

IND310drive

Terminal

Technical Manual

www.mt.com

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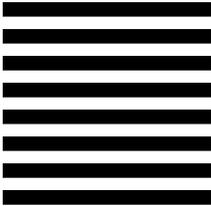
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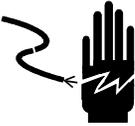
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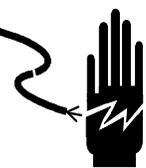
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	 WARNING!
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	 WARNING!
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Chapter 1.0

Introduction

This chapter covers

- Model Identification
- Physical Dimensions
- Specifications
- Operating Environment

The IND310drive industrial terminal is a single- or multi-range, high-performance weighing terminal for use with METTLER TOLEDO® analog and/or POWERCELL®/MTX® scale platforms.

The terminal has permanent and temporary memory locations for storing vehicle weights that can be recalled to complete a transaction and print a ticket. User-definable database tables enable application and variable data to be stored permanently or temporarily and recalled on demand. Printed report formats include:

- Transactions
- Vehicle ID table
- Temporary ID table
- User-definable application tables

For information about IND310drive terminal operation, refer to the IND310drive User's Guide.

Safe Disposal Requirement

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.



Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

Model Identification

Please refer to Table 1-1 to identify the IND310drive that was ordered. The IND310drive model number is located on the back of the terminal along with the serial number.

Table 1-1: IND310drive Model Identification Numbers

IND310drive Model Identification					
Model Type	Scale 1 Option	Scale 2 Option	Other Options	Line Cord Option	Region/ Language
Always 31L	0 = None 1 = Single ALC* 2 = Dual ALC 3 = POWERCELL	0 = None 1 = Single ALC 3 = POWERCELL	Always 00000V0	A = US B = Schuko C = UK D = Australian E = Swiss F = Danish H = Indian	Always 00

*Analog Load Cell

Examples of model configuration identification numbers are as follows:

Standard IND310drive desk/wall model with a single ALC and a US line cord. The unit is multi-lingual.

31L1000000V0A00

31L = IND310drive desk/wall
10 = Single ALC
00000V0 = drive application
A = US line cord
00 = multi-lingual

Standard IND310drive desk/wall model with a dual ALC with an Australian line cord. The unit is multi-lingual.

31L2000000V0D00

31L = IND310drive desk/wall
20 = Dual ALC
00000V0 = drive application
D = Australian line cord
00 = multi-lingual

Standard IND310drive desk/wall model with a POWERCELL, single ALC on Scale 2, and a Schuko line cord. The unit is multi-lingual.

313100000V0B00

31L = IND310drive desk/wall
31 = POWERCELL and Single ALC
00000V0 = drive application
B = Schuko line cord
00 = multi-lingual

Physical Dimensions

Refer to Appendix A, Installation for detailed instructions on mounting the terminal and connecting peripheral components.

The IND310drive terminal physical dimensions are shown in Figure 1-1 through Figure 1-4.



Figure 1-1: Overall View of IND310drive

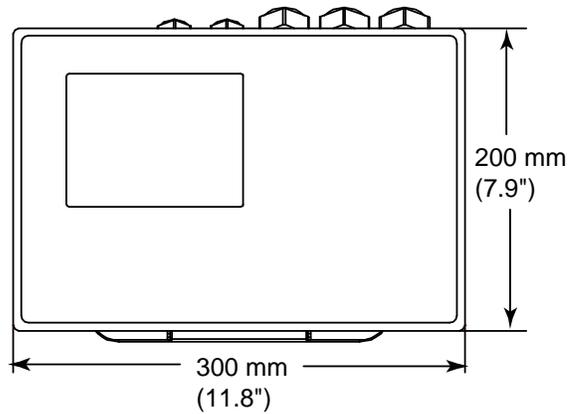


Figure 1-2: Top View of IND310drive

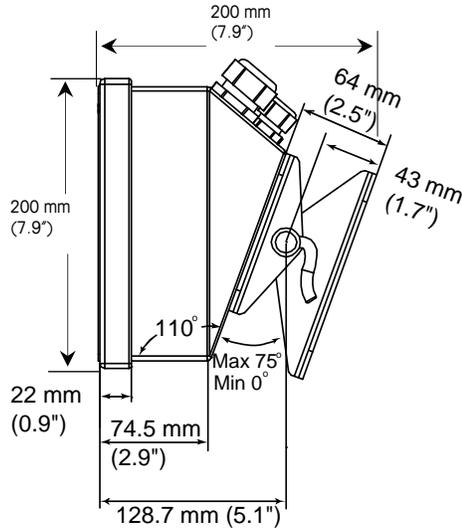


Figure 1-3: Side View of IND310drive

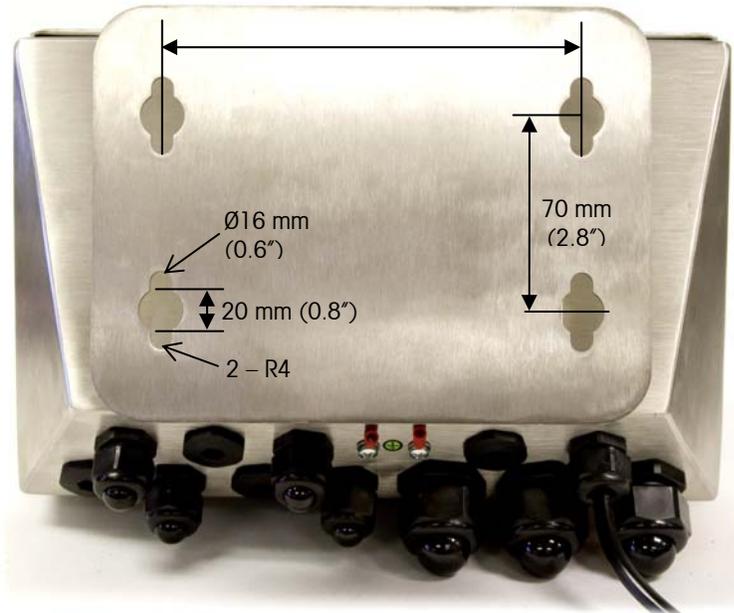


Figure 1-4: Bottom View and Mounting Hole Locations for the IND310drive

Specifications

The IND310drive terminal conforms to the specifications listed in Table 1-2.

Table 1-2: IND310drive Specifications

IND310drive Specifications	
Enclosure Type	Stainless Steel Desk with adjustable angle stand
Environmental Protection	Washdown, IP69K

IND310drive Specifications	
Power	Universal Internal AC Power Supply 87 - 264 VAC, 49 - 61 Hz Fused at 1.6 amp, 250 volt
Display	Monochrome, graphic LCD, 1/4 VGA (320 x 240 pixels)
Weight Display	Variable size Default: 24 mm (0.9 in)
Scale Types	Analog, POWERCELL [®] , MTX [®]
Number of Cells	8 - 350Ω Analog load cells per channel, maximum of two channels 10 POWERCELLs or MTX load cells 24 POWERCELLs with Optional External Power Supply
Number of Scales	Up to 2 platforms
Keypad	0 – 9 Numeric, Decimal 10 Functional/Navigational keys 4 Application Specific and 5 Softkeys
External Keyboard	Supports Optional External Keyboard via USB connector
Communications	(2) Serial Ports: COM1–RS232, 20mA CL COM2–RS232, RS485/422 TCP/IP 10Base-T Ethernet ISO8859-15 Character Table ¹
Dimensions w x d x h	300 x 270 x 190 mm 11.8 x 10.6 x 7.5 in
Net Weight	5.5 kg / 8.0 kg
Shipping Weight	12 lb / 17 lb
Operating Environment	-10 °C to 40 °C (14 °F to 104 °F) 10 to 95% humidity, non-condensing

¹ Customer printer must support the ISO8859-15 character table to be compatible.

IND310drive Specifications	
Approvals	CE Conformity 90/384/EU – Non-automatic Balances and Scales EN45501: 1992 – Adopted European Standard 89/336/EU – EMC Directive EN55022, 1998, Class A Weights and Measures (US) Class III or III-L devices NTEP Certificate of Conformance No. CC 04-032 Weights and Measures (Canada) 10,000 division rating and approval No. AM5539 Weights and Measures (Australia) Class III non-automatic weighing instruments as defined in the National Standards Commission, Document R76 No. NMI 5456 Conforms to OIML R76/1992-NL1-04.27 Conforms to IP69K

Controller PCB

The IND310drive terminal’s controller printed circuit board (PCB) supports scale function interface boards, including single analog, dual analog, POWERCELL, or single analog and POWERCELL interfaces. Supply voltage for the POWERCELL is 12 volts. The external POWERCELL power supply voltage is 24 volts.

Communications ports (COM1 and COM2) are RS-232/20 mA CL and RS485/422 compatible. Both serial ports are available simultaneously for transmitting; however, only one can receive data at any given time. A USB and an Ethernet port are also available. Connections to the controller PCB are made using removable terminal strips with wire sizes ranging from 24 to 16 AWG.

Display and Keyboard

The IND310drive terminal has an LCD display that shows the terminal’s status, including the active scale, date, and time across the top, the current application in the middle, and enabled softkey functions across the bottom.

The display includes five softkeys and four application keys, each measuring 19.05 mm (0.75 in.) high. Four scale function keys, each measuring 12.7 mm (0.5 in.) are positioned to the right-side of the display.

Up to ten additional softkeys are available depending on the weighing options and terminal functions enabled. The softkey setup and key mapping capabilities of the terminal determine the positioning of the softkeys and locations where they display.

DOWN ▼ or UP ▲ arrow icons that display on the lower-right corner of the screen (to the far right of the softkey icons) indicate that additional softkey selections are available.

The terminal's 12-key numeric keypad is used to enter data and commands. Numeric keys each measure 12.7 mm (0.5 in.), and are located on the upper-right side of the terminal front panel. Scale operation may also be controlled using an optional external USB keyboard.

Five navigational keys are located below the numeric keypad. These keys enable the operator to navigate through setup options in the menu tree and within setup and application screens.

Operating Environment

Consider the following environmental factors when selecting a location for operation of the IND310drive:

- Temperature and humidity
- Environmental protection
- Hazardous areas

Temperature and Humidity

The IND310drive operating environment temperature and relative humidity are listed in Table 1-2. The terminal can be stored at temperatures ranging from -20° to 60° C (-4° to 140° F) at 10 to 95% relative humidity, non-condensing.

Environmental Protection

The IND310drive meets IP69K requirements.

Hazardous Areas

The IND310drive is not intrinsically safe and must not be operated in areas classified as Hazardous by the National Electrical Code (NEC) because of the combustible or explosive atmospheres in those areas. Contact an authorized METTLER TOLEDO representative for information about hazardous applications.

	<p style="text-align: center;"> WARNING!</p> <p>THE IND310drive TERMINAL IS NOT INTRINSICALLY SAFE! DO NOT USE WITHIN AREAS CLASSIFIED AS HAZARDOUS DIVISION 1 OR ZONE 0/1 BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES.</p>
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Chapter 2.0

Operation

This chapter covers

- Overview
- Default Screen
- No Vehicle Application Operation
- Application Operation
- Clear and Reset Functions
- Report Generation

This chapter provides information about general operation and setup of the IND310drive terminal.

Overview

See Chapter 3.0, Configuration for more information about setup.

Operation of the terminal depends on enabled functions and setup parameters. Functionality and configuration parameters are programmed in Setup mode and can be modified as necessary by users with appropriate access levels.

Security

The IND310drive supports two levels of users/passwords for setup security: Administrator and Limited. An administrator-level user can access all setup areas of the terminal. A limited-access-level user can access all areas of the setup except for the Scale and Diagnostics blocks.

The terminal is pre-configured at the factory with a user name of "ADMIN" and a user name of "Operator". The pre-configured users (ADMIN and Operator) cannot be changed, only the passwords can be added or modified. The factory default passwords are null (no password). The unit as configured at the factory requires no login or password entry to enter the setup mode. All functions of the terminal will be available to all users until a password is entered. Be sure to remember the password configured for the ADMIN user. If the password is changed or forgotten, access to the setup menu will not be available. Be sure to protect the password from access by unauthorized personnel. The password provides access to the entire setup menu, unless the metrology switch is placed in the approved position.

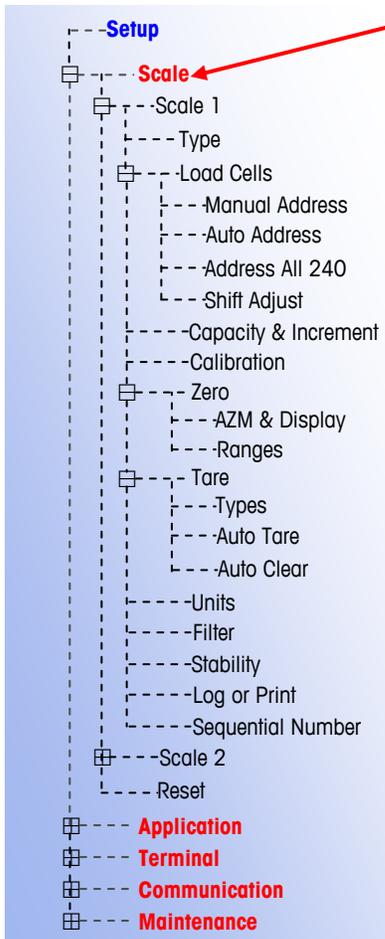
- ◀ Ensure that a password has been configured for the ADMIN user prior to configuring any passwords for other users. Failure to configure the ADMIN user password before configuring other user passwords could result in being blocked from access to the entire system.

Metrology Switch

The metrology switch (Figure 2-1), which is sealed per Weights and Measures, controls access to the scale submenu of the setup tree. This submenu includes functions such as calibration, filter settings, tare settings and others.



Figure 2-1: Metrology Switch Location



The Scale submenu is accessible (may be expanded) only when the Metrology switch is in the non-approved position. If the metrology switch is in the approved position (Figure 2-2) the user may enter setup, but will be unable to enter the scale setup submenu, shown by the absence of a box with a plus sign next to the scale submenu. In order to access the scale setup submenu, escape out of the setup menu, change the metrology switch to the non-approved position, and then enter the setup menu screen again.

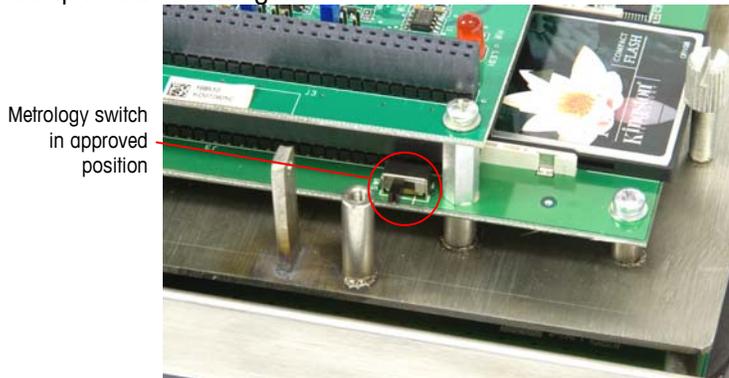
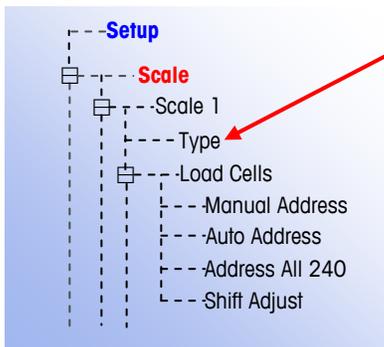


Figure 2-2: Metrology Switch in the Approved Position

Legal for Trade Settings



Legal for Trade settings are accessed through the setup menu at Scale > Scale 1 > Type. The IND310drive operates within the weights and measurement rules associated with the Legal for Trade settings. To change the Legal for Trade settings:

1. Go to the setup menu and select Scale > Scale 1 > Type. The Scale 1 Type screen displays (Figure 2-3).

Figure 2-3: Scale 1 Type Screen

2. Use the Approval drop-down menu to select the appropriate approval type. The choices for approval are:
 - None
 - Australia
 - Canada
 - OIML
 - USA
3. Ensure that the appropriate approval type is selected so that the IND310drive will display weight values in accordance with specific local weights and measures rules. Selection of the approval from None to one of the above choices also enables use of the metrology switch and its settings as described in the Metrology Switch section.

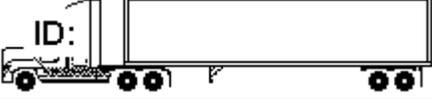
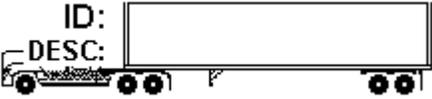
Keystroke Functions

Key names and commands are identified in this manual by upper- and lower-case letters. Key names, such as ENTER, are in all upper-case letters, and commands, such as “select,” are in lower-case (unless they begin a sentence, in which case the first initial is upper-case). For example:

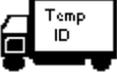
- “Press INDEX...” means to press the INDEX softkey.
- “Select an option...” means to use the UP or DOWN arrow navigation keys to select a setting, then press ENTER.

Softkeys and application displays use graphic images for identification. Table 2-1 shows graphic images and their functions.

