pulling straight away from the meter back. Set next to the meter for later installation.

MOUNTING THE TRANSMITTERS

1. Find a protected location for each transmitter. Drill two 5/16" or 8 mm mounting holes for each transmitter.
2. Install the transmitters so the cable connector is easily accessible and is pointed in the direction the cable will go to the meter.
3. Do not let the load-cell cables get sharply kinked where they come out of the transmitter.

ROUTING THE SIGNAL CABLES

1. Route the two cables from the truck (channel 1) transmitter to the two truck load cells. Note which load cell (left or right) has the red-banded cable. Secure the cables with nylon cable ties or tape so the cables are protected and exposed loops are minimized.
2. Similarly route and secure the two cables from the trailer (channel 2) transmitter. As an aid in troubleshooting, connect the red-banded cable to the same side as on the truck.
3. Check the load cell and cable connectors to be sure they are free of dirt, grease, and moisture.
4. Plug the cables into the load cells and tighten the connectors until resistance is felt. Tighten the connectors an additional 1/4 turn using only your fingers; pliers are not necessary. The additional tightening will seat the weather-proofing O-ring that is inside the cable connectors.
5. Route the truck (channel 1) cable from the transmitter to the meter. Wherever the cable passes through a body panel, such as floor, toe-board, or firewall, provide protection for the cable to prevent chafing. At the meter, put a tag on the cable to identify it as channel 1.
6. Next, route the cable from the trailer (channel 2) transmitter to the front of the trailer and locate a place for the trailer half of the cable connector. Install the cable on the connector and fasten the connector to the trailer.
7. Install the other half of the connector on the forward portion of the cable and route the cable into the cab for connection to the meter. Observe the same precautions as in step 5, above. Identify the cable as channel 2.

8. Secure the cables in the cab, next to the meter, and cut them to the proper length for connection to the meter. Be sure and maintain the channel identification.

ROUTING THE POWER CABLE

1. *The power cable must be connected directly to the batteries. DO NOT connect to an accessory terminal on the ignition switch, fuse panel, or behind the dash. The meter must have a "clean" source of 12 volts.*
2. Route the power cable from the batteries to the meter. DO NOT connect to the batteries yet.
3. Observe the previous precautions about protecting the cable from undo chafing and abrasion.

CONNECTING THE CABLES

1. Carefully cut back 1 inch of the outer insulation on the meter end of each cable. Do not cut into the white or black insulation of the signal wires or the red or black insulation of the power cable.
2. Strip off 1/4 inch of the individual wire insulation.
3. Install the wires into the green meter connector and snugly tighten each terminal. Use Figure 10-1 as a guide.

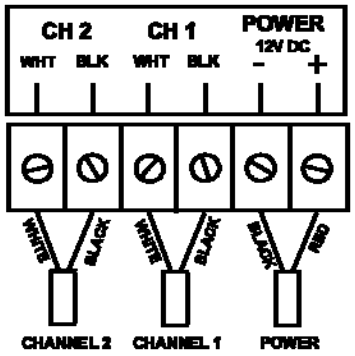


Figure 10-1. Meter connections

4. Review all of your installations and cable routings, looking for unnecessary loops, tight bends or kinks in the cables, properly inserted connectors, and connection of the trailer cable.
5. Connect the battery end of the power cable to the batteries. ***Use an inline fuseholder with a 3-amp slow-blow fuse***. Put the fuseholder and fuse in the red wire and next to the positive battery terminal.
6. ***Make sure you are connecting to 12 volts and not 24 volts.***

FINAL STEP

1. Position the meter plug for insertion into the back of the meter. Insure that the screws for the connector terminals are visible on the top side. That will position the red battery wire next to the edge of the meter case. Verify by looking at the label on the back of the meter.
2. Insert the connector into the meter by gently pushing straight in.
3. At the front of the meter, press the ON OFF key in the lower right-hand corner of the meter front panel. The information display, above the blue “soft keys”, will first show **POWER ON** and then show the meter model and the software version. During this time, the meter is also performing an internal self-test which includes briefly lighting all of the small red indicator lights. If the information display shows any error messages, refer to Chapter 8, *Troubleshooting*.

