5.4.4.3.   Count Out Sequence

The IND246 Counting application can be used to count out pieces from a container placed on the scale. This function varies depending on the mode in use.

5.4.4.3.1.   Tare-Sample

1. At the **Tare?** prompt, place the entire container on the scale and press ENTER 🔘.

2. At the **Sample?** prompt, remove the sample quantity from the container and press ENTER 🔘.

3. The terminal will display a negative count equal to the sample quantity. As additional pieces are removed the count will update in a negative direction.

5.4.4.3.2.   APW

If in the Tare-Sample sequence and the display is prompting **APW?:**

1. Enter the APW of the part and press ENTER 🔘.

2. The terminal will display a count of zero pieces.

3. As pieces are removed the count will update in a negative direction.

5.4.4.3.3.   Sample-Tare

1. Place the sample pieces on the empty scale and press ENTER 🔘.

2. At the **Tare?** prompt, place the full container on the scale and press ENTER 🔘.

3. The terminal will display a count of zero pieces.

4. As pieces are removed from the container, the count will update in a negative direction.

5.4.4.4.   Counting a Full Container

Parts in a full container can be counted when the terminal is in Sample-Tare mode.

1. Take the sample as normal.

2. At the **Tare?** prompt, use the numeric keypad to enter the preset tare value of the container and press ENTER 🔘.

3. Place the full container on the scale. The count will update to show the total number of pieces.

5.4.4.5.   Switching from Sample to APW Entry Mode

The normal sampling sequence requires taking a sample to determine the APW value for the part. If the APW is already known, it can be entered directly by changing the entry mode from sampling to APW entry.

 ▪ The mode switching icon (**Smpl/APW** or $\frac{\text{Ref n}}{\text{Ref}}$) must be enabled in setup (at **Application > Counting > Menu Keys**) in order to appear on the Operator Menu.

 ▪ When the terminal's display language is set to English, the **Smpl/APW** icon will appear. If any other language is set, $\frac{\text{Ref n}}{\text{Ref}}$ will appear.

To change the mode from Sampling to APW entry:

1. When the display is prompting **Sample?**, press the MENU ⓜ key to access the Operator Menu.

2. Select Sample/APW key **Smpl/APW** or $\frac{Ref\ n}{Ref\ □}$ and press ENTER 🔘.

3. The prompt will now show **APW?** and support direct entry of an APW.

To change the mode from APW entry to Sampling:

1. When the display is prompting **APW?**, press the MENU ⓜ key to access the Operator Menu.

2. Select the Sample/APW key **Smpl/APW** or $\frac{Ref\ n}{Ref\ □}$ and press ENTER 🔘.

3. The prompt will now show **SAMPLE?** and support part sampling to determine an APW.

5.4.4.6.   Clearing the Counting Cycle

When the display is showing the number of pieces in a piece count, the display can be cleared back to the prompting sequence by pressing the CLEAR key 🇨 twice. The first press of the CLEAR key 🇨 will clear the tare value and the second press will clear the APW value and return the display to either the **Tare?** Or **Sample?** prompt, depending on the operating sequence selected.

5.4.4.7.   Recall of Stored IDs

An ID Table can be enabled in setup to store up to 99 IDs. This is useful if the APW of the part being counted and the tare weight are consistent. Use of the stored values eliminates the taring and sampling process and shows the piece count immediately.

Each part ID is identified by a one- or two-digit ID number, and includes a description, tare weight, APW and (if so configured in setup) an accumulator and counter.

An ID Table record can be recalled by one of two methods:

- If the ID is not known, the record can be found by viewing the ID Table.
- If the ID is known, it can be entered in a Quick Recall sequence.

5.4.4.7.1.   Recall from ID Table

To recall a record from the ID Table:

1. Press the MENU ⓜ key to access the Operator Menu.

2. Select ID Table ⬦ and press ENTER 🔘.

3. The first ID record will be displayed, with a scroll bar to the right.

4. Use the UP and DOWN ⌄ navigation keys to move the view until the desired record is displayed:

   a. Press ENTER 🔘 to select the record and return to the counting application

   b. Press the LEFT ❮ arrow to return to the counting application without selecting a record.

5.4.4.7.2.   Quick ID Recall

When the display is in piece-counting mode, a known ID can be recalled directly:

1. Use the numeric keypad to enter the ID. A **Data:** label will display on line 1 of the display, and the entered number on line 2.

2. Once the ID has been entered, press ID to perform the recall.

3. If the ID is not found in the ID Table, an error message will appear. Clear the message by pressing ENTER. The display will return to the counting mode, using the previous APW value.

5.4.5.   Print Formats

When a demand print is triggered in the Counting application, the terminal will look for a demand connection to one of the ports using template 9. If such a connection exists, then template 9 will be sent out via the selected port. If there is no demand connection using template 9, a "**No demand connection**" error will be displayed.

5.4.5.1.   New Print Fields

Template 9 contains four new data fields related to the Counting application that are not available in the other templates. These new print fields are:

- APW
- Piece Count
- Record ID (from ID Table)
- Record Description (from ID Table)

5.4.5.2.   Default Template

The default structure for template 9 is shown in Figure 5-14. Elements in braces {…} are fields of data supplied by the terminal. Figure 5-15 shows a printed sample of the default template.

{String 1} {New line}
{String 2} {New line}
{Time} {3 spaces} {3 spaces} {Date} {New line}
{Displayed Weight} {New line}
{Piece Count} {New line}
{Record Description} {New line}
{End of template}

Figure 5-14: Default Structure of Template 9

```
Meyer's Hardware
Zurich, Switzerland
16:12:45      Feb 17 2012
   12.20 lb N
450 PCS
4M x 12 Screw
```

Figure 5-15: Print Sample, Default Template 9

This template can be edited, as described in the **Communication** section of **Chapter 3** of this manual, **Configuration > Communication > Templates**.

5.4.5.3.   Report Format

The ID Table Report can be configured as narrow (40 characters) or wide (80 characters) in setup at **Communication > Reports**.

Figure 5-16 details the structure and contents of the ID Table Report in narrow format. Figure 5-17 show the same information for the wide format report.

```
-- ID TABLE REPORT --
12:27:43       15 Feb 2012


01   Blue cups              0.0123 kg
  0.00 kg T        12        318 Pcs
*************************************
02   Red cups               0.0357 kg
  0.00 kg T         8        285 Pcs
*************************************
03   Green cups            0.03466 kg
  0.00 kg T        18        623 Pcs
*************************************


```

Figure 5-16: Example of Printed ID Table Report, Narrow Format

```
-- ID TABLE REPORT --
12:27:43       15 Oct 2010


01   Blue cups               0.0123 kg    0.00 kg T          12        318 Pcs
*******************************************************************************
02   Red cups                0.0357 kg    1.23 kg T           8        285 Pcs
*******************************************************************************
03   Green cups             0.03466 kg    12.5 kg T          18        623 Pcs
*******************************************************************************


```

Figure 5-17: Example of Printed ID Table Report, Wide Format

5.5. Peak Weight Measurement ↑☐

5.5.1. Overview

The Peak Weight Measurement application continuously monitors the change in weight and, when the weight is suddenly reduced (as when a tested product breaks), records and displays the maximum weight measured before failure. This application provides the ability to:

- Display the peak weight result from the current cycle.

- Operate in a single weigh cycle mode.

- Operate in a multiple weigh cycle mode in which multiple transactions are recorded in a sample run. The maximum, minimum and average weight values are recorded over the multiple weigh cycles of the sample run.

When the ⓕ key is pressed from the basic weigh mode the initial Peak Weight Hold display screen will be shown. The ↑☐ icon in the lower left corner indicates the Peak Weight Hold application mode. Pressing the ⓕ key again will return the terminal to display the basic weighing mode.

5.5.2. Operational Features

In addition to the fundamental weighing functions, the following IND246 terminal basic weighing features can also be used within the Peak Weight application.

5.5.2.1. ID

The ID feature can be accessed from either basic weighing mode or from within the Animal Weighing application (by pressing the ID key first). A single ID field is shared between basic weighing and the application.

The ID key ⓘⓓ can be pressed at any time before or during a cycle to enter an identification field to be displayed and/or printed. When pressed, the application display will change to the **ID?** prompt with an entry box at the bottom of the display.

The data is entered the same way as in the basic functionality and pressing ENTER ⏎ accepts the new ID entry and returns the display to the operating application display.

The ID field is shared between the basic weighing mode and the Peak Weight Measurement application. There is only one ID field.

5.5.2.2. Discrete I/O

The IND246 Peak Weight application supports one new discrete input command and two new discrete outputs.

The new input is for **Start Peak Weigh**. This input can be triggered only when the **Press ENTER to start** prompt appears, to begin the peak weighing cycle.

Two discrete outputs are supported – one for **Running** and one for **Cycle Complete**. The **Running** output turns ON after the ENTER key ⏎ is pressed or the **Start Peak Weigh** input is triggered at the

beginning of the peak weight cycle. The **Running** output turns OFF at the end of the peak weight cycle.

The **Cycle Complete** output turns ON at the end of the peak weight cycle when a new peak weight has been determined and the **Running** output turns OFF. This output turns OFF when the ENTER key is pressed and the **Running** output turns ON.

5.5.3. Configuration

The FUNCTION key ⒡ must be programmed for Peak Weight in setup at **Application > Function Key > Assignment** in order for this application to operate and to access the setup steps for the Peak Weight application. When the FUNCTION key is properly programmed, the Peak Weight branch of setup is displayed as shown in Figure 5-18.
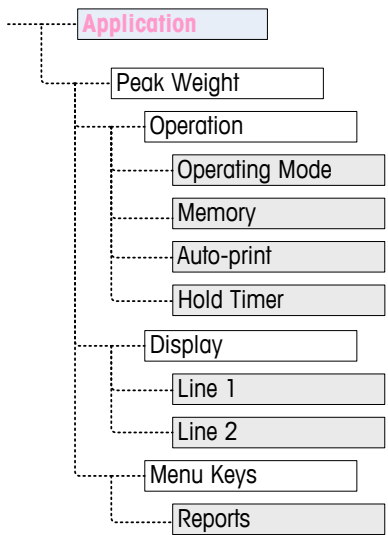
Figure 5-18: Peak Weight Application Configuration Menu

5.5.3.1.   Operation

5.5.3.1.1.   Operating Mode

Operating Mode may be **Gross** (the default) or **Net**. If **Gross** is selected, a semi-automatic zero is automatically performed at the start of the cycle. If **Net** is selected, a tare function is automatically triggered at the beginning of the peak weight cycle.

5.5.3.1.2.   Memory

Memory can be **Disabled** (the default) or **Enabled**. When **Enabled,** the multiple cycle mode will be active to store Minimum, Average and Maximum values in memory. If **Disabled**, each cycle will be independent of other cycles and there will not be any comparisons between the current cycle and previous or future cycles.

5.5.3.1.3.   Auto-print

Auto-print can be **Disabled** (the default) or **Enabled**. This selection overrides the basic weighing Auto-print setting made in setup at **Scale > Log or Print**, when operating within the application.

5.5.3.1.4.   Hold Timer

If Auto print is enabled, this parameter will be shown. The Hold Timer determines the number of seconds that the display will "freeze" at the end of the peak cycle before the automatic print is triggered. Values from **0.0** (no delay) to **9.9** are possible.

5.5.3.2.   Display

5.5.3.2.1.   Line 1

Line 1 of the lower display can be set to display **Status** (the default) or **ID**, or it can be **Disabled**.

5.5.3.2.2.   Line 2

With memory disabled, **Line 2** can be set to display **Transaction #** (the default), or it can be **Disabled**. With memory enabled. **AVG, MAX** or **MIN** values are added to the choices. If **AVG, MAX** or **MIN** is selected, the Cycle # will also display.

5.5.3.3.   Menu Keys

The **Menu Keys** parameter determines whether the Peak Weight **Reports** icon will be accessible from the Operator Menu. By default, Operator access to **Reports** is **Disabled**.

The **Reports** icon provides access to the stored memory values **MIN, AVG** and **MAX** when operating in the memory mode.

5.5.4.   Operating Sequences

Based on the desired operation, each peak weighment can be a separate transaction to determine the peak weight value of a sample or the peak values from several weighments can be recorded and the peak values from these transactions compared. The following two sequences are described in this section:

- Single Weigh Cycle (Memory disabled)
- Multiple Weigh Cycles (Memory enabled)

5.5.4.1.   Single Weigh Cycle

The Single Weigh Cycle is the application's simplest mode. In this mode each peak weight cycle is a separate transaction. No calculation is performed for averages or minimum/maximum values and only transactional prints are created – a printed report is not available.

Begin with the scale empty and the terminal in the Peak Weight application.

1. The display will prompt **Press ENTER to start**.

2. Install the sample to be tested into the test apparatus.

3. If required, a transactional ID may be entered by pressing the ID key ⬤ then enter the ID data in the entry box below. Press ENTER ⬤ when complete.

4. Press ENTER ⬤ or trigger the **Start Peak Weigh** discrete input to begin the peak weigh cycle. The Cycle Complete discrete output turns OFF.

5. If gross mode operation was selected in setup, the terminal will perform a zero function to establish a valid zero reference point. If net mode operation was selected, the terminal will tare any weight on the scale to net zero as a reference point.

6. Line 1 under the weight display will indicate **Running** and the **Running** discrete output will turn ON. As pressure is applied to the sample, the terminal will monitor and display the resulting weight value.

7. Eventually, the sample will break due to the pressure and the weight will be reduced dramatically. The terminal will then display the heaviest weight measured before the sample broke. An asterisk (*) in the left of the display indicates the peak weight shown is not a live scale weight.

8. The status on Line 1 will change to **Cycle complete.** The **Running** discrete output will turn OFF and the **Cycle Complete** discrete output will turn ON.

9. Press PRINT 🖨 to print the resulting weight. If Auto Print is enabled, the terminal will automatically trigger a demand output after the Hold Timer value is exceeded.

5.5.4.2.   Multiple Weigh Cycles

Multiple Weigh Cycle mode is active when Memory is enabled in setup. In this mode, simple statistics are kept over several peak weighing cycles. While each peak weight cycle is still a separate transaction, calculations are done for the average peak weight, the minimum peak weight and maximum peak weight values over multiple cycles, and these statistics are kept in memory. When in the Multiple Weigh Cycle mode, the Peak Weigh process is repeated as many times as there are samples.

Refer to the Single Weight Cycle procedure above for step-by-step operation details.

The **MAX**, **MIN** or **AVG** statistic can be selected to appear in line 2 of the display. If enabled, the value from memory will be shown to the right of the cycle number. The statistics values in memory are updated at the end of each cycle, when the status changes to **Cycle Complete**.

The statistics from the multiple weighing cycles are available for viewing and printing in the Operator Menu (refer to **Memory Operation**, below).

5.5.4.3.   Scale in Motion Error

The zero or tare function at the beginning of the Peak Weigh cycle cannot occur if the scale is not stable. When the Peak Weigh cycle is started, the terminal will wait the programmed amount of time (3, 10 or 30 seconds) for stability. If the scale stabilizes before the end of this timeout, the cycle will continue. If stability is not reached within this time:

- The cycle is aborted.
- A stability error message appears in the system line.
- The **Cycle Complete** output will turn on again.
- The display will return to the **Press ENTER to start.** prompt, and the cycle must be restarted.

5.5.4.4.   Aborting a Peak Weigh Cycle

Press CLEAR ⓒ during a weigh cycle to abort the cycle. The **Running** output turns OFF and a pop-up message will appear, asking for confirmation to abort the cycle.

With **Yes** in focus, press ENTER 🔘 to abort the cycle. The **Cycle Complete** output turns ON and the display returns to the home screen.

🔹 An aborted cycle is **not** added to the memory in a multiple cycle run.

To continue the cycle without aborting, press the LEFT or RIGHT arrow key to change focus from **Yes** to **No**, then press ENTER 🔘. The **Running** output turns ON again and the display continues to update.

5.5.5.   Memory Operation

5.5.5.1.   Viewing Memory

Press MENU Ⓜ to display the Operator Menu for the Peak Weigh application mode.

Focus should be on the REPORTS icon ▭, so press ENTER 🔘 to access the memory view. The Peak Weight Memory screen will appear as seen in Figure 5-19.

To return to the Operator Menu, press the LEFT navigation key. Press the LEFT navigation key again to return to the application home page.

5.5.5.2.   Peak Weight Memory Definition

Figure 5-19 shows the Peak Weight Memory screen. The fields in this screen are updated at the end of each peak weight cycle.
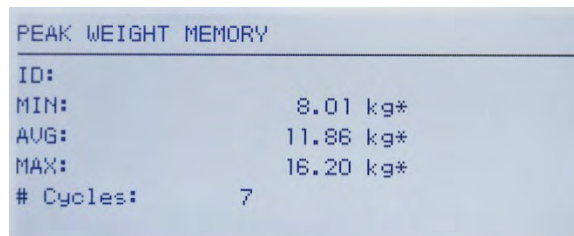
Figure 5-19: Peak Weight Memory Display

- If an **ID** has been entered, it will be shown to the right of the ID label on the display. If the ID field is empty, the data to the right will be blank. The ID field is the standard ID used in the terminal's basic functionality.

- If **Net** mode is active, the weight fields will include a **Net** legend.

- The **MIN** field is the lowest peak weight value in the current multiple-cycle run. When a peak weight cycle completes and the new peak weight is lower than the currently stored value, the new minimum peak weight will replace the previously stored value.

- The **AVG** field is the average of all the peak weight values in the current multiple-cycle run. When a new peak cycle completes, it is averaged with the previous values to generate a new

average value. The value is rounded to the selected display increment size and decimal position.

- The **MAX** field is the highest peak weight value in the current multiple-cycle run. When a peak weight cycle completes and the new peak weight is higher than the currently stored value, the new peak weight will replace the previously stored value.

- The **# Cycles** field indicates the number of transactions that have occurred since memory was cleared last (refer to Clearing Memory on page 5-35). This value indicates the number of transactions used in calculating the values shown on the Peak Weight Memory display.

5.5.5.3.   Printing Memory

With the **Peak Weight Memory** screen displayed, press PRINT ⊡ to trigger an output of the report. Refer to the Report Format section later in this section for details of the printed Print Formats.

■ The memory is not automatically cleared after printing – it must be cleared manually after printing.

■ A connection for Reports is required to print the report.

5.5.5.4.   Clearing Memory

1. While viewing the Peak Weight Memory screen (Figure 5-19), pressing the CLEAR key ⊙ will trigger an operator message requesting confirmation to clear the memory.

2. With **Yes** in focus, press ENTER ⊡ to clear the memory and return the display to the memory view with all values reset.

3. To exit without clearing the memory, press the LEFT or RIGHT arrow keys to move focus to **No**, then press ENTER ⊡ to clear the message pop-up and return to the report view.

4. To return to the Operator Menu, press the LEFT navigation key. Press the LEFT navigation key again to return to the application home page.

5.5.6.   Print Formats

When a demand print is triggered in the Peak Weigh application, the terminal will look for a demand connection to one of the ports using template 7. If such a connection exists, then template 7 will be sent out the selected port. If there is no demand connection using template 7, a "No demand connection" error will be displayed.

5.5.6.1.   New Print Fields

Template 7 contains five data fields related to the Peak Weigh application that are not available in the other print templates. These new data fields are:

- # of Cycles
- Average Weight
- Maximum Weight
- Minimum Weight
- Peak Weight

5.5.6.2.   Default Template

The default template for template 7 is shown in Figure 5-20. Elements in braces {…} are fields of data supplied by the terminal. Figure 5-21 shows an example of the printed default template.

{Print String 1} {New Line}

{Print String 2} {New Line}

{Time} {3 spaces} {3 spaces} {Date} {New Line}

{Transaction #} {New Line}

{ID} {New Line}

{Peak Weight} {Print string 5} {New Line}

{End of template}

Figure 5-20: Default Structure of Template 7

Figure 5-21 shows an example of a print created from Template 7. In this case, the strings included in the template's first two rows have been customized.

```
Acme Materials Lab
Upper Arlington, OH 43085
16:12          Mar 17 2012
000025
#12 Briquette
   62.15 lb Peak Weight
```

Figure 5-21: Print Sample, Default Template 7

5.5.6.3.   Report Format

The Peak Weigh Multiple-Cycle report is a fixed-width format. The selection in setup for the width of the report as narrow (40 characters) or wide (80 characters) has no effect on the report. The Header and Footer setup steps are used for this report.

Figure 5-22 shows an example of a printed report.

```
 -- PEAK WEIGHT REPORT --
02:57 PM      Jan 16 2012

#12 Brick         Cycles: 2
MIN:    88.40 lb*
AVG:   102.75 lb*
MAX:   117.10 lb*
```

Figure 5-22: Example of Peak Weight Report

5.6.   Vehicle Weighing

■ An SD memory card must be installed in the terminal in order to run the Vehicle Weighing application.

5.6.1.   Overview

The IND246 Vehicle Weighing application provides two modes of operation to support Temporary Tare and Permanent Tare storing, retrieving and printing.

An icon at the lower left corner of the display indicates which of the two modes is active:

Temporary Tare Weighing

Permanent Tare Weighing

Either or both of these modes can be enabled in setup. If both modes are enabled, pressing FUNCTION ⓕ once puts the terminal in Temporary Tare weighing mode and the temporary tare icon will be shown in the lower left corner of the display. A second press accesses Permanent Tare weighing and the Permanent Tare icon will be shown. After the last enabled mode is displayed, the next press of the FUNCTION key ⓕ returns the terminal to the basic weighing mode.

The printing of vehicle weights without use of the storage/recall process is supported in the basic weighing mode. This is sometimes called Quick Print or Transient print, which simply prints gross vehicle weights.

5.6.1.1.   Temporary Tare Weighing

Temporary Tare functionality is a two-pass mode that uses the Temporary ID table to store the weight from an inbound transaction. If required, the terminal can automatically assign a temporary two-digit ID. Alternatively, the ID can be assigned manually.

When the vehicle returns to the scale for the outbound transaction, the system recalls the previously stored weight associated with the vehicle's ID, and the vehicle's net weight calculated. Once the outbound ticket is printed, the Temporary Tare record is cleared from the table.

5.6.1.2.   Permanent Tare Weighing

In this mode, the known tare weight for a vehicle is stored in the Permanent ID table, making one-pass weighing possible. When the full vehicle is on the weighing platform, the stored tare weight is recalled from memory by ID and an outbound process triggered.

New Permanent ID records can be created either by direct entry in setup or with an initial stored tare weight of zero. During the first transaction involving this vehicle, it will be weighed twice, once empty and once full, and the actual tare weight determined and updated to the record.

The Permanent ID table can be configured to accumulate total weights for trucks in a fleet of known vehicles.

5.6.2. Operational Features

In addition to the fundamental weighing functions, the following IND246 terminal basic weighing features can also be used within the Vehicle Weighing application.

5.6.2.1. ID Entry

If an ID value is entered in the basic weighing mode, it remains available for printing when in the Vehicle application. However, within the Vehicle application the ID function is used only to retrieve records from the Permanent ID table or the Temporary ID table.

5.6.2.2. Net Sign Correction

When enabled (in setup at **Scale > Tare > Types**), Net Sign Correction allows the IND246 to be used for both shipping (inbound empty) and receiving (inbound loaded) operations and always display a positive net weight. If net sign correction is disabled in setup, any stored weight value in the tare register is assumed to be a tare regardless of the gross weight present on the scale at the time of the final transaction. In this case, if the stored weight is actually the gross weight, the net value can be negative.

With net sign correction enabled, if the stored weight is larger than the weight on the scale, the terminal will treat the larger weight as the gross weight and the smaller weight as the tare weight, so that the difference will always result in a positive net weight.

5.6.2.3. Target Table Import and Export

The METTLER TOLEDO IND246 File Transfer Tool (FTT) program, included on the IND246 Resource CD-ROM, runs on a PC to exchange application files and tables with the IND246 terminal. Refer to the User's Guide of the File Transfer Tool for details.

5.6.3. Configuration

The FUNCTION key F must be programmed for Vehicle Weighing in setup at **Application > Function Key > Assignment** in order for this application to operate and to access the setup steps for the Vehicle Weighing application. When the FUNCTION key F is properly programmed, the Vehicle Weighing branch of setup is displayed as shown in Figure 5-23.
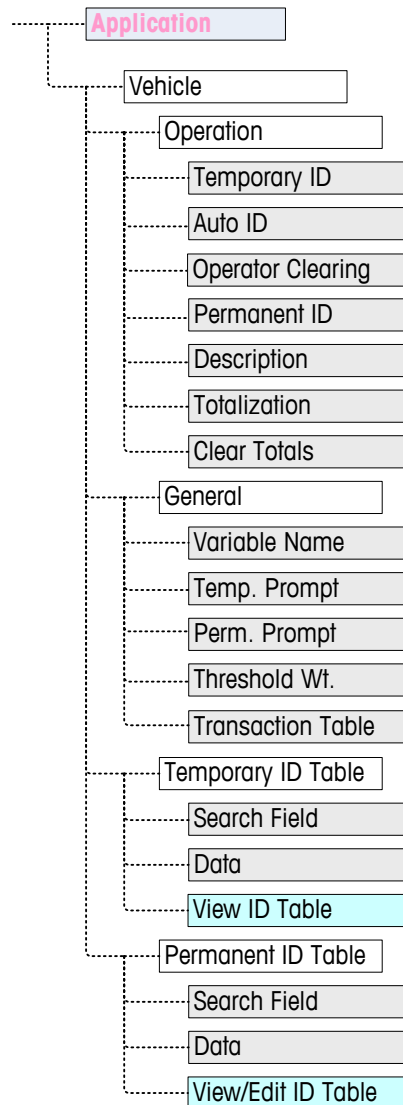
Figure 5-23: Vehicle Application Configuration Menu

5.6.3.1.   Operation

The application can be configured with both Temporary and Permanent ID modes enabled. By default, Temporary ID is enabled and Permanent ID disabled.

5.6.3.1.1.   Temporary ID

Can be **Enabled** (the default) or **Disabled**. When **Enabled**, the Temporary Tare mode will be accessible via the FUNCTION key allowing the terminal to store a weight value in the Temporary ID Table for each inbound vehicle.

5.6.3.1.2.   Auto ID

Auto ID is shown only if **Temporary ID** is **Enabled**. This setting can be **Enabled** or **Disabled** (the default). When **Auto ID** is **Enabled**, a 2-digit numeric ID will automatically be assigned to an inbound vehicle on the first pass of its weighing cycle.

5.6.3.1.3.   Operator Clearing

Operator Clearing is shown only if **Temporary ID** is **Enabled**. This setting can be **Enabled** or **Disabled** (the default). When **Operator Clearing** is **Enabled**, Temporary ID records can be cleared when viewed from the Operator Menu. If this step is **Disabled**, Temporary ID records can only be deleted from within setup.

5.6.3.1.4.   Permanent ID

Can be **Enabled** or **Disabled** (the default). When **Enabled**, the Permanent Tare mode will be accessible via the FUNCTION key and the terminal will allow permanent tare values to be entered into the Permanent ID table.