Table 2-1: Graphic Images and Functions

Graphic Image	Function
	Capture Span
	Capture Zero
	Clear
	Clear Total
	Contrast
	Current "Var1" Value
	Current "Var2" Value
	Current A1 Value
	Current A2 Value
	Current A3 Value
	Current A4 Value
	Current Vehicle ID
	Current Vehicle Description
	Custom Report
	Darker
	Database Files
	Database Query (search)
Defrag	Defragment

Graphic Image	Function
	Delete
	Edit
ESC	Escape (exit without storing)
	Exit (return to previous screen)
	Vehicle ID Weighing
	Index Weighing
i	Information
	Information/Recall
	Lighter
	Metrology (Weight) Information
V ^ A v	More Soffkey Selections
	New/Insert
	Repeat Print
	Report
	Reset
000	Reset Counter
	Return to A1-A4 File Entry
	Return to Var1-2 Entry
	Setup Menu

Graphic Image	Function
	Start
	Start Search
	Stop
	Temporary ID Table
	Temporary ID Weighing
	Time & Date
	Transient Vehicle Weighing
	Unit Switching
	Validate Entry/Transaction
	Vehicle ID Table

General Navigation

Navigate in the applications and configure the IND310drive using

- Softkeys
- Application keys
- Scale function keys
- Navigation keys
- Numeric keys
- Alpha keys
- External Keyboard

The locations of the above listed keys and the default weighing operation screen are shown in Figure 2-4.

Softkeys

The softkey setup page is used to

- Change softkey positions
- Enable softkey functions
- Disable softkey functions

For example, a contrast softkey can be enabled for making quick adjustments to the terminal screen's contrast setting.

Five softkeys are located along the bottom of the display screen (see Figure 2-4). Some screens might have up to three pages of softkeys for a total of 15 possible functions. A DOWN ARROW icon  displayed on the lower-right corner of the screen (to the far right of the softkey icons) indicates that more softkey selections are available. Press the DOWN arrow navigation key to display additional softkey screens. Press the UP arrow navigation key to display the previous softkey screen. See Appendix F for information regarding Softkey Setup.

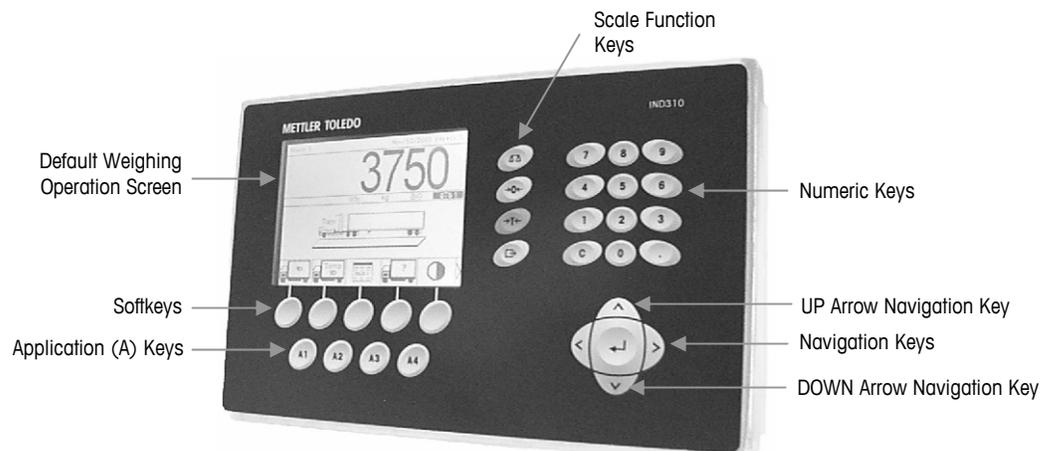


Figure 2-4: Key Locations and Default Weighing Operation Screen

Application Keys

Application keys (A keys) are located below the softkeys (see Figure 2-4) and are labeled

- A1
- A2
- A3
- A4

The application key setup screen is used to assign specific functions to the application keys. For example, application keys could be configured to magnify the display ten times, adjust contrast, or select user-defined table information.

Scale Function Keys

Scale function keys (see Figure 2-4) are:

 **Select Scale**—Enables the operator to select a specific scale. Press the SELECT SCALE key to switch between available scales.

 **Zero**—Zero is the weight of the scale platform or weighbridge when it is empty. The gross zero reference is recorded during calibration. Press the ZERO scale function key to capture a new gross zero reference point if pushbutton zero is enabled in configuration and the weight is within the zero range.

 **Tare**—Tare is the weight of a vehicle when it is empty. Tare is normally used to determine the net weight of the contents of a vehicle. Press the TARE scale function key when an empty vehicle is on the scale. The terminal then displays a zero weight. The vehicle is loaded and driven back onto the scale. The terminal then displays the net weight of the contents. Pushbutton tare must be enabled to use this key in this manner.

When the empty weight of the vehicle is a known value, enter the tare weight using the numeric keys and then press the TARE scale function key. The terminal will display the net weight of the contents of the vehicle. Keyboard tare must be enabled in order to use this key in this manner.

 **Print**—Press the PRINT scale function key to generate a hard-copy printout of a report or of information displayed on the screen or to initiate a demand print of an assigned print template. A printer must be connected to a serial port and the terminal must be configured to match its serial port settings to the printer's. Communication connection and configuration is necessary to connect a template or report to the selected serial port, and to define the selected template or report in configuration.

Navigation Keys

Navigation keys (see Figure 2-4) enable navigation within the setup menu tree, setup screens, and application screens. Navigation keys include:

-  **Up and**  **down arrows** — move the focus up or down to different setup options within the menu tree or to different fields within setup pages. Focus is indicated by highlighted text. These keys are also used to switch to another page of softkeys.
-  **Left and**  **right arrows** — expand (right arrow) or collapse (left arrow) the setup options in the menu tree. These arrows also move the cursor position to a specific character in text areas, and enable left and right scrolling to view all information available on a screen.
-  **Enter** — opens the setup page for viewing and editing setup parameters. The Enter key moves the focus from a field label to a setup value for that field. After entering a value, the enter key is used to accept new values and the focus moves to the next field label.

Numeric Keys

Use the terminal's 12-key numeric keypad (see Figure 2-4) to enter data and commands.

To use numeric keys, position the cursor in the field (see Navigation Keys) and press the numeric keys to enter the appropriate data. Press the DECIMAL key (. key) to enter decimal points where necessary.

The CLEAR key (C key) functions like a backspace key. Position the cursor at the end of data to be deleted and press the C key. Press the C key once for each character to be deleted.

Alpha Keys

On some setup pages, soffkeys and application keys function as alpha keys (see Figure 2-5) that are used to enter alphabetic characters for setup parameters such as passwords.

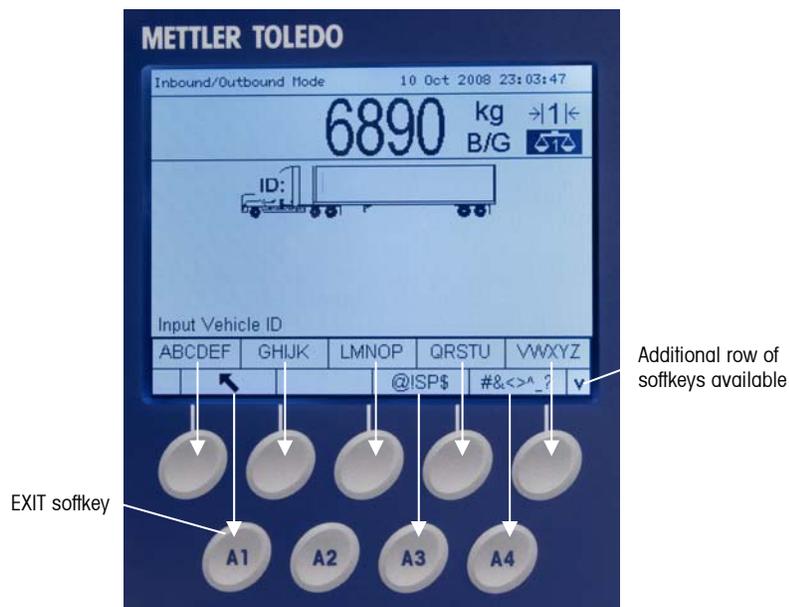


Figure 2-5: Alpha Keys

To use alpha keys, position the cursor in the data entry location (see Navigation Keys), press the soffkey or application key associated with the desired set of alpha characters as shown in Figure 2-5. The soffkeys change to display each alpha character included in the selected set of alpha characters. Use the UP and DOWN arrow navigation keys (see Figure 2-4) to switch between upper-case and lower-case characters. Press the key associated with the specific alpha character desired for data entry. Use the EXIT soffkey  to return to the main alpha key menu. Repeat this process until all alpha characters have been entered.

From the main alpha key menu, press the EXIT soffkey to escape from alpha entry without saving data. Use the CLEAR (C) key (see Numeric Keys, Figure 2-1) to delete unwanted alpha characters.

Use the CLEAR (C) key (see Numeric Keys) to delete unwanted alpha characters.

External Keyboard

Refer to Appendix A, Installation for more information on connecting an external keyboard.

An external keyboard can be connected to the IND310drive at the USB port. The keys on an external keyboard perform the following functions

- **F1 through F5**—Perform the same functions as the softkeys, with F1 being the softkey on the left and F5 being the softkey on the right.
- **Alt F1 through Alt F4**—Perform the same functions as the A1 through A4 application keys.
- **F6 through F9**—Perform the same functions as the SELECT (F6), ZERO (F7), TARE (F8), and PRINT (F9) scale function keys.
- **Keyboard numeric and alphabetic keys**—Function independently of the softkeys and can be used to enter alphabetic letters and numerals. The Enter key on the keyboard functions the same as the ENTER navigation key. The Backspace key functions the same as the CLEAR (C) key. The arrow keys function the same as the navigation keys.
- **Number keys**—Function the same as the keys on the terminal’s numeric keypad when the number lock function is engaged.

Default Screen

The default screen can be configured to display No Vehicle Application, Vehicle ID, or Temporary ID as the default weighing mode. At power up, when exiting setup, or upon completion of a transaction the IND310drive will automatically display the input screen associated with the selected default auto start mode. (See Chapter 3.0, Configuration, Application, Vehicle Weighing for information about how to configure the default auto start mode.) Figure 2-6 shows an example of a Vehicle ID Weighing default screen.

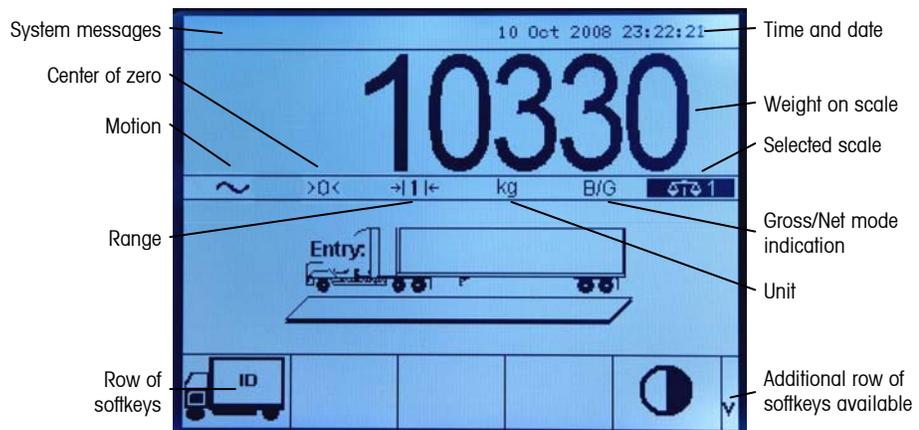


Figure 2-6: Default Vehicle ID Weighing Operation Screen

No Vehicle Application Operation

No vehicle application operation mode enables operation of the terminal without any vehicle application. The IND310drive functions as a weighing terminal, but with no transaction functions. This mode of operation can be used for weighing tanks, rail cars, or other large items not associated with transaction weighing. See Chapter 3.0, Configuration, Application, Vehicle Weighing for information about setting up the terminal for no vehicle application operation.

Application Operation

Routine operations with all vehicle features enabled in setup include four modes of terminal operation:

- **Vehicle ID Weighing**—Uses a permanent stored Vehicle ID table to identify the tare value of the vehicle, and then follows the steps defined by the outbound process to complete the procedure, which is also called a transaction. Vehicle ID Weighing enables the accumulation of totals based on vehicle ID.
- **Temporary ID Weighing**—Coordinates the inbound and outbound processes for vehicles that are not permanently stored in the Vehicle ID table through the use of a Temporary ID table. Temporary ID Weighing stores the vehicle information in the Temporary ID table and follows the inbound process. It also removes this temporary entry when the vehicle returns and follows the outbound process. The entry is temporary, so accumulation of totals does not occur.
- **Index Weighing**—Enables the Vehicle ID Weighing mode and Outbound process to be condensed through the use of a special Index table that provides a single ID reference for quick multiple ID look-ups.
- **Transient Weighing**—This mode enables weighing of vehicles that are not part of normal operation in a manner similar to the Vehicle ID Weighing mode. Transient Weighing does not use the Vehicle ID table, so the operator must enter vehicle data. Transient Weighing transactions are not included in totals.

There are two weighing processes:

- **Outbound**—Completes the vehicle transaction. The gross, tare, and net weight values are now known. Other transaction information may be collected (A1–A4 table data, Variable 1, and/or Variable 2 data). The completed transaction information is stored and can be printed.
- **Inbound**—Enables the vehicle identification information and a stored weight value to be collected. Other transaction information may be collected (A1–A4 table data). The inbound transaction information is stored and can be printed.

Direct Entry Option

An alternative method to initiate a transaction is direct entry of known data. To use this option, enter any type of known data, such as a tare weight on the main weighing screen to initiate a transaction. Press a softkey or scale function key to select how the terminal uses the information. For example, enter a tare weight and press the TARE scale function key. The data entered becomes a manually-entered tare.

Vehicle ID Weighing

Vehicle ID Weighing uses the Vehicle ID Table where vehicle IDs, descriptions, and permanent stored tares are entered prior to operation. Totals of vehicle weights are also maintained in the Vehicle ID Table (if enabled in setup). To view or edit the

Vehicle ID Table, press the VEHICLE ID TABLE softkey  at any time.

To use Vehicle ID Weighing:

1. From the default weight screen (Figure 2-6) press the DOWN arrow key to display all available softkeys (see Figure 2-7).

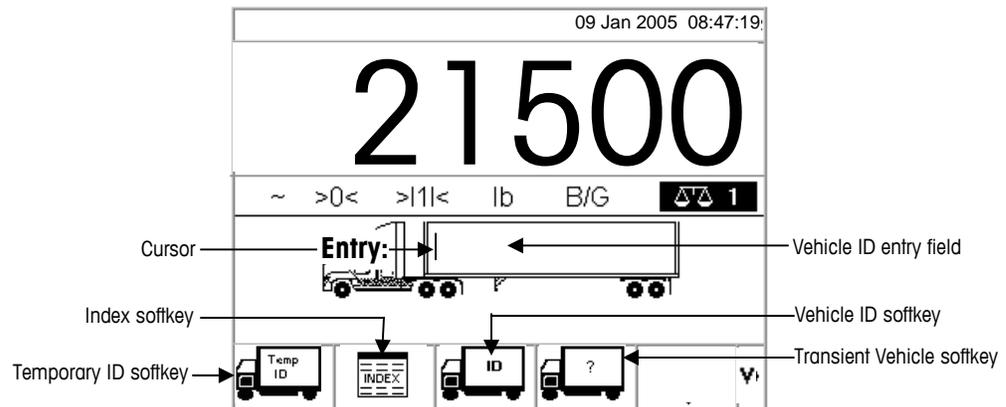


Figure 2-7: Default Weight Screen

- This screen may appear differently depending on setup configuration. If the VEHICLE ID softkey does not appear, see Appendix F, Softkey and Application Key Mapping.

 2. Once the vehicle is on the scale, press the VEHICLE ID softkey. A vehicle ID prompt displays with a cursor in the Vehicle ID entry field. The softkeys and application keys become alpha keys (see Figure 2-5).
 3. Use the alpha keys and the numeric keypad to enter the vehicle ID. Press the ENTER key to complete the entry. The ID value entered is the look-up key for the vehicle in the Vehicle ID table.

 - If an external keyboard is connected, it can be used to enter information.

4. If the vehicle's ID is located in the Vehicle ID table, the terminal uses the stored data (including tare weight) and continues with the outbound process. To continue the transaction, see Outbound Process.
5. If the vehicle's ID is located in the Vehicle ID table and the vehicle ID tare weight was entered as zero or left blank, then the first transaction with that vehicle ID is taken as an inbound transaction. During the inbound transaction, the IND310drive will prompt the user with "Save this tare weight in the Vehicle ID Table?" Since the transaction is inbound, the user should answer YES. The tare weight is stored temporarily in the Vehicle ID table. During the outbound transaction, the IND310drive will prompt the user a second time with "Save this tare weight in the Vehicle ID Table?" Since the transaction is now outbound, the user should answer NO.

If the vehicle's ID is not located, the display will read ID NOT FOUND (see Figure 2-8).

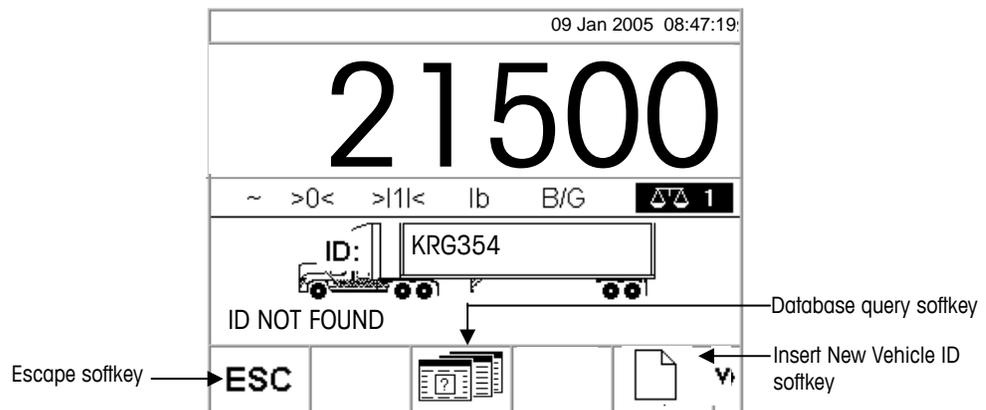


Figure 2-8: Default Weight Screen

See Appendix D, Database Structure and Use, Table Searches for more information about how to search for a vehicle ID.