CHAPTER 11 MAINTENANCE

INTRODUCTION

Proper maintenance of your PNT 9710 on-board weighing system, including preventive maintenance, is necessary to insure accurate and consistent weight readings. The best practice is to develop both daily and weekly inspection procedures.

DAILY INSPECTIONS

1. Look at both the truck, trailer, and load cell cables to see if they are
    - kinked
    - torn
    - cut or frayed
    - properly secured away from debris
2. Be sure the plug and socket in the trailer cable are free of dirt and grease.
3. Insure that the meter is still securely fastened at its mounting location and the connector is pushed all the way into the back of the meter.
4. Inspect the load cells and clean out any buildup of mud, snow and ice, rocks, or other debris from between the load cells and the truck or trailer frame.

WEEKLY INSPECTIONS

1. While looking at the truck, trailer, and load cell cables, run you hand along the cables to help detect any cuts or abrasions.
2. Verify that the connectors at the load cells and transmitters are still screwed in tight and the transmitters are still securely mounted.
3. Inspect the connector at the back of the meter, looking for loose or frayed wires.
4. Be sure the power cable is still securely connected at the battery, the connection is not showing signs of corrosion, and the insulation is not being worn through where it could cause a short to the truck frame.

CHAPTER 12 ADVANCED SETUP

INTRODUCTION

The **ADVANCED SETUP** menu includes sub-menus for

- enabling the filter
- setting the number of load cells connected to the meter
- enabling the load/delivery (LD) feature for incremental weighing
- enabling the lift-to-weigh feature for tipping operations
- enabling the cal
- enabling the accumulator to store up to 100 weighing events
- selecting the channel mode (1 or 2 channels)

The sections for the sub-menus in this chapter are written to be independent of each other. If you wish to use more than one of the sub-menus, press the CANCEL key only once at the end of the selection sequence. Then use the UP or DOWN arrow to select another sub-menu. Pressing the CANCEL key twice will return the meter to normal operation.

ENABLING THE FILTER

When the filter is enabled, the meter will average 2, 4, or 8 data samples before displaying the weight. Using the filter will stabilize the display (numbers will not bounce around as much) but the display will be slower to update.

1. Press the MENU key for about 12 seconds

   until the information display shows

2. After releasing the MENU key, the

   information display will show

   and the weight display will show

3. To select the **FILTER** submenu,

   press the PRINT key until the

   information display shows

4. Press the MORE key to increase filtering or the LESS key to decrease filtering.

5. Press the CANCEL key to return to

   the submenu selection.

6. Press the CANCEL key again to exit **ADVANCED SETUP** and return to normal operation.

SELECTING THE NUMBER OF LOAD CELLS PER CHANNEL

1. Press the MENU key for about 12 seconds

   until the information display shows

2. After releasing the MENU key, the

   information display will show

   and the weight display will show

3. To select the **NUMBER OF LOAD CELLS** submenu,

   press the PRINT key until the

   information display shows

4. Press the appropriate key to select the number of load cells that are connected to Channel 1.

5. Press the CANCEL key and then the PRINT key for Channel 2.

   The information display will show

6. Repeat Step 4 to select the number of load cells that are connected to Channel 2.

5. Press the CANCEL key to return to

   the submenu selection.

6. Press the CANCEL key again to exit **ADVANCED SETUP** and return

   to normal operation.

ENABLING LOAD/DELIVERY

1. Press the MENU key for about 12 seconds

   until the information display shows

2. After releasing the MENU key, the

   information display will show

   and the weight display will show

3. To select the **LOAD/DELIVERY** submenu,

   press the PRINT key until the

   information display shows

4. Press the appropriate blue key for **YES** or **NO.**

5. Press the CANCEL key to return to

   the submenu selection.