5.6.3.1.5.   Description

Description appears only if **Permanent ID** mode is **Enabled**, and can be **Disabled** (the default) or **Enabled**. When enabled, a **Description** entry field is available in setup for each Permanent ID record that can be printed in the outbound template.

5.6.3.1.6.   Totalization

Totalization appears only if **Permanent ID** mode is **Enabled**, and can be **Disabled** (the default) or **Enabled**. If enabled, the net weight for each Permanent Tare outbound transaction will be added to the totals value for that Permanent ID.

5.6.3.1.7.   Clear Totals

Clear Totals is available in Permanent ID mode only if **Totalization** is **Enabled**. It may be set to **Automatic** (the default), **Manual** or **Disabled**.

In **Automatic** mode, the count and total values are automatically cleared after printing a Permanent ID Table report. If **Manual** is selected, the CLEAR key can be pressed after printing the report to clear the count and total values. If **Disabled** is selected, the count and total values of each record have to be individually reset to zeroes while editing the records in the Permanent ID table view inside setup.

5.6.3.2.   General

5.6.3.2.1.   Variable Name

The **Variable Name** field allows entry of a 20 character prompt to be used on the display when prompting for entry of the variable data field. The same variable is used for both Temporary Tare and Permanent Tare operating modes. The default value is **Var?.**

5.6.3.2.2.   Temp. Prompt

This step determines when in the Temporary Tare inbound/outbound sequence the variable should be prompted. It can be **Disabled** (the default), or set to **Inbound** or **Outbound**. If it is not **Disabled**, the **Variable Name** prompt is displayed either during the Inbound or Outbound pass of a Temporary Tare transaction, and the entered data is available for printing in the resulting ticket.

5.6.3.2.3.   Perm. Prompt

This step determines if the variable prompt is shown in a Permanent Tare outbound sequence. It can be **Disabled** (the default), or set to **Outbound**. If it is set to **Outbound**, the **Variable Name**

prompt is displayed during the Permanent Tare transaction, and the entered data is available for printing in the resulting ticket.

5.6.3.2.4.   Threshold Wt.

When the weight on the scale exceeds the **Threshold Weight**, the **ID?** prompt or Auto ID (if enabled) is automatically triggered. An inbound or outbound weighing process cannot start until the weight exceeds this value.

5.6.3.2.5.   Transaction Table

The Transaction Table can be **Disabled** (the default) or **Enabled**. If **Enabled**, this table records information about each transaction up to 10,000 transactions. A pop-up message will warn that the table is nearly full after59,500 transactions have been recorded. At this point, only 500 more transactions can be recorded before a "**Transaction table now full**" message appears, and the table must be exported and cleared.

5.6.3.3.   Temporary ID Table

Selecting the Temporary Tare ID table branch of the menu tree opens a **TEMP ID SEARCH** screen. Here, search parameters (field and data value) can be entered to narrow a search of the whole table. Once the parameters are set, move focus to Start and press ENTER 🔘 to carry out the search and display the first Temporary ID record. Records are listed in the order in which the terminal stores them, and each will include **ID**, **Weight**, the entered **Variable** data (if enabled), **Time** and **Date**.

The UP and DOWN arrow keys scroll through the records, with one record displayed per screen. Only the CLEAR key 🔘 functions in this screen.

5.6.3.3.1.   Delete Record or All Records

To delete a currently displayed Temporary Tare ID record, press the CLEAR key 🔘 . A prompt of **Delete record?** Will be shown with **Yes** in focus. To delete the record, press ENTER 🔘 . To keep the record or to prompt for deletion of all records, change focus to **No** with the LEFT ◀ or RIGHT arrow keys and press the ENTER key 🔘 .

The display will prompt **Delete all records?** with a selection of **Yes** in focus. To delete all records, press ENTER 🔘 . To keep all records, change the focus to NO with the LEFT ◀ or RIGHT arrow keys and press the ENTER key 🔘 .

5.6.3.4.   Permanent ID Table

Selecting the Permanent Tare ID table branch of the menu tree opens a **PERM. ID SEARCH** screen. Here, search parameters (field and data value) can be entered to narrow a search of the whole table. Once the parameters are set, move focus to Start and press ENTER 🔘 to carry out the search and display the first Permanent Tare record. Records are shown in the order they were entered and, depending on which features are enabled, each will include **ID**, **Description, Tare** weight, the entered **Variable** data, and values for **Count** and **Total**.

The UP and DOWN arrow keys scroll through the records, with one record displayed per screen. The following keys are functional in this screen:

Key	Function
ID ID	Used to begin entry of a new ID record.
C CLEAR	Deletes the displayed record. A security prompt is displayed. Can also delete all records in the table by following prompts.
ENTER	Selects the displayed record for editing of any of the fields.

5.6.3.4.1.   New Record

Press the ID button ID to start creating a new record. The PERMANENT ID NEW screen permits the entry of an **ID**, **Description***, **Tare** weight and unit, **Variable***, **Count*** and **Total***. Items marked with an asterisk * appear only if enabled in setup. When the record is complete, press the LEFT arrow key ‹ to exit the entry screen.

5.6.3.4.2.   Delete Record or All Records

To delete a currently displayed Permanent Tare ID record, press the CLEAR key C . A prompt of **Delete record?** Will be shown, with **Yes** in focus. To delete the record, press ENTER . To keep the record or to prompt for deletion of all records, change focus to **No** with the LEFT or RIGHT arrow keys and press the ENTER key .

The display will prompt **Delete all records?** with a selection of **Yes** in focus. To delete all records, press ENTER . To keep all records, change the focus to NO with the LEFT or RIGHT arrow keys and press the ENTER key .

5.6.3.4.3.   Edit Record

To edit an existing record, press the ENTER key and the data fields for that record will be shown. The PERMANENT ID EDIT screen permits editing of the **ID**, **Description***, **Tare** weight and unit, **Variable***, **Count*** and **Total*** fields. Items marked with an asterisk * appear only if enabled in setup. When editing of the record is complete, press the LEFT arrow key ‹ to exit the edit screen and save the record.

5.6.3.4.4.   Clearing Totals for an Individual Record

If Totals are enabled for the Permanent ID Table, they can be cleared in one of three ways:

- Automatically, after a report is printed
- Manually, by pressing CLEAR after a report is printed
- Manually, by editing the values in each record in the table and entering values of 0 for the counter and total fields.

5.6.4.   Operating Sequences

The following sections describe the two modes of operation of the Vehicle application:

- Temporary Tare
- Permanent Tare

5.6.4.1.   Temporary Tare Operation

Begin with the scale empty and the terminal in the Temporary Tare mode of the Vehicle Weighing application. The Temporary Tare icon ⬚T⬚ will be shown in the lower left corner.

5.6.4.1.1.   Inbound Transaction

1. The display will show **Add weight > xxxx** (i.e,. greater than xxxx) where xxxx is the threshold value entered in setup.

2. A vehicle pulls onto the scale and the weight exceeds the threshold value.

3. When a no-motion condition is detected, the display will change to the **ID?** prompt.

4. The alphanumeric identification (ID) for this record to be stored is entered in the entry box below the prompt. This ID will be used later to recall the stored weight. If Auto ID was enabled, a 2-digit ID will automatically be assigned by the terminal. This ID can be overwritten if desired. When the ID entry is complete, press the ENTER key ⏎ .

5. If enabled in setup, the terminal will prompt for the variable entry. If so prompted, enter the variable transaction data using the alphanumeric keys and press ENTER ⏎ when complete. The variable is a descriptive, printable field which is related to this specific vehicle or vehicle load.

6. The ID, weight and variable information for the inbound transaction is now displayed for confirmation. If the data is correct, press PRINT to generate the inbound transaction. If any of the data is not accurate, press the CLEAR key ⓒ to clear all data and return to the **ID?** prompt.

7. The vehicle weight, variable (if entered), time and date are now stored in the Temporary ID Table (by the ID) and an inbound print is triggered. The Inbound transaction stays on screen for a duplicate print, if required.

🔷 Duplicate print capability is not available if the live weight on the scale deviates from the printed transaction weight by more than 50 divisions.

8. The display returns to its initial state after the duplicate ticket is printed, or when the weight changes more than 50 display divisions.

5.6.4.1.2.   Outbound Transaction

1. The display will show **Add weight > xxxx** (i.e,. greater than xxxx) where xxxx is the threshold value entered in setup.

2. A vehicle which has already been weighed in an inbound transaction pulls onto the scale and the weight exceeds the threshold value.

3. When a no-motion condition is detected, the display will prompt **ID?**.

4. Enter the alphanumeric identification (ID) for this vehicle from the inbound transaction. If Auto ID is enabled, a 2-digit ID will automatically be assigned by the terminal. This ID must be overwritten with the ID from the inbound transaction. The ID can also be recalled by viewing the records in the Temporary ID Table and pressing ENTER ⏎ when the desired record is displayed. When the ID entry is complete, press ENTER ⏎ .

5. If the variable information was entered previously or if variable data is disabled, skip the next step.

6. If enabled in setup, the terminal will prompt for the variable entry. If so prompted, enter the variable transaction data using the alphanumeric keys and press ENTER ⌨ when complete. The variable is a descriptive, printable field which is related to this specific vehicle or vehicle load.

7. The terminal will recall the weight stored during the inbound transaction and display it at the top of the display as **M = xxxxx.** The display will change to the net mode. If net sign correction is enabled, the net weight will be positive even if the inbound weight is larger than the outbound weight. If disabled, the net weight can be negative.

8. The ID, weight and variable information for the outbound transaction is now displayed for confirmation. If the data is correct, press PRINT to generate the outbound transaction. If any of the data is not accurate, press the CLEAR key ⓒ to clear all data and return to the **ID?** prompt.

9. The Temporary ID is cleared from the Temporary ID Table and an outbound print is triggered. The transaction data stays on screen for a duplicate print, if required.

🔹 Duplicate print capability is not available if the live weight on the scale deviates from the printed transaction weight by more than 50 divisions.

10. The display returns to its initial state after the duplicate ticket is printed, or when the weight changes more than 50 display divisions.

5.6.4.1.3. Viewing/Recalling a Temporary Tare Record

Instead of manually entering the ID for the outbound transaction, the ID can be recalled from the Temporary ID Table.

1. When the display is prompting for **ID?,** press the MENU key ⓜ .

2. Focus should be on the Temporary ID Table icon 🆃. If not, move the focus to that icon.

3. Press ENTER to view the first record in the table.

4. Use the UP and DOWN arrow keys to view all the records in the table.

5. When the desired record is displayed, press the ENTER key ⌨ to recall that record.

6. The stored weight and variable (if used) will be recalled to the screen and the display will show the resulting net weight.

7. Complete the transaction by pressing PRINT ⌨ .

5.6.4.2. Permanent Tare Operation

Begin with the scale empty and the terminal in the Permanent Tare mode of the Vehicle Weighing application. The Permanent Tare icon 🆔 will be shown in the lower left corner. In this mode, the tare weight of the vehicle has already been "permanently" stored into the Permanent ID Table so the vehicle only passes over the scale one time.

5.6.4.2.1. Outbound Transaction

1. The display will show **Add weight > xxxx** (i.e,. greater than xxxx) where xxxx is the threshold value entered in setup.

2. A vehicle pulls onto the scale and the weight exceeds the threshold value.

3. When a no-motion condition is detected, the display will prompt **ID?.**

4. Enter the alphanumeric identification (ID) for this vehicle. The ID can also be recalled by viewing the records in the Permanent ID Table and pressing ENTER when the desired record is displayed. When the ID entry is complete, press ENTER.

5. If enabled in setup, the terminal will prompt for the variable entry. If so prompted, enter the variable transaction data using the alphanumeric keys and press ENTER when complete. The variable is a descriptive, printable field which is related to this specific vehicle or vehicle load.

6. The terminal will recall the stored weight from the Permanent ID Table and display it at the top of the display as **M = xxxxx.** The display will change to the net mode. The stored weight must be less than the live scale weight or an error **Tare value greater than live weight.** will be displayed.

7. The ID, weight and variable information for the transaction is now displayed for confirmation. If the data is correct, press PRINT to generate the outbound transaction. If any of the data is not accurate, press the CLEAR key to clear all data and return to the **ID?** prompt.

8. An outbound print is triggered and if enabled in setup, the net weight will be added to the totals for the Permanent ID record. The transaction data stays on screen for a duplicate print, if required.

■ Duplicate print capability is not available if the live weight on the scale deviates from the printed transaction weight by more than 50 divisions.

9. The display returns to its initial state after the duplicate ticket is printed, or when the weight changes more than 50 display divisions.

5.6.4.2.2. Inbound Transaction (Stored Tare of 00)

An inbound transaction for a Permanent Tare is only possible if the original ID record was created in setup with a tare value of "00". In this case, the vehicle must initially pass across the scale two times so the true tare weight can be stored to the table.

1. The display will show **Add weight > xxxx** (i.e,. greater than xxxx) where xxxx is the threshold value entered in setup.

2. A vehicle with a previously stored tare weight of "00" pulls onto the scale and the weight exceeds the threshold value.

3. When a no-motion condition is detected, the display will prompt **ID?**.

4. Enter the alphanumeric identification (ID) for this vehicle. The ID can also be recalled by viewing the records in the Permanent ID Table and pressing ENTER when the desired record is displayed. When the ID entry is complete, press ENTER.

5. The ID, weight and variable information for the inbound transaction is now displayed for confirmation. If the data is correct, press PRINT to generate the inbound transaction. If any of the data is not accurate, press the CLEAR key to clear all data and return to the **ID?** prompt.

6. The actual vehicle weight now replaces the original "00" value in the Permanent ID Table and an inbound print is triggered. The Inbound transaction stays on screen for a duplicate print, if required.

■ Duplicate print capability is not available if the live weight on the scale deviates from the printed transaction weight by more than 50 divisions.

7. The display returns to its initial state after the duplicate ticket is printed, or when the weight changes more than 50 display divisions.

8. When this ID is processed the second time, if the initially stored weight was the gross weight, that stored weight will be replaced with the lower tare value. After this, outbound transactions can be repeatedly performed in a one-pass process.

5.6.4.2.3. Viewing/Recalling a Permanent Tare Record

Instead of manually entering the ID for the outbound transaction, the ID can be recalled from the Permanent ID Table.

1. When the display is prompting for **ID?**, press the MENU key (M).

2. Focus should be on the Permanent ID Table icon ⌷ID. If not, move the focus to that icon.

3. Press ENTER to view the first record in the table.

4. Use the UP and DOWN arrow keys to view all the records in the table.

5. When the desired record is displayed, press the ENTER key (⌂) to recall that record.

6. The stored weight and variable (if used) will be recalled to the screen and the display will show the resulting net weight.

7. Complete the transaction by pressing PRINT (⌂).

5.6.4.3. Table Memory Limits

The IND246 tables each have a limited capacity:

Temporary ID Table	99 records
Permanent ID Table	99 records
Transaction Table	10,000 records

5.6.4.3.1. Temporary and Permanent ID Tables

When the Temporary and Permanent ID tables are full, an attempt to add a new record will cause a pop-up message – **Cannot save record. Table is full** – to display. After this message is acknowledged by pressing (⌂), the operator must then access the table ((M), then ⌷T or ⌷ID) and delete unneeded records.

5.6.4.3.2. Transaction Table

When 3,900 transactions have been recorded, a pop-up message will appear: **Transaction Table almost full**. After this message is acknowledged by pressing (⌂), the table must be exported as a .csv file, and the table cleared. These functions can only be carried out by a user with access to Setup.

■ Do not delete records from a .csv file. Doing so will cause an error when the table is written back to the terminal.

5.6.4.4. Quick Print

Vehicle weighments can be made which are not part of the normal operation of the truck scale, and should not be included in the ID table data and transaction records. For this purpose, the IND246 makes it simple to print a ticket showing the gross weight of a vehicle on the scale.

To use Quick Print:

8. Press the FUNCTION key ⒡ once (or twice, if both Temporary and Permanent ID modes are enabled) to return to basic weighing mode.

9. If an ID string is to be included in the transaction, press the ID key ⒤ᴅ, then use the alphanumeric keypad to enter the string and press ENTER ⏎.

10. Press PRINT ⎙.

11. A demand output will be triggered with the selected template format.

12. To return to the Vehicle application, press the FUNCTION key ⒡.

5.6.5. Print Formats

When a demand print is triggered in the Vehicle Weighing application, the terminal will look for a demand connection to one of the ports using templates 4 and 5. If such a connection exists, then either template 4 (inbound) or template 5 (outbound) will be sent out the selected port. If there is no demand connection using template 4 and 5, a "No demand connection" error will be displayed.

5.6.5.1.   New Print Fields

Templates 4 and 5 contain nine data fields related to the Vehicle application that are not available in the other print templates. These new data fields are:

- Transaction Date
- Transaction Time
- Transaction Type
- Variable
- Vehicle Description

- Vehicle Gross
- Vehicle ID
- Vehicle Net
- Vehicle Tare

5.6.5.2.   Default Template

The default format for template 4 is shown in Figure 5-24. Elements in braces {…} are fields of data supplied by the terminal.

{String 1} {New Line}
{String 2} {New Line}
{String 3} {New Line}
{Transaction Time} {3 spaces} {Transaction Date} {New Line}
{Transaction #} {10 spaces} {Transaction Type} {New Line}
{Vehicle ID} {New Line}
{Variable } {New Line}
{Vehicle Gross} {New Line}
{End of Template}

Figure 5-24: Default Structure of Template 4 – Inbound

Figure 5-25 shows an example of the inbound template's print output, with the strings customized.

```
Jones Inc. Recycle Center
Upper Arlington, OH 43085
   -- INBOUND --
15:24:33     May 17 2010
0000018          Temporary
ID: BMR-4399
Copper Pipe
   24360 lb
```

Figure 5-25: Print Sample, Default Template 4

Figure 5-26 and Figure 5-27 show the structure and printed output, respectively, of the outbound template 5.

{String 1} {New Line}

{String 4} {New Line}

{Transaction Time} {3 spaces} {Transaction Date} {New Line}

{Transaction #} {10 spaces} {Transaction Type} {New Line}

{Vehicle ID} {New Line}

{Vehicle Description} {New Line}

{Variable } {New Line}

{Vehicle Gross} {New Line}

{Vehicle Tare} {New Line}

{Vehicle Net} {New Line}

{End of Template}

Figure 5-26: Default Structure of Template 5 – Outbound

In the {Vehicle Tare} field, **PT** indicates that a stored tare value was used. If the tare value is the live scale weight, the label will be **T**.

```
Jones Inc. Recycle Center
   -- OUTBOUND --
16:12:45     May 17 2010
000194          Permanent
ID: BMR-4399
Beckman Trucking
Copper Pipe
   87520 lb
   24360 lb T
   63160 lb N
```

Figure 5-27: Print Sample, Default Template 5

5.6.5.3.   Report Format

The Temporary Tare ID Table and the Permanent Tare ID Table can be configured for either narrow (40 characters) or wide (80 characters) in setup at **Communication > Reports**. The examples shown here include a header line, asterisk separators, and three footer lines.

Figure 5-28 details the structure and contents of the Permanent ID Report in narrow format. Figure 5-29 shows the same information for the wide format report.

```
-- TEMPORARY ID REPORT --
12:27:43   16 Feb 2012

ABC-1234
   18460 lb    9:24:16   16 Feb 2012
Copper Pipe
**************************************
XYZ-2468
   14800 lb    9:28:41   16 Feb 2012
Copper Wire
**************************************
FGH-1357
   15220 lb   10:09:32   15 Feb 2012
Stainless Steel
**************************************
```

Figure 5-28: Example of Temporary ID Report, Narrow Format

```
-- TEMPORARY ID REPORT --
12:29:31   16 Feb 2012


ABC-1234              18460 lb    9:24:16   16 Feb 2012   Copper Pipe
*************************************************************************
XYZ-2468              14800 lb    9:28:41   16 Feb 2012   Copper Wire
*************************************************************************
FGH-1357              15220 lb   10:09:32   15 Feb 2012   Stainless Steel
*************************************************************************
```

Figure 5-29: Example of Temporary ID Report, Wide Format

5.6.5.3.2.   Permanent ID Report

Figure 5-30 details the structure and contents of the Permanent ID Report in narrow format. Figure 5-31shows the same information for the wide format report.

```
-- PERMANENT ID REPORT --
12:34:55   16 Feb 2012


BRM-3885
Robert Ledo Inc. Red 567
   18460 lb   n: 7      Total:  102640
Copper Pipe
**************************************
JFB-4850
Sam's Hauling Black 12
   14800 lb   n: 32     Total:  293820
Copper Wire
**************************************
BJA-5896
APEX Trucking Grn 877
   21080 lb   n: 49     Total:  649980
Stainless Steel
**************************************
```

Figure 5-30: Example of Permanent ID Report, Narrow Format

```
-- PERMANENT ID REPORT --
12:36:16   16 Feb 2012


BRM-3885         Shaik Inc. Red 567        18460 lb
n: 7      Total:    102640   Copper Pipe
****************************************************************************
JFB-4850         Iqbal's Hauling           14800 lb
n: 32     Total:    293820   Copper Wire
****************************************************************************
BJA-5896         APEX Trucking             18460 lb
n: 49     Total:    649980   Stainless Steel
****************************************************************************
```

Figure 5-31: Example of Permanent ID Report, Wide Format

6 Service and Maintenance

The IND246 terminal is designed to provide years of dependable operation. However, METTLER TOLEDO recommends that – as with any industrial measurement equipment – the terminal and the connected scale system be serviced periodically. Timely, factory-specified maintenance and calibration by a METTLER TOLEDO authorized service technician will ensure and document accurate and dependable performance to specifications.

6.1. Cleaning and Maintenance

Clean the terminal's keypad and cover with a clean, soft cloth that has been dampened with a mild glass cleaner. Do not use any type of industrial solvent such as toluene or isopropanol (IPA) that could damage the terminal's finish. Do not spray cleaner directly on the terminal.

Regular maintenance inspections and calibration by a qualified service technician are recommended. The IND246 terminal is a rugged instrument; however, the front panel is a relatively thin covering over sensitive electronic switches and a lighted display. Care should be taken to avoid any punctures to this surface or any vibrations or shocks to the instrument. If the front panel is punctured, ensure that steps are taken to prevent dust and moisture from entering the unit until the terminal can be repaired.

6.2. Service

Only qualified personnel should perform installation, programming, and service. Please contact a local authorized METTLER TOLEDO representative for assistance.

METTLER TOLEDO recommends periodic preventative maintenance to the terminal and scale system to ensure reliability and to maximize service life. All measurement systems should be periodically calibrated and certified as required to meet production, industry and regulatory requirements. We can help you maintain uptime, compliance and quality system documentation with periodic maintenance and calibration services. Contact your local METTLER TOLEDO authorized service organization to discuss your requirements.

	⚠ **WARNING**
	ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THE TERMINAL. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

6.3.   Battery Operation

NOTICE
NIMH BATTERIES SLOWLY DISCHARGE WHEN NOT USED (FOR EXAMPLE WHEN STORED FOR FUTURE USE). BATTERY OPERATED TERMINALS AND SPARE NIMH BATTERY PACKS IN STORAGE MUST BE FULLY CHARGED EVERY THREE MONTHS TO PREVENT PERMANENT BATTERY DAMAGE.

The length of time that the IND246 will operate on a fully charged battery depends on the number of load cells connected, and the options installed in the IND246 terminal. Powering multiple load cells and using the backlight will greatly reduce battery operating time. Table 6-1 lists the average expected operating time provided by a new IND246 battery pack, based on backlight usage and the number of load cells and options.

Table 6-1: Expected Battery Life

Continuous Operation Load	Battery Life with Backlight	Battery Life without Backlight
1- 350Ω cell, no options	21.5 hrs	49 hrs
1 – 350Ω cell, COM2/DIO option	12.5 hrs	19 hrs
4 – 350Ω cells, no options	17. 5 hrs	32 hrs
4 – 350Ω cells, COM2/DIO option	11 hrs	15.5 hrs

As a battery pack ages, its power storage capability diminishes, which reduces the times indicated in Table 6-1.

6.3.1.   Specifications

The specifications for the 72253419 battery pack are shown in Table 6-2.

Table 6-2: Battery Pack Specifications

Item	Value
Voltage	7.2Vdc
Capacity	4300 mAh
Standard Charging	900 mA for 10 hours
Maximum Charging Rate	1800 mA
Maximum Charging Voltage	9Vdc

For optimal battery performance, operate the IND246 with internal battery at an ambient temperature in the range of 10°C to 30°C (50°F to 86°F). This applies to discharging as well as charging the battery.

6.3.2.   Battery Status Icon

The IND246 terminal provides a battery status icon in the upper left corner of the display to indicate the amount of power remaining in the NiMH battery pack. Table 6-3 indicates what each icon means.

Table 6-3: Battery Status Icon

Graphic	Battery Condition
	Full charge
	Most power remaining
	Getting low
	Low
	Extremely low

NOTICE

NIMH BATTERIES SLOWLY DISCHARGE WHEN NOT USED (FOR EXAMPLE WHEN STORED FOR FUTURE USE). BATTERY OPERATED TERMINALS AND SPARE NIMH BATTERY PACKS IN STORAGE MUST BE FULLY CHARGED EVERY THREE MONTHS TO PREVENT PERMANENT BATTERY DAMAGE.

When the remaining battery power reaches the "extremely low" threshold, a warning message will appear in the top line of the display, indicating that the battery is getting low. The same warning message will appear each time the terminal is powered ON. If the battery is not charged and the voltage drops lower a second, "Urgent," warning message will appear and the terminal will turn itself off after approximately 1 minute, to prevent damage to the battery. For continued operation, the battery must be recharged or a fully charged battery must be installed.

6.3.3. Accessing the Battery Pack

The 72253419 battery pack cannot be charged inside the IND246 terminal. The battery pack must be removed from the terminal and charged using an external 72253420 battery charger.

⚠ **CAUTION**

THE BATTERY USED IN THIS DEVICE MAY PRESENT A RISK OF FIRE OR CHEMICAL BURN IF MISTREATED. DO NOT CRUSH, DISASSEMBLE, HEAT ABOVE 60°C OR INCINERATE. REPLACE BATTERY WITH 72253419 ONLY. USE OF ANOTHER BATTERY MAY PRESENT A RISK OF BURN, FIRE OR EXPLOSION.

6.3.3.1.   To Remove the Battery Pack:

1.   The round battery cover is on the right side of the terminal. Turn the cover ¼ turn counter-clockwise until the handle is vertical.

2.	Remove the cover by pulling it out of the terminal.

Note the tabs on the battery cover.

3.	Pull out the wire handle and use it to remove the battery from its housing.

6.3.3.2.	To Reinstall the Battery pack:

1.	Insert a fully charged battery pack into the battery cavity with the wire handle toward the outside of the terminal. Align the flat side of the battery with the flat side of the cavity, as indicated at left.

The battery pack should slide easily into the battery cavity. Do not force it into its housing – if it is hard to insert, check for proper alignment of the flat side of the battery to the flat side of the battery cavity.

2.	When the battery is fully inserted, the end of the battery will be approximately 20mm (3/4") inside the enclosure. When it is fully inserted, fold the wire handle over to allow space for the cover.