When a vehicle ID is not located, the user has three options:

- **Escape**—Press the ESCAPE softkey (see Figure 2-8) to return to the main Default Weight Screen.
- **Search for the vehicle ID**—Press the DATABASE QUERY softkey (see Figure 2-8) to search for the vehicle ID. Once the correct ID is located, continue with the outbound process (see Outbound Process).
- **Insert New Vehicle ID**—Press the Insert New Vehicle ID softkey (see Figure 2-8) to store the ID in the temporary ID table (see Temporary ID Weighing).

New Vehicle ID

Pressing the softkey to insert a new vehicle ID opens the Vehicle ID setup page.

1. Edit the page with the information for the vehicle
2. Select the tare type.
3. If tare is weighed, press the tare key.

4. If the IND310drive has both a Scale1 and a Scale2 then it will ask the user to select which scale to use.
5. Press the "OK" softkey when finished to store the vehicle ID information.

Temporary ID Weighing

Temporary ID Weighing involves the use of the Temporary ID Table to record tare weights for inbound transactions and to recall these weights on outbound transactions. Manually-entered tare weights can also be used for Temporary ID Weighing. To view or edit the Temporary ID Table, press the TEMPORARY ID TABLE softkey  at any time.

Following an outbound transaction, the vehicle ID is removed from the Temporary ID Table. The totals for these types of transactions are not recorded in the Temporary ID Table, but are recorded in the A1, A2, A3, and A4 Tables if enabled.

To use Temporary ID Weighing:

1. Once the vehicle is on the scale, press the TEMPORARY ID softkey (see Figure 2-7). If enabled in the Temporary ID setup, an automatic ID number between 001 and 999 displays, which can be used as the Temporary ID. (See Chapter 3.0, Configuration, Application, Vehicle Weighing, Database for information about enabling the automatic ID numbering in the Temporary ID Table.) To use the automatic number as the ID, press ENTER. To enter more detailed information:
 - A. Enter the ID information at the temporary ID prompt that displays with a cursor in the ID field. The softkeys and application keys become alpha keys (see Figure 2-5).
 - B. Use the alpha keys and the numeric keypad to enter the vehicle ID. Press the ENTER key to complete the entry.
 - C. If the vehicle ID is found in the Temporary ID Table, the terminal uses the stored data and continues with the outbound process. To continue the transaction, see Outbound Process.

When a vehicle ID is not located, the user has three options:

- **Escape**—Press the ESCAPE softkey (see Figure 2-8) to return to the main Default Weight Screen.
- **Search for the vehicle ID**—Press the DATABASE QUERY softkey (see Figure 2-8) to search for the vehicle ID. Once the correct ID is located, continue with the outbound process (see Outbound Process).
- **Insert an ID in the Temporary ID Table**—Press the INSERT softkey . The vehicle ID is inserted into the Temporary ID Table. To continue the transaction, see Inbound Process.

See Appendix D, Database Structure and Use, Table Searches for more information about how to search for a vehicle ID.

Manually-Entered Tare Weights for Temporary ID Weighing

Operators can use manually-entered tare weights rather than stored tare weights in the Temporary ID Weighing mode (if enabled in setup).

To manually enter a tare weight:

1. From the default weight screen (Figure 2-9), use the numeric keypad to enter the tare value in the tare entry field **BEFORE** pressing the TEMPORARY ID softkey.

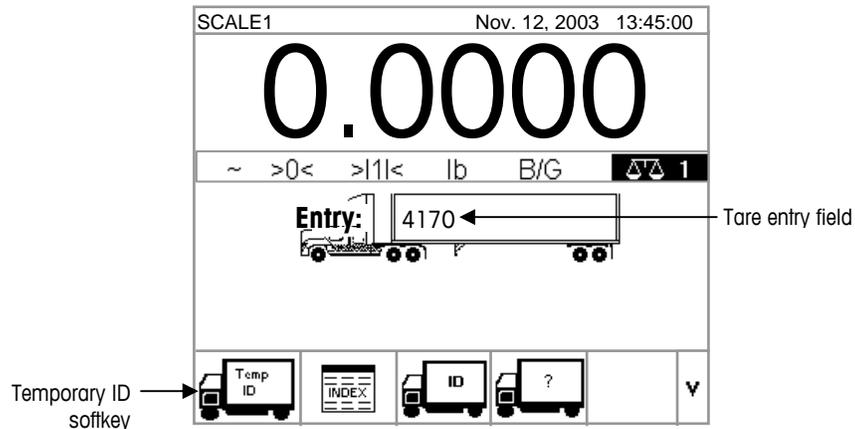


Figure 2-9: Default Weight Screen

2. Press the TEMPORARY ID softkey, then press ENTER to use the automatic ID number (001–999) assigned as the Temporary ID or enter the Vehicle Description using the alpha keys. To continue the transaction, see Outbound Process.

Index Weighing

Index Weighing uses the Index Table, which enables a relational ID to be used to locate values for enabled table information, including the Vehicle ID and A1–A3 Tables (if configured in setup). Index Weighing requires the use of the A4 Table as the Index Table, which is configured in the application memory setup.

1. Once the vehicle is on the scale, press the INDEX softkey (Figure 2-10).

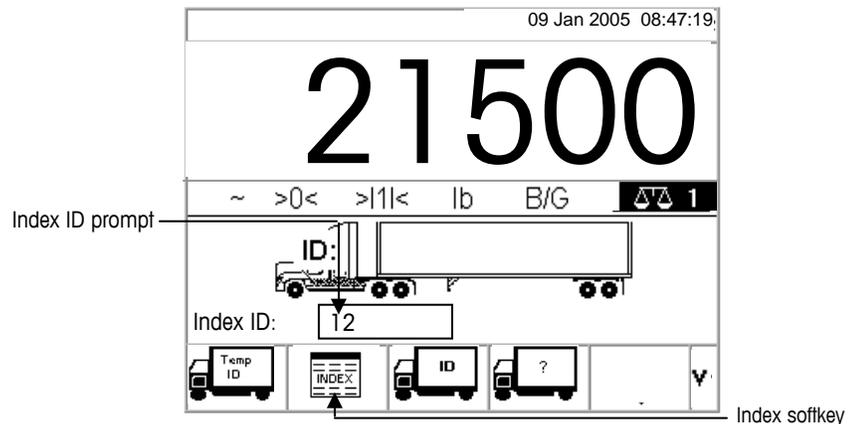


Figure 2-10: Weight Screen With Index ID Prompt

2. An Index ID prompt displays with a cursor in the ID field (see Figure 2-10).
3. Use the numeric keypad to enter the Index ID. Press the ENTER key to complete the entry.
4. If the ID is found in the Index Table, the terminal uses the relational ID data to locate corresponding data in the vehicle ID and A1–A3 tables. To continue the transaction, see Outbound Process.

When an Index ID is not located, the user has two options:

- **Escape**—Press the ESCAPE softkey **ESC** to return to the main Default Weight Screen.
- **Search for the Index ID**—Press the DATABASE QUERY softkey  to search for the index ID. Once the correct ID is located, continue with the outbound process (see Outbound Process).

See Appendix D, Database Structure and Use, Table Searches for more information about how to search for an Index ID.

Transient Vehicle Weighing

Use Transient Vehicle Weighing for vehicles that should not be included in totals or in the terminal's memory.

To use Transient Vehicle Weighing:

1. Once the vehicle is on the scale, press the TRANSIENT VEHICLE WEIGHING softkey (see Figure 2-11).

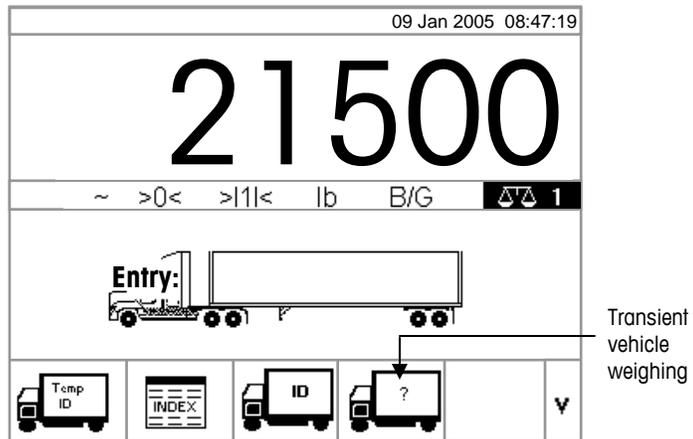


Figure 2-11: Default Weighing Screen

2. A prompt displays with a cursor in the description field. The softkeys and application keys become alpha keys (see Figure 2-12).

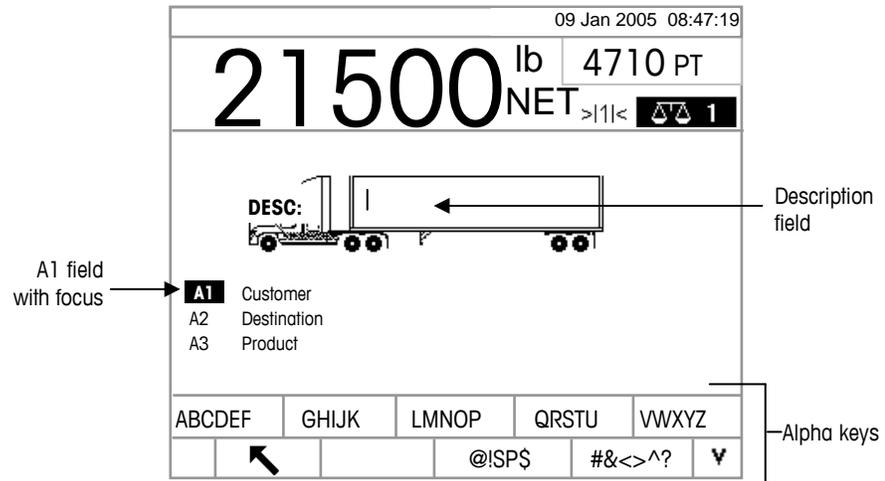


Figure 2-12: Transient Weighing ID Prompt

3. Use the alpha keys and the numeric keypad to enter the description. Press the ENTER key to complete the entry. To continue the transaction, see Outbound Process.

Outbound Process

Completing the Outbound Process involves:

- Entering Database Information
- Validating the Transaction
- Printing and Storing

Entering Database Information

Database files must be enabled in the setup menu for the different types of weighing operations in order to enable the collection of database information during transactions. If enabled, totals are maintained for the database information.

- Entry of database information is not obligatory. Press the OK softkey  to continue a transaction without entering data.

To enter database information:

1. The A1 field has focus (is highlighted) when the screen displays. Press the ENTER key to access the A1 field. The softkeys and the application keys become alpha keys
 2. Use the alpha keys and the numeric keypad to enter the Short A/N (alpha/numeric) ID of the desired database information in the text boxes that correspond to the A1, A2, A3, and A4 (if enabled) tables (see Figure 2-13).
- If the A4 Table is not enabled as the index table, it can be a user-defined entry field that functions like the A1–A3 Tables.

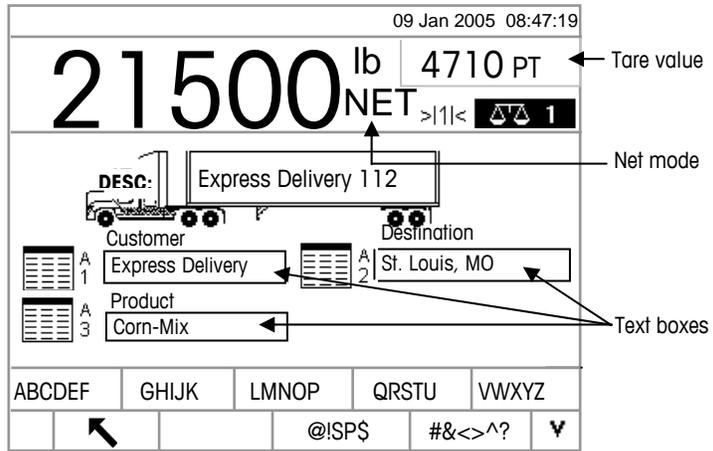


Figure 2-13: A1-A3 Tables Data Entry Screen

See Appendix D, Database Structure and Use, Table Searches for more information about how to search database tables.

3. Press the ENTER key. The description that corresponds to the Short A/N ID displays in the text box.
4. If the Short A/N ID is not found in the database, the message “A1 ID NOT FOUND” displays. Search the database by pressing the DATABASE QUERY softkey .
5. Once all table entries are complete, press the OK softkey  to accept the entries.
6. For Index Weighing, the A1, A2, and A3 table fields (if enabled) will display the database values as referenced in the Index Table. If necessary, change the values by following steps 1-3. A1, A2, and A3 table values that are changed during Index Weighing will not be changed in the Index Table.
6. If variable data entry has been enabled, variable data fields display. Variable data field names are enabled in the application setup. For example, in Figure 2-14 humidity is enabled as Variable 1 and quality is enabled as Variable 2. Use the alpha keys and the numeric keypad to enter variable data.

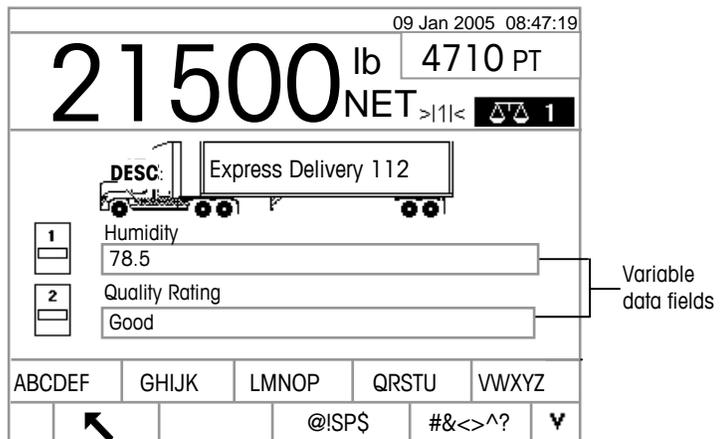


Figure 2-14: Variable Data Entry Screen

7. Once all table entries are complete, press the OK softkey  to accept the entries.

- Entry of data here is not obligatory. Variable data is not stored. Press the OK softkey to continue without entering data.

Validating the Transaction

After entering all data for the database and variable data, the validation screen displays (Figure 2-15). This screen shows all database table entries.

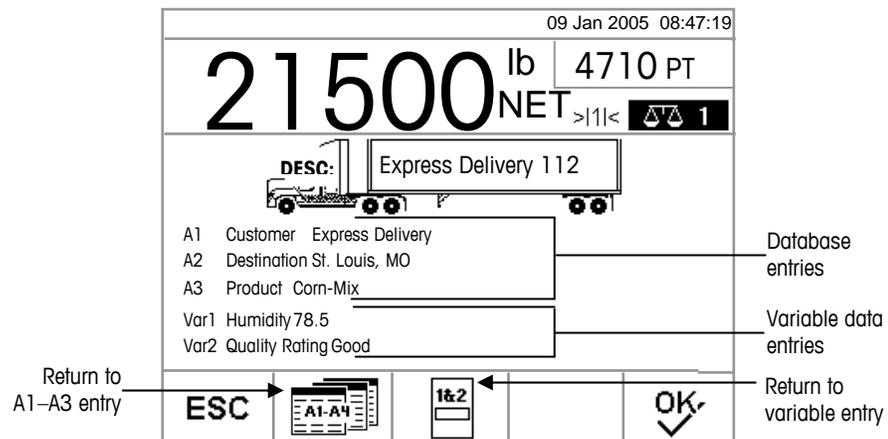


Figure 2-15: Validation Screen

To validate the transaction

- Verify that the information displayed for the database entries (A1–A3) and the variable data entries (Var1–Var2) is correct.
 - If any information is not correct, press the RETURN TO A1–A3 ENTRY softkey or the RETURN TO VARIABLE ENTRY softkey to go back to the appropriate entry screen to correct the information. Press the ESCAPE softkey to clear all data and re-start the transaction.
 - Once all information is correct as displayed, press the OK softkey to validate the transaction.
- If the A4 Table is not enabled as the index table, it can also be a user-defined entry field that functions like the A1–A3 Tables, and information will display and should be validated for this database entry as well.

Printing and Storing

- Once the transaction is validated, the information related to the transaction is stored in the Transaction Table and the outbound transaction prints (if enabled in setup).
- After storing and/or printing, the display returns to Gross mode and the terminal is ready for the next transaction.

Repeat Printing

Anytime the IND310drive prints, a buffer is created that retains a copy of what was printed. The information in the buffer can be printed repeatedly as needed. To initiate the Repeat Print function, press the REPEAT PRINT softkey .

Inbound Process

Completing the Inbound Process involves:

- **Entering Database Information**—The same procedures as listed under Entering Database Information for the Outbound Process.
- **Validating the Transaction**—The same procedures as listed under Validating the Transaction for the Outbound Process.
- **Printing and Storing**—The same procedures as listed under Printing and Storing for the Outbound Process, except ID, description, and inbound weight information related to the transaction are also stored in the Temporary Table.

Commodity Function

The commodity function enables the use of custom units on a per commodity basis (up to 25 different commodities). For example, an operator might want to use a custom unit of bushels for corn rather than kilograms or pounds. The commodity table enables the creation of a table (the A1 Table) that defines the multiplication or division factor that converts kilograms or pounds of corn to bushels. When the commodity (corn) is weighed, the output shows the converted amount and custom unit (bushels).

See Chapter 3.0, Configuration, Application, Memory, A1, A2, and A3 Tables for further information about configuring the commodity function.

Clear and Reset Functions

Clear and reset functions enable users to clear the Alibi & Transaction table and to reset specific parameters or all IND310drive parameters back to the factory default settings.