6. Press the CANCEL key again to exit **ADVANCED SETUP**

   and return to normal operation.

ENABLING LIFT-TO-WEIGH

1. Press the MENU key for about 12 seconds

   until the information display shows 

2. After releasing the MENU key, the

   information display will show 

   and the weight display will show 

3. To select the **LIFT-TO-WEIGH** submenu,

   press the PRINT key until the

   information display shows 

4. Press the appropriate blue key for **YES** or **NO.**

5. Press the CANCEL key to return to

   the submenu selection. 

6. Press the CANCEL key again to exit **ADVANCED SETUP**

   and return to normal operation.

ENABLING SENSOR OUTPUT

This feature is available only with two-channel systems that use two load cells per channel.

1. Press the MENU key for about 12 seconds

   until the information display shows

2. After releasing the MENU key, the

   information display will show

   and the weight display will show

3. To select the **SENSOR OUTPUT** submenu,

   press the PRINT key until the

   information display shows

4. Press the appropriate blue key for **YES** or **NO.**

5. Press the CANCEL key to return to

   the submenu selection.

6. Press the CANCEL key again to exit **ADVANCED SETUP**

   and return to normal operation.

ENABLING CAL

This feature is available only with two-channel systems and with load cells that have the same output.

1. Press the MENU key for about 12 seconds

   until the information display shows

2. After releasing the MENU key, the

   information display will show

   and the weight display will show

3. To select the **CAL** submenu,

   press the PRINT key until the

   information display shows

4. Press the appropriate blue key for **YES** or **NO.**

5. Press the CANCEL key to return to

   the submenu selection.

6. Press the CANCEL key again to exit **ADVANCED SETUP**

   and return to normal operation.

ENABLING THE ACCUMULATOR

1. Press the MENU key for about 12 seconds

   until the information display shows 

2. After releasing the MENU key, the

   information display will show 

   and the weight display will show 

3. To select the **ACCUMULATOR** submenu,

   press the PRINT key until the

   information display shows 

4. Press the appropriate blue key for **YES** or **NO.**

5. Press the CANCEL key to return to

   the submenu selection. 

6. Press the CANCEL key again to exit **ADVANCED SETUP**

   and return to normal operation.

SELECTING THE CHANNEL MODE

1. Press the MENU key for about 12 seconds

   until the information display shows

2. After releasing the MENU key, the

   information display will show

   and the weight display will show

3. To select the **CHANNEL MODE** submenu,

   press the PRINT key until the

   information display shows

4. Press the appropriate blue key for 1 channel or 2 channels.

5. Press the CANCEL key to return to

   the submenu selection.

6. Press the CANCEL key again to exit **ADVANCED SETUP**

   and return to normal operation.

WARRANTY

Pacific Northwest Technologies (PNT) warrants the PNT9700 series meter to be free from defects in materials and workmanship for two years from date of purchase. Any in-warranty defective product returned to PNT, freight prepaid with proof of purchase date, will be repaired or replaced at PNT's option. This warranty is limited to the electronic circuitry and original case of the product and specifically excludes damage caused by abuse, unreasonable use, or neglect. This warranty is in lieu of all other warranties , expressed or implied, and no other representations or claims of any nature shall bind or obligate PNT. Any implied warranties applicable to this product are limited to the two year period following its purchase. IN NO EVENT WILL PNT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM POSSESSION, USE, OR MALFUNCTION OF THIS PRODUCT.

In accordance with government regulations, you are advised that:
(i) some states do not allow limitations on how long an implied warranty lasts and/or the exclusion or limitation of incidental or consequential damages, so the above limitations and/or exclusions may not apply to you, and further (ii) this warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Return return freight prepaid with proof of purchase date to:
Pacific Northwest Technologies
ATTN: Return Department
8294 28th CT NE Suite 500
Lacey, WA 98516

Be sure to include your name, return address, and nature of defect. Out of warranty service and repair, where proof of purchase is not provided, shall be returned with repairs charged C.O.D.