3.	Install the battery cover by aligning its tabs with the slots inside the battery cavity – the handle will be vertical. When it is fully inserted, the cover should be flush with the outside of the terminal.

4.	Turn the cover ¼ turn clockwise so the handle is horizontal. The cover is now locked in place.

■ **Note**: To maintain the terminal's IP66 rating, make sure that the battery cover is completely closed and the handle is horizontal. If the battery cover is not fully tightened, dusts or liquids can enter the terminal enclosure and cause damage.

6.3.4. Charging the Battery Pack

NOTICE

NIMH BATTERIES SLOWLY DISCHARGE WHEN NOT USED (FOR EXAMPLE WHEN STORED FOR FUTURE USE). BATTERY OPERATED TERMINALS AND SPARE NIMH BATTERY PACKS IN STORAGE MUST BE FULLY CHARGED EVERY THREE MONTHS TO PREVENT PERMANENT BATTERY DAMAGE.

The 72253419 NiMH battery pack should only be charged using METTLER TOLEDO 72253420 battery charger. This charger is designed specifically for the IND246 battery pack. The charger can be laid on a flat surface or mounted to a vertical surface, as shown in Figure 6-1. Install the charger in the orientation best suited for the application. Allow enough space at the bottom of the charger to connect the detachable line cord.

The battery charger will fully recharge the battery pack in approximately 10 hours. After it is fully charged, the battery can be left in the charger without being damaged.

Charger on Flat Surface   **Charger Mounted Vertically**

Figure 6-1: Battery Charger Mounting

⚠ **WARNING**

THE BATTERY USED IN THIS DEVICE MAY PRESENT A RISK OF FIRE OR CHEMICAL BURN IF MISTREATED. DO NOT CRUSH, DISASSEMBLE, HEAT ABOVE 60°C OR INCINERATE. REPLACE BATTERY WITH 72253419 ONLY. USE OF ANOTHER BATTERY MAY PRESENT A RISK OF BURN, FIRE OR EXPLOSION.

NOTICE

DO NOT ATTEMPT TO CHARGE THE BATTERY IF THE BATTERY TEMPERATURE IS BELOW 0°C (32°F). CHARGING IS NOT POSSIBLE AT OR BELOW THIS TEMPERATURE. DO NOT OPERATE THE BATTERY CHARGER OUTSIDE ITS TEMPERATURE RANGE OF 0°C (32°F) TO 40°C (104°F).

6.3.4.1.   Charging Procedure

NOTICE

NIMH BATTERIES SLOWLY DISCHARGE WHEN NOT USED (FOR EXAMPLE WHEN STORED FOR FUTURE USE). BATTERY OPERATED TERMINALS AND SPARE NIMH BATTERY PACKS IN STORAGE MUST BE FULLY CHARGED EVERY THREE MONTHS TO PREVENT PERMANENT BATTERY DAMAGE.

---

1. Unplug the battery charger from AC power.

2. Make certain no debris has fallen into the opening of the battery socket on the charger. If debris is present in the battery socket, remove it before inserting the battery pack.

3. Insert the battery pack into the charger, noting that the flat side of the battery pack aligns with the flat side of the battery socket.

4. Do not force the battery pack into the charger. It should slide easily into the socket.

5. When fully inserted, about 2/3 of the battery will extend out of the battery socket, as shown in Figure 6-2.

Figure 6-2: Battery Pack in Charger

6. Plug the line cord into AC power.

7. The red LED should illuminate indicating that the fast charge cycle is underway.

8. When the battery pack is almost fully charged, the red LED will go out and a green Led will be shown.

9. The charger will continue to provide a small "trickle" charge to the battery until the battery is removed.

10. When charging is complete, remove the battery pack from the charger and reinstall into the IND246 terminal, as described above.

6.3.5.   Disposing of a Depleted Battery Pack

As a result of normal use over a period of time, the available power in the 72253419 NiMH battery pack will be reduced and it will lose its ability to power the IND246 terminal for an extended time. When this occurs, the battery pack should be replaced with a new battery pack and the original battery pack must be disposed of.

	⚠ **CAUTION**
	DISPOSE OF USED BATTERY PROMPTLY. KEEP AWAY FROM CHILDREN. DO NOT DISASSEMBLE AND DO NOT DISPOSE OF IN FIRE.

Follow local laws and regulations regarding the disposal of the NiMH battery pack.

6.4. Troubleshooting

Troubleshooting activities described here are to assist in identifying whether the problem is in the IND246 terminal or has an external cause.

- Blank Display
- On/Off Key Test
- Power Test
- Coin Cell Battery Test
- Problem Diagnosis
- Error Codes and Error Messages
- Internal Diagnostic Testing

6.4.1. Blank Display

If the display on the IND246 terminal appears to be blank, first confirm if the display is actually blank or if the backlight is simply off or if the contrast adjustment is incorrect. Even with the backlight off or a poor contrast setting, changing weight digits should still be barely visible with a change in weight.

If changing weight digits can still be seen, check the contrast and backlight settings in setup. Moving the terminal to a very bright environment may help to navigate setup easier.

If no changing digits can be seen, proceed to the Power Test.

6.4.2. Power Test

There are two different power tests – one for the AC powered terminal, one for the battery powered model. These tests are described in the next two sections.

6.4.2.1. Battery Power Test

On battery powered IND246 terminals, if the battery voltage is below a minimum limit, the terminal may not attempt to turn on when the On/Off key is pressed.

Refer to the Battery Status Icon section for details about battery power status.

6.4.2.2.   AC Power Test

6.4.2.2.1.   Analog Version

On AC powered analog IND246 terminals, if the display is blank or if intermittent problems are occurring, the condition of the AC power source should be checked. Use a multi-meter to check that the AC input power is within −15% to +10% of the standard 100–240 VAC voltage range.

Begin by checking the AC power at the source. If no AC power is present, have a qualified electrician at the site restore power at the source. After power is restored, test the IND246 for correct operation.

6.4.3.   Problem Diagnosis

The following chart lists a few potential symptoms and some suggestions for resolving the issue. Use qualified electricians to test for problems with the AC power source. If a problem that is not listed in Table 6-4 occurs, or if the suggested fix does not resolve the problem, contact an authorized METTLER TOLEDO service representative for assistance.

Table 6-4: Symptoms and Suggested Fixes

Symptom	Suggestion
Display is blank	1. Check backlight and contrast settings. 2. Confirm On/Off key is functional. 3. Confirm source of AC power is OK or confirm battery is fully charged. 4. Contact service representative.
Display on but weight does not change	1. Check wiring to load cell. Look for broken wires, open connections or mis-wiring. 2. Contact service representative.
No serial port communications	1. Use serial diagnostics section of Maintenance block of setup to determine if the problem is internal or external to the terminal. 2. Contact service representative.
Discrete inputs or outputs don't operate	1. Use the discrete input and output diagnostics section of the Maintenance block of setup or the DIO status display on the system line to determine if the problem is internal or external to the terminal. 2. Contact service representative.

6.4.4.   Error Codes and Error Messages

The IND246 terminal uses a combination of error codes and error messages to indicate error conditions that occur in the terminal. A list of possible error codes is given in Table 6-5.

Table 6-5: Error Code List

Error Code	Description
Err 0001	An approval region has been enabled and the W&M switch is off
Err 0002	This setup parameter cannot be changed while terminal is approved
Err 0003	Increment size will be reset due to scale capacity change
Err 0004	In multiple range mode, programmed capacity for range 2 must be greater than the programmed capacity for range 1

Error Code	Description
Err 0005	Capacity value exceeds limit
Err 0006	Calibration weight exceeds range
Err 0007	GEO value exceeds limit
Err 0008	Illegal capacity value
Err 0009	In multiple range mode, range 2 increment / range 1 increment must be < 50

Error messages will be shown on the top line of the display and will overwrite the DIO status or time and date information if they have been enabled in setup. After the message is cleared, the display reverts to the previous data shown before the error was detected. An example of an error message display is given in Figure 6-3 and the possible error messages are listed in Table 6-6 with a brief description of the error.
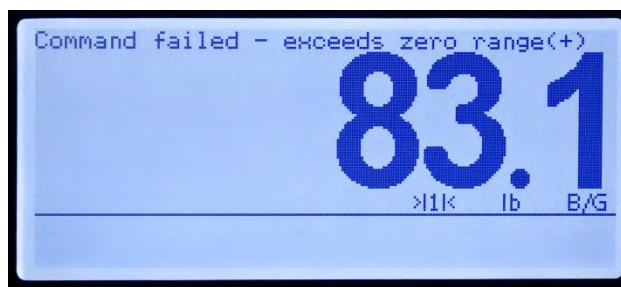
Figure 6-3: Error Message Display

Table 6-6: Error Codes, Analog Version

Error Message	Description
Input string illegal	An alpha-numeric value was entered where only a numeric value is valid
Preset tare failed	
Command failed - . . .	
exceeds capacity limit	Unit switching would result in a value too large to display
exceeds zero range (+)	ZERO key pressed and weight is above capture range
exceeds zero range (-)	ZERO key pressed and weight is below capture range
illegal scale mode	ZERO key pressed while terminal is in net mode
illegal tare value	
invalid increment value	
invalid tare function	
invalid zero function	
keypad tare disabled	A preset tare was attempted while the keypad tare function is disabled
motion	Scale motion inhibited completion of command
no demand output	A print was requested without a demand connection
power-up zero not captured	
scale in x10 mode	Command not possible while scale is expanded x10
scale not ready	Print requested and print interlock or auto print reset requirements have not been met

Error Message	Description
scale over capacity	Print was requested while scale was over capacity
scale under zero	Print was requested while scale was blanked under capacity
tare exceeds limit	Preset tare value is greater than scale capacity
tare not enabled	TARE key pressed while tare is disabled
tare too small	TARE key was pressed while weight was less than 1 display increment
tare under zero	TARE key was pressed while weight was below zero
Template mismatch	Shown when a demand print has been requested while one of the applications is running, but no demand connection with that application's template has been configured.
E E E	Shown in the weight display if Power-up Zero capture is enabled and the weight on the scale exceeds the Power-up Zero capture range during a power-up cycle.

Table 6-7: Error Codes, POWERCELL Version

Event Number	Description
57	PDX BOARD ACCESS ERROR
58	PDX BOARD RESPONSE TIMEOUT
59	PDX BOARD INVALID PROTOCOL RESPONSE
5a	PDX BOARD OPERATION ABORTED
5b	PDX CELL xx* NO RESPONSE
5c	PDX CELL xx* NEG OUT OF RANGE
5d	PDX POWER CELL COMMAND FAILED
60	PDX STUCK PLATFORM
64	PDX BOARD MAJOR OVERVOLTAGE OR OVERCURRENT
65	PDX BOARD MAJOR UNDERVOLTAGE
76	PDX BOARD MINOR OVERVOLTAGE OR OVERCURRENT
77	PDX BOARD MINOR UNDERVOLTAGE
78	PDX CELL xx* INITIALIZING
79	PDX CELL xx* NOT FOUND
80	Loadcel_Network_Initializing

* Indicates the cell number

6.4.5. Internal Diagnostics

The IND246 terminal provides several internal diagnostic tools that are accessible in setup mode. These tests are intended to assist in diagnosing whether a problem is internal or external to the terminal.

To access these tools, enter the Operator menu then the SETUP mode and navigate to the Maintenance menu. Open the Maintenance block then the Diagnostic block. Each of the diagnostic items is shown in the menu. The following diagnostic tests are included:

6.4.5.1.   Display Test

When the display test is run, the terminal will display all dots on for approximately 4 seconds then all dots off for another 4 seconds. This cycle will repeat continuously until the LEFT navigation key is pressed to exit.

Note: All dots are also illuminated on the display during the power up sequence.

6.4.5.2.   Keyboard Test

When performing the keyboard test, any key on the keypad that is pressed will be shown on the display (refer to Figure 6-4). This confirms the key is operating properly. Do not press the LEFT arrow key until the test is complete. To exit the test, press the LEFT navigation key.

DIAGNOSTICS\KEYBOARD TEST
Key Pressed: ->0<-
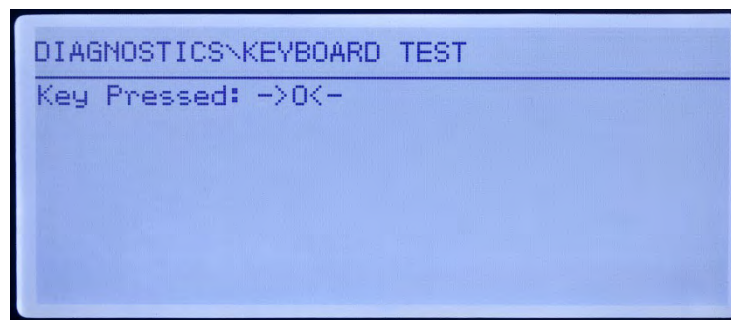
Figure 6-4: Keyboard Test – ZERO Key Pressed

6.4.5.3.   Scale Diagnostics

- **Load Cell Output** — Displays the current load cell output (active weight) in internal counts. When weight is placed on the scale platform, the number of counts should increase. Press the LEFT navigation key to exit the display.
- **Calibration Values** — Displays the current calibration values for the scale. If these values are recorded after a scale calibration, and the Main PCB is replaced in the future, the calibration values can be manually entered here to "transfer" the previous calibration to the new Main PCB. Press the LEFT navigation key to exit the display.
- **Shift Adjust (POWERCELL ONLY)** - Small mismatches in mechanical and electronic gain of the load sensing paths can cause the same test weight to produce slightly different readings, depending on the location of the test weight on the scale. The IND246 POWERCELL permits two kinds of adjustment – by pairs, and by individual cells.

  Adjustment by pairs ensures a constant reading from the scale regardless of where the load is placed on the long axis between pairs of cells – for instance, in vehicle weighing applications.

  Adjustment by cells adds a factor to each load cell output to compensate for the slight differences between them. The scale will then output the same weight value regardless of the physical location of the weight on the scale.

  Shift Adjust is not available on a scale with only a single load cell configuration.

- **Statistics** — Displays statistical information for the scale including the total number of weighments (as determined by a demand print), the number of scale overloads, the peak weight weighed on the scale, total number of zero commands and failed zero commands. This data can be very helpful when diagnosing scale problems. Press the LEFT navigation key to exit the display.

6.4.5.4.   Serial Test

This tool tests the transmit and receive functions on the serial (COM) ports. The COM port to be tested must be selected first and then the test can be started.

1. Select the COM port to be tested in the selection box then press ENTER to begin the test.
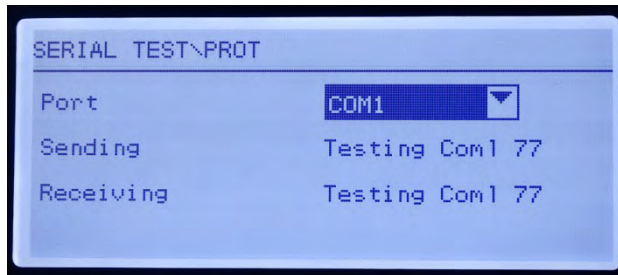
Figure 6-5: Serial Test Display

2. During the test, a data string is output repeatedly approximately once every three seconds. The data is: [Testing COMx: nn] where "x" is the COM port and "nn" is an incrementing value beginning at 1 and continuing through 99 then starting over again. Each transmission increments this number by one.

3. Any data received during the serial test is displayed in the bottom part of the display to the right of the "Receiving:" label. Control characters are not displayed in this mode.

4. If a jumper wire is placed between the transmit and the receive terminals (Figure 6-6) on the port being tested, the same data string that is transmitted displays as the receiving field. This jumper can confirm correct operation of both the transmit and receive circuitry of that COM port.

Figure 6-6: Jumper Wire Between COM1 Transmit and Receive Terminals

5. To select another port for the serial port test, press the ENTER key to move focus back into the port selection box select another port.

6. To stop the test routine and exit, press the LEFT navigation key.

6.4.5.5. Discrete I/O Test

This test provides a view of the status of the discrete inputs and allows enabling or disabling of the discrete outputs for diagnostic purposes. Open the Discrete I/O test page by pressing the ENTER key.

1. A warning message is shown first to remind the tester that the outputs can be turned on manually during this test so any control power to the discrete outputs should be removed.

	⚠ **WARNING**
	THE DISCRETE OUTPUTS OF THE TERMINAL WILL BE MANUALLY ENABLED DURING THIS TEST. REMOVE OUTPUT CONTROL POWER SO EXTERNAL EQUIPMENT WILL NOT BE ENERGIZED BY MISTAKE. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILURE TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

2. Press ENTER to continue to the diagnostic screen. When viewing the test screen, the input status will be shown at the top of the display and the output status will be shown at the bottom of the display (Figure 6-7). Focus is shown on Output #1 first.
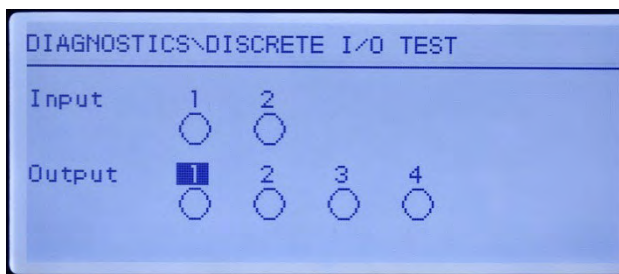
Figure 6-7: Discrete I/O Test Screen

3. Focus for control of a specific output is indicated by reverse video of the number above the output. When an output is in focus, pressing the UP navigation key turns the output ON. A smaller, solid circle is shown to indicate that output is ON. This is shown in Figure 6-8.
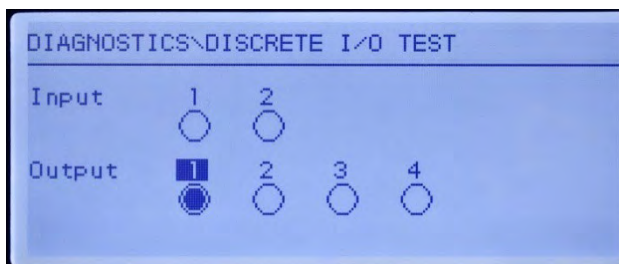
Figure 6-8: Discrete I/O Test Screen, Output 1 Active

4. Pressing the DOWN navigation key returns the output in focus to the OFF condition and the circle is shown as empty.

5. Focus can be moved to any of the other outputs by using the LEFT or RIGHT navigation key. Each of the outputs can then be turned ON with the UP navigation key or OFF with the DOWN navigation key.

6. To end the test and exit, press the ENTER key.

   ▪ Note that when the Discrete I/O Test screen is exited, all outputs will be turned off again.

6.5. Replacing BRAM Battery

This procedure is used when the coin cell battery for RAM backup must be replaced. Information from BRAM is copied to the optional SD memory card during the battery replacement process so that the BRAM data is not lost.

1. Remove power from the terminal and insert the SD memory card if not already installed. Refer to Figure 6-9 for location of SD memory card.

🔹 Note: Do not force the card into the slot. If the card does not slide smoothly into the slot, confirm the correct orientation.
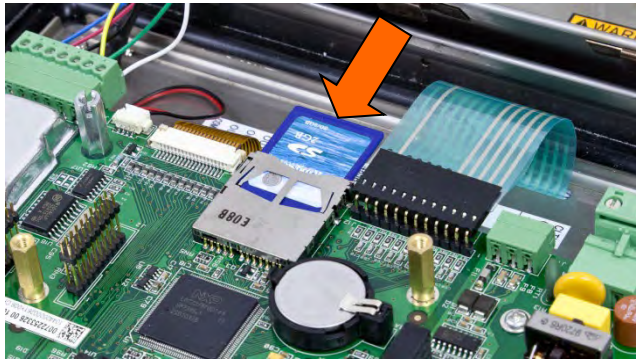
Figure 6-9: SD Memory Card Insertion

2. Apply power, enter setup and access the battery replacement procedure at **Maintenance > Replace Battery**.

3. A warning message will be shown indicating that BRAM data will be stored to the SD memory card. Press ENTER to begin the backup process or the LEFT navigation key to exit without starting the process.

4. After pressing ENTER, the terminal will indicate **Copying** during the backup and **Backup complete** when the backup procedure is finished. A message to remove power from the terminal and replace the battery will also be shown.

5. Remove power, remove the coin cell battery and replace with a new CR2032 battery, METTLER TOLEDO part number 22009188. Refer to 错误!未找到引用源。 for location of the coin cell battery. Be careful not to touch the contact areas (top and bottom) of the battery with your hands. Grasp by the edges of the battery or use gloves during handling.

6. After the battery has been replaced, apply power to the terminal and during power-up the terminal will automatically copy the backed up BRAM data from the SD memory card back into the BRAM.

🔹 Note that the time and date must be reentered after this procedure.

6.6. System Backup and Restore

The SD memory card (optional in the POWERCELL version) provides a medium to store setup files containing the terminal's configuration. The following information is included in the system backup and restore in the analog and POWERCELL versions of the IND246, respectively.

6.6.1. Files, Media and Data

All setup parameters, tables and log files are saved in files named **246_nn.txt** and **246_nn.bin** (where "nn" can be a number between 01 and 99). These files are stored in a folder called 246BKUP on the SD memory card. The saved files can be restored to the terminal in case the data is lost or after the setup is totally cleared with a master reset.

The SD memory card supports saving of as many as 99 setup files.

The backup and restore sequences of prompts are initiated from the setup mode by access in the **Maintenance > Backup to SD** or **Maintenance > Restore from SD** blocks.

■ The SD memory card is not hot-swappable. It must be installed before power is applied to the terminal.

The SD memory media provided by METTLER TOLEDO as an option has been fully tested for correct operation. While other SD memory media may work, some may not work correctly. METTLER TOLEDO will only support correct operation of the SD memory card model offered as the IND246 terminal accessory.

■ Variable entry numbers refer to index locations detailed in Appendix D, section D.8.3.

Table 6-8: Data Backed up and Restored in IND246 Terminal

Variable Entry			Description
Block	Start	End	
100	101	141	Scale menu data
200	201	206	Application menu data
	211	271	
300	301	321	Terminal menu data
	323	331	
400	429	482	Communication menu data
500	501	505	Maintenance menu data
511*	512	527	POWERCELL load cell data
600	601	605	Calibration data
700	711	718	Template 1 - 3 data
	721	730	Template 4 - 9 data
	741	750	String 1 - 10 data

* IND246 POWERCELL only.

6.6.2. Backup to SD Memory Card

1. Remove power from the terminal and insert the SD memory card if not already installed. Refer to Figure 6-9 for location of SD memory card.

2. Apply power, enter setup and access the backup procedure at **Maintenance > Backup to SD**.

3. At the **Dataset Name** parameter, press ENTER to program the saved file names. The files will be named 246_nn, where "nn" can be a number between 01 and 99. Enter the desired file number then press ENTER.

4. Focus will move to the **Start** prompt on the display. Press ENTER to begin the backup or press the LEFT navigation key to exit without saving.

5. After pressing ENTER, the terminal will indicate **Working. Please wait.** during the backup and **Backup complete** when the backup procedure is finished.

6. Press ENTER to acknowledge the **Backup complete** message then exit setup.

6.6.3. Restore from SD Memory Card

After the setup parameters, tables and log files have been stored onto the SD memory card, they can be restored to the terminal when needed by following this procedure.

▪ After a restore is performed, the system will automatically restart.

1. Remove power from the terminal and insert the SD memory card if not already installed. Refer to Figure 6-9 for location of SD memory card.

2. Apply power, enter setup and access the restore procedure at Maintenance > Restore from SD.

3. At the **Dataset Name** parameter, select the name of the saved file to be restored. Only files with the name 246_nn.txt and 246_nn.bin in the 246BKUP folder will be shown in the selection box.

4. Next, select the type of information to be restored to the terminal. Either the **Configuration and Calibration** can be restored or the **Configuration only**.

5. Focus will move to the Start prompt on the display. Press ENTER to begin the restore process or press the LEFT navigation key to exit without restoring.

6. After pressing ENTER, the terminal will indicate **Working. Please wait.** during the backup and **Restore complete.** when the restpre procedure is finished.

6.7. Master Reset

A hardware master reset restores all terminal setup parameters to the factory default settings and deletes all tables and log files (refer to Appendix B, **Parameter Values**).

▪ Be sure to make a backup of data **before** performing a master reset.

The master reset typically is performed under these circumstances:

- When a software configuration problem arises that cannot be resolved without starting from the factory default settings.

- When password security is enabled to protect setup, and the password is lost.
- After a firmware upgrade is performed.

To initiate a master reset, perform the following steps:

1. Remove AC power.
2. Place switch SW1-2 in the ON position, as shown in Figure 6-10.
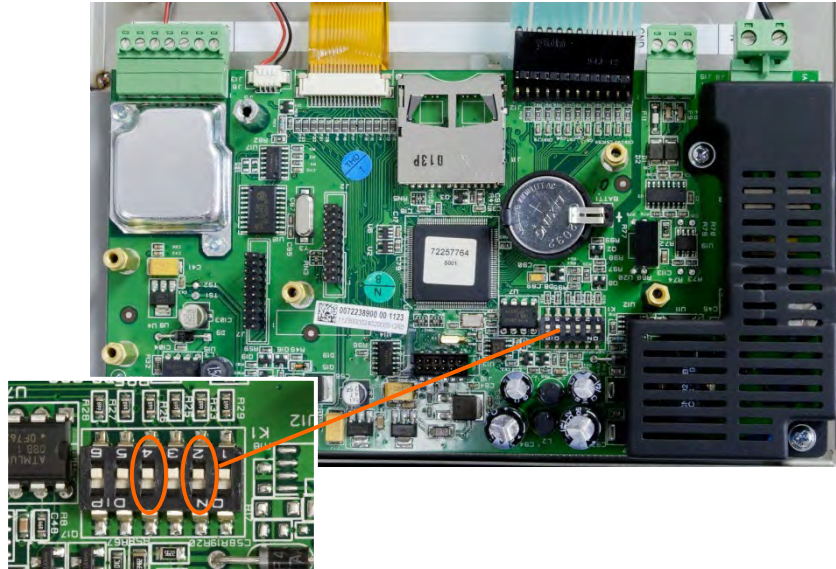
Figure 6-10: Switches SW1-2 and SW1-4

■ The position of SW1-4 (also shown in Figure 6-10) determines whether metrologically significant EEPROM data for scale calibration is reset when a master reset is performed. SW1-4 must be set to ON to reset EEPROM data. If SW1-4 is set to OFF, metrological EEPROM data will **not** be affected by the master reset and the original calibration will persist.

3. Apply AC power. During the power up sequence, the display will indicate a warning message of [WARNING MASTER RESET! Press ENTER to continue.]

4. Press ENTER to perform a master reset. When the reset is complete, the screen will return to the normal weight display.

OR

To exit without a master reset, do not press ENTER.

5. Remove AC power.
6. Return SW1-2 (and, if it was changed, SW1-4) to their original OFF positions.
7. Reapply AC power.

6.8. Upgrading Firmware

If a new **246A0nn.hex** (IND246 analog) or **246P0nn.hex** (IND246 POWERCELL) file is copied to the SD Memory card from a PC, the firmware can then be updated by the following procedure.