Clearing the Alibi & Transaction Table

The user may want to clear the transaction table after the terminal has first been installed or in North American applications, where the user has downloaded the existing data and wishes to continue with a clear table. Clearing the Alibi & Transaction table may take up to three minutes. In addition to clearing the data, the process runs a database defragmentation routine.

To clear the Alibi & Transaction table:

1. Go to the setup menu and select Application/Memory/Alibi & Transaction Table. The Alibi & Transaction Table screen displays (Figure 2-16).

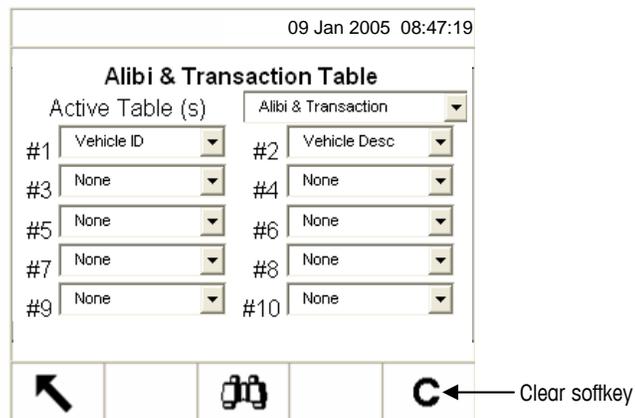
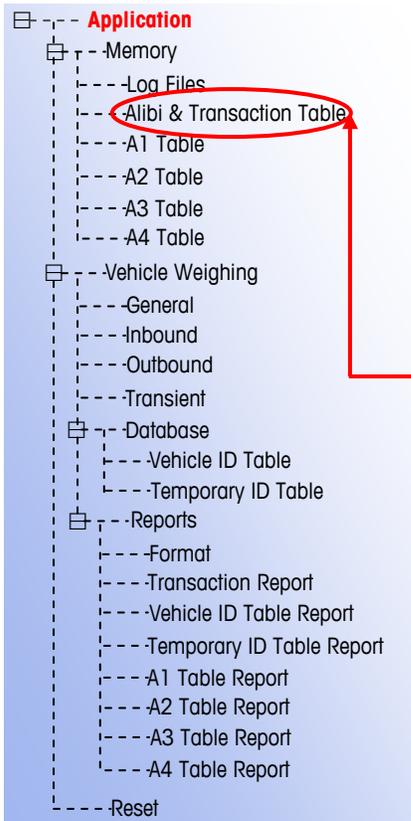
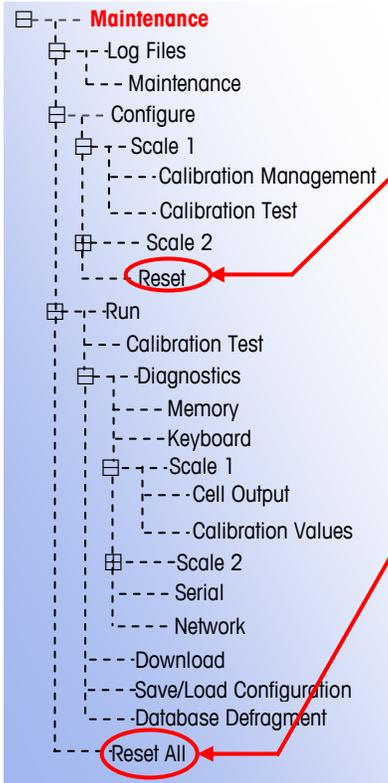


Figure 2-16: Alibi & Transaction Table

2. Press the CLEAR **C** softkey. A "Please Wait" message displays while the operation is running. The task is complete when the "Please Wait" message no longer displays.

Reset



Reset in the setup menu tree may be performed at individual submenus or at the Maintenance menu as RESET ALL.

Reset appears in each submenu: Scale, Application, Terminal, Communication, and Maintenance/Configure and is used to reset specific parameters for that submenu back to the factory default settings. In the Scale submenu there are several parameters that are **not reset**:

- Scale Type
- Capacity
- Increment
- Scale Calibration Data

Reset All resets all IND310drive parameters back to factory default settings, but does not affect Scale Type, Capacity, Increment, and Scale Calibration Data. The configuration of data tables is reset, but the data within tables (Vehicle ID, A1–A4) are also **not cleared** by the reset function. Data within the tables can only be cleared within the Table Editing screens.

Report Generation

See Appendix D, Database Structure and Use, Table Reports, for more information about how to configure reports.

Reports are generated from database tables including:

- Transaction Table
- Temporary ID Table
- Vehicle ID Table
- A1, A2, A3, and A4 Tables

The RUN REPORT soffkey  must display on the operational screens to generate table reports. Otherwise, table reports can only be generated from setup screens.

To generate a table report from an operational screen:

1. Press the RUN REPORT softkey. The Reports Run/Full screen displays (see Figure 2-17).

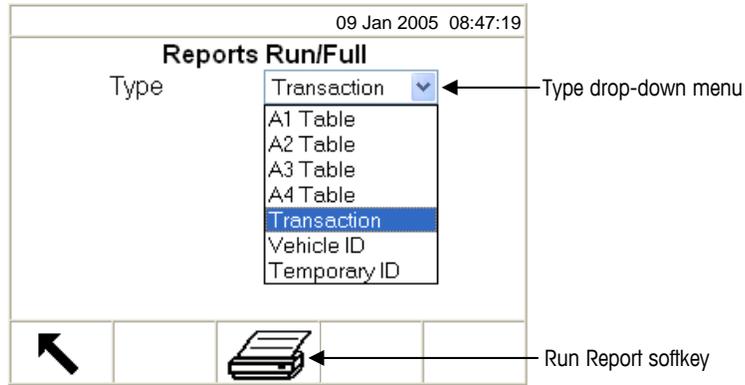


Figure 2-17: Reports Run/Full Screen

2. Use the Type drop-down menu to select the desired type of database table report. Press the ENTER key to accept the selection.
3. Press the RUN REPORT softkey. The Report Setup Screen for the selected report type displays (see Figure 2-18).
4. Continue to Step 5 under to generate a table report from a setup screen below.

To generate a table report from a setup screen:

1. Press the SETUP MENU softkey .
2. Scroll down the setup menu tree to Application>Vehicle Weighing>Reports.
3. Select the desired type of database table report.
4. Press the ENTER key to open the setup screen for the selected table report. The Report Setup Screen for the selected report type displays (see Figure 2-18).

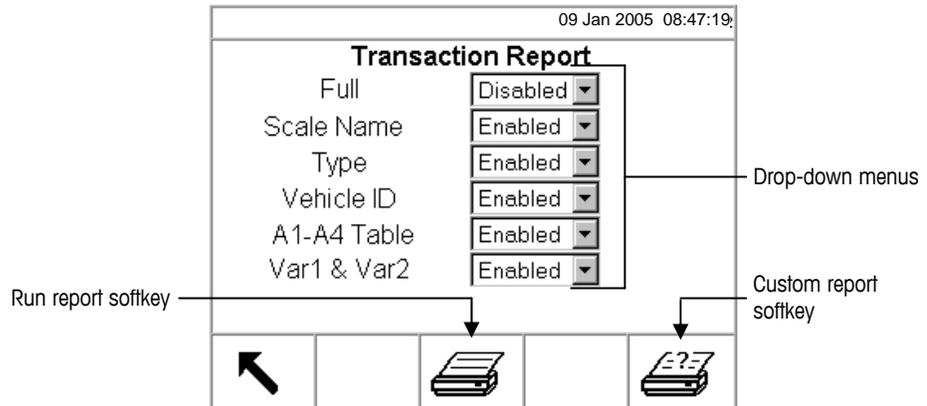


Figure 2-18: Report Setup Screen (Transaction Report)

See Chapter 3.0, Configuration, Memory, A4 Table for more information about A4 table functions.

5. Use the drop-down menus on the Report Setup Screen to enable or disable the defined table fields within the structure of the table report.
 - If Full is enabled for the transaction table report, other selections do not display.
 - If the A4 table is configured as the Index Table, the fields that display change to enable set up of the Index Table report structure.
6. Press the RUN REPORT soffkey to run a standard table report that includes data from all enabled fields.
7. Press the CUSTOM REPORT soffkey to limit the records included within the report fields and run a custom report. See Figure 2-19 for an example of a custom report setup screen.

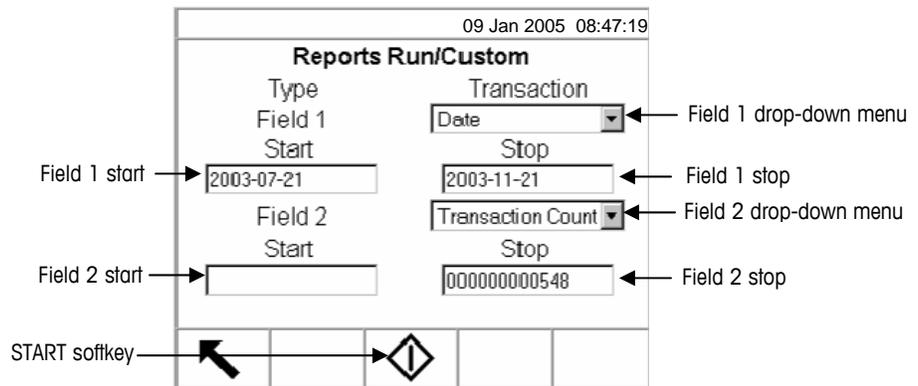


Figure 2-19: Example Custom Report Setup Screen

To configure and run a custom report:

1. Use the Field 1 and Field 2 drop-down menus to select fields to be used to limit records that are included in a report.
2. Specify the range of reported field values by entering start and stop values for the selected fields. For example, if Date is selected for Field 1, and a start value of 2003-07-21 and a stop value of 2003-11-21 are entered, only records with dates between July 21, 2003 and November 21, 2003 will be included in the report.

If the stop value is left blank, then any records with values that fall after the start value are included in the report. If the start is left blank, then any records with values that fall before the stop value are included in the report. For example, if Transaction Count is selected for Field 2 with a blank start value and a stop value of 548, then all records with transaction counts between 1 and 548 and dates between July 21, 2003 and November 21, 2003 will be included in the report.

- The date format is fixed at YYYY-MM-DD for these fields. (This date format might not match the terminal’s date configuration.)
3. Press the START soffkey to run the custom report.

METTLER TOLEDO

For your notes

Chapter 3.0

Configuration

This chapter covers

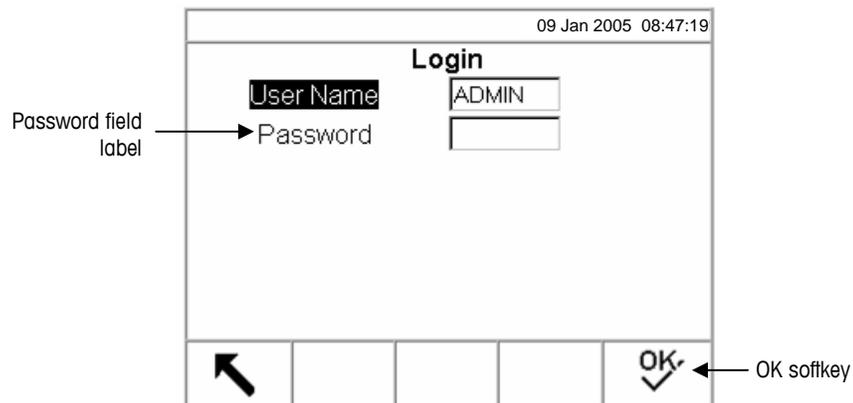
- Entering Setup Mode
- Overview of Configuration
- Configuration Options
- Restoring Factory Default Settings
- Exiting Setup Mode

This chapter provides information about how to configure the IND310drive terminal's operating system. It describes access to the setup mode, where functions can be enabled, disabled, or defined by entering parameter values in specific setup screens.

Entering Setup Mode

See Chapter 2.0, General Navigation for more information about how to use the navigation and alpha keys.

The configuration of the IND310drive terminal is accessed through the SETUP softkey . If password security has been enabled, a login screen (Figure 3-1) displays and the user must enter the correct password in order to advance into setup. See "Security" in Chapter 1.0 or "Users" in Chapter 3.0 to configure a password.



To enter a password:

1. Use the DOWN arrow key to move the focus to the Password field label.
2. Press the ENTER key. The softkeys change to alpha keys (see Figure 3-2).

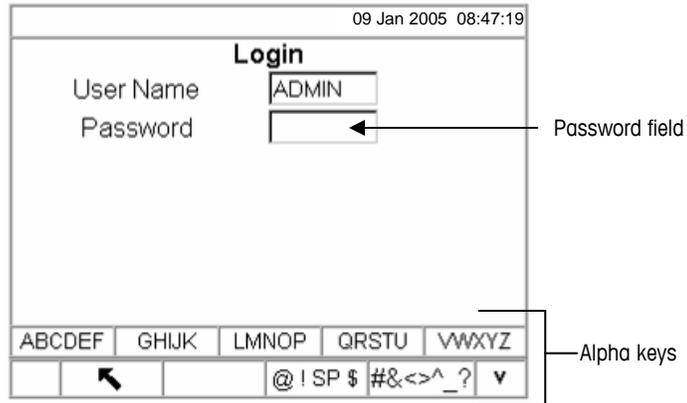


Figure 3-2: Login Screen (Alpha Keys)

3. Use the alpha keys to enter the password in the password field.
4. Press the ENTER key. The alpha keys no longer display.
5. Press the OK softkey . If the password is correct, the terminal goes into setup mode.

Once the terminal is in setup mode, the setup menu tree displays.

Setup Menu Tree

Each line of the setup menu tree is referred to as a branch (see Figure 3-3). Some branches are singular, while others have additional branches that become visible when the view of the main branch is expanded. If a branch has additional branches under it, the collapsed symbol (⊞) initially displays in front of the branch name. After the branch view has been expanded, the expanded symbol (⊟) displays in front of the branch name and the additional branches become visible.

If security is enabled in setup the first branch displayed in the setup menu tree will be Login. If security has not been enabled (no password), Login will not be visible and the first branch displayed will be Home.

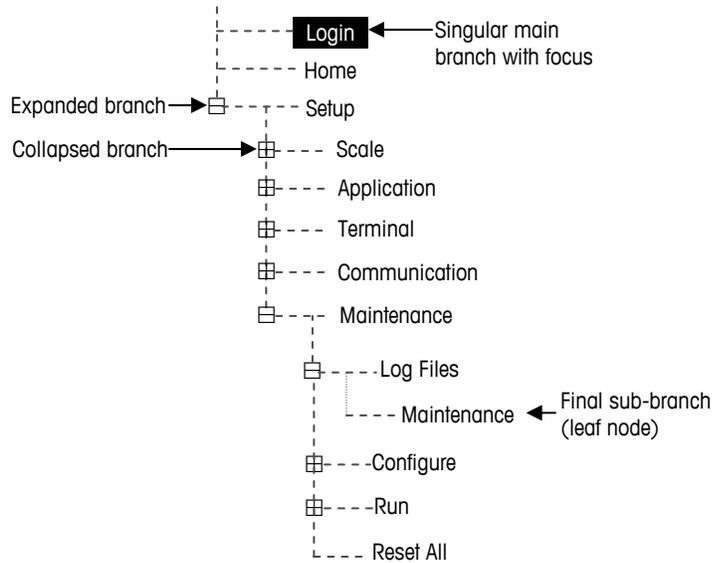


Figure 3-3: Setup Menu Tree

Use the UP and DOWN arrow keys to move through the setup menu tree. Press the UP arrow key to move the focus (shown by highlighted text) up the menu tree.

Press the RIGHT arrow key to expand a branch and the LEFT arrow key to collapse a branch. When the focus is on a sub-branch, focus can quickly be moved back to the main branch by pressing the LEFT arrow key.

When a singular (non-expandable) main branch such as Login or Home is in focus, or when the final sub-branch in a series is reached (also non-expandable and referred to as a leaf node), press the ENTER key to display the setup screen for that function.

Setup Screens

Setup screens enable access to data fields where parameters can be entered or modified to configure the terminal to meet specific application function needs.

Navigation

Use the UP and DOWN arrow keys to move through the field labels displayed on each setup screen. Press the UP arrow key to move the focus (shown by highlighted text) up the field labels (see Figure 3-4). When the focus reaches the top label, it will wrap to the bottom label. Press the DOWN arrow key to move the focus down the field labels. When the focus reaches the bottom label, it will wrap to the top label.

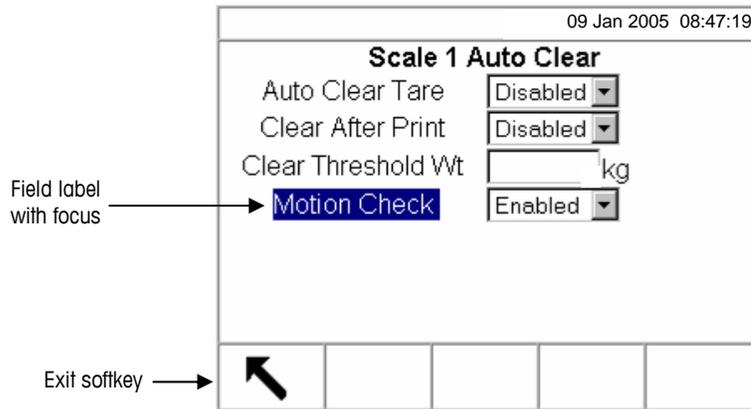


Figure 3-4: Setup Screen (Focus on Field Label)

Data Entry

Press the ENTER key to move the focus from the field label to the value of the field where data is to be entered or edited (see Figure 3-5).

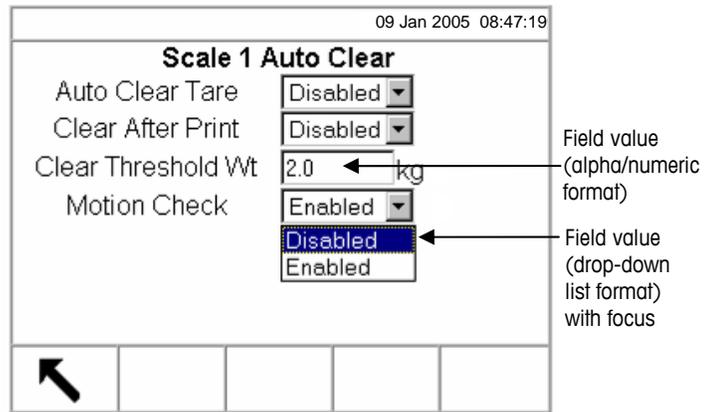


Figure 3-5: Setup Screen (Focus on Field Value)

If the field values are formatted in a drop-down list, the drop-down list will display when the ENTER key is pressed.

To change the field value using a drop-down list

1. Use the UP and DOWN arrow keys to scroll through the list and place the focus on the value to be selected.
2. Press the ENTER key to accept the selection as the value for the field. The selection displays as the value for the field and the focus moves to the next field label.

If the field values are formatted for alpha/numeric character entry, softkeys and application keys will display and function as alpha keys.

To change the field value using alpha/numeric characters

1. Use the alpha keys and the numeric keypad to enter the desired value.
OR
2. Use the LEFT and RIGHT arrow keys to move the cursor into position if the value needs to be edited from a specific point rather than replaced. Position the cursor at the end of the data to be deleted and press the C key once for each character to be deleted.
3. Press the ENTER key to accept the entered alpha/numeric characters for the field. The entry displays as the value for the field and the focus moves to the next field label.

To exit a setup screen, press the EXIT softkey,  which is in the first softkey position. The setup menu tree displays with the focus on the branch for the setup screen that was exited from. After exiting the setup screen, the focus is on the last selected branch.

Overview of Configuration

The setup menu tree can be expanded to show every branch and leaf node in the terminal's configuration. Use the navigation keys as described previously under Setup Menu Tree to select the desired setup screen.

There are five major sections in the setup menu:

- Scale
- Application
- Terminal
- Communication
- Maintenance

Details for each section are provided in the Configuration Options section.

Figure 3-6 shows the setup menu tree with all branches expanded.

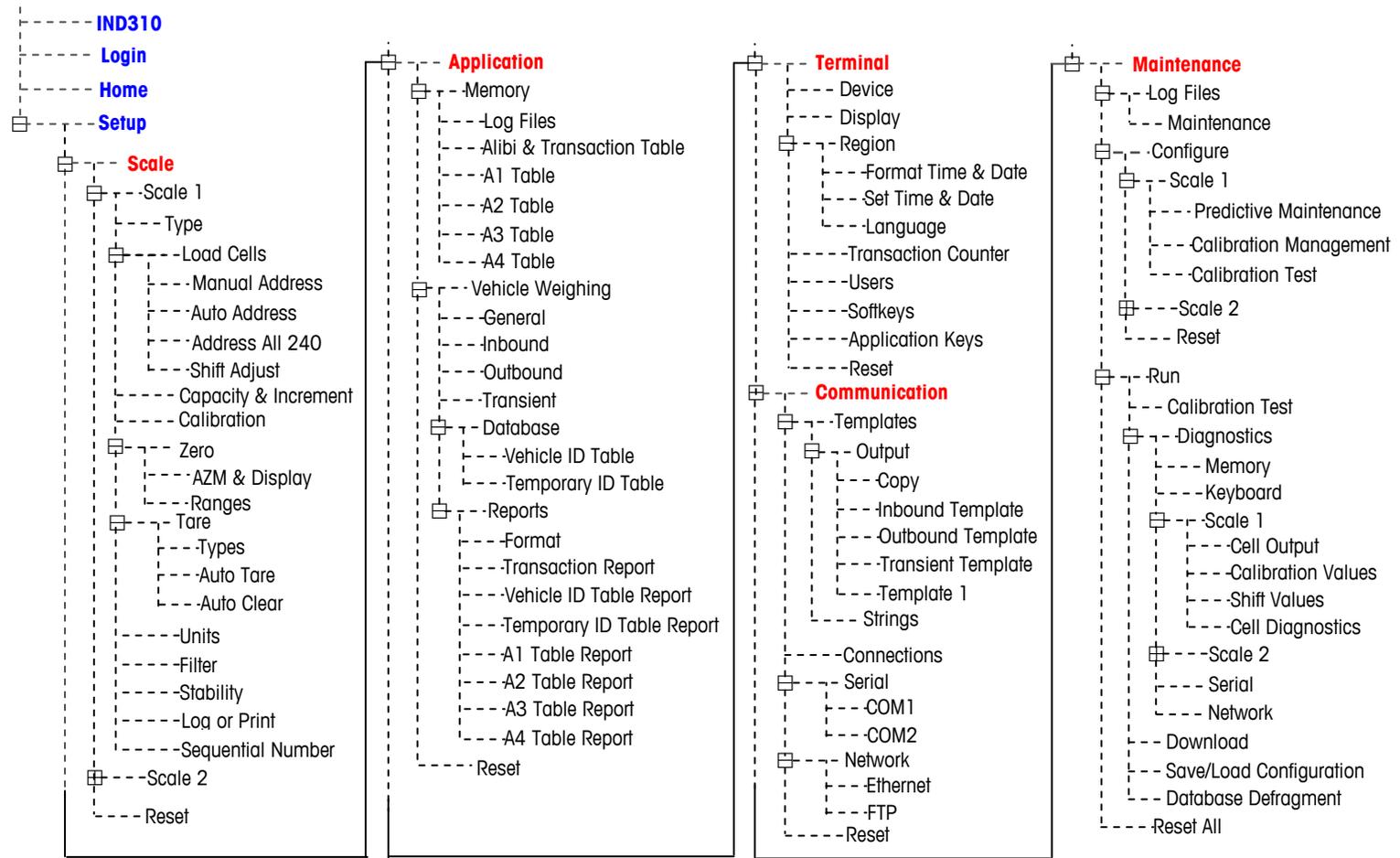
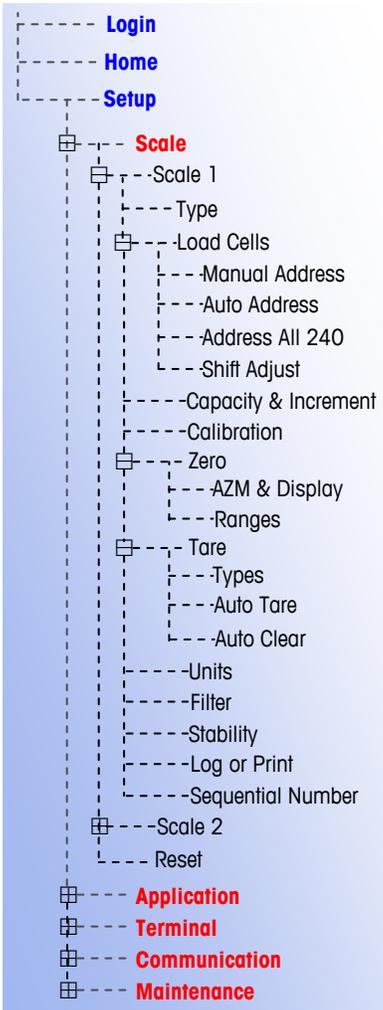


Figure 3-6: Setup Menu Tree With All Branches Expanded

Configuration Options

Configure terminal options on the setup screens that are available under the five major sections of the setup menu.

- If the metrology switch is in the approved position, access to the Scale section is not permitted. The Scale section will not display on the setup menu tree.

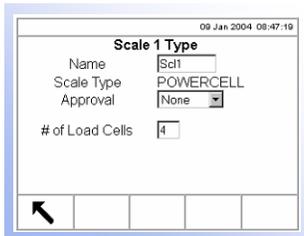


Scale

The Scale section provides the following access to the configuration of the connected scales:

- Type (and Load Cell screens when appropriate)
- Capacity and Increment values
- Calibration
- Zero parameters
- Tare parameters
- Units
- Filter parameters
- Stability parameters
- Log or Printing threshold parameters
- Sequential Number

Each configured scale has its own sub-branch with these sections. A Reset is present at the end of the section to enable a limited reset to the factory default settings for the Scale parameters.



Type

The Scale Type screen enables configuration of the scale Name, displays the current scale PCB Type in the terminal, provides a selection list for Approval mode, and enables the entry of # of Load Cells (only if the scale type is POWERCELL). The EXIT softkey will return the display to the menu tree.

Name

The Name field enables entry of the scale identification. Enter the scale name (an alpha-numeric string of up to ten characters) in the Name entry box. This name appears in the system line of the default operational displays and the menu tree to identify the scale.

Scale Type

The Scale Type field automatically shows the hardware configuration. This field will display either Analog or POWERCELL..

Approval

Approval refers to the metrological (weights and measures) approval configuration for the specific scale. The selection list can be set to:

- None—no approval is required
- Australia
- Canada
- OIML
- USA

of Load Cells

The number of load cells connected to the POWERCELL scale PCB must be entered in this field.

◀ This entry line is only present if the scale type is POWERCELL.

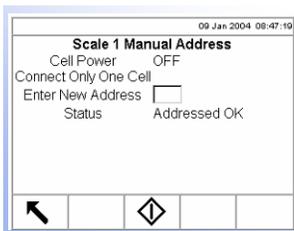
Load Cells

The Load Cells sub-branch is only present if the scale type is POWERCELL. It consists of four leaf nodes:

- Manual Address
- Auto Address
- Address All 240
- Shift Adjust

Manual Address

The Manual Address screen enables a POWERCELL load cell to be addressed or re-addressed to a specific new address value. This procedure page requires entering the new address and then pressing the START softkey .



Each load cell has a unique address to identify it. The valid address range is from 1 to 239, with 240 representing the “No Address Assigned” state. The factory default address for all cells is 240. To change the address manually, connect cells one at a time and follow the above procedure. Normally, a POWERCELL is addressed during initial installation only. The only reason to re-address a working POWERCELL is because it has been moved to a new location.

Cell Power

The Cell Power indicates the current status of the power output to the load cell. This status is always shown as OFF or ON and is automatically switched off to perform the addressing operation.

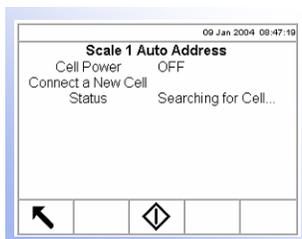
Enter New Address

The New Address entry box enables entry of the value of the new load cell address. A numeric value appropriate for the specific scale should be entered. The cells are addressed starting at 1.

Status

The status message line indicates the condition of the current procedure. Valid status messages include:

- Searching for Cell...
- No Cell Found
- Addressing XX (where XX is the cell address)
- Failed to Address
- Addressed OK



Auto Address

The Auto Address screen enables all of the POWERCELL load cells to be automatically addressed. If the load cells have never been addressed, this procedure will step through addressing each one. This procedure requires pressing

the START softkey .

The address for a newly added cell will be the first available address. For example, if addresses 1, 2, 5, and 6 are assigned and a new cell is automatically addressed, it will be assigned address 3.

- Cells must be addressed one at a time.

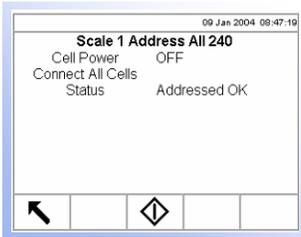
Cell Power

The Cell Power indicates the current status of the power output to the load cell. This status is always shown as OFF or ON and is automatically switched off to perform the addressing operation.

Status

The status message line indicates the condition of the current procedure. Valid status messages include:

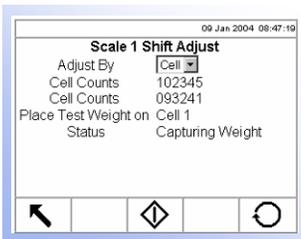
- Searching for Cell...
- No Cell Found
- Addressing XX (where XX is the cell address)
- Failed to Address
- Addressed OK



Address All 240

The Address All 240 screen enables all of the POWERCELL load cells to be automatically set to address 240. This is the default address. Cells may be re-addressed manually or automatically.

Cell Power and Status messages are the same as the information listed for the Auto Address screen. This procedure requires pressing the START softkey .



Shift Adjust

The Shift Adjust screen enables the load cell shift adjust values to be reset.

Adjust By

Use the Adjust By drop-down menu to select cell or pair.

Cell Counts

The Cell Counts field(s) display live weight information for the cell(s) being loaded.

Place Test Weight On

Place Test Weight On will read Cell "X" for cell shift adjust and Pair "X" for pair shift adjust (where X is the cell or pair number).

Status

Status messages include:

- Capturing Weight
- Adjust OK
- Adjust Failed

Press the RESET softkey  to reset all load cell shift adjust values to one. A screen displays that asks for verification to reset all load cell shift adjust values.

Press the OK softkey  to continue. A status message displays verifying that the reset all load cell shift adjust values was successful.

Capacity and Increment

Use the Capacity and Increment setup screen to select primary units, set the number of ranges or intervals, and the blanking over capacity.

- Press ENTER to leave the “Capacity” field and press ENTER again to leave the “Increments” field before pressing the exit arrow. Otherwise the values will not be saved.

Primary Units

Set the primary units from the drop-down menu selections, which include:

- Grams (g)
- Kilograms (kg)
- Pounds (lb)
- Tons (ton)
- Tonnes (t)

#Ranges/Intervals

Set the number of ranges or number of intervals from one to three on the #Ranges/Intervals drop-down menu. Specify the capacity and increments for each range or interval.

Blanking Over Capacity

Blanking the display is used to indicate an over-capacity condition. Set the blank over capacity for the divisions (d) that the terminal is permitted to go over capacity. For example, if capacity is set at 100 kg by 0.1 increments and the blank over capacity setting is 5 d, the terminal can display weights up to 100.5 kg. At weights over 100.5, the display will blank and dashed lines will display instead of a weight.

See Appendix G, Geo Codes for further information and a table of geo adjustment values and associated geo codes.

Calibration

The Calibration screen enables entry of a geo code adjustment value, the base serial number, calibration units, and linearity adjustment.

Geo Code

Enter the geo code for the appropriate geo adjustment value for the current geographical location. Geo codes are numbered 0–31.

Base Serial Number

Enter the scale base serial number in this field.

Calibration Units

Calibration units are listed the drop-down menu. Primary is the only selection.

Linearity Adjustment

Select the linearity adjustment from the drop-down menu. Selections are as follows:

- **Disabled**—Use only zero and span
- **3 point**—Use zero, midpoint, and span
- **4 point**—Use zero, lowpoint, midpoint, and span

The Scale 1 Calibration setup screen displays two softkeys that can be used for calibration procedures

- Capture Zero → **0** ←
- Capture Span → **|** ←

Capture Zero

The CAPTURE ZERO softkey triggers an independent operation to reset the zero condition of the scale. A status message displays when this softkey is pressed that directs the user to empty the scale and press the START softkey.  The status of the capture zero operation displays. When the operation is complete, a final status message displays that verifies the completion of the capture zero operation.

Capture Span

The CAPTURE SPAN softkey initiates a sequence to capture span (the difference between the highest and lowest calibration weight values) that can be performed independently of capturing zero.

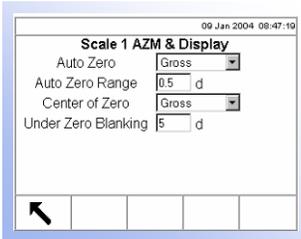
To capture span

1. Press the CAPTURE SPAN softkey. The Capture Span setup screen displays.
2. Place test load weight 1 on the scale.
3. Enter the weight for test load 1.
4. Press the START softkey. The status of the weight capture operation displays. When the operation is complete, a status message displays that verifies the completion of the weight capture. Press the ENTER key.
5. Repeat steps 2–4 for test loads 2 and 3. These are enabled for linearity adjustment 3 point and 4 point respectively.
6. If the capture span operation was successful, a verification message that reads “Capture Span OK” displays. If the capture span operation was not successful, an error message that reads “Capture Span Failed” displays.

Zero

There are several methods that can be used to reset the zero condition of a scale when small amounts of material are on the platform. Two setup screens are available for these methods:

- Auto Zero Maintenance (AZM) & Display
- Ranges



AZM & Display

AZM is a means of enabling "true zero" at all times on a digital scale. AZM compensates for conditions such as indicator or load cell drift or debris on a scale platform.

Auto Zero

Use the AZM & Display setup screen to enable auto zero for gross weighing or gross and net weighing, or to turn auto zero off.

Auto Zero Range

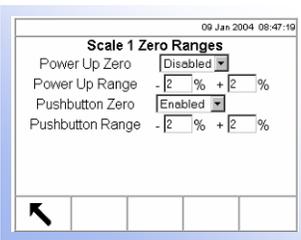
Set the auto zero range for the number of divisions around the original zero in which auto zero can be applied.

Center of Zero

The center of zero icon $>0<$ can be set to display on the operation screen for either gross or gross and net weighing. This display can also be set to off.

Under Zero Blanking

Blanking the display is used to indicate an under-zero condition when the terminal is in the Gross mode (no tare). Set the under zero blanking for the number of divisions (d) that the terminal is permitted to go under zero.



Ranges

Use the settings on the Ranges screen to enable or disable Power Up Zero and Pushbutton Zero and to set the ranges around the original zero condition for the scale for applying these functions.

Power Up Zero

If Power Up Zero is enabled, the terminal resets zero upon power up.

Power Up Range

If Power Up Zero is enabled, +Range and -Range fields will display for setting the range around the original zero condition for the scale within which Power Up Zero can be applied. The range units are percent.