1. Remove power from the terminal and insert the SD memory card with the "246AOnn.hex" file copied to it into the SD memory card slot on the Main Board. Refer to Figure 6-9 for location of the SD memory slot.

2. Power up the terminal and access **Setup > Maintenance > Install SW Update**.

3. A message of [WARNING! Install new software from SD memory?] will be shown on the display. To exit without performing the firmware upgrade, press the LEFT navigation key.

4. To perform the upgrade, in the **File Name** parameter, select the firmware file to be uploaded. Only files with the format 246AOxx.hex on the SD card will be displayed.

5. With the desired file selected, press ENTER.

6. The display will show [Updating] for approximately 30 seconds then a power up cycle will be started.

7. After the power cycle, the upgrade is complete.

To eliminate potential memory errors, it is recommended that a Master Reset be performed after updating the firmware.

6.9.   Board and Display Replacement

This section describes the recommended procedures for removal and installation of option boards, the main board and the display module. Before beginning any of these procedures:

1. Perform a backup of all setup parameters with InSite SL or InSite CSL program.

2. Remove power from the terminal. Unplug the AC line cord on the AC version and remove the battery pack from the battery version.

3. Open the enclosure to access the internal electronics. Refer to the **Installation Manual** for details on opening the enclosure.

4. When handling any electronic boards or modules, use a grounding strap to prevent risk of electrostatic discharge damage.

5. Identify and label all cables and internal harnesses.

6.9.1.   Option Board Removal

To remove any option board from an IND246, follow these steps.

1. Disconnect all cables and harnesses from the option board to be removed.

2. Use a medium Phillips screwdriver to remove the screws securing the option boards to its mounting location. Each board will be secured with three screws. Refer to Figure 6-11.
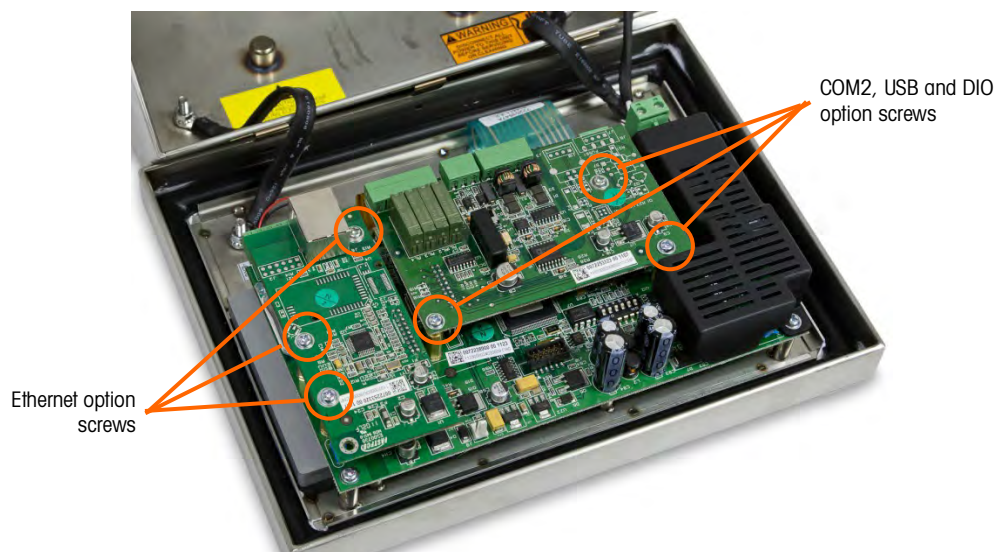
Figure 6-11: Option Board Removal

3. Note the locations of the option boards then remove them and set them aside on a static-free mat.

6.9.2. Main Board Removal

To remove the main board from an IND246, follow these steps. It is assumed that any option boards have been removed per the previous instructions.

1. Disconnect the AC power harness or battery harness, the COM1 cable if present, the keyboard tail and the load cell cable.

2. To remove the harness to the display board, gently slide the two plastic ends of the connector on the main board away from the center of the board (freeing the tension on the harness) and pull the harness from the connector. This is shown in Figure 6-12.
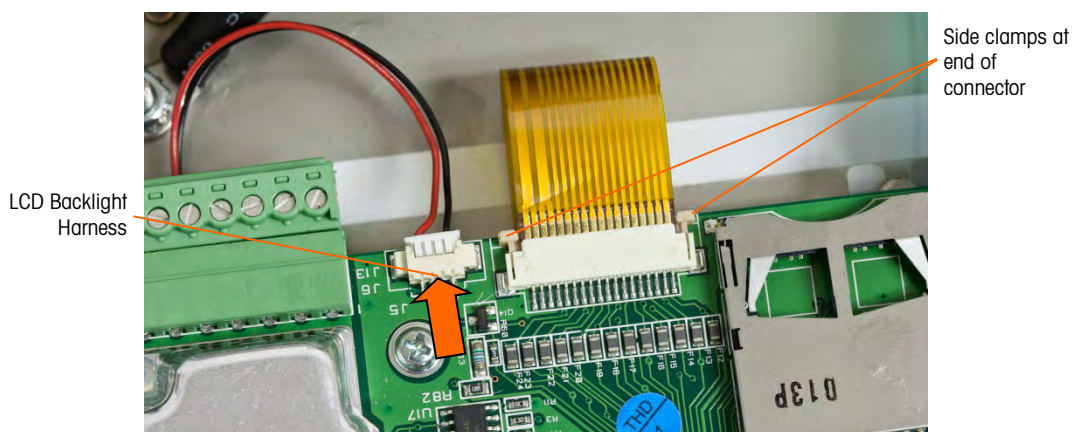
Figure 6-12: Display Harness Removal

3. Remove the LCD backlight harness (also shown in Figure 6-12) by gently pulling away from the board at the left and right ends of the connector. Do not pull on the wires – damage to the harness may result.

4. Unscrew and remove the four screws holding the main board to the enclosure. Their locations are circled in Figure 6-13. In the case that the Ethernet option was installed, one screw will be replaced with a hex post stand-off. Use a 6mm nut driver or a straight blade screwdriver to remove the hex post stand-off from the location noted.

SD Memory
Card Socket

Ethernet option
screws

Hex post if Ethernet
option installed
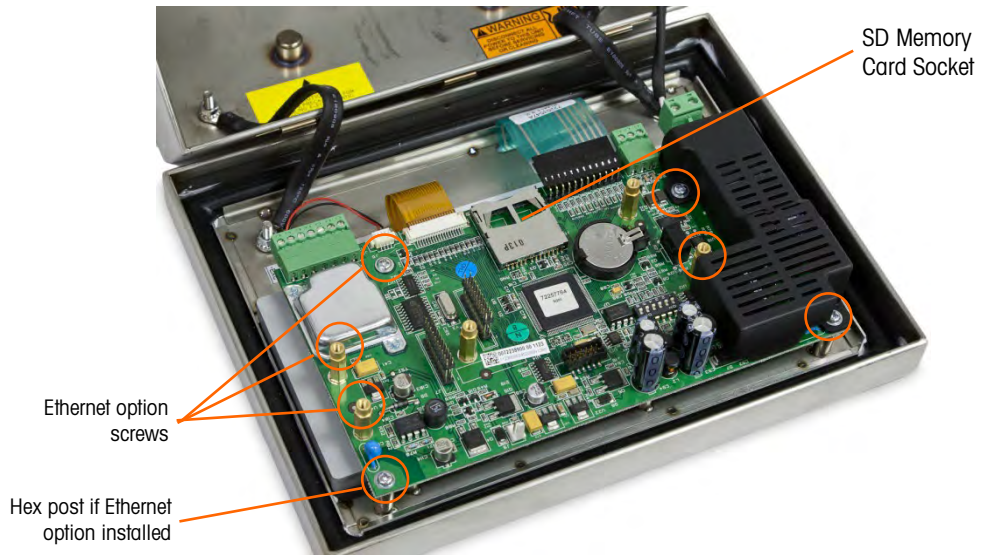
Figure 6-13: Mounting Screws for Main Board, Analog Version

SD Memory
Card Socket

Ethernet option
screws

Hex post if Ethernet
option installed
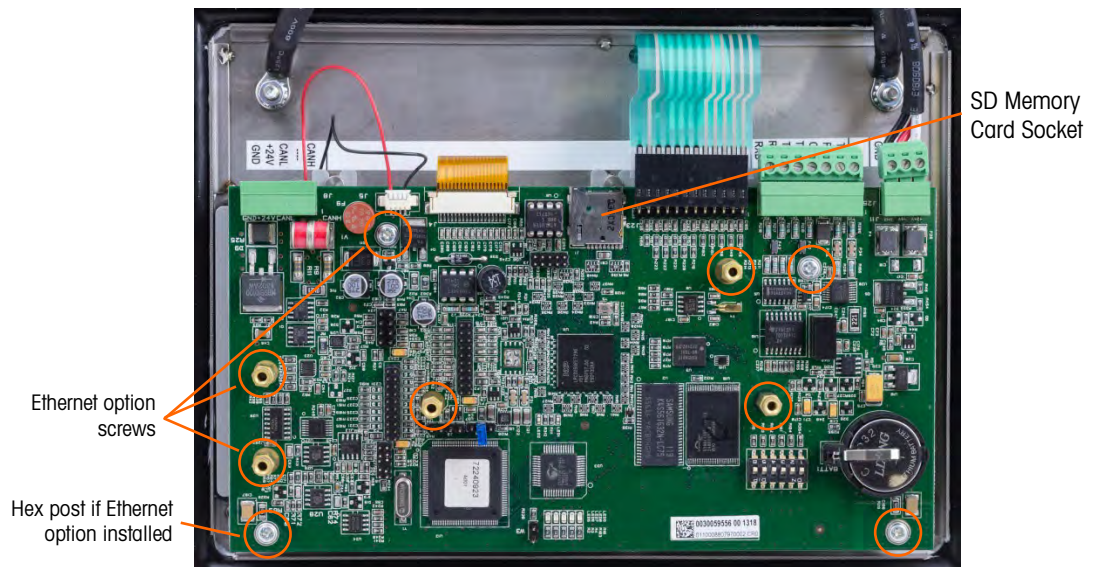
Figure 6-14: Mounting Screws for Main Board, POWERCELL Version

5. Carefully lift the PCB out of the enclosure and set it on a static-free mat.

6. If an SD memory card is installed, press in to loosen the card from the socket then remove the card and retain the card to be installed into the replacement main board. Refer to Figure 6-9 or Figure 6-13 for location of SD Memory card slot.

6.9.3. Display Module Removal

To remove the LCD display module from an IND246, follow these steps. It is assumed that option boards and the main board have been removed per the previous instructions.

1. Unscrew and remove the two screws holding the display module to the enclosure. The screw positions are identified in Figure 6-15.
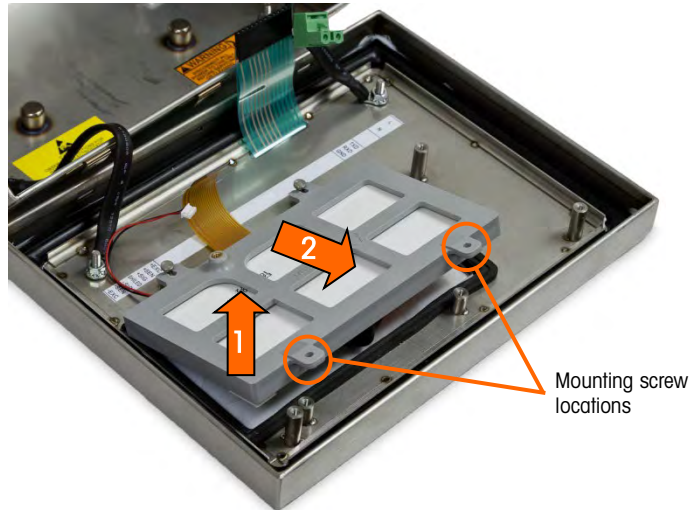
Figure 6-15: Display Module Mounting Screws

2. Lift the end of the display bracket (and display) where the screws were removed up then pull forward to disengage the top of the bracket from the two metal posts.

3. Carefully remove the display module and bracket from the enclosure and set on a static-free mat.

6.9.4. Display Module Installation

To install the LCD display module into an IND246, follow these steps. It is assumed that option boards and the main board have been removed per the previous instructions.

1. Make sure the display gasket on the inside of the front cover is intact. Replace if necessary.

2. Clean the inside of the display window and the front of the display with a mild window cleaner and a soft, lint-free cloth.

3. Place the LCD display module into the display bracket with the display and backlight harnesses oriented as shown in Figure 6-15.

4. While keeping the screw-end of the bracket lifted slightly, press the opposite end of the display bracket onto the two metal posts.

5. Lower the display and bracket into place.

6. Install the two screws holding the display module to the enclosure. The screws are identified in Figure 6-15.

■ All mounting screws should be installed with 23 inch pounds (2.6 Nm) of torque.

6.9.5.　Main PCB Installation

To install the main board into an IND246, follow these steps. It is assumed that option boards have been removed per the previous instructions.

1. Install the SD memory card from the previous main board (if used).

2. Position the main board over the four screw holes in the terminal enclosure identified in Figure 6-13.

3. Install the four screws. Note that if the Ethernet option is to be used, one of the screws is replaced with a hex post stand-off. Refer to Figure 6-13 for the location of the hex post stand-off.

■ All mounting screws and the hex post stand-off should be installed with 23 inch pounds (2.6 Nm) of torque.

4. Reconnect the load cell cable, backlight harness, display harness, keyboard tail, COM1 cable and the power harness connections.

6.9.6.　Option PCB Installation

1. To install any option boards into an IND246, follow these steps.

2. Position the option board over the appropriate connector on the main board and the three mounting holes identified in Figure 6-11.

3. Gently press the option board down so that all the pins on the main board connector slide into the socket on the bottom of the option board. When properly installed, each pin will insert into a corresponding hole in the connector. Refer to Figure 6-16
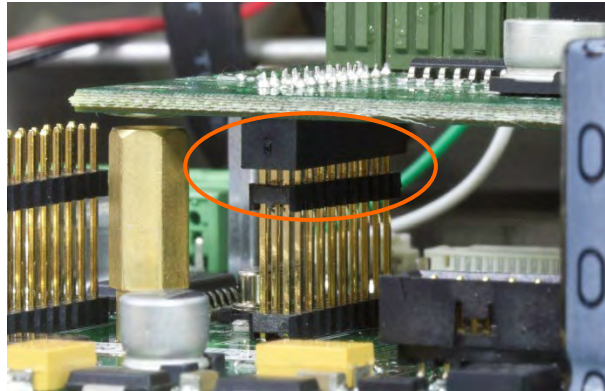
Figure 6-16: Aligning Option Board Pins

4. Secure the option board with the three screws.

■ All mounting screws should be installed with 23 inch pounds (2.6 Nm) of torque.

5. Reinstall all cables to the option board.

6.9.7.　Final Steps

After replacing any of the boards or modules described above, follow these steps to complete the process.

1. Make sure all cables are routed so that they will not get pinched when the front cover is installed to the enclosure.

2. Position the front cover over the rear housing then gently press it down into place.

3. Press down firmly in each of the four corners of the front cover in sequence until each corner clip snaps audibly snaps into place.

4. It is very important that each of the 4 corner clips have snapped into place. When pressing down on the cover during installation, listen for the "click" sound of each clip engaging.

5. Connect the AC mains power or reinstall the battery.

6. Press the On/Off key and test the terminal for correct operation. Note that if the main board has been replaced, setup steps may have to be changed to obtain the desired operation.

A. Default Templates

A.1. Basic Functionality

```
13.73 kg
 2.00 kg PT
11.73 kg N
```

Template 1 – Multiple Line G T N		
Element	**Data**	**F-Code**
1	Gross Weight	6
2	New Line	9
3	Tare Weight	21
4	New Line	9
5	Net Weight	8
6	New Line	9
7	End of template	5

```
Scale 1
17:02:23
29/Mar/2012
    44.01 kg
    13.73 kg T
    30.28 kg N
```

Template 2 – Multiple Line Scale ID, T & D, G T N		
Element	**Data**	**F-Code**
1	Scale Name	10
2	New Line	9
3	Time	22
4	New Line	9
5	Date	3
6	New Line	9
7	Gross Weight	6
8	New Line	9
9	Tare Weight	21
10	New Line	9
11	Net Weight	8
12	New Line	9
13	End of template	5

Template 3 – Single line G T N		
Element	**Data**	**F-Code**
1	Gross Weight	6
2	Tare Weight	21
3	Net Weight	8
4	New Line	9
5	End of template	5

```
44.01 kg   13.73 kg T   30.28 kg N
```

A.2. Vehicle Application

```
METTLER TOLEDO
IND246
-- INBOUND --
11:08   2012-03-30
0000010          Temporary
ID: JDM-092
OATS
   72340 lb
```

Template 4 - Inbound		
Element	**Data**	**F-Code**
1	String 1	11
2	New Line	9
3	String 2	12
4	New Line	9
5	String 3	13
6	New Line	9
7	Transaction Time	44
8	3 spaces	0
9	Transaction Date	43
10	New Line	9
11	Transaction #	23
12	10 spaces	1
13	Transaction Type	45
14	New Line	9
15	Vehicle ID	49
16	New Line	9
17	Variable	46
18	New Line	9
19	Vehicle Gross Weight	48
20	New Line	9
21	End of template	5

```
METTLER TOLEDO
-- OUTBOUND --
11:06   2012-03-30
0000009          Permanent
ID: ABB-123
ACME TRUCKING
WHEAT
    84540 lb
    18560 lb PT
    65980 lb N
```

Template 5 - Outbound		
Element	Data	F-Code
1	String 1	11
2	New Line	9
3	String 4	14
4	New Line	9
5	Transaction Time	44
6	3 spaces	0
7	Transaction Date	43
8	New Line	9
9	Transaction #	23
10	10 spaces	1
11	Transaction Type	45
12	New Line	9
13	Vehicle ID	49
14	New Line	9
15	Vehicle Description	47
16	New Line	9
17	Variable	46
18	New Line	9
19	Vehicle Gross Weight	48
20	New Line	9
21	Vehicle Tare Weight	51
22	New Line	9
23	Vehicle Net Weight	50
24	New Line	9
25	End of template	5

A.3.   Checkweighing Application

Template 6 - Checkweighing		
Element	Data	F-Code
1	String 1	11
2	New Line	9
3	String 2	12

```
METTLER TOLEDO
IND246
17:36      29/Mar/2012
0000003
Bag #24
    34.51 kg
```

Template 6 - Checkweighing		
Element	**Data**	**F-Code**
4	New Line	9
5	Time	22
6	3 spaces	0
7	3 spaces	0
8	Date	3
9	New Line	9
10	Transaction #	23
11	New Line	9
12	Target Description	28
13	New Line	9
14	Displayed Weight	4
15	New Line	9
16	End of template	5

A.4. Peak Weight Application

```
METTLER TOLEDO
IND246
10:35      30/Mar/2012
0000005
Test #27
    41.86 kg Peak Weight
```

Template 7 – Peak Weight		
Element	**Data**	**F-Code**
1	String 1	11
2	New Line	9
3	String 2	12
4	New Line	9
5	Time	22
6	3 spaces	0
7	3 spaces	0
8	Date	3
9	New Line	9
10	Transaction #	23
11	New Line	9
12	ID	7
13	New Line	9
14	Peak Weight	42
15	String 5	15

Template 7 – Peak Weight		
Element	Data	F-Code
16	New Line	9
17	End of template	5

A.5. Animal Weighing Application

```
METTLER TOLEDO
IND246
14:55      30/Mar/2012
ACME FARMS
Total Wt.: *     1835 lb
```

Template 8 – Animal Weighing		
Element	Data	F-Code
1	String 1	11
2	New Line	9
3	String 2	12
4	New Line	9
5	Time	22
6	3 spaces	0
7	3 spaces	0
8	Date	3
9	New Line	9
10	ID	7
11	New Line	9
12	Average Weight	24
13	New Line	9
14	End of template	5

A.6. Counting Application

```
METTLER TOLEDO
IND246
10:46      30/Mar/2012
   37.35 kg N
1868 PCS
4mm x 25mm Hex Bolt
```

Template 9 - Counting		
Element	Data	F-Code
1	String 1	11
2	New Line	9
3	String 2	12
4	New Line	9
5	Time	22
6	3 spaces	0
7	3 spaces	0

Template 9 - Counting		
Element	Data	F-Code
8	Date	3
9	New Line	9
10	Displayed Weight	4
11	New Line	9
12	Piece Count	35
13	New Line	9
14	Description	37
15	New Line	9
16	End of template	5

B.   Parameter Values

The following table lists each of the setup parameters shown when the Setup mode is programmed to display F-Codes instead of English. A descriptive name is included, followed by a list of the selections with corresponding selection values.

Default values are indicated by an asterisk (*****).

B.1.   Scale Block, IND246 Analog

F-Code	Descriptive Name	Selections and Values
F1.1	Type	
F1.1.1	Name	***Scale 1**
F1.1.2	Approval	***0: None** 1: Argentina 2: Australia 3: Canada 4: OIML 5: USA 6: Sri Lanka
F1.1.3	Certificate #	xxxxxxxx
F1.2	Capacity and Increment	
F1.2.1	Primary Unit	g ***kg** lb t ton
F1.2.2	Number of Ranges	***0: One range** 1: Two ranges
F1.2.3	Capacity 1	***50**
F1.2.4	Increment 1	0: 0.0001 1: 0.0002 2: 0.0005 3: 0.001 4: 0.002 5: 0.005 ***6: 0.01** 7: 0.02

F-Code	Descriptive Name	Selections and Values
		8: 0.05 9: 0.1 10: 0.2 11: 0.5 12: 1 13: 2 14: 5 15: 10 16: 20 17: 50 18: 100 19: 200
F1.2.5	Capacity 2	
F1.2.6	Increment 2	0: 0.0001 1: 0.0002 2: 0.0005 3: 0.001 4: 0.002 5: 0.005 6: 0.01 ***7: 0.02** 8: 0.05 9: 0.1 10: 0.2 11: 0.5 12: 1 13: 2 14: 5 15: 10 16: 20 17: 50 18: 100 19: 200
F1.3	Calibration	
F1.3.1	GEO	***17** (01 – 31)
F1.3.2	Linearity	***0: Disabled** 1: Enabled
F1.3.3	Set Zero	
F1.3.4	Set Span	
F1.4	Zero	
F1.4.1	Auto Zero	***0: Disabled** 1: Gross 2: Gross and Net

F-Code	Descriptive Name	Selections and Values
F1.4.2	Auto Zero Range	***0: 0.5d** 1: 1d 2: 3d 3: 10d
F1.4.3	Under Zero Blanking	0: Disabled ***1: 20d always** 2: 20d with Zero required
F1.4.4	Power up Zero	***0: Disabled** 1: ± 2% 2: ± 10%
F1.4.5	Pushbutton Zero	0: Disabled ***1: ±2%** 2: ±20%
F1.5	Tare	
F1.5.1	Types	
F1.5.1.1	Pushbutton Tare	0: Disabled ***1: Enabled**
F1.5.1.2	Keyboard Tare	0: Disabled ***1: Enabled**
F1.5.1.3	Net Sign Correction	***0: Disabled** 1: Enabled
F1.5.2	Auto Tare	
F1.5.2.1	Auto Tare	***0: Disabled** 1: Enabled
F1.5.2.2	Tare Threshold Wt.	***0.00**
F1.5.2.3	Reset Threshold Wt.	***0.00**
F1.5.2.4	Motion check	***0: Disabled** 1: Enabled
F1.5.3	Auto Clear	
F1.5.3.1	Auto Clear Tare	***0: Disabled** 1: Enabled
F1.5.3.2	Clear Threshold Wt.	***0.00**
F1.5.3.3	Motion check	***0: Disabled** 1: Enabled
F1.5.3.4	Clear after Print	***0: Disabled** 1: Enabled
F1.6	Units	
F1.6.1	Second Unit	***None** g kg lb

F-Code	Descriptive Name	Selections and Values
		oz t ton
F1.7	Filter	
F1.7.1	Low Pass Filter	0: Very Light 1: Light ***2: Medium** 3: Heavy
F1.7.2	Stability Filter	***0: Disabled** 1: Enabled
F1.8	Stability	
F1.8.1	Motion Range	0: Disabled ***1: 1d** 2: 3d
F1.8.2	No-motion Interval	***0: 0.3 s** 1: 0.5 s 2: 0.7 s 3: 1 s
F1.8.3	Timeout	0: Disabled ***1: 3 s** 2: 10 s 3: 30 s
F1.9	Log or Print	
F1.9.1	Minimum Weight	***0.00**
F1.9.2	Interlock	***0: Disabled** 1: Enabled
F1.9.3	Automatic	***0: Disabled** 1: Enabled
F1.9.4	Reset on	0: Deviation ***1: Return**
F1.9.5	Threshold Wt.	***0.00**
F1.9.6	Motion Check	***0: Disabled** 1: Enabled
F1.10	Reset Scale Block	

B.2.   Scale Block, IND246 POWERCELL

F-Code	Descriptive Name	Selections and Values
F1.1	Type	
F1.1.1	Name	**Scale 1*
F1.1.2	Scale Type	**PDX*, GDD, 615D, 611D
F1.1.3	# of Loadcells	
F1.1.4	Approval	**0: None* 1: Argentina 2: Australia 3: Canada 4: OIML 5: USA 6. Sri Lanka
F1.1.5	Certificate #	xxxxxxxx
F1.2	Load Cell	
F1.2.1	Single Cell Address	n/a
F1.2.2	Manual Address	
F1.2.3	Shift Adjust	
F1.2.4	Shift Adjust Single	
F1.3	Capacity and Increment	
F1.3.1	Primary Unit	g **kg* lb t ton
F1.3.2	# Ranges/Intervals	**0: One range* 1: Two intervals 2: Two ranges
F1.3.3	Capacity 1	**50*
F1.3.4	Increment 1	0: 0.0001 1: 0.0002 2: 0.0005 3: 0.001 4: 0.002 5: 0.005 **6: 0.01* 7: 0.02 8: 0.05 9: 0.1 10: 0.2

F-Code	Descriptive Name	Selections and Values
		11: 0.5 12: 1 13: 2 14: 5 15: 10 16: 20 17: 50 18: 100 19: 200
F1.3.5	Capacity 2	
F1.3.6	Increment 2	0: 0.0001 1: 0.0002 2: 0.0005 3: 0.001 4: 0.002 5: 0.005 6: 0.01 ***7: 0.02** 8: 0.05 9: 0.1 10: 0.2 11: 0.5 12: 1 13: 2 14: 5 15: 10 16: 20 17: 50 18: 100 19: 200
F1.4	Calibration	
F1.4.1	GEO	***17** (01 – 31)
F1.4.2	Linearity	***0: Disabled** 1: Enabled
F1.4.3	Set Zero	
F1.4.4	Set Span	
F1.5	Zero	
F1.5.1	Auto Zero	***0: Disabled** 1: Gross 2: Gross and Net