For example, if the +Range setting for Power Up Zero is set at 2%, Power Up Zero will only occur when the weight reading on the scale is at or below 2% of the original zero condition. If the -Range setting for Power Up Zero is set at 2%, Power Up Zero will only occur when the weight reading on the scale is at or above -2% of the original zero condition.

Pushbutton Zero

If Pushbutton Zero is enabled, auto zero can be implemented by front panel pushbutton.

Pushbutton Range

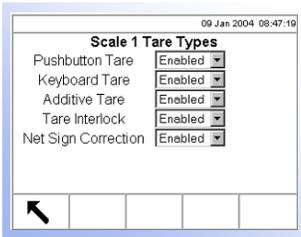
If Pushbutton Zero is enabled, +Range and –Range fields will display for setting the range around the original zero condition for the scale within which Pushbutton Zero can be applied. The range units are percent. For example, if the +Range setting for Pushbutton Zero is set at 2%, the Pushbutton Zero can only be used when the weight reading on the scale is at or below 2% of the original zero condition. If the –Range setting for Pushbutton Zero is set at 2%, the Pushbutton Zero can only be used when the weight reading on the scale is at or above –2% of the original zero condition.

Tare

Tare is used to subtract the empty weight of a vehicle from the gross weight on the scale to determine the net weight of the contents of a vehicle. Tare is inhibited if the scale is in motion.

Three setup screens are available to configure tare

- Tare Types
- Auto Tare
- Auto Clear



Tare Types

Use the Tare Types setup screen to enable or disable tare types.

Pushbutton Tare

When pushbutton tare is enabled, the TARE scale function key **→T←** can be pressed when an empty vehicle is on the scale to determine tare. The terminal displays a zero weight and net mode. When the vehicle is loaded and driven back onto the scale, the terminal displays the net weight of the contents.

Keyboard Tare

When keyboard tare is enabled, the known value for the empty weight of a vehicle (tare) can be entered manually. Use the numeric keypad to enter the known tare weight. The terminal will then display the net weight of the contents of the vehicle.

Additive Tare

Additive tare is a tare value that is added to an existing tare weight value to establish a new tare weight value. If additive tare is enabled, a tare weight value can be added using the numeric keypad while the terminal is in the net weight mode. The tare value entered is added to the existing tare weight value. Tare interlocks inhibit this mode.

Tare Interlock

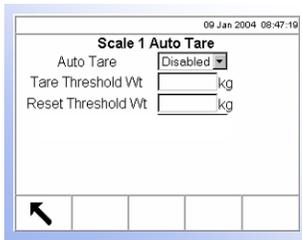
Tare interlocks are a set of restrictions on how tare can be used that are required by certain local weights and measures regulations. If tare interlocks are enabled, the terminal must be at gross zero to clear a tare weight or to enter a keyboard tare. Tare interlocks also prevent the terminal from replacing an existing tare with a new auto tare.

Net Sign Correction

Net sign correction enables the IND310drive terminal to be used for both shipping (inbound empty) and receiving (inbound loaded) operations. If net sign correction is enabled, the terminal will switch the gross and tare weight fields on the printed ticket, if necessary, so that the larger weight is the gross weight, the smaller weight is the tare weight, and the difference is always a positive net weight. Net sign correction affects only the printed data output. The displayed weight and continuous data output will continue to show a negative net weight value. Table 3-1 provides a net sign correction example.

Table 3-1: Net Sign Correction Example

Data Output	Weight Displayed	Weight Printed
Gross weight	35100 lb	64080 lb G
Tare weight	64080 lb	35100 lb PT
Net weight	-28980 lb	28980 lb N



Auto Tare

Use the Auto Tare screen to enable or disable auto tare, set the tare and reset threshold weights, and enable or disable motion check.

Auto Tare

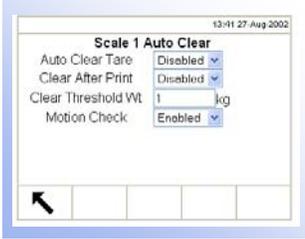
When auto tare is enabled, the tare weight is taken automatically when a vehicle is on the scale. Tare interlocks prohibit replacement auto tare.

Tare Threshold Wt

When weight on the scale platform exceeds the tare threshold value, the terminal automatically tares.

Reset Threshold Weight

The reset threshold weight must be less than the tare threshold weight. When the weight on the scale platform falls below the reset threshold value, such as when a load has been removed, the terminal automatically resets the auto tare trigger.



Auto Clear Tare

To clear tare automatically when the scale returns to the center of zero, enable the auto clear tare setting.

Clear After Print

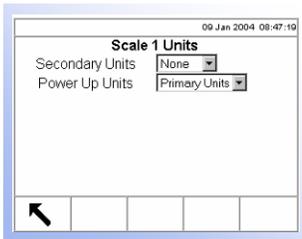
To clear tare automatically after printing, enable the clear after print setting.

Clear Threshold Wt

When the gross scale weight exceeds then falls below the clear threshold value, the terminal automatically clears tare and returns to gross mode.

Motion Check

Enable the motion check setting to prevent auto clear from occurring when the scale is in motion.



Units

This setup screen enables the selection of secondary weighing and auxiliary units.

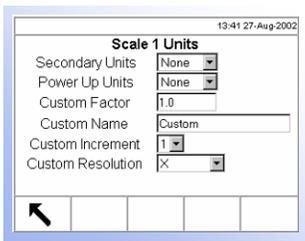
Secondary Units

Use the Secondary Units drop-down menu to select secondary weighing units, configure custom secondary units, or to select none. Available weighing units include:

- Custom
- Grams (g)
- Kilograms (kg)
- Pounds (lb)
- Tonnes (t)
- Tons (ton)

Custom Units

If Custom is selected for secondary units, four additional fields display for configuring custom units. The terminal displays *** when custom units are in use.



Custom Factor

Enter a multiplication factor for the custom unit in this field, such as 0.592 or 1.019. This value is used for a unit of measurement that is not standard. For example, MyUnit=1.3 lbs. If "lbs" is the primary unit, then the custom factor is "1.3".

Custom Name

The softkeys turn into alpha keys when this field is selected. Use the alpha keys to enter the name for the custom unit.

Custom Increment

Program a custom increment of 1, 2, or 5 using the corresponding drop-down menu. The "Custom Unit" will use this increment multiplied by the "Custom Resolution". For example, MyUnit needs an increment of 0.5, so the user will select Custom Increment 5 and Custom Resolution 0.X. If MyUnit needs an increment of "0.002", then the user chooses a custom increment of "2" and a custom resolution of "0.00X".

Custom Resolution

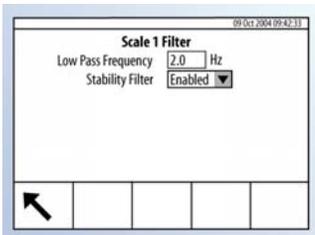
The custom resolution drop-down menu enables resolution at:

- 0.00000X
- 0.0000X
- 0.000X
- 0.00X
- 0.0X
- 0.X
- X
- X0
- X00
- X000

Refer to "Custom Increment" above for examples of use.

Power Up Units

Power up units defines the units the terminal defaults to after power up. Use the drop-down menu to select either primary or secondary units.



Filter

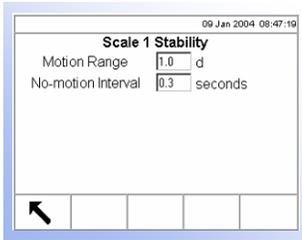
The IND310drive terminal has a low-pass, multi-pole vibration filter that can be set for several conditions. The heavier the filtering, the slower the display settling time will be.

Low Pass Frequency (Hz)

Low pass frequency is the frequency above which all disturbances are filtered out. The lower the frequency, the better the disturbance rejection, but the longer the settling time required for the scale.

Stability Filter

The stability filter can also be enabled or disabled on this setup screen. If enabled, the "Stability Filter" takes the place of the Low Pass Filter during the "No Motion" condition to provide the highest possible filtering (lowest Low Pass Frequency). When motion is detected, filtering automatically switches back to the Low Pass Frequency Filter defined above. The Stability Filter should only be enabled for transaction applications and is not suitable for batching or filling operations.



Stability

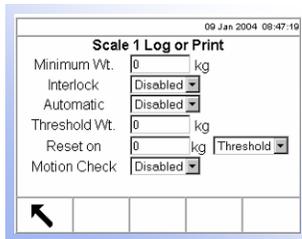
The IND310drive terminal includes a stability detector (weight in motion). The Stability setup screen enables setting a motion range and a no-motion interval.

Motion Range

Set the motion range to eliminate weight changes from fluctuations in the weight display caused by movement. The range is set in divisions (d) that the terminal is permitted to fluctuate.

No-motion Interval

The no motion interval defines the amount of time (seconds) that will elapse before a no motion signal is sent to the terminal.



Log or Print

The Log or Print setup screen is where the thresholds to control how and when data is saved or output to a printer are defined. Normal demand mode printing occurs whenever a print request is made, providing there is no motion on the scale and zero has been captured (a negative gross weight will not be printed).

Minimum Weight

The minimum weight setting is the threshold below which log or print functions will not initiate.

Interlock

Interlock prevents repeat logging and printing. If enabled, interlock requires that the weight reading return to zero (or below the minimum print value) and then settle to a weight greater than the minimum print value before responding to the next log or print request.

Automatic

Enable the automatic setting to log data and send a print request every time the weight on the scale settles to a positive value that is larger than the minimum threshold weight value.

Threshold Wt.

Enter the minimum threshold weight value for automatic logging and printing of data in this field.

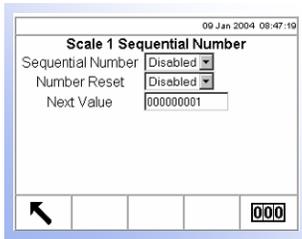
Reset on

The automatic setting to reset based on weight threshold or weight deviation values can also be configured on this screen. Select threshold (the weight value at which the reset function will be triggered) or deviation (the weight difference between the

weight on the scale and the minimum weight value at which the reset function will be triggered) from the drop-down menu and enter the weight value in the “Reset on” field.

Motion Check

Enable the motion check setting to prevent automatic log and print functions from occurring when the scale is in motion.



Sequential Number

Sequential number refers to the unique transaction number for the selected scale. Each scale has its own sequential number. This number is separate from the terminal transaction number. Each time a transaction occurs, the terminal transaction number advances and so does the corresponding sequential number for the selected scale.

Sequential Number

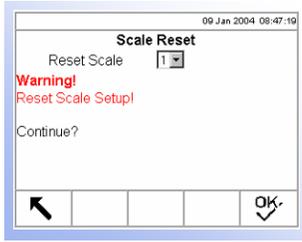
Use the drop-down menu to enable or disable the sequential number feature.

Number Reset

Use the drop-down menu to enable sequential number reset. Press the RESET COUNTER soffkey **000** to reset the sequential number for the selected scale.

Next Value

Use this field to set the next value to be used for sequential numbering.



Reset

The Reset screen enables the scale setup values to be reset to factory default settings.

Reset Scale

Use the drop-down menu to select the scale for which setup values will be reset to factory default settings. Press the OK softkey  to complete the reset process.

- Scale reset does NOT include the reset of type, capacity, increment, or calibration data. Reset this data by selecting Maintenance, Reset All.

Application

Use application setup screens to configure:

- Memory
- Vehicle Weighing

Memory

Memory setup screens include:

- Log Files
- Alibi & Transaction Table
- A1, A2, and A3 Tables
- A4 Table
- Message Table

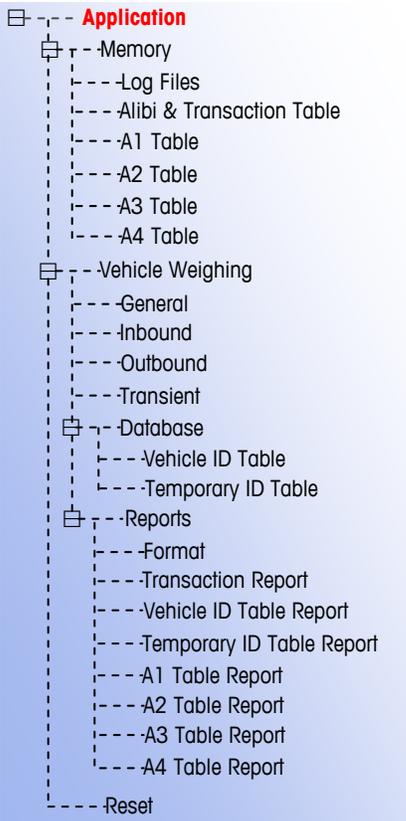
Log Files

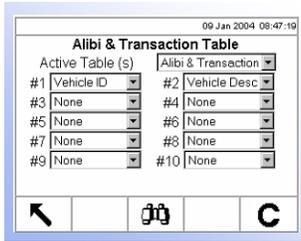
Enable or disable the maintenance logging function for each scale using the drop-down menus labeled for Scale 1 and Scale 2 located on the Log Files setup screen.

Maintenance Log

The maintenance log file tracks any calibration changes in the terminal for the selected scales. These log files are always read only (can only be viewed or reset completely).

Press the RESET softkey  to reset the log files. A screen displays that asks for verification. Press the OK softkey  to continue. A status message displays verifying that the reset was successful.





Alibi & Transaction Table

The Alibi & Transaction Table setup screen provides drop-down menus for enabling or disabling the Alibi and/or Transaction tables and the fields for these tables.

Active Table(s)

Use the Active Table(s) drop-down menu to enable or disable tables through the following selections:

- **None**—Disables alibi and transaction tables
- **Alibi only**—Enables only the alibi memory table
- **Alibi & Transaction**—Enables the alibi memory and the transaction table

See Appendix D, Database, Structure and Use for more information about alibi memory and transaction tables.

Alibi Memory Table

The alibi memory table stores basic transaction information that is not user-definable. This information always includes:

- Date and time stamp
- Transaction count
- Gross, tare, and net weights and weight unit

Transaction Table

The transaction table is a user-configurable table that is linked to the alibi table by the transaction counter value. The transaction table consists of up to ten extra fields that can be selected for use. The transaction table always includes:

- Date and time stamp
- Transaction count

#1–#10 Table Fields

Use the #1–#10 drop-down menus to select the fields for the tables. When using a single scale, the fields required for the alibi memory table are:

- Time & Date
- Transaction counter
- Weight values (with unit)

If additional scales are present, the following additional fields are optional:

- Sequence number
- Scale name

When the Transaction Table is enabled, the following selections are available for the #1–#10 table fields:

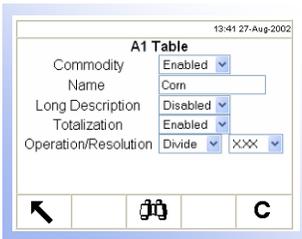
- A1 Value
- A2 Value
- Scale name
- Var1 Value
- Vehicle Description
- A1 Results*
- A3 Value
- Sequence #
- Var2 Value
- Vehicle ID

- A1 Units*
- A4 Value
- Type

* A1 Results and A1 Units are only available if the A1 Table is designated as a Commodity Table.

Press the SEARCH softkey  to view the transaction information.

To clear the Alibi & Transaction Table, press the CLEAR **C** softkey. A "Please Wait" message displays while the operation is running. The task is complete when the "Please Wait" message no longer displays. Clearing the Alibi & Transaction table may take up to three minutes. In addition to clearing the data, the process runs a database defragmentation routine.



A1, A2, A3 Tables

Set up the A1, A2, and A3 table structures through these three setup screens. Also view and edit table information, and generate custom table reports from these screens.



Commodity (Available Only for the A1 Table)

The commodity function enables the use of custom units on a per commodity basis (up to 25 different commodities). For example, an operator might want to use a custom unit of bushels for corn rather than kilograms or pounds. The commodity table enables the creation of a table that defines the multiplication or division factor that converts kilograms or pounds of corn to bushels. When the commodity (corn) is weighed, the output shows the converted amount and custom unit (bushels).

Use the Operation/Resolution and Factor fields to configure the desired conversion, which can be Multiply or Divide using a factor of X, X.X, X.XX, or X.XXX. These fields display only if Commodity is selected as the type of table.

If Commodity is Enabled, the Table Name is automatically "Commodity" and cannot be changed. Also, Totalization will always be enabled.

Name

Enter the desired label for associated operational screens for each table. For example, if the A1 table will contain customer names, enter Customer in the name field.

Long Description

Long Description is a long alphanumeric string that describes the table entry. Use the Long Description drop-down menu to enable or disable Long Description in the table structure.

Totalization

Totalization is a field that tracks totals for each specific table entry. For example, in a customer table the total weight for all transactions involving each customer in the table. Use the Totalization drop-down menu to enable or disable Totalization in the table structure.

Press the CLEAR softkey  to delete all table records. Press the SEARCH softkey  to search on specific drop-down menu information or to view or edit the tables that include this information.

When the SEARCH softkey is pressed, the Table/Search screen displays (see Figure 3-7).

Refer to Appendix D, Database, Structure and Use, Tables Searches for more information about searching tables.

Figure 3-7: Table/Search Screen

Use the drop-down menus and associated fields to enter specific search information, or leave the fields blank to view all table information. Press the START softkey . The Table Search/Results screen displays (see Figure 3-8).

Date	Time	Short ID	Desc
09-Sep-2003	11:40:13	001	Big Blue

Figure 3-8: Table Search/Results Screen

Modifying Information

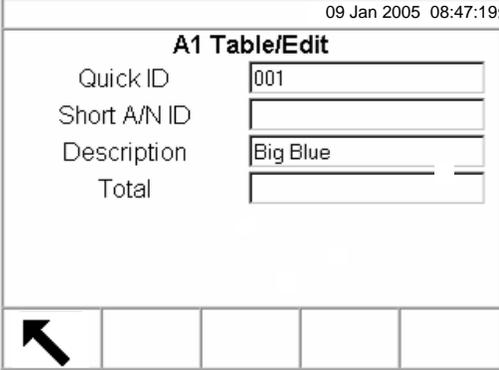
Modify table information by:

- Editing 
- Inserting 
- Deleting 

Use the CUSTOM REPORT softkey  to generate a custom table report.

Editing

Use the UP and DOWN arrow keys to select a record to edit. Press the EDIT  softkey to open the setup screen for editing a record. An example of a Table/Edit screen is shown in Figure 3-9.



A1 Table/Edit	
Quick ID	001
Short A/N ID	
Description	Big Blue
Total	

09 Jan 2005 08:47:19

←

Figure 3-9: Table/Edit Screen

To edit table information:

1. Use the UP and DOWN arrow keys to move the focus to the field name to be edited.
2. Press the ENTER key to select a field value to edit. The alpha keys display.
3. Use the alpha keys and the numeric keypad to enter or edit the desired value.
4. Press the ENTER key to accept the entry.
5. Press the EXIT softkey to return to the Table Search/Results screen.

Inserting

To create a new table entry, press the NEW softkey  to open the setup screen to create a new table record. Enter the field values as described in steps 1–5 under editing table information.

Deleting

Use the UP and DOWN arrow keys to select a table record to delete. Press the DELETE softkey  to delete the record.

Running Custom Reports

To run a custom report, press the CUSTOM REPORT softkey . The Table/Reports Run/Custom screen displays (see Figure 3-10).

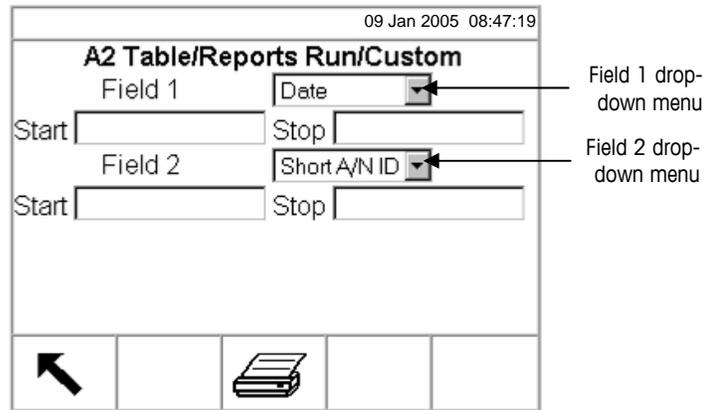
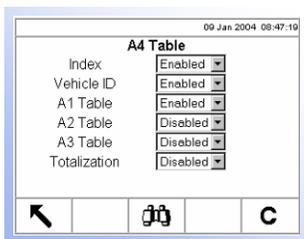


Figure 3-10: Table/Reports Run/Custom Screen

To configure and run a custom report:

1. Use the Field 1 and Field 2 drop-down menus (see Figure 3-10) to select fields to be used to limit records that are included in a report.
2. Specify the range of reported field values by entering start and stop values for the selected fields. For example, if Date is the selected field, and a start value of 2003-07-21 and a stop value of 2003-11-21 are entered, only records with dates between July 21, 2003 and November 21, 2003 will be included in the report. If the stop is left blank, then anything after the start value is included in the report. If the start is left blank, then anything before the stop value is included in the report.
 - ▶ The date format is fixed at YYYY-MM-DD for these fields. (This date format might not match the terminal's date configuration.)
3. Press the REPORT soffkey to run the custom report.



Refer to Appendix D, Database Structure and Use, Index for further information about the A4 Table structure.

A4 Table

Set up the A4 table structure on this setup screen. Also view and edit table information, and generate custom table reports from this screen.

Index

The index table is comprised of ID keys that are used to reference data located in other tables.

If the Index is disabled, the A4 table functions like the A1, A2, and A3 tables as described above.

If the Index is enabled, the A4 table functions as an index table and the fields that display change to enable set up of the index table structure.

Vehicle ID

Use the Vehicle ID drop-down menu to enable or disable reference to the Vehicle ID table from the Index table.

A1 Table, A2 Table, and A3 Table

Use the A1 Table, A2 Table, and A3 Table drop-down menus to enable or disable reference to these tables from the Index table.

Refer to Modifying Information under Memory, A1, A2, and A3 Tables for further information about how to modify table information.

Totalization

Totalization tracks totals for each specific Index table ID. Use the Totalization drop-down menu to enable or disable Totalization in the Index table structure.

Modify table information by editing, deleting, or inserting information. Use the CUSTOM REPORT softkey to generate a custom table report. These procedures are the same as those described previously under A1, A2, and A3 tables.

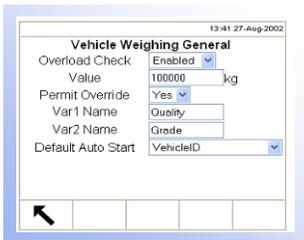
Vehicle Weighing

Vehicle weighing setup screens enable configuring of operational functions, defining of database table structure for vehicle and transient ID tables, and formatting of reports. Vehicle weighing setup screens include:

- General
- Inbound
- Outbound
- Transient
- Database
- Reports

Vehicle Weighing General

Use the Vehicle Weighing General setup screen to set overload check parameters and variable names and to select the default mode of operation for the IND310drive.



Overload Check

Overload Check signals overloading of the scale above a maximum weight value. Use the Overload Check drop-down menu to enable or disable the overload check function. If the overload check function is disabled, the Value and Permit Override fields do not display on this screen. If the overload check function is enabled, the Value and Permit Override fields display.

Value

Enter the maximum weight value that can be on the scale and above which will trigger the overload check signal.

Permit Override

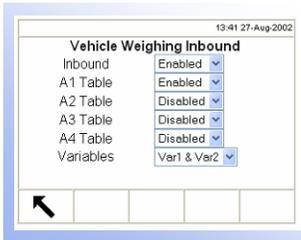
Select Yes or No from the permit override drop-down menu. If the Permit Override setting is “No” and an overload condition exists, the transaction automatically cancels and the terminal returns to an idle state. In order to weigh the vehicle, it is necessary to correct the overload problem and start the transaction again.

Var1 Name and Var2 Name

Use the Var1 Name and Var2 Name fields to enter the desired label for associated operational screens for Variable 1 and Variable 2. For example, if the Variable 1 will contain a quality rating, enter Quality in the Var1 Name field.

Default Auto Start

Use the Default Auto Start fields to select No Vehicle Application , VehicleID, or TempID as the default weighing mode. At power up, when exiting setup, or upon completion of a transaction the IND310drive will automatically display the input screen associated with the selected default auto start mode.



Vehicle Weighing Inbound

Set up parameters for inbound vehicle weighing on this setup screen.

Inbound

Use the Inbound drop-down menu to enable or disable the use of inbound vehicle weighing on the terminal. Temporary ID storage is enabled when inbound vehicle weighing is enabled.

A1 Table, A2 Table, A3 Table, and A4 Table

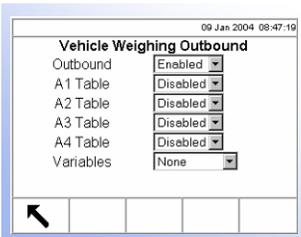
Enable or disable the use of the A1–A4 tables for inbound weighing transactions in the associated drop-down menus available on this screen.

- The A4 table drop-down menu does not display if index is enabled for the A4 table.

Variables

Select the variables (if any) to be available for inbound vehicle weighing by using the variables drop-down menu to select:

- None
- Variable 1
- Variables 1 and 2



Vehicle Weighing Outbound

Set up parameters for outbound vehicle weighing on this setup screen.

Outbound

Use the Outbound drop-down menu to enable or disable the use of outbound vehicle weighing on the terminal.

A1 Table, A2 Table, A3 Table, and A4 Table

Enable or disable the use of the A1–A4 tables for outbound weighing transactions in the associated drop-down menus available on this screen.

- The A4 table drop-down menu does not display if index is enabled for the A4 table.

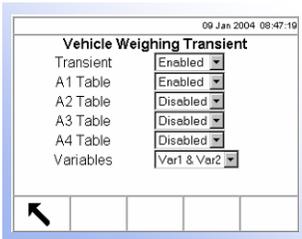
Variables

Select the variables (if any) to be available for outbound vehicle weighing by using the variables drop-down menu to select:

- None
- Variable 1
- Variables 1 and 2

Vehicle Weighing Transient

Set up parameters for transient vehicle weighing on this setup screen.



Transient

Use the Transient drop-down menu to enable or disable the use of transient vehicle weighing on the terminal.

A1 Table, A2 Table, A3 Table, and A4 Table

Enable or disable the use of the A1–A4 tables for transient weighing transactions in the associated drop-down menus available on this screen.

- The A4 table drop-down menu does not display if index is enabled for the A4 table.

Variables

Select the variables (if any) to be available for transient vehicle weighing by using the variables drop-down menu to select:

- None
- Variable 1
- Variables 1 and 2

Database

Set up table structures on two database setup screens:

- Vehicle ID
- Temporary ID



Vehicle ID Table

Use this setup screen to set up the Vehicle ID table structure.

Long Description

Long Description is a long alphanumeric string that describes the Vehicle ID table entry. Use the Long Description drop-down menu to enable or disable Long Description in the Vehicle ID table structure.

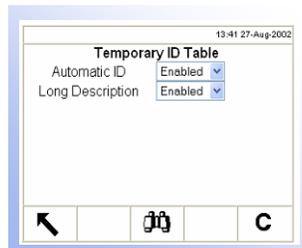
Totalization

Totalization is a field that tracks the total weight for all transactions involving each vehicle ID in the table. Use the Totalization drop-down menu to enable or disable Totalization in the Vehicle ID table structure.

Press the CLEAR softkey **C** to reset the table. Press the SEARCH softkey  to search on specific drop-down menu information or to view the tables that include this information.

Refer to Modifying Information under Memory, A1, A2, and A3 Tables for further information about how to modify table information.

Modify database information by editing, inserting, or deleting information. Use the CUSTOM REPORT  softkey to generate a custom database report. These procedures are the same as those described previously under Memory, A1, A2, and A3 Tables.



Temporary ID Table

Use this setup screen to set up the Temporary ID table structure.

Automatic ID

Automatic ID provides the next available number for the temporary vehicle ID and displays it in the vehicle ID input box at the start of the temporary ID transaction. Automatic ID Numbers range from 001 to 999. Numbers after 999 roll over to 001. Automatic ID checks the existing numbers in the temporary ID table. If a number already exists then the next available number is chosen.

Long Description

Long Description is a long alphanumeric string that describes the Temporary ID table entry. Use the Long Description drop-down menu to enable or disable Long Description in the Temporary ID table structure.

Press the CLEAR softkey **C** to delete all table records. Press the SEARCH softkey  to search on specific drop-down menu information or to view the tables that include this information.

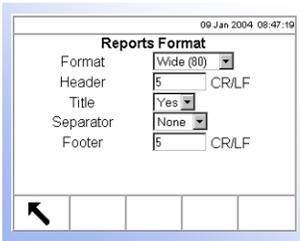
Refer to Modifying Information under Memory, A1, A2, and A3 Tables for further information about how to modify table information.

Modify database information by editing, inserting, or deleting information. Use the CUSTOM REPORT  softkey to generate a custom database report. These procedures are the same as those described previously under Memory, A1, A2, and A3 Tables.

Reports

The reports setup screens enable configuration of the structure of table reports that are generated by the IND310drive terminal. The reports setup screens include:

- Reports Format
- Transaction Report
- Vehicle ID Table Report
- Temporary ID Table Report
- A1 Table Report
- A2 Table Report
- A3 Table Report
- A4 Table Report



Reports Format

The Reports Format setup screen enables selection of the format for all table reports for vehicle weighing.

Format

Use the drop-down menu for the Format field to select the width of the reports

- **Wide (80)**—80 character-wide reports
- **Narrow (40)**—40 character-wide reports

Header

The Header field enables a number to be specified for how many line feeds will be placed at the start of each report.

Title

The Title drop-down menu enables a title line to be printed.

Separator

The Separator drop-down menu enables selection from a choice of characters to be used as line separators to separate records in table reports as appropriate.

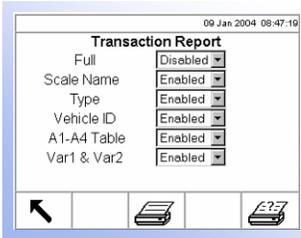
Character choices are:

- None (no characters)
- * (asterisks)
- - (dashes)
- = (equal symbols)
- CR/LF (blank line)

For example, if * (asterisks) is selected, the resulting line separator will appear as follows:

Footer

The Footer field enables a number to be specified for how many line feeds will be placed at the end of each report.



Transaction Report

Use this setup screen to configure the structure for generating transaction reports.

Full

If Full is enabled for the transaction table report, all fields are included in the report and the other selections do not appear on the setup screen. If Full is disabled, the other selections display.

Scale Name

Enable Scale Name to include it in the transaction table report.

Type

Enable Type to include the scale type in the transaction table report.

Vehicle ID

Enable Vehicle ID to include it in the transaction table report.

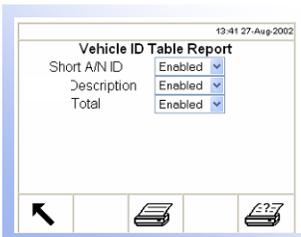
A1-A4 Table

Enable A1-A4 Table to include A1, A2, A3, and A4 table data in the transaction table report.

Var1 & Var2

Enable Var1 & Var2 to include Variable 1 and Variable 2 data in the transaction table report.

Press the RUN REPORT softkey  to run a transaction report. Press the CUSTOM REPORT softkey  to limit the records included and run a custom report.



Vehicle ID Table Report

Use this setup screen to configure the structure for generating vehicle ID table reports.

Short A/N ID

Use the Short A/N ID drop-down menu to enable or disable short A/N ID in the vehicle ID table report structure.

Description

Use the Description drop-down menu to enable or disable description in the vehicle ID table report structure.

Total

Use the Total drop-down menu to enable or disable totals in the vehicle ID table report structure.

Press the RUN REPORT softkey  to run a vehicle ID table report. Press the CUSTOM REPORT softkey  to limit the records included and run a custom report.

Temporary ID Table Reports

Use these setup screens to configure the structure for generating Temporary ID table reports.



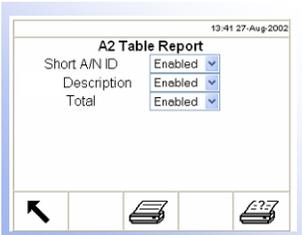
A1, A2, and A3 Table Reports

Use these setup screens to configure the structure for generating A1, A2, and A3 table reports.



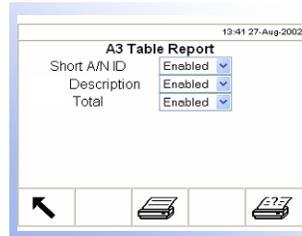
Short A/N ID

Use the Short A/N ID drop-down menu to enable or disable short A/N ID in the A1, A2, and A3 table report structures.



Long Description

Use the Description drop-down menu to enable or disable description in the A1, A2, and A3 table report structures.



Total

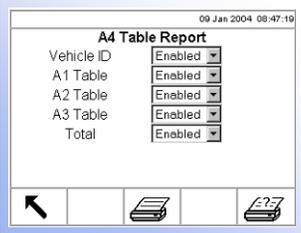
Use the Total drop-down menu to enable or disable totals in the A1, A2, and A3 table report structures.

Press the RUN REPORT softkey  to run an A1, A2, or A3 table report. Press the CUSTOM REPORT softkey  to limit the records included and run a custom report.



A4 Table Report

If the A4 table is not enabled as the Index table, the setup screen and configuration for the A4 table report is the same as listed previously under A1, A2, and A3 Table Reports.



If the Index is enabled, the A4 table functions as an index table and the fields that display change to enable set up of the index table report structure.

Vehicle ID

Use the Vehicle ID drop-down menu to enable or disable vehicle ID in the A4 (Index Table) report structure.

A1 Table, A2 Table, and A3 Table

Use the A1 Table, A2 Table, and A3 Table drop-down menus to enable or disable these tables in the A4 table report structure.

Total

Use the Total drop-down menu to enable or disable totals in the A4 table report structure.

Press the RUN REPORT softkey  to run an A4 table report. Press the

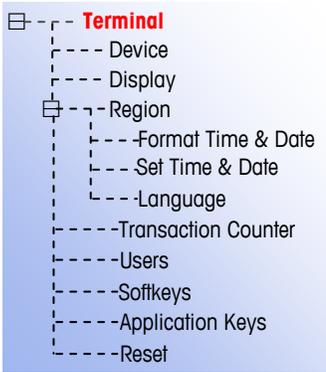
CUSTOM REPORT softkey  to limit the records included and run a custom report.



Reset

The Reset setup screen resets setup values to factory default settings for all of the application setup except for the database information in tables. Tables can be reset only by using the Reset All screen under the Maintenance section. Press the OK

softkey  to complete the reset process.



Terminal

Use terminal setup screens to configure:

- Device
- Display
- Region
- Transaction counters
- Users
- Softkeys
- Application key



Device

The Device setup screen shows information about the terminal, enables the entry of new information, allows beeper settings to be enabled or disabled, and enables scheduling of the time of day defragmentation to occur on either a monthly or daily basis.

Terminal ID

The device setup screen shows a terminal ID of IND310drive as the default. When the Terminal ID text box is selected, the softkeys become alpha keys. To change the terminal ID, use the alpha keys to enter a new ID. Press the ENTER key to accept the ID entered.

Project ID

When the Project ID text box is selected, the softkeys become alpha keys. Use the alpha keys to enter a project ID. Press the ENTER key to accept the ID entered.

Description

The default device description is Mettler Toledo Industrial Terminal.