F-Code	Descriptive Name	Selections and Values
F1.5.2	Auto Zero Range	***0: 0.5d** 1: 1d 2: 3d 3: 10d
F1.5.3	Under Zero Blanking	0: Disabled ***1: 20d always** 2: 20d with Zero required
F1.5.4	Power up Zero	***0: Disabled** 1: ± 2% 2: ± 10%
F1.5.5	Pushbutton Zero	0: Disabled ***1: ±2%** 2: ±20%
F1.6	Tare	
F1.6.1	Types	
F1.6.1.1	Pushbutton Tare	0: Disabled ***1: Enabled**
F1.6.1.2	Keyboard Tare	0: Disabled ***1: Enabled**
F1.6.1.3	Net Sign Correction	***0: Disabled** 1: Enabled
F1.6.2	Auto Tare	
F1.6.2.1	Auto Tare	***0: Disabled** 1: Enabled
F1.6.2.2	Tare Threshold Wt.	***0.00**
F1.6.2.3	Reset Threshold Wt.	*0.00
F1.6.2.4	Motion check	*0: Disabled 1: Enabled
F1.6.3	Auto Clear	
F1.6.3.1	Auto Clear Tare	***0: Disabled** 1: Enabled
F1.6.3.2	Clear Threshold Wt.	***0.00**
F1.6.3.3	Motion check	***0: Disabled** 1: Enabled
F1.6.3.4	Clear after Print	***0: Disabled** 1: Enabled
F1.7	Units	
F1.7.1	Second Unit	***None** g kg lb

F-Code	Descriptive Name	Selections and Values
		oz t ton Custom
F1.8	Filter	
F1.8.1	Low Pass Filter	0: Very Light 1: Light *2: Medium 3: Heavy
F1.8.2	Stability Filter	*0: Disabled 1: Enabled
F1.9	Stability	
F1.9.1	Motion Range	0: Disabled *1: 1d 2: 3d
F1.9.2	No-motion Interval	*0: 0.3 s 1: 0.5 s 2: 0.7 s 3: 1 s
F1.9.3	Timeout	0: Disabled *1: 3 s 2: 10 s 3: 30 s
F1.10	Log or Print	
F1.10.1	Minimum Weight	*0.00
F1.10.2	Interlock	*0: Disabled 1: Enabled
F1.10.3	Automatic	*0: Disabled 1: Enabled
F1.10.4	Reset on	0: Deviation *1: Return
F1.10.5	Threshold Wt.	*0.00
F1.10.6	Motion Check	*0: Disabled 1: Enabled
F1.11	Reset Scale Block	

B.3. Application Block

F-Code	Descriptive Name	Selections and Values
F2.1	Memory	
F2.1.1	Alibi Memory	*0: Disabled

F-Code	Descriptive Name	Selections and Values
		1: Enabled
F2.2	Totalization	
F2.2.1	Mode	***0: Disabled** 1: Displayed Weight 2: Gross Weight
F2.2.2	Clear GT on Print	***0: Disabled** 1: Enabled
F2.2.3	Subtotal	***0: Disabled** 1: Enabled
F2.2.4	Clear ST on Print	***0: Disabled** 1: Enabled
F2.2.5	Convert Weight	0: Disabled ***1: Enabled**
F2.3	Discrete I/O	
F2.3.1	Discrete Inputs	
F2.3.1.1	Input 1 Polarity	***0: + True** 1: - True
F2.3.1.2	Input 1 Assignment	***0: None** 1: Blank display 2: Clear tare 3: Print 4: SICS – S command 5: SICS – SI command 6: SICS – SIR command 7: Tare 8: Unit switching 9: Zero 10: Start Animal Weigh Cycle 11: Start Peak Weight Cycle
F2.3.1.3	Input 2 Polarity	***0: + True** 1: - True
F2.3.1.4	Input 2 Assignment	***0: None** 1: Blank display 2: Clear tare 3: Print 4: SICS – S command 5: SICS – SI command 6: SICS – SIR command 7: Tare 8: Unit switching 9: Zero 10: Start Animal Weigh Cycle 11: Start Peak Weight Cycle

F-Code	Descriptive Name	Selections and Values
F2.3.2	Discrete Outputs	
F2.3.2.1	Output 1 Assignment	***0: None** 1: Center of Zero 2: Motion
F2.3.2.2	Output 2 Assignment	3: Net 4: Over capacity 5: Under Zero
F2.3.2.3	Output 3 Assignment	6: Cycle complete (animal weighing) 7: Working (animal weighing) 8: OK zone (checkweighing) 9: Over zone (checkweighing)
F2.3.2.4	Output 4 Assignment	10: Under zone (checkweighing) 11: Running (peak weight) 12: Cycle complete (peak weight)
F2.4	Function Key	
F2.4.1	Assignment	***0: Disabled** 1: Animal Weighing 2: Check Weighing 3: Counting 4: Peak Weight 5: Vehicle
F2.4.2	Auto Start	0: Disabled ***1: Enabled**
F2.5	Animal Weighing	
F2.5.1	Operation	
F2.5.1.1	Mode	***0: Mode 1** 1: Mode 2
F2.5.1.2	Sampling Time	***5**, 0.1 – 9.9
F2.5.1.3	Auto Start	***0: Disabled** 1: Enabled
F2.5.1.4	Start Threshold	***500.0**
F2.5.1.5	Auto Print	***0: Disabled** 1: Enabled
F2.5.1.6	Print Delay	***5**, 0 – 10
F2.5.2	Display	
F2.5.2.1	Line 2	***0: Disabled** 1: Average 2: ID
F2.6	Checkweighing	
F2.6.1	Operation	
F2.6.1.1	Source	0: Gross Weight ***1: Displayed Weight**

F-Code	Descriptive Name	Selections and Values
F2.6.1.2	Tolerance Type	***0: Target Deviation** 1: % of Target 2: Weight Value
F2.6.1.3	Target Editing	0: Disabled 1: Target Only ***2: Target and Tolerances**
F2.6.1.4	Hold Timer	***0.0**, 0.0 – 9.9
F2.6.1.5	Motion Check	***0: Disabled** 1: Enabled
F2.6.2	Display	
F2.6.2.1	Display Mode	0: No Display ***1: Actual Weight** 2: Target Difference
F2.6.2.2	Line 1	0: Disabled 1: ID ***2: Description** 3: Target and tolerance 4: Zone
F2.6.2.3	SmartTrac	0: Disabled ***1: Enabled**
F2.6.2.4	Motion Blanking	***0: Disabled** 1: Enabled
F2.6.3	Menu Keys	
F2.6.3.1	Active Target	0: Disabled ***1: Enabled**
F2.6.3.2	Quick Set Target	***0: Disabled** 1: Enabled
F2.6.3.3	Target Table	***0: Disabled** 1: Enabled
F2.6.4	Target Values	
F2.6.4.1	Target	xxxxxx
F2.6.4.2	- Tolerance or Under Limit	xxxxxx
F2.6.4.3	+ Tolerance or Over Limit	xxxxxx
F2.6.4.4	Description	xxxxxxxxxxxxxxx
F2.6.5	Target Table	
F2.6.5.1	Target Table	***0: Disabled** 1: Enabled
F2.6.5.2	Totalization	***0: Disabled** 1: Enabled

F-Code	Descriptive Name	Selections and Values
F2.6.5.3	Clear Totals	***0: Disabled** 1: Automatic 2: Manual
F2.6.5.4	View Table – New – Edit	
F2.6.5.4.1	ID	xxxxxxxxx
F2.6.5.4.2	Target	xxxxxxxxx
F2.6.5.4.3	- Tolerance	xxxxxx
F2.6.5.4.4	+ Tolerance	xxxxxx
F2.6.5.4.5	Description	xxxxxxxxxxxxxxx
F2.6.5.4.6	n	xxxxxxx
F2.6.5.4.7	Total	xxxxxxx
F2.7	Counting	
F2.7.1	Operation	
F2.7.1.1	Prompt	***0: Tare – Sample** 1: Sample – Tare
F2.7.1.2	Auto Clear APW	***0: Disabled** 1: Enabled
F2.7.2	Display	
F2.7.2.1	Line 1	***0: Disabled** 1: ID 2: Description 3: APW
F2.7.2.2	Line 2	***0: Disabled** 1: ID 2: Description 3: APW
F2.7.3	Menu Keys	
F2.7.3.1	ID Table	***0: Disabled** 1: Enabled
F2.7.3.2	Reports	***0: Disabled** 1: Enabled
F2.7.3.3	Sample/APW Select	***0: Disabled** 1: Enabled
F2.7.4	ID Memory	
F2.7.4.1	ID Table	***0: Disabled** 1: Enabled
F2.7.4.2	Totalization	***0: Disabled** 1: Enabled
F2.7.4.3	Clear on Print	0: Disabled ***1: Automatic** 2: Manual

F-Code	Descriptive Name	Selections and Values
F2.7.5	ID Table – New – Edit	
F2.7.5.1	ID	xx
F2.7.5.2	Description	xxxxxxxxxxxxxxxxxxx
F2.7.5.3	APW	x.xxxxx
F2.7.5.4	Tare	xxxxxx
F2.7.5.5	n	xxxxxxx
F2.7.5.6	Total	xxxxxxx
F2.8	Peak Weight	
F2.8.1	Operation	
F2.8.1.1	Operating Mode	***0: Gross** 1: Net
F2.8.1.2	Memory	***0: Disabled** 1: Enabled
F2.8.1.3	Auto Print	***0: Disabled** 1: Enabled
F2.8.1.4	Hold Timer	***0.0**
F2.8.2	Display	
F2.8.2.1	Line 1	0: Disabled 1: ID ***2: Status**
F2.8.2.2	Line 2	0: Disabled 1: Average 2: Maximum 3: Minimum ***4: Transaction #**
F2.8.3	Menu Keys	
F2.8.3.1	Reports	***0: Disabled** 1: Enabled
F2.9	Vehicle	
F2.9.1	Operation	
F2.9.1.1	Temporary ID	0: Disabled ***1: Enabled**
F2.9.1.2	Auto ID	***0: Disabled** 1: Enabled
F2.9.1.3	Operator Clearing	0: Disabled ***1: Enabled**
F2.9.1.4	Permanent ID	***0: Disabled** 1: Enabled
F2.9.1.5	Description	***0: Disabled** 1: Enabled

F-Code	Descriptive Name	Selections and Values
F2.9.1.6	Totalization	***0: Disabled** 1: Enabled
F2.9.1.7	Clear Totals	***0: Disabled** 1: Automatic 2: Manual
F2.9.2	General	
F2.9.2.1	Variable Name	[20 characters max.]
F2.9.2.2	Temporary Prompt	**0: Disabled** 1: Inbound 2: Outbound
F2.9.2.3	Permanent Prompt	***0: Disabled** 1: Outbound
F2.9.2.4	Threshold Weight	***200**
F2.9.2.5	Transaction Table	**0: Disabled** 1: Enabled
F2.9.3	Temporary ID Table	
F2.9.3.1	Search Field 1	0: Date 1: ID 2: Saved Weight 3: Time 4: Unit 5: Variable
F2.9.3.2	Operator	< <= = >= > <>
	Data	xxxxxx
F2.9.3.3	Start	Recall of records
F2.9.3.3.1	ID	xx
F2.9.3.3.2	Weight	xxxxxx
F2.9.3.3.3	Variable	xxxxxxxxxxxxxxxxxxxx
F2.9.3.3.4	Time	xx:xx:xx
F2.9.3.3.5	Date	xxxx-xx-xx
F2.9.4	Permanent ID Table	
F2.9.4.1	Search Field 2	0: ID 1: Description 2: Tare Weight 3: Unit 4: Variable

F-Code	Descriptive Name	Selections and Values
	Data	xxxxxx
F2.9.4.2	Operator	 < <= = >= > <>
F2.9.4.3	Start	Recall / Edit / New records
F2.9.4.3.1	ID	xx
F2.9.4.3.2	Description	xxxxxxxxxxxxxx
	Tare	xxxxxx
F2.9.4.3.3	Unit	kg lb t ton
F2.9.4.3.4	Variable	xxxxxxxxxxxxxxxxxxx
F2.9.4.3.5	Count	xxxxxxx
F2.9.4.3.6	Total	xxxxxxx
F2.10	Reset Application Block	

B.4. Terminal Block

F-Code	Descriptive Name	Selections and Values
F3.1	Device	
F3.1.1	Serial Number	[15 digits max.]
F3.1.2	Key Timeout	x
F3.2	Display	
F3.2.1	Screensaver	0: Disabled 1: 1 minute 2: 5 minutes ***3: 10 minutes** 4: 30 minutes

F-Code	Descriptive Name	Selections and Values
F3.2.2	Backlight Timeout	0: Always on 1: Disabled ***2: 1 minute** 3: 5 minutes 4: 10 minutes
F3.2.3	Auto Off Timer	***0: Disabled** 1: 10 minutes 2: 30 minutes 3: 60 minutes
F3.2.4	System Line	***0: Blank** 1: Discrete I/O 2: Time & Date 3: Both
F3.2.5	Tare Display	0: Disabled ***1: Active** 2: Always
F3.2.6	Adjust Contrast	
F3.3	Region	
F3.3.1	Format Time and Date	
F3.3.1.1	Time Format	0: 12:MM 1: 12:MM:SS 2: 24:MM ***3: 24:MM:SS**
F3.3.1.2	Date Format	0: DD/MM/YY ***1: DD/MMM/YYYY** 2: MM/DD/YY 3: MMM/DD/YYYY 4: YY/MM/DD 5: YYYY/MMM/DD
F3.3.1.3	Date Field Separator	*** /** - . (space) None
F3.3.2	Set Time & Date	
F3.3.2.1	Hour	xx
F3.3.2.2	Minutes	xx
F3.3.2.3	Day	xx

F-Code	Descriptive Name	Selections and Values
F3.3.2.4	Month	0: January 1: February 2: March 3: April 4: May 5: June 6: July 7: August 8: September 9: October 10: November 11: December
F3.3.2.5	Year	xxxx
F3.3.3	Language	
F3.3.3.1	Menu Language	***0: English** 1: "F" code 2: French 3: German 4: Italian 5: Spanish
F3.3.3.2	Setup Language	***0: English** 1: "F" codes
F3.4	Transaction Counter	
F3.4.1	Transaction Counter	0: Disabled ***1: Enabled**
F3.4.2	Edit Counter	***0: Disabled** 1: Enabled
F3.4.3	Next Transaction	***0000001**
F3.5	User	
F3.5.1	Password Protection	***0: Disabled** 1: Enabled
F3.5.2	Password	xxxxxx
F3.5.3	Confirm Password	xxxxxx
F3.6	Menu Keys	
F3.6.1	Alibi Memory	***0: Disabled** 1: Enabled
F3.6.2	Contrast Adjust	***0: Disabled** 1: Enabled
F3.6.3	Transaction Counter	***0: Disabled** 1: Enabled
F3.6.4	Time and Date	0: Disabled ***1: Enabled**

F-Code	Descriptive Name	Selections and Values
F3.6.5	Totals Memory	***0: Disabled** 1: Enabled
F3.6.6	Expand X10	***0: Disabled** 1: Enabled
F3.7	Reset Terminal	

B.5.   Communications Block

F-Code	Descriptive Name	Selections and Values	
F4.1	Templates		
F4.1.1	Output Templates		
F4.1.1.1	Template 1		
F4.1.1.1.1	Field	1 - 25	0: 3 spaces 1: 10 spaces 2: 15 spaces 3: Date 4: Displayed Wt. 5: End of template 6: Gross Weight 7: ID 8: Net Weight 9: New Line 10: Scale Name 11: String 1 12 – 19: String 2 - 9 20: String 10 21: Tare Weight 22: Time 23: Transaction #
F4.1.1.1.2	Add Line Feeds	xx	
F4.1.1.2	Template 2		
F4.1.1.2.1	Field	1 - 25	Same as F4.1.1.1.1
F4.1.1.2.2	Add Line Feeds	xx	
F4.1.1.3	Template 3		
F4.1.1.3.1	Field	1 - 25	Same as F4.1.1.1.1
F4.1.1.3.2	Add Line Feeds	xx	

F-Code	Descriptive Name		Selections and Values
F4.1.1.4	Template 4 (Vehicle Inbound)		
F4.1.1.4.1	Field	1 - 25	All of F4.1.1.1.1, plus 43: Transaction Date 44: Transaction Time 45: Transaction Type 46: Variable 47: Vehicle Description 48: Vehicle Gross Weight 49: Vehicle ID 50: Vehicle Net Weight 51: Vehicle Tare Weight
F4.1.1.4.2	Add Line Feeds	xx	
F4.1.1.5	Template 5 (Vehicle Outbound)		
F4.1.1.5.1	Field	1 - 25	All of F4.1.1.1.1, plus 43: Transaction Date 44: Transaction Time 45: Transaction Type 46: Variable 47: Vehicle Description 48: Vehicle Gross Weight 49: Vehicle ID 50: Vehicle Net Weight 51: Vehicle Tare Weight
F4.1.1.5.2	Add Line Feeds	xx	
F4.1.1.6	Template 6 (Checkweighing)		
F4.1.1.6.1	Field	1 - 25	All of F4.1.1.1.1, plus 27: n 28: Target Description 29: Target ID 30: Target Weight 31: Target & Tolerances 32: Total 33: Zone
F4.1.1.6.2	Add Line Feeds	xx	
F4.1.1.7	Template 7 (Peak Force Measurement)		
F4.1.1.7.1		1 - 25	All of F4.1.1.1.1, plus 38: # of Cycles 39: Average Weight 40: Maximum Weight 41: Minimum Weight 42: Peak Weight
F4.1.1.7.2	Add Line Feeds	xx	
F4.1.1.8	Template 8 (Animal Weighing)		
F4.1.1.8.1	Field	1 - 25	All of F4.1.1.1.1, plus 24: Average Weight 25: # of Animals 26: Average per Animal

F-Code	Descriptive Name	Selections and Values
F4.1.1.8.2	Add Line Feeds	xx
F4.1.1.9	Template 9 (Counting)	
F4.1.1.9.1	Field	1 - 25 All of F4.1.1.1.1, plus 34: APW 35: Piece Count 36: Record ID 37: Record Description
F4.1.1.9.2	Add Line Feeds	xx
F4.1.2	Strings	
F4.1.2.1	String # 1 - # 10	xxxxxxxxxxxxxxxxxxxxxxxxxx
F4.2	Reports	
F4.2.1	Width	***0: Narrow (40)** 1: Wide (80)
F4.2.2	Header	[20 characters max.]
F4.2.3	Record Separator	***0: None** 1: * 2: - 3: = 4: CR/LF
F4.2.4	Footer	xx
F4.3	Connections	
F4.3.1	COM1	
F4.3.1.1	Assignment	0: None 1: Continuous Output 2: Continuous-Extended Output ***3: Demand Output** 4: Reports 5: SICS 6: Variable Access 7: Continuous Multi1 (Animal weigh) 8: Continuous Multi2 (Animal weigh)
F4.3.1.2	Template	***0: Template 1** 1: Template 2 2: Template 3 3: Template 4 4: Template 5 5: Template 6 6: Template 7 7: Template 8 8: Template 9
F4.3.1.3	Checksum	***0: Disabled** 1: Enabled
F4.3.1.4	Assignment 2	***0: None** 1: Demand Output 2: Reports
F4.3.1.5	Template	Same as F4.3.1.2

F-Code	Descriptive Name	Selections and Values
F4.3.1.6	Assignment 3	***0: None** 1: Demand Output 2: Reports
F4.3.1.7	Template	Same as F4.3.1.2
F4.3.2	COM2	
F4.3.2.1	Assignment	***0: None** 1: Continuous Output 2: Continuous-Extended Output 3: Demand Output 4: Reports 5: SICS 7: Continuous Multi1 (Animal weigh) 8: Continuous Multi2 (Animal weigh)
F4.3.2.2	Template	***0: Template 1** 1: Template 2 2: Template 3 3: Template 4 4: Template 5 5: Template 6 6: Template 7 7: Template 8 8: Template 9
F4.3.2.3	Checksum	***0: Disabled** 1: Enabled
F4.3.2.4	Assignment 2	***0: None** 1: Demand Output 2: Reports
F4.3.2.5	Template	Same as F4.3.2.2
F4.3.2.6	Assignment 3	***0: None** 1: Demand Output 2: Reports
F4.3.2.7	Template	Same as F4.3.2.2
F4.3.3	USB	
F4.3.3.1	Assignment	0: None 1: Continuous Output 2: Continuous-Extended Output ***3: Demand Output** 4: Reports 5: SICS 6: Variable Access 7: Continuous Multi1 (Animal weigh) 8: Continuous Multi2 (Animal weigh)

F-Code	Descriptive Name	Selections and Values
F4.3.3.2	Template	***0: Template 1** 1: Template 2 2: Template 3 3: Template 4 4: Template 5 5: Template 6 6: Template 7 7: Template 8 8: Template 9
F4.3.3.3	Checksum	***0: Disabled** 1: Enabled
F4.3.3.4	Assignment 2	***0: None** 1: Demand Output 2: Reports
F4.3.3.5	Template	Same as F4.3.3.2
F4.3.3.6	Assignment 3	***0: None** 1: Demand Output 2: Reports
F4.3.3.7	Template	Same as F4.3.3.2
F4.3.4	Ethernet	
F4.3.4.1	Assignment	***0: None** 1: Demand Output 2: Print Client 3: Reports 4: SICS 5: Variable Access
F4.3.4.2	Template	***0: Template 1** 1: Template 2 2: Template 3 3: Template 4 4: Template 5 5: Template 6 6: Template 7 7: Template 8 8: Template 9
F4.3.4.3	Assignment 2	***0: None** 1: Demand Output 2: Reports
F4.3.4.4	Template	Same as F4.3.4.2
F4.3.4.5	Assignment 3	***0: None** 1: Demand Output 2: Reports
F4.3.4.6	Template	Same as F4.3.4.2
F4.3.5	Print Client	
F4.3.5.1	Assignment	0: None 1: Continuous Output 2: Continuous-Extended Output ***3: Demand Output** 4: Reports

F-Code	Descriptive Name	Selections and Values
F4.3.5.2	Template	***0: Template 1** 1: Template 2 2: Template 3 3: Template 4 4: Template 5 5: Template 6 6: Template 7 7: Template 8 8: Template 9
F4.3.5.3	Checksum	***0: Disabled** 1: Enabled
F4.3.5.4	Assignment 2	***0: None** 1: Demand Output 2: Reports
F4.3.5.5	Template	Same as F4.3.5.2
F4.3.5.6	Assignment 3	***0: None** 1: Demand Output 2: Reports
F4.3.5.7	Template	Same as F4.3.5.2
F4.4	Serial	
F4.4.1	COM1	
F4.4.1.1	Baud Rate	0: 300 1: 600 2: 1200 3: 2400 4: 4800 ***5: 9600** 6: 19200 7: 38400 8: 57600 9: 115200
F4.4.1.2	Data Bits	0: 7 ***1: 8**
F4.4.1.3	Parity	***0: None** 1: Even 2: Odd
F4.4.1.4	Flow Control	***0: None** 1: XON - XOFF
F4.4.1.5	Interface	***RS-232** RS422 RS485

F-Code	Descriptive Name	Selections and Values
F4.4.2	COM2 / USB	
F4.4.2.1	Baud Rate	0: 300 1: 600 2: 1200 3: 2400 4: 4800 ***5: 9600** 6: 19200 7: 38400 8: 57600 9: 115200
F4.4.2.2	Data Bits	0: 7 ***1: 8**
F4.4.2.3	Parity	***0: None** 1: Even 2: Odd
F4.4.2.4	Flow Control	***0: None** 1: XON - XOFF
F4.4.2.5	Interface	***0: RS-232** 1: RS-485
F4.5	Network	
F4.5.1	Ethernet	
F4.5.1.1	MAC Address	xxxxxxxxxxxx
F4.5.1.2	DHCP Client	***0: Disabled** 1: Enabled
F4.5.1.3	IP Address	***192.168.0.1**
F4.5.1.4	Subnet Mask	***255.255.255.0**
F4.5.1.5	Gateway	***0.0.0.0**
F4.5.2	Print Client	
F4.5.2.1	Server IP Address	***0.0.0.0**
F4.5.2.2	Server TCP Port	***8000**
F4.6	Reset Communication Block	
Communication - Network – Wi-Fi Connection Settings		
SSID	IND245	
Encryption method	WPA2-AES	
Password	12345678	
Communication - Network – Wi-Fi Network Settings		
MAC		
MAC address	**Disabled**	
IP address	192.168.0.1	
Subnet Mask	255.255.255.0	
Gateway	192.168.0.10	

B.6.   Maintenance Block, IND246 Analog

F-Code	Descriptive Name	Selections and Values
F5.1	Diagnostics	
F5.1.1	Display Test	
F5.1.2	Keyboard Test	
F5.1.2.1	Key Pressed:	Key symbol displayed when pressed
F5.1.3	Scale	
F5.1.3.1	Load Cell Output	
F5.1.3.1.1	Output	xxxxxxx
F5.1.3.2	Calibration Values	
F5.1.3.2.1	Zero Counts	xxxxxxxx
F5.1.3.2.4	High Test Load	xxxxxxxx
F5.1.3.2.5	High Counts	xxxxxxxx
F5.1.3.2.6	Shift Adjust	xxxxxxxx
F5.1.3.3	Statistics	
F5.1.3.3.1	Weighments	xxxxxxxx
F5.1.3.3.2	Overloads	xxxxxxxx
F5.1.3.3.3	Peak Weight	xxxxxxxx
F5.1.3.3.4	Zero Commands	xxxxxxxx
F5.1.3.3.5	Zero Failures	xxxxxxxx
F5.1.3.3.6	Zero Drift and Overload	
F5.1.4	Serial Test	
F5.1.4.1	Port	0: None 1: COM1 2: COM2/IUSB
F5.1.4.2	Sending	Testing COM1: xx
F5.1.4.3	Receiving	xxxxxxxxxxxxx
F5.1.5	Discrete I/O Test	
F5.1.5.1	Input	1, 2
F5.1.5.2	Output	1 – 4
F5.2	Replace Battery	
F5.3	Install SW Update	
F5.3.1	File Name	246A0xx
F5.4	Backup to SD	
F5.4.1	Dataset Name	246_xx

F-Code	Descriptive Name	Selections and Values
F5.4.2	Start	
F5.5	Restore from SD	
F5.5.1	Dataset Name	246_xx
F5.5.2	Restore	1: Configuration Only 2:Configuration and Calibration
F5.5.3	Start	
F5.6	Reset All	

B.7. Maintenance Block, IND246 POWERCELL

F-Code	Descriptive Name	Selections and Values
F5.1	Diagnostics	
F5.1.1	Display Test	
F5.1.2	Keyboard Test	
F5.1.2.1	Key Pressed:	Key symbol displayed when pressed
F5.1.3	Scale	
F5.1.3.1	Load Cell Output	
F5.1.3.1.1	Output	xxxxxxx
F5.1.3.2	Calibration Values	
F5.1.3.2.1	Zero Counts	xxxxxxxx
F5.1.3.2.2	Mid Test Load	Xxxxxxxx not on POWERCELL
F5.1.3.2.3	Mid Counts	Xxxxxxxx not on POWERCELL
F5.1.3.2.4	High Test Load	xxxxxxxx
F5.1.3.2.5	High Counts	xxxxxxxx
F5.1.3.3	Statistics	
F5.1.3.3.1	Weighments	xxxxxxxx
F5.1.3.3.2	Overloads	xxxxxxxx
F5.1.3.3.3	Peak Weight	xxxxxxxx
F5.1.3.3.4	Zero Commands	xxxxxxxx
F5.1.3.3.5	Zero Failures	xxxxxxxx
F5.1.4	Serial Test	
F5.1.4.1	Port	0: None 1: COM1 2: COM2/IUSB
F5.1.4.2	Sending	Testing COM1: xx
F5.1.4.3	Receiving	xxxxxxxxxxxxxx

F-Code	Descriptive Name	Selections and Values
F5.1.5	Discrete I/O Test	
F5.1.5.1	Input	1, 2
F5.1.5.2	Output	1 – 4
F5.2	Replace Battery	
F5.3	Install SW Update	
F5.3.1	File Name	246AOxx
F5.4	Backup to SD	
F5.4.1	Dataset Name	246_xx
F5.4.2	Start	
F5.5	Restore from SD	
F5.5.1	Dataset Name	246_xx
F5.5.2	Restore	1: Configuration Only 2: Configuration and Calibration
F5.5.3	Start	
F5.6	Cell Maintenance.	
F5.6.1	Performance Log	Interval, in hours
F5.6.2	Error Log	*Enabled, Disabled
F5.6.3	MT Service Security	
F5.6.4	MT Service View	Enabled with Lock String at MT Service Security
F5.7	Reset All	

C. Alibi Memory

Alibi memory stores transaction information in a preset format that is not changeable. Alibi memory can be enabled or disabled in setup at **Application > Memory > Alibi**. In order for the Alibi memory to store transaction data, the optional SD memory card must be installed.

The alibi memory operates by storing up to 100 alibi records in a battery-backed file as they occur. When this file is full, each of these records is written to the "alibi.bin" file in flash and the 100-record file is cleared and begins to store the next 100 records. The Alibi memory feature can store up to 60,000 transactions before it rolls over and begins to overwrite the oldest file. When the Alibi memory becomes 75% full, a warning message displays indicating the status. Another message displays when the file is 90% full. It will continue to store records and when it is 100% full, it begins overwriting the oldest records. At this point, new Alibi memory records will be recorded over the older ones.

Each record in the Alibi Memory file includes:

- Date and time fields

- A transaction counter value, which is a unique numeric field that identifies the transaction (the transaction counter must be enabled in terminal setup to activate the transaction counter value)

- Gross or net weight, tare weight, type of tare, and weight unit

C.1. Viewing Alibi Memory Records

Alibi memory records can be viewed from the **Alibi** icon on the Operator menu. Follow the steps below to view Alibi memory records.

1. Press the MENU key (M) then move focus to the Alibi icon **Alibi** using the navigation keys ∧ > ∨ < then press ENTER .

2. The Search Screen displays. Figure C-1 shows Search Field 1 - the first of two Alibi memory search screens. Note the scroll bar at right, indicating the availability of a second screen. The second screen contains Search Field 2 and its associated data fields.
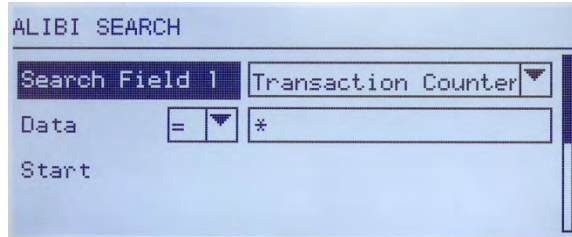
3. Figure C-1: Alibi Search Screen

4. Use the Search Field 1 and Search Field 2 selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" character, the asterisk (*) to view all records.

5. Move focus to the "Start" label below the "Data" label on either Search Field 1 or Search Field 2 screen then press ENTER [icon] to begin the search.

6. The Alibi Memory Search View screen displays with the search results sorted in chronological order. The most current record will be shown first. Each additional record can be viewed by pressing the DOWN navigation key. Figure C-2 includes a series of screens to show the contents of further records available in the view.
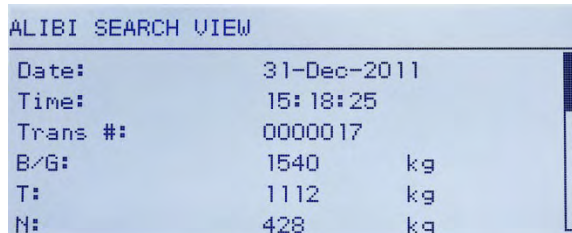
Figure C-2: Alibi Search Results View

The Alibi Memory cannot be manually cleared. It is automatically cleared after it has been disabled and enabled again in setup.

C.2. Printing Alibi Memory Records

Results of the Alibi Memory search can be printed directly from the view page. The print format is fixed with a few cosmetic programming selections described in Chapter 3.0, **Configuration**. Sample report printouts are provided at the end of this section.

To Print Alibi Memory:

1. Access the Alibi Memory view as described previously using the MENU softkey [icon] and the Alibi icon **Alibi**.

2. Use the Search Field selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" character, the asterisk (*), to view all records.

3. With the Alibi Memory search results displayed, press the PRINT key.

4. A "Reports" connection must be configured to enable the report print.

C.3.   Alibi Memory Print Formats

The Alibi Memory report printout is in a fixed format with certain selectable parameters in setup. The width of the report is selectable as either narrow (40 characters) or wide (80 characters). In addition to the report width, the field separator character can be selected and the number of blank lines at the beginning (header) and end (footer) of the report can be entered.

C.3.1.   Narrow Format, * Record Separator

```
-- ALIBI MEMORY REPORT --
12:27:43      26 Jun 2011

14-Jun-2011        16:07:45        0000027
     8.2 lb          0 lb T      8.2 lb
****************************************
14-Jun-2011        14:09:32        0000026
    72.7 lb          0 lb T     72.7 lb
****************************************
14-Jun-2011        11:14:16        0000025
    33.3 kg       11.6 kg T     21.7 kg
****************************************
```

Figure C-3: Narrow Report Format

C.3.2.   Wide Format, = Record Separator

```
-- ALIBI MEMORY REPORT --
12:27:43      15 Jun 2011

14-Jun-2011   16:07:45   0000027        8.2 lb          0 lb T       8.2 lb
============================================================================
14-Jun-2011   14:09:32   0000026       72.7 lb          0 lb T      72.7 lb
============================================================================
14-Jun-2011   11:14:16   0000025       33.3 kg        11.6 kg T     21.7 kg
============================================================================
```

Figure C-4: Wide Report Format

D. Communications

D.1. Serial Interface Parameters

One standard serial port and one optional serial port are supported with the IND246 terminal. They are designated COM1 (standard port on the Main PCB) and COM2 (optional).

For the standard IND246 terminal COM1 provides an RS-232 interface only. For the IND246 POWERCELL terminal there is a choice of a RS-232, RS-422 or RS-485 interface. The RS-232 interface is a three-wire (TDX, RXD, and GND) with selectable XON-XOFF handshaking. The RS-232 interface is a three-wire (TDX, RXD, and GND) with selectable XON-XOFF handshaking. The RS-485 connection is a two-wire interface but does not support multi-drop communication with addressing. The port must be selected for use as either RS-232 or RS-485 due to the different operating requirements of the interfaces.

Optional **COM2** provides RS-232 and RS-485 interfaces.

Character framing is programmable in the setup mode. Framing can be:

- 1 start bit
- 7 or 8 ASCII data bits (selectable)
- 0 or 1 parity bit (selectable as none, even, or odd)
- 1 stop bit

The baud rate can be configured from 300 to 115.2K baud and a checksum character can also be configured when using one of the continuous output strings.

The IND246 terminal supports the following functions on the serial ports:

- Demand output with CTPZ input
- Continuous output with CTPZ input
- Extended continuous output with CTPZ input
- SICS (level 0 and level 1)
- Reports
- Variable access (COM1 only)
- Continuous – Multi 1 (selectable when animal weighing is active)
- Continuous – Multi 2 (selectable when animal weighing is active)

The COM1 port is also used when flashing new firmware to the terminal.

D.2. Demand Output Mode

The demand output mode transmits data only when the terminal receives a print request. Print requests are sent to the IND246 terminal when:

- The operator presses PRINT

- A discrete input selected as print is triggered

- An ASCII "P" is sent through a demand or continuous port

- Auto print is enabled and all conditions for auto print are met

- A print command is sent via shared variable access. NOTE: This does not apply to terminals with Argentina approval.

When triggered, data is transmitted in a string programmed in the output template portion of setup. Demand mode is used typically when sending data to a printer or PC on a transactional basis.

NOTE: When the demand output mode is assigned, the port is automatically set up to also receive certain ASCII characters to duplicate keypad functions. Refer to the C,T,P,Z section later in this appendix for more details.

D.2.1. Output Templates

The IND246 terminal provides three programmable output templates to define the string of data to be transmitted. Each of the templates is configured in setup and can contain up to 25 fields of data. The same template can be sent to both COM1 and COM2 if both ports are programmed for demand output. It is also possible to send a different data string from the two ports by assigning a different template to each one. The default values for each of the templates follow:

Template 1

```
 29.94 kg
 10.32 kg  T
 19.62 kg  NET
```

Template 2

```
Scale Name
Time
Date
 29.94 kg
 10.32 kg  T
 19.62 kg  NET
```

Template 3

```
 29.94 kg      10.32 kg  T      19.62 kg  NET
```

D.3.   Continuous Output Mode

The continuous output mode of the IND246 terminal can be used to continuously send weight data and scale status information to a remote device such as a PC or a remote display.

> NOTE: When any of the continuous output modes are assigned, the port is automatically set up to also receive certain ASCII characters to duplicate keypad functions. Refer to the C,T,P,Z section later in this appendix for more details.

D.3.1.   Standard Continuous Output

Continuous Output can be assigned to COM1 or COM2. A checksum character can be enabled or disabled with continuous output. A data string will be output approximately 4 times per second for baud rates above 4800 baud. If a baud rate below 4800 is selected, the output rate will be slower. At 300 baud, the output rate is only approximately 1 per second. The data consists of 17 or 18 bytes as shown in Table D-1.

Non-significant weight data and tare data digits are transmitted as spaces. The continuous output mode provides compatibility with METTLER TOLEDO products that require real-time weight data. Table D-1 shows the format for the standard continuous output.

Table D-1: Standard Continuous Output Format

		Status[2]			Indicated Weight[3]						Tare Weight[4]							
Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data	STX[1]	SB-A	SB-B	SB-C	MSD	-	-	-	-	LSD	MSD	-	-	-	-	LSD	CR[5]	CHK[6]

> Continuous Output Format Notes:

1. ASCII Start of Text character (02 hex), always transmitted.

2. Status bytes A, B and C. Refer to Table D-2, Table D-3, and Table D-4 for details of the structure.

3. Displayed weight. Either gross or net weight. Six digits, no decimal point or sign. Insignificant leading zeroes are replaced with spaces.

4. Tare weight. Six digits of tare weight data. No decimal point in field.

5. ASCII Carriage Return <CR> character (0D hex).

6. Checksum, transmitted only if enabled in setup. Checksum is used to detect errors in the transmission of data. Checksum is defined as the 2's complement of the seven low order bits of the binary sum of all characters preceding the checksum character, including the <STX> and <CR> characters.

Table D-2, Table D-3, and Table D-4 detail the status bytes for standard continuous output.

Table D-2: Status Byte A Bit Definitions

Bits 2, 1, and 0			
2	1	0	Decimal Point Location
0	0	0	XXXXX00

Bits 2, 1, and 0			
0	0	1	XXXXX0
0	1	0	XXXXXX
0	1	1	XXXXX.X
1	0	0	XXXX.XX
1	0	1	XXX.XXX
1	1	0	XX.XXXX
1	1	1	X.XXXXX
Bits 4 and 3			
4		**3**	**Build Code**
0		1	X1
1		0	X2
1		1	X5
Bit 5			Always = 1
Bit 6			Always = 0

Table D-3: Status Byte B Bit Definitions

Status Bits	Function
Bit 0	Gross = 0, Net = 1
Bit 1	Sign, Positive = 0, Negative = 1
Bit 2	Out of Range = 1 (Over capacity or Under Zero)
Bit 3	Motion = 1, Stable = 0
Bit 4	lb = 0, kg = 1 (see also Status Byte C, bits 0, 1, 2)
Bit 5	Always = 1
Bit 6	Zero Not Captured after power-up = 1

Table D-4: Status Byte C Bit Definitions

Bits 2, 1, and 0			Weight Description
2	**1**	**0**	
0	0	0	lb or kg, selected by Status Byte B, bit 4
0	0	1	grams (g)
0	1	0	metric tons (t)
0	1	1	ounces (oz)
1	0	0	not used
1	0	1	not used

Bits 2, 1, and 0			Weight Description
2	**1**	**0**	
1	1	0	tons (ton)
1	1	1	custom units
Bit 3			Print Request = 1
Bit 4			Expand Data x 10 = 1, Normal = 0
Bit 5			Always = 1
Bit 6			Always = 0

D.3.2. Continuous Output in Animal Weighing

When the animal weighing application is selected, the data in the continuous output operates differently. This is done so that a remote display can display the average total weight on the platform.

Before the animal weighing cycle begins, the continuous output operates as normal. When the animal weighing cycle starts, the data in the continuous output changes to transmit asterisks (2Ah) in the displayed weight field and zeroes in the tare weight field. This continues until the processed weight is determined.

After the averaging cycle, the averaged weight is shown on the IND246 display, and the continuous output transmits the averaged weight in the displayed weight field. This continues as long as the display shows the processed average weight. During this time, if a tare has been taken, the tare weight is still sent in the tare weight field in the continuous output.

When the terminal weight display goes back to showing live scale weight, the continuous output returns to normal.

D.3.3. Continuous – Extended Output

The extended continuous output is a 24 byte message string that is an extension of the standard 17 bytes continuous output format. The additional bytes serve to provide a node address and, optionally, custom application bits. A checksum character is selectable.

The IND246 terminal supports only the point-to-point application of the extended continuous format. The multi-drop application is not supported.

Table D-5 describes the extended continuous output format. The output takes the form shown here:

<SOH><ADR><SB-1><SB-2><SB-3><SB-4><WWWWWWWWW><TTTTTTTT><CR><CKS>

Table D-5: Format of Continuous – Extended Output

		Status				Indicated Weight									Tare Weight									
Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Data	SOH	ADR	SB1	SB2	SB3	SB4	W	W	W	W	W	W	W	W	W	T	T	T	T	T	T	T	T	CR	CKS
Note	A	B	C				D									E								F	G

■ Extended Continuous Output Format Notes:

1. ASCII Start of Header character <SOH> (01xh)

2. Address character always present. The address is always "1" (31xh).

3. Status Bytes 1 to 4. Refer to Table D-6, Table D-7, Table D-8 and Table D-9.

4. Displayed weight (gross or net). Nine (9) ASCII digits including negative sign, decimal point. Leading zeros are set to spaces (20H). A minus sign (2DH) is sent immediately before the MSD for negative weights. Digits sent when data is invalid can be weight, zeros, or spaces (they should be ignored by receiving device). This field may also contain asynchronous error codes, when the data invalid bit is set.

5. Tare weight. Eight (8) ASCII digits including decimal point. Leading zeros set to spaces (20xh).

6. ASCII carriage return <CR> (0Dxh).

7. Optional checksum. This character is the 2's complement of the sum of the 7 least significant bits of all preceding characters including the <SOH> and <CR>. The checksum character is transmitted with the same parity as all other characters.

Table D-6, Table D-7, Table D-8 and Table D-9 indicate the functions of status bytes 1, 2, 3 and 4.

Table D-6: Status Byte 1 Definitions

Bit 3	Bit 2	Bit 1	Bit 0	Units
0	0	0	0	None
0	0	0	1	pounds
0	0	1	0	kilograms
0	0	1	1	grams
0	1	0	0	metric tons
0	1	0	1	tons
0	1	1	0	Not used
0	1	1	1	Not used
1	0	0	0	ounces
1	0	0	1	custom
1	0	1	0	Not used
1	0	1	1	Not used
1	1	0	0	Not used
1	1	0	1	Not used
1	1	1	0	Not used
1	1	1	1	Not used
Bit 4				Center of zero = 1
Bit 5				Always = 1
Bit 6				Weight in motion = 1

Table D-7: Status Byte 2 Definitions

Bit	Description	
Bit 0	Gross or net mode, Net = 1	
Bit 2	**Bit 1**	**Tare type**
0	0	No tare
0	1	Semi-automatic tare
1	0	Preset tare
1	1	Not used
Bit 3	Always = 0	
Bit 4	Always = 0	
Bit 5	Always = 1	
Bit 6	Expanded by x10 = 1	

Table D-8: Status Byte 3 Definitions

Bit	Description
0	Data invalid = 1
1	Out of range under zero = 1
2	Out of range over capacity = 1
3	In power up (zero not captured) = 1
4	Print initiated = 1
5	Always = 1
6	Not used

Table D-9: Status Byte 4 Definitions

Bit	Description
0	Always = 0
1	Always = 0
2	Always = 0
3	Always = 0
4	Always = 0
5	Always = 1
6	Always = 0

◼ **Additional Extended Continuous Output Notes:**

- The Data Invalid bit in Status Byte 3 indicates an overcapacity value, an under zero condition, or other conditions that indicate the weight value may not be valid. Any device reading the continuous output must monitor the Data Invalid bit and handle the data accordingly.

- The application bits in Status Byte 4 are used for specific functions by other terminals and are not use in the IND246 terminal.

- In addition to setting the Data Invalid bit to 1 in Status Byte 3 when the weight data is not available, the indicated weight data field could be replaced with an asynchronous error code. The 9-character weight field is replaced with the following error code data format:

Indicated Weight Field Character	Description
1	Always "E" (45xh) indicating an error message
2 – 5	Error source
6 – 7	Error code
8 – 9	Space (20 Hex)

D.3.4.   Multi-Continuous Out

The multi-continuous mode is only supported when the Animal Weighing application is enabled and Mode 2 operation (multiple animals) is selected. This mode of continuous output supports multiple remote displays for the three data fields of Mode 2 operation. The three fields are: quantity of animals, average weight per animal and average total weight. There are two variations of multi-continuous output – multi-continuous 1 and 2.

The 'Quantity of animals' field in the output is updated when a new value has been entered. The average animal weight and total weight fields are transmitted only while these values are on the display. When the display is cleared, spaces (20h) are sent for these fields.

D.3.4.1.   Multi-Continuous 1

This continuous output is used with multi-scale scoreboards (except 8616). The string consists of separate messages for each of the three data fields.

Table D-10 shows the structure for each of the three messages. The data field identification character (e.g. 01H) replaces the typical STX leading character in the output.

Table D-10: Multi-Continuous 1 Format

Character #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data	ADR	SWA	SWB	SWC	W	W	W	W	W	W	T	T	T	T	T	T	CR	CKS
Notes	1	2			3						4						5	6

Multi-Continuous 1 Output Format Notes:

1. <ADR> ASCII Character in hex that represents the data field address 01h=quantity of animals, 02h=average weight per animal, 03h=average total weight.

2. <SWA>, <SWB>, <SWC> Status Word Bytes A, B, and C. Refer to the Standard continuous output Bit Identification Tables (Table D-2, Table D-3 and Table D-4) for individual bit definition.

3. Data field. Six digits, no decimal point or sign. Non significant leading zeros are replaced with spaces.

4. Tare weight. Six digits, no decimal point or sign. This data will always be all spaces for quantity of animals and average weight per animal fields.

5. <CR> ASCII Carriage Return, Hex 0D.

6. <CKS> Checksum character, 2's complement of the 7 low order bits of the binary sum of all characters on a line preceding the checksum, including the CR.

The output of each of the three data fields occurs in sequence and then the fields repeat. One complete cyclic data transmission is shown in Table D-11. This output represents:

- A quantity of 8 animals

- An average weight per animal of 803 pounds

- An average total weight of 6426 pounds.

Table D-11: Multi-continuous 1 Complete Data String

Quantity of Animals (8)																	
Character #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data	SOH	2Ah	20h	20h	20h	20h	20h	20h	20h	38h	20h	20h	20h	20h	20h	20h	CR	CKS

Average Weight per Animal (803 lb)																	
Character #	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Data	STX	2Ah	20h	20h	20h	20h	20h	38h	30h	33h	20h	20h	20h	20h	20h	20h	CR	CKS

Average Total Weight (6426 lb)																	
Character #	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Data	EOT	2Ah	20h	20h	20h	20h	36h	34h	32h	36h	20h	20h	20h	20h	20h	20h	CR	CKS

D.3.4.2.   Multi-Continuous 2

This continuous output is used with multi-scale remote displays and 8618 scoreboard (set for protocol P:22).

The string consists of separate messages for every data field. The leading character for each field is always STX. Each data field is identified by the binary encoding of the field number in the three least significant bits (0-2) of Status Byte C – refer to Table D-15. The structure for each message is shown in Table D-12.

Table D-12: Multi-Continuous 2 Data Format

Character #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data	STX	SWA	SWB	SWC	W	W	W	W	W	W	T	T	T	T	T	T	CR	CKS
Notes	1	2			3						4						5	6

Multi-Continuous 2 Output Format Notes:

1. <STX> ASCII Start of Text Character, Hex 02.

2. <SWA>, <SWB>, <SWC> Status Word Bytes A, B, and C. Refer to Table D-13, Table D-14and Table D-15 for individual bit definition.

3. Data field. Six digits, no decimal point or sign. Non significant leading zeros are replaced with spaces.

4. Tare weight. Six digits, no decimal point or sign. This data will always be all spaces for quantity of animals and average weight per animal fields.

5. <CR> ASCII Carriage Return, Hex OD.

6. <CKS> Checksum character. 2's complement of the 7 low order bits of the binary sum of all characters on a line preceding the checksum, including the STX and CR.

The following tables detail the status bytes for Multi-Continuous 2 output.

Table D-13: Multi-Continuous 2 - Status Byte A

Bit 0	Bit 1	Bit 2	Decimal Point Location
0	0	0	XXXX00
1	0	0	XXXXX0
0	1	0	XXXXXX
1	1	0	XXXXX.X
0	0	1	XXXX.XX
1	0	1	XXX.XXX
0	1	1	XX.XXXX
1	1	1	X.XXXXX
Bit 3	**Bit 4**		**Build Code**
1	0		X1
0	1		X2
1	1		X5
Bit 5			Always = 1
Bit 6			Always = 0

Table D-14: Multi-Continuous 2 - Status Byte B

Status Bits	Function
Bit 0	Gross=0, Net=1
Bit 1	Sign, Positive=0, Negative=1
Bit 2	Out of Range =1 (Over capacity or under zero)
Bit 3	Motion=1
Bit 4	lb=0, kg=1 (see also Status Byte C, bits 0-2)
Bit 5	Always=1
Bit 6	In Power Up=1

Table D-15: Multi-Continuous 2 - Status Byte C

Bit 0	Bit 1	Bit 2	Weight Description
1	0	0	Quantity of animals
0	1	0	Average weight per animal
1	1	0	Average total weight
0	0	1	Not used
1	0	1	Not used

Bit 3	Print Request=1
Bit 4	Expand Data x10=1
Bit 5	Always=1
Bit 6	Always=0

The output of each of the three data fields occurs in sequence and then the fields repeat. One complete cyclic data transmission is shown in Table D-16. The yellow blocks indicate the status words containing the address and the green blocks indicate the data.

- A quantity of 8 animals

- An average weight per animal of 803 pounds

- An average total weight of 6426 pounds.

Table D-16: Multi-Continuous 2 Complete Data String

	Quantity of Animals (8)																	
Character #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data	STX	2Ah	20h	21h	20h	20h	20h	20h	20h	38h	20h	20h	20h	20h	20h	20h	CR	CKS

	Average Weight per Animal (803 lb)																	
Character #	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Data	STX	2Ah	20h	22h	20h	20h	20h	38h	30h	33h	20h	20h	20h	20h	20h	20h	CR	CKS

	Average Total Weight (6426 lb)																	
Character #	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Data	STX	2Ah	20h	23h	20h	20h	36h	34h	32h	36h	20h	20h	20h	20h	20h	20h	CR	CKS

D.4.   Scoreboard Displays

The Animal Weighing application is designed to operate with the METTLER TOLEDO ADI family of scoreboard displays. Function depends on which application mode is selected in setup at F2.5.1.1.

In Mode 1, the standard continuous output is modified to send live weight to a single scoreboard during the weighing cycle, and the averaged weight when averaging is complete.

In Mode 2, the Continuous Multi-1 mode can be used to display three separate fields (the quantity of animals, the total averaged weight and the average animal weight) simultaneously on three separate scoreboards.

The Continuous Extended format is not configured for use with the Animal Weighing application.

D.4.1.   Continuous Output

This feature can be used in either Mode 1 or Mode 2 of Animal Weighing operation. A single scoreboard is used to show live scale weight until the averaging cycle starts. During the averaging cycle, the indicated weight field is changed to asterisks which will cause the ADI family of scoreboards to blank. When the averaged weight is determined, the average weight will be shown on the scoreboard until the cycle is ended (PRINT requested). After the cycle is ended, the scoreboard will return to showing live scale weight until the next cycle is started.

When using a single scoreboard, either COM1 (RS-232) or the optional COM2 (RS-232 or RS-422) can be used to send data from the terminal. Refer to the ADI Installation and Service Manual to wiring details.

Program the ADI scoreboard with the values shown in Table D-17.

Table D-17: ADI Programming: Continuous Output

Option #	Value	Option #	Value	Option #	Value	Option #	Value
1	Off	8	Off	15	Off	22	Off
2	1 (On)	9	Off	16	Off	23	Off
3	Off	10	Off	17	Off	24	Off
4	Off	11	Off	18	42	25	Off
5	Off	12	Off	19	Off		
6	Off	13	Off	20	Off		
7	Off	14	Off	21	Off		

D.4.2.   Continuous Multi-1 Output

This feature should be used only in Mode 2 of operation. One, two or three scoreboards are used, each showing one field of information. Each scoreboard is assigned an address in its setup (Option 11) so that it displays one of the three fields being sent by the terminal. Address assignments are shown in Table D-18.

Table D-18: Scoreboard Addresses for Mode 2 Operation

Address	Field to Display
1	Quantity of animals
2	Average weight per animal
3	Total weight of all animals

Program the ADI scoreboards with the values listed in Table D-19. Note that Option 11 sets the field to be displayed, as shown in Table D-18.

Table D-19: ADI Programming: Continuous-Multi 1 Output

Option #	Value	Option #	Value	Option #	Value	Option #	Value
1	Off	8	Off	15	Off	22	Off
2	1 (On)	9	Off	16	Off	23	Off
3	Off	10	Off	17	Off	24	Off
4	Off	11	1, 2 or 3	18	Off	25	Off
5	Off	12	Off	19	Off		
6	Off	13	Off	20	Off		
7	Off	14	Off	21	Off		

To connect two or three ADI scoreboards together, the terminal's COM2 option must be installed, and RS-422 communication must be used. Program the IND246 COM2 for RS-485 output and wire the scoreboards in parallel, as shown in Figure D-1. For longer cable distances, it may be

necessary to install a 120Ω termination resistor between the A and B data lines of the last scoreboard.
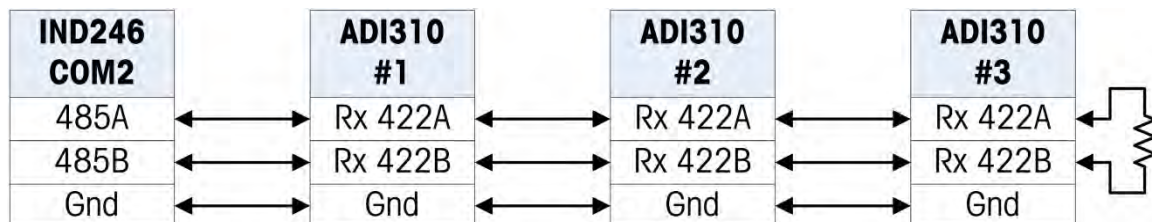
Figure D-1: ADI Scoreboard Wiring for IND246 Continuous-Multi 1 Output

D.5.   CTPZ

When a serial port is programmed as a demand, continuous, continuous extended or continuous Multi1 or Multi2 output, the CTPZ input mode is automatically assigned. The CTPZ input mode provides a method for a remote serial device to trigger several basic functions when a command character is sent to the terminal. A termination character is not required. Remote ASCII command characters include:

- C – Clears the scale to gross
- T – Tares the scale (causes a pushbutton tare)
- P – Initiates a print command
- Z – Zeros the scale

All other characters are ignored. Note that some of the applications have serial commands added. These are described in the application details in the Application chapter.

🔹 ASCII command characters must be sent in upper-case letters.

Example

To initiate a pushbutton tare, program the terminal for demand or continuous output for a specific port, program the serial port parameters to match the other device and then send the ASCII character "T".

D.6.   Standard Interface Command Set (SICS) Protocol

The IND246 terminal supports the METTLER TOLEDO Standard Interface Command Set (MT-SICS), which is divided into four levels (0, 1, 2, 3), depending on the functionality of the device. This terminal supports parts of levels 0 and 1:

- MT-SICS level 0 – Command set for the simplest device.
- MT-SICS level 1 – Extension of the command set for standard devices.

A feature of this interface is that the commands combined in MT-SICS level 0 and 1 are identical for all devices. Both the simplest weighing device and a fully expanded weighing workstation can recognize the commands of MT-SICS levels 0 and 1.

D.6.1. Version Number of the MT-SICS

Each level of the MT-SICS has its own version number, which can be requested with the command I1 from level 0. This terminal supports:

- MT-SICS level 0, version 2.2x (except the ZI command)

- MT-SICS level 1, version 2.2x (except the D, DW and K commands)

D.6.2. Command Formats

Each command received by the terminal via the SICS interface is acknowledged by a response to the transmitting device. Commands and responses are data strings with a fixed format. Commands sent to the terminal comprise one or more characters of the ASCII character set. Commands must be in upper-case.

The parameters of the command must be separated from one another and from the command name by a space (20xh), in the examples shown in this section, a space is represented as _).

Each command must be terminated by <CR>< LF> (0Dxh, 0Axh).

The characters <CR> and <LF>, which can be input using the **ENTER** or **RETURN** key of most PC terminal keypads, are not shown in this description; however, it is essential they be included for communication with the terminal.

Example

Command to tare the terminal:

"TA_20.00_lb" (The command terminators <CR>< LF> are not shown.)

D.6.3. Response Formats

All responses sent by the terminal to the transmitting device acknowledging the received commands have one of the following formats:

Response with weight value

Response without weight value

Error message

D.6.3.1. Format of the Response with Weight Value

A general description of the response with weight value as follows:
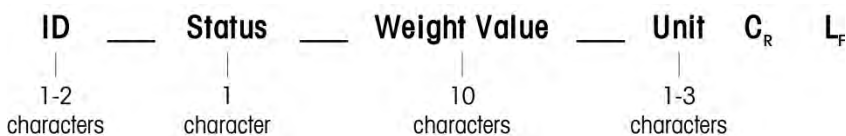
ID	Status	Weight Value	Unit	C$_R$	L$_F$
1-2 characters	1 character	10 characters	1-3 characters		

ID – Response identification.

__ – Space (20xh)

Status – Status of the terminal. See description of the commands and responses.

Weight Value – Weighing result, which is shown as a number with 10 digits, including sign directly in front of the first digit. The weight value appears right justified. Preceding zeroes are suppressed with the exception of the zero to the left of the decimal point.

Unit – Weight unit displayed.

CR – Carriage Return (0Dxh.)

LF – Line Feed (0Axh)

Comment – the <CR> and <LF> characters will not be shown in this description.

Example

Response with a stable weight value of 0.256 kg:

S _ S_ _ _ _ _ _ 0.256 _ kg

D.6.3.2.   Format of the Response without Weight Value

A general description of the response without weight value is as follows:
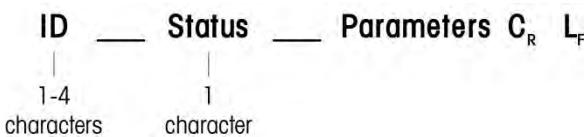
$$\text{ID} \quad \underline{\quad} \quad \text{Status} \quad \underline{\quad} \quad \text{Parameters} \quad C_R \quad L_F$$

ID
1-4 characters

Status
1 character

ID – Response identification.

__ – Space (20xh)

Status – Status of the terminal. See description of the commands and responses.

Parameters – Command-dependent response code.

CR – Carriage Return (0Dxh)

LF – Line Feed (0Axh)

Comment – the <CR> and <LF> characters will not be shown in this description.

ID C_R L_F

D.6.3.3.   Format of Error Message

There are three different error messages. The identification always comprises two characters:

- ES – Syntax error
  The terminal has not recognized the received command.
- ET – Transmission error
  The terminal has received a "faulty" command, such as a parity error.
- EL – Logical error
  The terminal cannot execute the received command.
- CR – Carriage return (0Dxh)
- LF – Line Feed (0Axh)

Comment – the <CR> and <LF> characters will not be shown in this description.

D.6.4. Tips for the Programmer

Tips for creating a robust communication with the terminal using the SICS protocol include:

D.6.4.1. Command and Response

Improve the dependability of application software by having the program evaluate the response of the terminal to a command. The response is the acknowledgment that the terminal has received the command.

D.6.4.2. Reset

When establishing communication between the terminal and system, send a reset command to the terminal to enable a start from a determined state. When the terminal or system is switched on or off, faulty characters can be received or sent.

D.6.4.3. Quotation Marks (" ")

Quotation marks included in the command responses are used to designate fields and will always be sent.

D.6.5. Commands and Responses MT-SICS Level 0

The terminal receives a command from the system computer and acknowledges the command with an appropriate response. The following sections contain a detailed description of the command set in alphabetical order with the associated responses. Commands and responses are terminated with <CR> and <LF>. These termination characters are not shown in the following description, but they must always be entered with commands or sent with responses.

The following commands of MT-SICS level 0 are supported:

I0	Inquiry of all implemented MT-SICS commands
I1	Inquiry of MT-SICS level and MT-SICS versions
I2	Inquiry of balance data
I3	Inquiry of balance SW version and type definition number
I4	Inquiry of serial number
S	Send stable weight value
SI	Send weight value immediately
SIR	Send weight value immediately and repeat
Z	Zero
@	Reset (clear out serial buffer)

The following are detailed descriptions of these Level 0 commands:

D.6.5.1. I0 – INQUIRY OF ALL IMPLEMENTED MT-SICS COMMANDS

Command: I0

Response: I0_B_0_"I0"   Level 0 "I0" command implemented

            I0_B_0_"I1"   Level 0 "I1" command implemented

		I0_B_0_"I2"	Level 0 "I2" command implemented
		I0_B_0_"I3"	Level 0 "I3" command implemented
		I0_B_0_"I4"	Level 0 "I4" command implemented
		I0_B_0_"S"	Level 0 "S" command implemented
		I0_B_0_"SI"	Level 0 "SI" command implemented
		I0_B_0_"SIR"	Level 0 "SIR" command implemented
		I0_B_0_"Z"	Level 0 "Z" command implemented
		I0_B_0_"@"	Level 0 "@" command implemented
		I0_B_0_"SR"	Level 1 "SR" command implemented
		I0_B_0_"T"	Level 1 "T" command implemented
		I0_B_0_"TA"	Level 1 "TA" command implemented
		I0_B_0_"TAC"	Level 1 "TAC" command implemented

Response: I0_A_1_"TI"   Level 1 "TI" command implemented (last command)

Response: I0_I   Cannot execute command at this time.

D.6.5.2.   I1 – INQUIRY OF MT-SICS LEVEL AND MT-SICS VERSIONS

Command: I1

Response: I1_A_" "_"2.2x"_"2.2x"_" "_" "

	""	No Levels fully implemented
	2.2x	Level 0, version V2.2x
	2.2x	Level 1, version V2.2x
	""	No MT-SICS 2 commands
	""	No MT-SICS 3 commands

Response: I1_I   Command understood, not executable at present.

Comments

- For the MT-SICS level, only fully implemented levels are listed. In this case, neither level 0 nor level 1 were fully implemented so the level is not specified.

- In the case of the MT-SICS version, all levels are specified even those only partially implemented.

D.6.5.3.   I2 – INQUIRY OF DATA

Command: I2

Response: I2_A_"IND246_Standard_50.00_kg"

	IND246	Model number of terminal
	Standard	Standard functionality

50.00 kg   Capacity and primary unit of the scale

Response: I2_I   Command understood, not executable at present.

Comments

- The number of characters in the "text" field depends on the scale capacity.

D.6.5.4.   I3 – INQUIRY OF SW VERSION

Command: I3

Response: I3_A_"1.00"

1.00   Firmware version of the terminal

Response: I3_I   Command understood, not executable at present.

Comment

- The number of characters of "text" depends on the revision level.

D.6.5.5.   I4 – INQUIRY OF SERIAL NUMBER

Command: I4

Response: I4_A_"123456"

123456 Serial number of terminal

Response: I4_I   Command understood, not executable at present.

Comments

- The serial number response is the content of the terminal serial number variable (#301) as entered in setup.

D.6.5.6.   S – SEND STABLE WEIGHT VALUE

Command: S

Response: S_S_ _ _ _ _ 436.2_lb

436.2   stable displayed weight

lb   weight unit

Response: S_I   Command understood, not executable at present.

Response: S_+   Terminal in overload range.

Response: S_-   Terminal in underload range.

Comments

- The terminal will wait for up to 3 seconds after receiving an "S" command for no-motion. If motion does not settle within this time, the command is aborted and the S_I response is sent.

D.6.5.7.   SI – SEND WEIGHT VALUE IMMEDIATELY

Command: SI

Response: S_S_ _ _ _ _ 436.2_lb   Stable weight value.

Response:	S_D_ _ _ _ _ 436.2_lb	Non-stable (dynamic) weight value.
Response:	S_I	Command understood, not executable at present.
Response:	S_+	Terminal in overload range.
Response:	S_-	Terminal in underload range.

Comments

- The response to the command SI is the last internal weight value (stable or dynamic) before receipt of the "SI" command.

D.6.5.8.   SIR – SEND WEIGHT VALUE IMMEDIATELY AND REPEAT

Command:	SIR	
Response:	S_S_ _ _ _ _ 436.2_lb	Stable weight value.
Response:	S_D_ _ _ _ _ 436.2_lb	Non-stable (dynamic) weight value.
Response:	S_I	Command understood, not executable at present.
Response:	S_+	Terminal in overload range.
Response:	S_-	Terminal in underload range

Example

Command:	SIR
Response:	S_D_ _ _ _ _ 129.07_kg
	S_D_ _ _ _ _ 129.09_kg
	S_S_ _ _ _ _ 129.09_kg
	S_S_ _ _ _ _ 129.09_kg
	S_D_ _ _ _ _ 114.87_kg
	... The scale continues to send stable or dynamic weight values

Comments

- The SIR command is overwritten and cancelled by the commands S, SI, SR, and @.
- The data output rate is approximately 4 per second.

D.6.5.9.   Z – ZERO

Command:	Z	
Response:	Z_A	Command performed, meaning the scale was in gross mode, scale was stable and weight was within the zero capture range.
Response:	Z_I	Command understood, not executable at present.
Response:	Z_+	Upper limit of zero setting range exceeded.
Response:	Z_-	Lower limit of zero setting range exceeded.

Comments

- The calibrated zero point determined during calibration is not influenced by this command.
- The terminal will wait for up to 3 seconds after receiving an "Z" command for no-motion. If motion does not settle within this time, the command is aborted and the Z_I response is sent.

D.6.5.10.   @ – RESET

Command: @

Response: I4_A_"12345678"

                          12345678   Serial number of the scale

Comments

- Resets the scale to the condition found after switching on, but without a zero setting being performed.
- All commands awaiting responses are canceled.
- The tare register is cleared.
- The SIR and SR commands are cancelled.
- The Reset command is always executed except that a Reset command received by the terminal during the calibration and test procedure cannot be processed.

D.6.6.   Commands and Responses MT-SICS Level 1

The following commands of MT-SICS level 1 are available:

SR   Send weight value on weight change (Send and Repeat)

T   Tare

TA   Set or inquiry of preset tare value

TAC   Clear tare value

TI   Tare Immediately

D.6.6.1.   SR – SEND WEIGHT VALUE ON WEIGHT CHANGE (SEND AND REPEAT)

Command: SR_Value_Unit

              SR

Response: S_S_ _ _ _ _ 105.1_lb   Current stable weight.

              S_D_ _ _ _ _ 106.7_lb   Dynamic weight value.

              S_S_ _ _ _ _ 124.3_lb   Next stable weight value.

Response: S_I   Command understood, not executable at present.

Response: S_L   Command understood, invalid parameter.

Response: S_+   Terminal in overload range.

Response: S_-   Terminal in underload range.

Example

Command:	SR_0.50_kg	Send the current stable weight value followed by every load change ≥ 0.50 kg.

Response:	S_S_ _ _ _ _100.00_kg	Scale stable.
	S_D_ _ _ _ _115.23_kg	More than 0.50 kg loaded.
	S_S_ _ _ _ _200.00_kg	Scale stable again.

Comments

- Command to send the current stable weight once then continuously after every weight change greater or equal to the "value" a non-stable (dynamic) value followed by the next stable value. If no preset value is included, the weight change must be at least 12.5% of the last stable weight value an a minimum of 30d.

- SR is overwritten and cancelled by the commands S, SI, SIR, @ and hardware break.

- If, following a non-stable (dynamic) weight value, stability has not been reached within the 3 second timeout interval, the response "S_I" is sent and then a non-stable weight value. Timeout then starts again form the beginning.

- The range value must be entered in primary units and must be in the range of 1d to capacity.

D.6.6.2.   T – TARE

Command:	T	

Response:	T_S_ _ _ _100.00_kg	Tare performed, meaning the scale was stable and weight was within the weighing range.

Response:	T_I	Command understood, not executable at present.
Response:	T_+	Upper limit of zero setting range exceeded.
Response:	T_-	Lower limit of zero setting range exceeded.

Comments

- The existing tare will be overwritten and replaced by the new preset tare weight value.

- The terminal will wait for up to 3 seconds after receiving a "T" command for no-motion. If motion does not settle within this time, the command is aborted and the T_I response is sent.

D.6.6.3.   TA – INQUIRE/ENTER TARE VALUE

Command:	TA	Inquiry of tare weight value
	TA_Tare Preset Value_Unit	Entry of a preset tare value.

Response:	TA_A_TareWeightValue_Unit	Current Tare weight value.

Response:	TA_I	Current Tare weight value cannot be transferred (the terminal is currently executing another command, such as zero setting).

Response:	TA_L	Command understood, invalid parameter.

Example

Command:	TA_10.00_kg	Load a preset tare of 10 kg.

Response:	TA_A_ _ _ _ _10.00_kg	The 10.00 kg tare value was accepted.

Comments

- The existing tare will be overwritten and replaced by the new preset tare weight value.
- The terminal will automatically round the tare value to the current readability.
- The preset value must be entered in primary units.

D.6.6.4.   TAC – CLEAR TARE VALUE

Command: TAC

Response: TAC_A   Tare value cleared.

Response: TAC_I   Command understood, not executable at present.

D.6.6.5.   TI – TARE IMMEDIATELY

Command: TI

Response: TI_S_WeightValue_Unit   Taring performed, stable tare value.

Response: TI_D_WeightValue_Unit   Taring performed, non-stable (dynamic) tare value.

Response: TI_I   Command understood, not executable at present.

Response: TI_L   The command is not executable.

Response: TI_+   Upper limit of taring range exceeded.

Response: TI_-   Lower limit of taring range exceeded.

Example

Command: TI

Response: TI_D_ _ _ _117.57_kg   Tare taken with dynamic weight value.

Comments

- Any previous tare value will be overwritten by the new tare weight value.
- Tare weight values determined during motion may not be accurate.
- The tare weight value is sent in the current units.

D.7.   Reports

In order to print reports of the Alibi memory, totalization registers, target table (Checkweighing application), ID table (Counting application), peak weight memory (Peak Weight application), Temporary ID table (Vehicle application) or Permanent ID table (Vehicle application), a connection must be made for the "Reports" function. When a reports connection is made to a serial port, whenever a report is run and then printed, it will be routed to the assigned port.

The line width of the printed report is selectable as either 40 characters or 80 characters in setup so that all reports have the same general format. These formats are fixed and cannot be changed. A header and a footer consisting of additional line feeds and the record separator character are also selected in the Reports sub-block of Communications.

Samples of the Alibi memory and totalization register reports in a 40 column wide and an 80 column wide print are shown in the following sections. The remaining application specific reports are shown in the detailed Application chapter of this manual.

D.7.1.   Alibi Memory

The alibi memory can be viewed and printed. Alibi memory is viewed by accessing the Operator menu (M key) and then selecting the ALIBI icon **Alibi**. A search screen is shown that can help reduce the number of records retrieved to a manageable level.

After entering the desired search criteria, move focus to the START text and press ENTER. The Alibi memory report will be run and the first record will be shown on the display. Move through the results using the UP and DOWN navigation keys. There is a scroll bar indicator on the right of the display to indicate where in the search results the currently displayed record is positioned.

Pressing PRINT with any record shown will initiate a transmission of the results out the port programmed as Reports. Examples with two records are shown in Figure D-2 and Figure D-3.

```
                Alibi Memory Report
          14:23:47      25/May/2011
25-May-2011      14:22:06        0000014
     27  kg   11.6  kg T    15.4  kg N
***************************************
25-May-2011      14:22:50        0000015
     27  kg   11.6  kg T    15.4  kg N
***************************************
```

Figure D-2: 40 Column Alibi Memory Print Example

```
Alibi Memory Report
14:24:19     25/May/2011
25-May-2011   14:22:06   0000014      27  kg      11.6  kg T      15.4  kg N
******************************************************************************
25-May-2011   14:22:50   0000015      27  kg      11.6  kg T      15.4  kg N
******************************************************************************
```

Figure D-3: 80 Column Alibi Memory Print Example

D.7.2.   Totals Report

The totals report will print only the fields that have been enabled for the totalizing function. If the subtotal feature has been disabled, then that field will not display or print. The example in Figure D-4 below includes both the subtotal and grand total fields. There is only one report format regardless of the line width selection.

```
                      Totals Report
              14:25:39      20/Jul/2007
        Subtotal:   n = 6              86.19 kg


        Grand Total: n = 27            372.76 kg


```

Figure D-4: Totals Report Sample

D.8.   Variable Access

All setup parameters and a few triggers and statuses in the terminal are available through a connection called "Variable Access". This is a serial interface assignment on COM1that permits remote clients to send and receive commands and data from the terminal.

D.8.1.   Connection

In order to access the variables in the IND246 terminal, the COM1 port must be used and it must be assigned as Variable Access in the connection menu of setup.

Make sure the serial port of the remote device matches the parameters selected for the COM1 port. This includes the baud rate, data bits, parity bit, and 1 stop bit.

Connect an RS-232 cable between the remote client PC and the COM1 port of the IND246 terminal.

Open a program to communicate with the terminal (such as HyperTerminal). Refer to the Commands section to understand how the commands should be structured.

D.8.2.   Commands

The IND246 supports two commands - Read and Write. Some variables are read only and some can be both read and written. A response is always sent after a Read request or a Write command. If a valid format and variable are requested in a Read, Response 1 from below will be sent. If the format is incorrect or a bad variable name is requested, an error like Response 2 will be sent. A Write command will receive either an acknowledge (ASCII <ACK> - 06xh) for an accepted command or a negative acknowledgement (ASCII <NAK> - 15xh) for an invalid command or data.

A Space character is required between the index number and data that is being sent. This characters is shown as <SP> (20xh) in the examples. All commands and responses are terminated with a Carriage Return and a Line Feed character. These characters are shown as <CR>< LF> (0Dxh, 0Axh).

D.8.2.1.   Individual Variables

The PC program can connect with the IND246 terminal to read and write specific variables per the following examples. The list of index numbers is given in the next section.

Read request: R(index#)<CR><LF>

   Read filter value: R129<CR><LF>

   Response 1 (valid):   R129<SP>1<CR><LF>

   Read filter value: R1**7**9<CR><LF>

	Response 2 (error):	R1**7**9<SP> Error: Invalid Request<CR><LF>

	Write request:	W(index#)<SP>xxxxx<CR><LF>
	Write target value :	W611<SP>42.75<CR><LF>
	Response 1 (valid):	<ACK><CR><LF> (data is accepted)
	Response 2 (error):	<NAK><CR><LF> (data or variable is invalid)

D.8.2.2.   Blocks of Variables

An entire block of data can be read or written at one time by using the index of an entire block (such as 100, 200, etc.). Each field in the block is separated with the "^" symbol (5Eh). If no data is to be changed in a specific field, that field can be left empty (no new data).

	Block read request:	R(index#)<CR><LF>
	Read target block:	R610<CR><LF>
	Response 1 (valid):	R610<SP>62.00^0.03^0.04^Green Tags<CR><LF>
	Read target block:	R6**5**0<CR><LF>
	Response 2 (error):	R6**5**0<SP>Error: Invalid Request<CR><LF>

The block write example will download a new target (50.00), -tol (0.05), +tol (0.08) and use previous description value.

	Block write request:	W(index#)<SP>xx^xx^xx<CR><LF>
	Write target value:	W610<SP>50.00^0.05^0.08^<CR><LF>
	Response 1:	<ACK><CR><LF>
	Response 2:	<NAK><CR><LF> (if data or variable is invalid)

D.8.3.   Variable List

The following groups of variables are supported in the IND246 terminal.

D.8.3.1.   Scale Status (read only)

Index	Name	Description		Notes
000	Scale Status Block	Entire Scale Status Block		
001	Displayed Weight	Format: weight<SP>unit. Weight is always 8 characters (including decimal) with leading spaces and unit is always 3 characters.		Weight unit is included.
002	Scale Status	b0	0 – gross mode 1 – net mode	This character is the same as status byte B in the continuous output
		b1	0 – positive weight 1 – negative weight	

Index	Name	Description		Notes
		b2	in normal weighing range out of range (over capacity or under zero)	string.
		b3	0 – no motion 1 – motion	
		b4	0 – lb, g, t, ton 1 – kg	
		b5	Always "1"	
		b6	zero not captured since power up zero captured after power up	
		b7	s "1"	
003	Tare Weight	Format: weight<SP>unit. Weight is always 8 characters (including decimal) with leading spaces and unit is always 3 characters.		Weight unit is included.
004	Raw Counts	Format: always 7 digits with leading zeroes.		

D.8.3.2.   DIO and Target Status (read only)

Index	Name	Description	
010	DIO & Target Status Block	Entire DIO & Target Status Block	
011	DIO Inputs – Status	b0	In 1, 0 – OFF, 1 – ON
		b1	In 2, 0 – OFF, 1 – ON
		b2-b5	Always "0"
		b6-b7	Always "1"
012	DIO Outputs Status	b0	Out 1, 0 – OFF, 1 – ON
		b1	Out 2, 0 – OFF, 1 – ON
		b2	Out 3, 0 – OFF, 1 – ON
		b3	Out 4, 0 – OFF, 1 – ON
		b4-b5	Always "0"
		b6-b7	Always "1"
013	MAC ID	Example: 00E07CF550E7, ASCII code	

D.8.3.3.   Terminal information (read only)

Index	Name	Description	Notes
020	Terminal information block	Entire terminal inforamtion block	
021	Mainboard type	0 – AC version 1 – DC version	

Index	Name	Description			Notes
022	COM/DIO option	0 – No disponible 1 – RS232/RS485 2 – USB 3 – E/S discretas 4 – RS232/RS485 + E/S discretas 5 – USB + E/S discretas			
023	Iptional network interface	0 – None 1 – Ethernet 2 – Wireless 3 – Bluetooth			
024	Software version	#. # # # Or if published. # # Xdd-mmm-yy if unpublished			Examples: 1.00 (published), 0.13x14-Oct-08 (unpublished)
025	Switch state	b0	SW1-1	Secured for Weights and Measures	
		b1	SW1-1	Master reset	
		b2	SW1-1	Software upload	
		b3	SW1-1	Master reset, including calibration data	
		b4	SW1-1	Factory test mode	
		b5	SW1-1	Enter setup	
		b6	Always "1"		
026	Adjustment status	0 – Adjustment OK 1 – Adjustment in progress 10 – Adjustment in motion 255 – Adjustment failure			
027	COM test results	0 – Normal, not in test mode 1 – In test mode, and testeing 2 – In test mode, test OK 3 – In test mode, test not OK			
028	Terminal status	0 – Normal weighint 1 – Setup mode 2 – Application mode			
029	SD card test result	0 – SD memory not found 1 – Test OK 10 – Test in progress 255 – Test not OK			

D.8.3.4.   Terminal Commands (write only)

Index	Name	Description	Notes
031	Keypad Commands Note that commands do not work within setup mode.	0-9 – Input numbers 0 to 9 . – Decimal point C – Clear D – Move down F – Function I – ID entry L – Move left M – Memory N – Switch unit O – Power off P – Print R – Move right S – Shift T – Tare scale U – Move up Z - Zero scale	
032	Output 1 Control	0 – Turn DIO Output 1 OFF 1 – Turn DIO Output 1 ON	
033	Output 2 Control	0 – Turn DIO Output 2 OFF 1 – Turn DIO Output 2 ON	
034	Output 3 Control	0 – Turn DIO Output 3 OFF 1 – Turn DIO Output 3 ON	
035	Output 4 Control	0 – Turn DIO Output 4 OFF 1 – Turn DIO Output 4 ON	
037	Restart Terminal	1 – Restart Terminal	
040	Zero Adjustment	1 – Trigger Zero Adjustment	
041	Mid span adjustment	1 – Trigger mid span adjustment	Used when linearity is enabled as the middle span point
042	Span adjustment	1 – Trigger high span adjustment	

D.8.3.5.   Setup – Scale (read and write)

Index	Name	Description
100	Scale Block	Entire Scale Block
101	Scale Name	20 characters max. No entry on terminal.
102	Approval Type	0 – None 1 – Argentina 2 – Australia 3 – Canada 4 – OIML 5 – Sri Lanka 6 – USA
103	Certificate #	Manual entry - 20 characters max.

Index	Name	Description
104	Unit	1 – g 2 – kg 3 – lb 4 – t 5 – ton
105	Number of ranges	0 – One Range 2 – 2 intervals 2 – 2 ranges
106	Range 1 capacity	Manual entry
107	Range 1 increment size	0 – 0.0001 1 – 0.0002 2 – 0.0005 3 – 0.001 4 – 0.002 5 – 0.005 6 – 0.01 7 – 0.02 8 – 0.05 9 – 0.1 10 – 0.2 11 – 0.5 12 – 1 13 – 2 14 – 5 15 – 10 16 – 20 17 – 50 18 – 100 19 – 200
108	Range 2 capacity	Manual entry
109	Range 2 increment size	0 – 19 [Refer to values for **107**]
110	GEO code	0 – 37 manual entry
111	Linearity	0 – Disabled 1 – Enabled
112	Auto Zero	0 – Disabled 1 – Gross 2 – Gross & Net
113	Auto Zero Range	0 – 0.5d 1 – 1d 2 – 3d 3 – 10d
114	Under Zero Blanking	0 – Disabled 1 – 20d 2 – 20d with zero required
115	Power up zero	0 – Disabled 1 - +/- 2% 2 - +/- 10%

Index	Name	Description
116	Pushbutton Zero	0 – Disabled 1 – ±2% 2 – ±20%
117	Pushbutton Tare	0 – Disabled 1 – Enabled
118	Keyboard tare	0 – Disabled 1 – Enabled
119	Net Sign Correction	0 – Disabled 1 – Enabled
120	Auto tare	0 – Disabled 1 – Enabled
121	Tare threshold weight	Manual entry
122	Reset threshold weight	Manual entry
123	Auto tare motion check	0 – Disabled 1 – Enabled
124	Auto clear tare	0 – Disabled 1 – Enabled
125	Clear threshold weight	Manual entry
126	Auto clear tare motion check	0 – Disabled 1 – Enabled
127	Clear after print	0 – Disabled 1 – Enabled
128	Second unit	0 – None 1 – g 2 – kg 3 – lb 4 – oz 5 – t 6 – ton 7 – Custom
129	Low Pass Filter	0 – Very light 1 – Light 2 – Medium 3 – Heavy
130	Stability Filter	0 – Disabled 1 – Enabled
131	Motion Range	0 – Disabled 1 – 1d 2 – 3d
132	No-motion interval	0 – 0.3 s 1 – 0.5 s 2 – 0.7 s 3 – 1 s

Index	Name	Description
133	Timeout	0 – Disabled 1 – 3 s 2 – 10 s 3 – 30 s
134	Minimum weight	Manual entry
135	Print interlock	0 – Disabled 1 – Enabled
136	Auto Print	0 – Disabled 1 – Enabled
137	Reset type	0 – Deviation 1 – Return
138	Reset weight (deviation mode)	Manual entry
139	Reset weight (return mode)	Manual entry
140	Auto print threshold	Manual entry
141	Auto print motion check	0 – Disabled 1 – Enabled
150	Scale Type	0 – POWERCELL GDD 2 – POWERCELL 615D 1 – POWERCELL PDX 3 – POWERCELL 611D
151	Number of load cells	Manual entry, values 1 to 12
152	Shift Adjust load cell	0 – Single 1 – Pair
153	Custom Unit string	Manual entry, max. 3 characters
154	Custom Unit factor	Manual entry
155	Custom Unit increment	Same as Increment Size1

D.8.3.6.   Setup – Application (read and write)

Index	Name	Description
200	Application Block	Entire Application Block
201	Alibi memory	0 – Disabled 1 – Enabled
202	Totalization mode	0 – None 1 – Displayed weight 2 – Gross weight
203	Clear GT on print	0 – Disabled 1 – Enabled
204	Subtotal	0 – Disabled 1 – Enabled
205	Clear ST on print	0 – Disabled 1 – Enabled
206	Convert weight	0 – Disabled 1 - Enabled
211	Input 1 Polarity	0 – + True 1 – - True

Index	Name	Description
212	Input 1 Assignment	0 – None 1 – Blank display 2 – Clear Tare 3 – Print 4 – SICS 'S' command 5 – SICS 'SI' command 6 – SICS 'SIR' command 7 – Tare 8 – Unit switch 9 – Zero 10 – Start animal weigh 11 – Start peak weigh
213	Input 2 Polarity	0 – + True 1 – - True
214	Input 2 Assignment	[Refer to values for **212**]
215	Output 1 Assignment	0 – None 1 – Center of Zero 2 – Motion 3 – Net 4 – Over capacity 5 – Under Zero 6 – Cycle complete 7 – Working 8 – OK zone 9 – Over zone 10 – Under zone 11 – Running 12 – Cycle complete 13 – Vehicle light 1 14 – Vehicle light 2
216	Output 2 Assignment	[Refer to values for **215**]
217	Output 3 Assignment	[Refer to values for **215**]
218	Output 4 Assignment	[Refer to values for **215**]
219	Function Key Assignment	0 – Disabled 1 – Animal Weighing 2 – Check Weigh 3 – Counting 4 – Peak Weight 5 – Vehicle
220	Function AutoStart	0 – Disabled 1 – Enabled
221	Animal Operation Mode	0 – 1 1 – 2
222	Sampling Time	Manual Entry
223	Auto Start	0 – Disabled 1 – Enabled
224	Start Threshold	Manual Entry

Index	Name	Description
225	Auto Print	0 – Disabled 1 – Enabled
226	Print Delay	Manual Entry
227	Animal Application Display	0 – Disabled 1 – Average 2 – ID
228	Counting Operation Prompt	0 – Tare-Sample 1 – Sample-Tare
229	Reserved	Not used
230	Auto Clear APW	0 – Disabled 1 – Enabled
231	Counting Application Display Line 1	0 – Disabled 1 – ID 2 – Description 3 – APW
232	Counting Application Display Line 2	0 – Disabled 1 – ID 2 – Description 3 – APW
233	Counting Application Menu Keys ID Table	0 – Disabled 1 – Enabled
234	Counting Application Menu Keys Reports	0 – Disabled 1 – Enabled
235	Counting Application Menu Keys Sample/APW Select	0 – Disabled 1 – Enabled
236	Counting ID Memory ID Table	0 – Disabled 1 – Enabled
237	Counting ID Memory Totalization	0 – Disabled 1 – Enabled
238	Counting ID Memory Clear on Print	0 – Disabled 1 – Automatic 2 – Manual
239	Counting ID Memory Update APW	0 – Disabled 1 – Enabled
240	Over/Under Operation Source	0 – Gross Weight 1 – Displayed Weight
241	Tolerance Type	0 – Target Deviation 1 – % of Target 2 – Weight Value
242	Target Editing	0 – Disabled 1 – Target Only 2 – Target & Tolerance
243	Hold Timer	Manual Entry, 0.0 to 9.9
244	Over/Under Motion Check	0 – Disabled 1 – Enabled

Index	Name	Description
245	Over/Under Display Mode	0 – No Display 1 – Actual Weight 2 – Target Difference
246	Over/Under Display Line 1	0 – Disabled 1 – ID 2 – Description 3 – Target & Tolerance 4 – Zone
247	SmartTrac	0 – Disabled 1 – Enabled
248	Over/Under Motion Blanking	0 – Disabled 1 – Enabled
249	Target Table	0 – Disabled 1 – Enabled
250	Over/Under Totalization	0 – Disabled 1 – Enabled
251	Over/Under Clear Totals	0 – Disabled 1 – Automatic 2 – Manual
252	Active Target Menu Key	0 – Disabled 1 – Enabled
253	Quick Set Target Menu Key	0 – Disabled 1 – Enabled
254	Target Table Menu Key	0 – Disabled 1 – Enabled
255	Peak Operation Mode	0 – Gross 1 – Net
256	Peak Operation Memory	0 – Disabled 1 – Enabled
257	Peak Operation Auto Print	0 – Disabled 1 – Enabled
258	Peak Weight Hold Timer	Manual Entry
259	Peak Display Line 1	0 – Disabled 1 – ID 2 – Status
260	Peak Display Line 2	0 – Disabled 1 – AVG 2 – MAX 3 – MIN 4 – Transaction #
261	Peak Menu Keys - Reports	0 – Disabled 1 – Enabled
262	Vehicle Operation Temporary ID	0 – Disabled 1 – Enabled

Index	Name	Description
263	Vehicle Operation Auto ID	0 – Disabled 1 – Enabled
264	Vehicle Operation Permanent ID	0 – Disabled 1 – Enabled
265	Vehicle Operation Description	0 – Disabled 1 – Enabled
266	Vehicle Operation Totalization	0 – Disabled 1 – Enabled
267	Vehicle Operation Clear Totals	0 – Disabled 1 – Automatic 2 – Manual
268	Vehicle General Variable Name	Manual Entry
269	Temp. Prompt	0 – Disabled 1 – Inbound 2 – Outbound
270	Perm. Prompt	0 – Disabled 1 – Outbound
271	Threshold Wt.	Manual Entry
273	Transaction Table	0 – Disabled 1 – Enabled
274	Operator Clearing	0 – Disabled 1 – Enabled

D.8.3.7.   Setup – Terminal (read and write)

Index	Name	Description
300	Terminal Block	Entire Terminal Block
301	Serial Number	Manual Entry - 15 digits max
302	Screen Saver	0 – Disabled 1 – 1 minute 2 – 5 minutes 3 – 10 minutes 4 – 30 minutes
303	Backlight timeout	0 – Always on 1 – Disabled 2 – 1 minute 3 – 5 minutes 4 – 10 minutes
304	Auto off timer	0 – Disabled 1 – 10 minutes 2 – 30 minutes 3 – 60 minutes

Index	Name	Description
305	System line	0 – Blank 1 – Discrete I/O 2 – Time & Date 3 – DIO and Time & Date
306	Tare display	0 – Disabled 1 – Always 2 – When active
307	Time Format	0 – 12:MM 1 – 12:MM:SS 2 – 24:MM 3 – 24:MM:SS
308	Date format	0 – DD/MM/YY 1 – DD/MMM/YYYY 2 – MM/DD/YY 3 – MMM/DD/YYYY 4 – YY/MM/DD 5 –YYYY/MMM/DD
309	Date field separator	0 - / 1 - - 2 -. 3 – (space) 4 – None
310	Set hour	Manual entry
311	Select AM/PM	0 – AM 1 – PM
312	Set minutes	Manual entry
313	Set day	Manual Entry
314	Set month	0 – January 1 – February 2 – March 3 – April 4 – May 5 – June 6 – July 7 – August 8 – September 9 – October 10 – November 11 – December
315	Set year	Manual entry
316	Menu Language	0 – English 1 – "F" code
317	Setup Language	0 – English 1 – "F" codes
318	Transaction counter	0 – Disabled 1 – Enabled

Index	Name	Description
319	Edit counter	0 – Disabled 1 – Enabled
320	Next transaction	Manual entry
321	Password Protect	0 – Disabled 1 – Enabled
322	Password	Manual entry – 5 digits
324	Operator menu - Alibi Memory	0 – Disabled 1 – Enabled
325	Operator menu – Contrast Adjust	0 – Disabled 1 – Enabled
326	Operator menu – Transaction Counter	0 – Disabled 1 – Enabled
327	Operator menu – Time & Date	0 – Disabled 1 – Enabled
328	Operator menu – Totals Memory	0 – Disabled 1 – Enabled
329	Operator menu – x10	0 – Disabled 1 – Enabled
330	Service number	Manual entry
331	Key timeout	8, max. 99

D.8.3.8.   Setup – Communication (read and write)

Index	Name	Description
400	Communication Serial Block	Entire Communication Block
429	Report width	0 – Narrow (40) 1 – Wide (80)
430	Report header	Manual entry
431	Report record separator	0 – None 1 - * 2 - - 3 - = 4 – CR/LF
432	Report footer	Manual entry
433	COM1 Assignment	0 – None 1 – Continuous Output 2 – Continuous-Extended Output 3 - Demand Output 4 - Reports 5 – SICS 6 – Variable Access 7 – Cont. Multi 1 8 – Cont. Multi 2

Index	Name	Description
434	COM1 template	0 – Template 1 1 – Template 2 2 – Template 3 3 – Template 4 4 – Template 5 5 – Template 6 6 – Template 7 7 – Template 8 8 – Template 9 9 – Template 10
435	COM1 Checksum	0 – Disabled 1 – Enabled
436	COM1 Assignment2	0 – None 1 – Demand 2 – Reports
437	COM1 Template2	Same as COM1 Template
438	COM1 Assignment3	0 – None 1 – Demand 2 – Reports
439	COM1 Template3	Same as COM1 Template
440	COM2 Assignment	0 – None 1 – Continuous Output 2 – Continuous-Extended Output 3 – Demand Output 4 – Reports 5 – SICS 6 – Cont. Multi1 7 – Cont. Multi2
441	COM2 Template	Same as COM1 Template
442	COM2 Checksum	Same as COM1 Checksum
443	COM2 Assignment2	0 – None 1 – Demand 2 – Reports
444	COM2 Template2	Same as COM1 Template
445	COM2 Assignment3	0 – None 1 – Demand 2 – Reports
446	COM2 Template3	Same as COM1 Template
447	Ethernet Assignment	0 – None 1 – Continuous Output 2 – Continuous-Extended Output 3 – Demand 4 – Print Client

Index	Name	Description
		5 – Reports 6 – SICS 7 – Variable Access 8 – Cont. Multi1 9 – Cont. Multi2
448	Ethernet Template	Same as COM1 Template
449	Ethernet Assignment2	0 – None 1 – Demand 2 – Reports
450	Ethernet Template2	Same as COM1 Template
451	Ethernet Assignment3	0 – None 1 – Demand 2 – Reports
452	Ethernet Template3	Same as COM1 Template
453	Print Client Assignment	0 – None 1 – Continuous Output 2 – Continuous-Extended Output 3 – Demand Output 4 – Reports 5 – Cont. Multi1 6 – Cont. Multi2
454	Print Client Template	Same as COM1 Template
455	Print Client Checksum	0 – Disabled 1 – Enabled
456	Print Client Assignment2	0 – None 1 – Demand 2 – Reports
457	Print Client Template2	Same as COM1 Template
458	Print Client Assignment3	0 – None 1 – Demand 2 – Reports
459	Print Client Template3	Same as COM1 Template
460	USB Assignment	0 – None 1 – Continuous Output 2 – Continuous-Extended Output 3 – Demand Output 4 – Reports 5 – SICS 6 – Variable Access 7 – Cont. Multi1 8 – Cont. Multi2
461	USB Template	Same as COM1 Template

Index	Name	Description
462	USB Checksum	0 – Disabled 1 – Enabled
463	USB Assignment2	0 – None 1 – Demand 2 – Reports
464	USB Template2	Same as COM1 Template
465	USB Assignment3	0 – None 1 – Demand 2 – Reports
466	USB Template3	Same as COM1 Template
467	COM1 Baud Rate	0 – 300 1 – 600 2 – 1200 3 – 2400 4 – 4800 5 – 9600 6 – 19200 7 – 38400 8 – 57600 9 – 115200
468	COM1 Data Bits	0 – 7 1 – 8
469	COM1 Parity	0 – None 1 – Even 2 – Odd
470	COM1 Flow Control	0 – None 1 – XON-XOFF
471	COM2 Baud rate	0 – 300 1 – 600 2 – 1200 3 – 2400 4 – 4800 5 – 9600 6 – 19200 7 – 38400 8 – 57600 9 – 115200
472	COM2 Data Bits	0 – 7 1 – 8
473	COM2 Parity	0 – None 1 – Even 2 – Odd
474	COM2 Flow Control	0 – None 1 – XON-XOFF

Index	Name	Description
475	COM2 Interface	0 – RS232 1 – RS485
476	COM2 Address	Manual Entry*
477	Ethernet DHCP Client	0 – Disabled 1 – Enabled
478	Ethernet IP Address	Manual Entry
479	Ethernet Subnet Mark	Manual Entry
480	Ethernet Gateway	Manual Entry
481	Print Client – Server IP Address	Manual Entry
482	Print Client – Server TCP Port	Manual Entry
483	COM1 Interface	0 – RS232 1 – RS422 2 – RS485

D.8.3.9.   Setup – Maintenance (read only)

Index	Name	Description
500	Maintenance Block	Entire Maintenance Block
501	Weighment Counter	
502	Scale Overloads Counter	
503	Peak Weight	
504	Zero Commands Counter	
505	Zero Command Failure Counter	
Backup (read only)		
512	Load Cell S/N	
513	Cell Capacity	
514	Load Cell Firmware Version	
515	Current Zero Counts	
516	Max. Load	
517	Overloads	
518	Zero Errors	
519	COM Supply	
520	Load Cell Supply	
521	Shield	
522	CAN_H Dominant	
523	CAN_L Dominant	
524	CAN_H Recessive	
525	CAN_L Recessive	
526	% load	

Index	Name	Description
527	Current counts	

D.8.3.10. Calibration Values (read and write)

Index	Name	Description
600	Calibration Block	Entire set of Calibration Values
601	Zero Counts	Zero counts
602	Mid Test Load	Test weight for mid-point span when linearity is enabled.
603	Mid Test Load Counts	Test load counts for mid-point span when linearity is enabled.
604	Span Test Load	Test weight value for high span point.
605	Span Test Load Counts	Test load counts for high span point.

D.8.3.11. Target Values (read and write)

Index	Name	Description
610	Target Block	Entire set of Target Values
611	Target	Target value
612	-Tol	-Tolerance value
613	+Tol	+Tolerance value
614	Description	Target description

D.8.3.12. POWERCELL Maintenance (read and write)

Index	Name	Description
620	POWERCELL maintenance block	Entire set of POWERCELL maintenance values
621	POWERCELL Error Log	Manual entry, values fro 0.0 to 999.9
622	POWERCELL Error Log	0 – Disabled 1 – Enabled
631-642	1st through 12th Load Cell Shift Adjust values	Manually entered, values 0.900000 to 1.100000

D.8.3.13. Template Block 1 (read and write)

Index	Name	Description
710	Template block 1	Entire set of Templates 1 ~ 4
711	Output Template 1 – Add line feeds	Manual entry

Index	Name	Description
712	Output Template #1 field content array	0 – 3 Spaces 1 – 10 Spaces 2 – 15 Spaces 3 – Date 4 – Displayed Weight 5 – End of Template 6 – Grand total 7 – Gross Weight 8 – ID 9 – Net Weight 10 – New Line 11 – Scale Name 12 – String 1 13 – String 2 14 – String 3 15 – String 4 16 – String 5 17 – String 6 18 – String 7 19 – String 8 20 – String 9 21 – String 10 22 – Sub total 23 – Tare Weight 24 – Time 25 – Transaction # 26 – Average Weight 27 – # of Animals 28 – Avg. per Animal 29 – n 30 – Target Description 31 – Target ID 32 – Target Weight 33 – Target & Tolerances 34 – Total 35 – Zone 36 – APW 37 – PIECE_COUNT 38 – Record ID 39 – Record Description 40 – # of Cycles 41 – AVG Weight 42 – MAX Weight 43 – MIN Weight 44 – Peak Weight 45 – Transaction Date 46 – Transaction Time 47 – Transaction Type 48 – Variable 49 – Vehicle Description 50 – Vehicle Gross 51 – Vehicle ID 52 – Vehicle Net 53 – Vehicle Tare
713	Output Template 2 – Add Line Feeds	Manual Entry
714	Output Template 2 – Field Content Array	Same as #712
715	Output Template 3 – Add Line Feeds	Manual Entry

Index	Name	Description
716	Output Template 3 – Field Content Array	Same as #712
717	Output Template 4 – Add Line Feeds	Manual Entry
718	Output Template 4 – Field Content Array	Same as 712

D.8.3.14.   Template Block 2 (read and write

Index	Name	Description
720	Template block 2	Entire set of Templates 1 ~ 4
721	Output Template 5 – Add Line Feeds	Manual entry
722	Output Template 5 – Field Content Array	Same as #712
723	Output Template 6 – Add Line Feeds	Manual Entry
724	Output Template 6 – Field Content Array	Same as #712
725	Output Template 7 – Add Line Feeds	Manual Entry
726	Output Template 7 – Field Content Array	Same as #712
727	Output Template 8 – Add Line Feeds	Manual Entry
728	Output Template 8 – Field Content Array	Manual Entry
729	Output Template 9 – Add Line Feeds	Same as #712
730	Output Template 9 – Field Content Array	Manual Entry

D.8.3.15.   Template String Block (read and write)

Index	Name	Description
740	Template String Block	Entire set of Template Strings
741	Template String 1 Content	Manual entry
742	Template String 2 Content	Manual entry
743	Template String 3 Content	Manual Entry
744	Template String 4 Content	Manual entry
745	Template String 5 Content	Manual Entry
746	Template String 6 Content	Manual entry
747	Template String 7 Content	Manual Entry
748	Template String 8 Content	Manual Entry
749	Template String 9 Content	Manual entry
750	Template String 10 Content	Manual Entry

E.   GEO Codes

The GEO code feature provided in the IND246 terminal permits calibration readjustment due to changes in elevation or latitude without reapplying test weights. This adjustment assumes a previously accurate calibration was done with the GEO code set properly for that original location and that the GEO code for the new location can be accurately determined. The procedure for using this feature is as follows.

E.1.   Original Site Calibration

1. Use the GEO code chart (Table E-1) on the following pages to determine the GEO code for the current altitude and location at which the scale will be calibrated.

2. Enter that GEO value into the GEO code parameter in setup at **Scale > Calibration**.

3. Immediately after entering the GEO code, perform a zero and span adjustment using accurate test weights.

4. Exit the setup menu tree.

5. The scale can now be used in its new location.

E.2.   New Site GEO Code Adjustment

When a terminal is to be reinstalled at a different geographic location, gravitational and altitude changes can be accounted for by following these steps. Note that this procedure is not necessary if an on-site recalibration is performed.

1. Use the GEO code chart (Table E-1) on the following pages to determine the GEO code for the new altitude and location at which the scale will be used.

2. Enter that GEO value into the GEO code parameter in Setup at **Scale > Calibration**.

3. Immediately after entering the GEO code, exit the setup menu tree. DO NOT perform a normal calibration.

The calibration has now been adjusted for the differences in gravity from the original site of calibration to the new site of use.

▪ Using the GEO code value for calibration adjustment is not as accurate as re-applying certified test weights and re-calibrating the scale in a new location.

Table E-1: GEO Adjustment Values

Latitude North or South, in Degrees and Minutes	Height Above Sea Level, in Meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Height Above Sea Level, in Feet										
	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730
0° 0'–5° 46'	5	4	4	3	3	2	2	1	1	0	0
5° 46'–9° 52'	5	5	4	4	3	3	2	2	1	1	0
9° 52'–12° 44'	6	5	5	4	4	3	3	2	2	1	1
12° 44'–15° 6'	6	6	5	5	4	4	3	3	2	2	1
15° 6'–17° 0'	7	6	6	5	5	4	4	3	3	2	2
17° 10'–19° 2'	7	7	6	6	5	5	4	4	3	3	2
19° 2'–20° 45'	8	7	7	6	6	5	5	4	4	3	3
20° 45'–22° 22'	8	8	7	7	6	6	5	5	4	4	3
22° 22'–23° 54'	9	8	8	7	7	6	6	5	5	4	4
23° 54'–25° 21'	9	9	8	8	7	7	6	6	5	5	4
25° 21'–26° 45'	10	9	9	8	8	7	7	6	6	5	5
26° 45'–28° 6'	10	10	9	9	8	8	7	7	6	6	5
28° 6'–29° 25'	11	10	10	9	9	8	8	7	7	6	6
29° 25'–30° 41'	11	11	10	10	9	9	8	8	7	7	6
30° 41'–31° 56'	12	11	11	10	10	9	9	8	8	7	7
31° 56'–33° 9'	12	12	11	11	10	10	9	9	8	8	7
33° 9'–34° 21'	13	12	12	11	11	10	10	9	9	8	8
34° 21'–35° 31'	13	13	12	12	11	11	10	10	9	9	8
35° 31'–36° 41'	14	13	13	12	12	11	11	10	10	9	9
36° 41'–37° 50'	14	14	13	13	12	12	11	11	10	10	9
37° 50'–38° 58'	15	14	14	13	13	12	12	11	11	10	10
38° 58'–40° 5'	15	15	14	14	13	13	12	12	11	11	10
40° 5'–41° 12'	16	15	15	14	14	13	13	12	12	11	11
41° 12'–42° 19'	16	16	15	15	14	14	13	13	12	12	11
42° 19'–43° 26'	17	16	16	15	15	14	14	13	13	12	12
43° 26'–44° 32'	17	17	16	16	15	15	14	14	13	13	12
44° 32'–45° 38'	18	17	17	16	16	15	15	14	14	13	13

Latitude North or South, in Degrees and Minutes	Height Above Sea Level, in Meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Height Above Sea Level, in Feet										
	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730
45° 38′–46° 45′	18	18	17	17	16	16	15	15	14	14	13
46° 45′–47° 51′	19	18	18	17	17	16	16	15	15	14	14
47° 51′–48° 58′	19	19	18	18	17	17	16	16	15	15	14
48° 58′–50° 6′	20	19	19	18	18	17	17	16	16	15	15
50° 6′–51° 13′	20	20	19	19	18	18	17	17	16	16	15
51° 13′–52° 22′	21	20	20	19	19	18	18	17	17	16	16
52° 22′–53° 31′	21	21	20	20	19	19	18	18	17	17	16
53° 31′–54° 41′	22	21	21	20	20	19	19	18	18	17	17
54° 41′–55° 52′	22	22	21	21	20	20	19	19	18	18	17
55° 52′–57° 4′	23	22	22	21	21	20	20	19	19	18	18
57° 4′–58° 17′	23	23	22	22	21	21	20	20	19	I9	18
58° 17'–59° 32'	24	23	23	22	2\2	21	21	20	20	19	19
59° 32'–60° 49'	24	24	23	23	22	22	21	21	20	20	19
60° 49'–62° 9'	25	24	24	23	23	22	22	21	21	20	20
62° 9'–63° 30'	25	25	24	24	23	23	22	22	21	21	20
63° 30'–64° 55'	26	25	25	24	24	23	23	22	22	21	21
64° 55'–66° 24'	26	26	25	25	24	24	23	23	22	22	21
66° 24'–67° 57'	27	26	26	25	25	24	24	23	23	22	22
67° 57'–69° 35'	27	27	26	26	25	25	24	24	23	23	22
69° 5'–71° 21'	28	27	27	26	26	25	25	24	24	23	23
71° 21'–73° 16'	28	28	27	27	26	26	25	25	24	24	23
73° 16'–75° 24'	29	28	28	27	27	26	26	25	25	24	24
75° 24'–77° 52'	29	29	28	28	27	27	26	26	25	25	24
77° 52'–80° 56'	30	29	29	28	28	27	27	26	26	25	25
80° 56'–85° 45'	30	30	29	29	28	28	27	27	26	26	25
85° 45'–90° 00'	31	30	30	29	29	28	28	27	27	26	26

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