Alarm Beeper

The alarm beeper sounds when an error, over capacity, or other warning situation occurs. Use the Alarm Beeper drop-down menu to enable or disable the alarm beeper.

Keypad Beeper

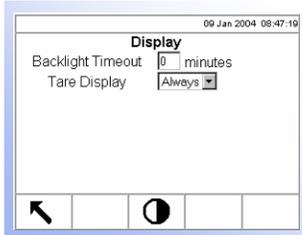
The keypad beeper sounds each time a terminal key is pressed. Use the Keypad Beeper drop-down menu to enable or disable the keypad beeper.

Defrag Time and Month/Day

Defragmentation occurs at the time specified in the Defrag Time field on the first day of every month if Month is selected or every day if Day is selected. The

defragmentation process takes no more than five minutes during which time the terminal displays the message: Defragmenting please wait.

Use the Defrag Time drop-down menu to select the desired time for defragmentation to occur. The default time is 2 a.m. Use the Defrag Month/Day drop-down menu to select the desired frequency for defragmentation. The default setting is Month. Defragmentation cannot be disabled.



Display

Use the Display setup screen to set the backlight timeout and tare display settings.

Backlight Timeout

Set the number of non-operational minutes that elapse before the backlight times out (dims) on the display setup screen. A setting of 0 in the backlight timeout field will cause the backlight to stay on continuously.

Tare Display

The tare display drop-down menu enables configuration of the tare display to:

- **Active**—Tare displays on the main weight display when a tare is present (will not display a tare of 0)
- **Always**—Tare always displays on the main weight screen even if the tare is 0
- **Never**—Tare value never displays, and the INFORMATION/RECALL softkey



must be pressed to view tare weight

Use the CONTRAST softkey  to adjust the contrast of the display. When this softkey is pressed, a screen displays with two additional softkeys:

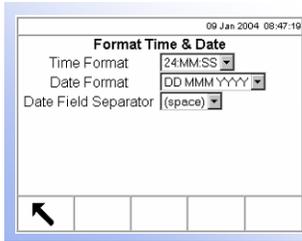
- DARKER CONTRAST  adjustment softkey
- LIGHTER CONTRAST  adjustment softkey

A bar graph displays and changes as the contrast is adjusted. The screen display also changes so the results of adjustments are immediately visible.

Region

The region setup screens enable configuration of:

- Time and date format
- Time and date settings
- Language



Format Time & Date

Drop-down menus on this setup screen enable formatting of:

Time Format

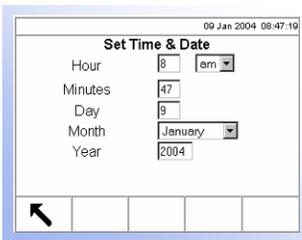
- 12:MM (12-hour clock with hour and minutes displayed)
- 12:MM:SS (12-hour clock with hour, minutes, and seconds displayed)
- 24:MM (24-hour clock with hour and minutes displayed)
- 24:MM:SS (24-hour clock with hour, minutes, and seconds displayed)

Date Format

- DD MM YY (Two-character day, month, year)
- DD MMM YYYY (Two-character day, three-character month, four-character year)
- MM DD YY (Two-character month, day, year)
- MMM DD YYYY (Three-character month, two-character day, four-character year)
- YY MM DD (Two-character year, month, day)
- YYYY MMM DD (Four-character year, three-character month, two-character day)

Date Field Separator

(space) / (slash) : (colon) - (dash)
. (period) ; (semicolon) , (comma)



Set Time & Date

Enter the hour, minutes, day, month, and year on this setup screen's text fields and drop-down menus. The terminal automatically adjusts the date for a leap year, and a battery backup maintains the time and date settings in the event of a power outage. Manual setting of the time is necessary for daylight savings time adjustments.

Hour

Use the numeric keypad to enter the hour in the Hour field text box. Use the AM/PM drop-down menu to select AM or PM. The AM/PM drop-down menu only displays if the time format is set to 12:MM or 12:MM:SS on the Format Time & Date setup.

Minutes

Use the numeric keypad to enter the minutes in the Minutes field text box.

Day

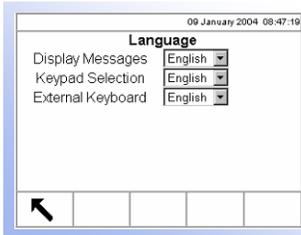
Use the numeric keypad to enter the day in the Day field text box.

Month

Use the Month drop-down menu to select the month.

Year

Use the numeric keypad to enter the year in the Year field text box.



Language

Use the Language setup screen to specify the language for terminal operations.

Display Messages

Use the Display Messages drop-down menu to select the language for messages that display on the terminal.

Keypad Selection

Use the Keypad Selection drop-down menu to select the language for the keypad characters that display on the terminal.

External Keyboard

Use the External Keyboard drop-down menu to select the language for an external keyboard connected to the terminal.



Transaction Counter

The transaction counter tracks the total transactions that are completed on the terminal. Use the Transaction Counter setup screen to configure transaction counter operations.

Transaction Counter

Use the Transaction Counter drop-down menu to enable or disable the transaction counter.

Counter Reset

Use the Counter Reset drop-down menu to enable or disable resetting the counter.

Next Transaction

The value for the counter for the next transaction displays in the Next Transaction field. If the counter reset is enabled, the next transaction value can be edited.

If the counter reset is enabled, a RESET COUNTER soffkey **000** displays. Press the RESET COUNTER soffkey to reset the counter to 000000000001.

- Resetting the transaction counter could result in duplicate transaction numbers in the Alibi Memory and Transaction tables.

Users



The IND310drive supports two levels of users/passwords for setup security: Administrator and Limited. The terminal is pre-configured at the factory with a user name of "ADMIN" and a user name of "Operator". The pre-configured users (ADMIN and Operator) cannot be changed, only the passwords can be added or modified. The factory default passwords are null (no password). The unit as configured at the factory requires no login or password entry to enter the setup mode. All functions of the terminal will be available to all users until a password is entered.

The ADMIN, administrator-level user can access all setup areas of the terminal. The Operator, limited-access-level user can access all areas of the setup except for the Scale and Diagnostics blocks.

- Ensure that a password has been configured for the ADMIN user prior to configuring any passwords for other users. Failure to configure the ADMIN user password before configuring other user passwords could result in being blocked from access to the entire system.

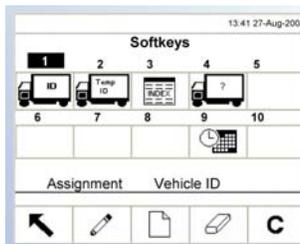
Press the EDIT softkey to access a second screen where a password can be entered.



- Passwords are case-sensitive.
- Be sure to store a record of the password in a safe place. Without the correct password access to the setup menu will not be possible.

Press the CLEAR softkey to restore the factory default setting to null.

Softkeys



Add or rearrange the softkeys on the terminal's main menu on the softkeys setup screen. When the softkeys setup screen opens, focus is on the softkey position numbers located above the icons.

Two softkeys, RECALL and SETUP , are automatically placed in the softkey setup. The default setting for the placement of these softkeys is in positions 14 and 15, which are permanent and are not shown on the edit screen. Only softkeys 1 to 10 can be edited.

Use the LEFT and RIGHT arrow keys to navigate among the softkey position numbers. Softkeys can be added, removed, and positioned by

Editing—Changes the softkey in the selected position to another softkey or to none, which leaves the softkey position blank.

Inserting—Inserts a softkey into a selected position. All other softkeys located at or after that position increase position number by one.

Deleting—Deletes a softkey into a selected position. All other softkeys located at or after that position decrease position number by one.

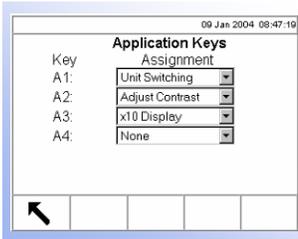
Refer to Appendix F, Softkey and Application Key Mapping for further information about configuring softkeys and application keys.

C Clearing—Clears all soffkey assignments.

Application Keys

Assign frequently used functions to application (A1–A4) keys on the application keys setup screen.

Use the assignment drop-down menus for each of the A1–A4 keys to select the desired function assignments.



Reset

The Reset setup screen resets setup values to factory default settings for the terminal setup. Press the OK soffkey  to complete the reset process.



Communication

The communication setup screens enables configuration of:

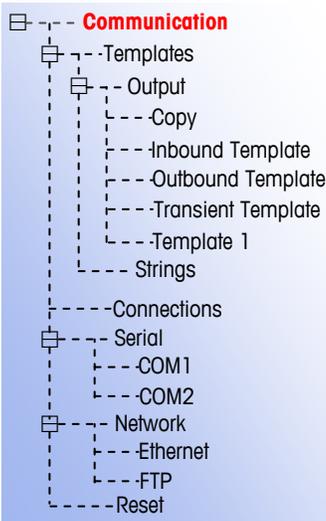
- Templates
- Connections
- Serial
- Network

Templates

The IND310drive terminal utilizes templates to define printed output following a weighing operation. Several setup screens are available to configure output templates, including:

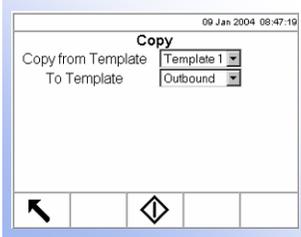
- Copy
- Inbound Template
- Outbound Template
- Transient Template
- Template 1

A template strings setup screen is also available to configure strings of characters that are frequently used in templates.



Copy

The Copy setup screen enables template parameters for printed output to be copied from one template to another for quick template setup or modification.



Copy from Template

Use the Copy from Template drop-down menu to select the template to copy parameters from.

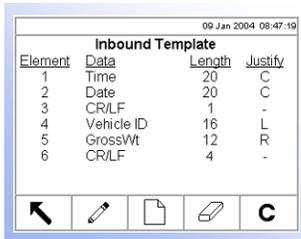
To Template

Use the To Template drop-down menu to select the template to copy parameters to.

Press the START softkey  to copy the template and return to the previous screen.

Inbound Template

The Inbound Template setup screen enables configuration of the output for inbound weighing operations defined by placement, data, character length, and justification. For example, if a template table lists element 1 data as Time with a length of 20 characters and center justification, the output will show the time first, using up to 20 characters, and centered on the page.

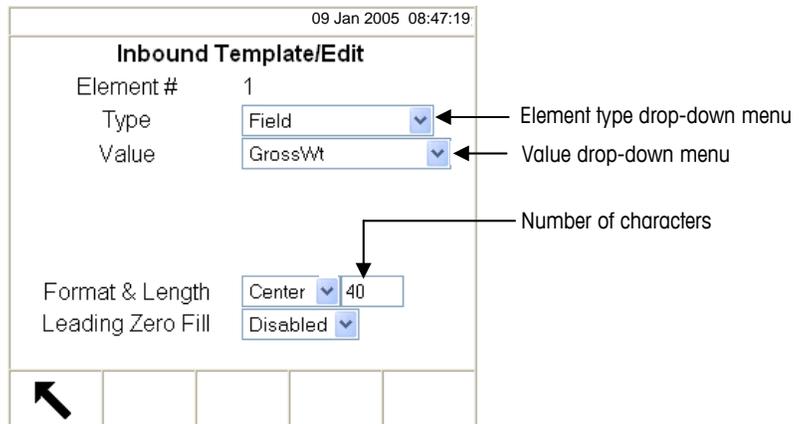


Parameters on the Inbound Template setup screen can be configured by:

- Editing
- Inserting
- Deleting
- Clearing

Editing

Use the UP and DOWN arrow keys to select a record to edit. Press the EDIT  softkey to open the setup screen for the record where edits can be made. An example of an inbound template record edit screen is shown in Figure 3-11.



Inserting

Use the UP and DOWN arrow keys to select a location in the list of elements to insert a new element. Press the NEW softkey  to open the setup screen to create a new record. Configure the parameters as described under Editing.

Press the EXIT softkey to return to the template setup screen when configuration of the new element is complete.

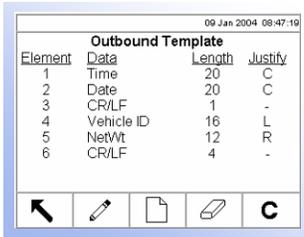
Clearing

Press the CLEAR softkey  to clear all elements from a template. A screen displays that asks for verification to clear all elements from the template. Press the OK softkey  to continue. A status message displays verifying that the clearing of the template was successful.

Outbound Template

The Outbound Template setup screen enables configuration of the output for outbound weighing operations defined by placement, data, character length, and justification.

Parameters on the Outbound Template setup screen can be configured by editing, inserting, deleting, and clearing. The procedures are the same as those listed previously under Inbound Template.

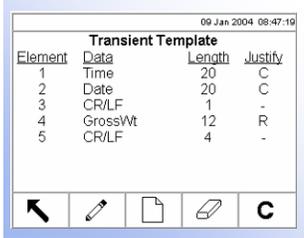


Element	Data	Length	Justify
1	Time	20	C
2	Date	20	C
3	CR/LF	1	-
4	Vehicle ID	16	L
5	NetWt	12	R
6	CR/LF	4	-

Transient Template

The Transient Template setup screen enables configuration of the output for transient weighing operations defined by placement, data, character length, and justification.

Parameters on the Transient Template setup screen can be configured by editing, inserting, deleting, and clearing. The procedures are the same as those listed previously under Inbound Template.

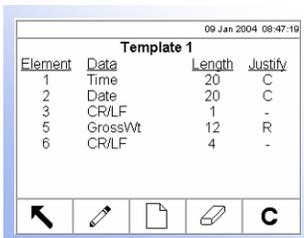


Element	Data	Length	Justify
1	Time	20	C
2	Date	20	C
3	CR/LF	1	-
4	GrossWt	12	R
5	CR/LF	4	-

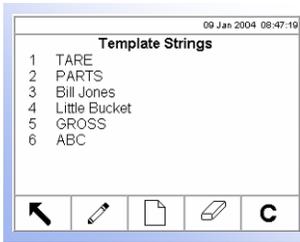
Template 1

The Template 1 setup screen enables configuration of the output for weighing operations defined by placement, data, character length, and justification. Use Template 1 to setup output parameter configurations that can then be quickly recalled or copied to other templates as needed.

Parameters on the Template 1 setup screen can be configured by editing, inserting, deleting, and clearing. The procedures are the same as those listed previously under Inbound Template.



Element	Data	Length	Justify
1	Time	20	C
2	Date	20	C
3	CR/LF	1	-
5	GrossWt	12	R
6	CR/LF	4	-



Template Strings Setup

The strings setup screen defines strings of characters that are frequently used in template messages. Press the PRINT scale function key  to print the template string messages.

Strings can be configured by:

- Editing
- Deleting
- Inserting
- Clearing

Editing

When the strings setup screen opens, the first string in the list will have focus. Use the UP and DOWN arrow keys to select a string to edit. Press the EDIT  softkey to open the setup screen for the string where edits can be made. An example of a template strings edit screen is shown in Figure 3-12.

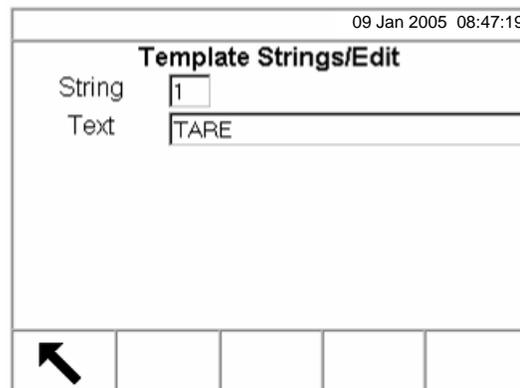


Figure 3-12: Template Strings Edit Screen

Edit the text for the string as desired. Press the EXIT  softkey to return to the template strings setup screen when editing of the element is complete.

Deleting

Use the UP and DOWN arrow keys to select a string to delete. Press the DELETE softkey  to delete the string.

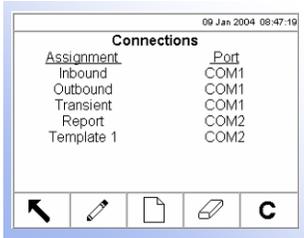
Inserting

To create a new string, press the NEW softkey  to open the setup screen to create a new string record. The next available string number will display. Enter the text for the string message.

Press the EXIT softkey to return to the template string setup screen when configuration of the new string is complete.

Clearing

Press the CLEAR softkey **C** to clear all template strings. A screen displays that asks for verification to clear all strings. Press the OK softkey **OK** to continue. A status message displays verifying that the clearing of the strings was successful.



Connections

The Connections setup screen displays port assignments (COM 1, COM 2, Ethernet Channel 1, or Ethernet Channel 2) for the following data streams as defined by the respective templates or by the report format:

- Continuous
- Multicontinuous 1 w/cksum
- Inbound
- PTS63
- Multicontinuous 2 w/cksum
- Outbound
- Multicontinuous 1
- Continuous w/cksum
- Report
- Multicontinuous 2
- CTPZ
- Template 1
- Template 1 Continuous
- Transient

The continuous and multicontinuous output modes of the IND310drive 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. PTS63 can also be selected here. The Continuous, Continuous w/cksum, Multicontinuous 1, Multicontinuous 1 w/cksum, Multicontinuous 2, Multicontinuous 2 w/cksum, Template 1 Continuous and PTS63 data streams must have a dedicated COM port that has no other assignments. These data streams and connections are further defined in Appendix D.

If continuous output to two ports is desired, the output can occur simultaneously from COM1 through an RS-232 connection (for example, to a PC) and a current loop (for example, to a score board or display). See Appendix A, Installation, Connecting to Peripherals, Other Peripherals for further information about these connections.

The CTPZ data stream sends commands to the IND310drive to perform several basic functions when a control character is received. This connection is further explained in Appendix D.

Connection assignments can be configured by:

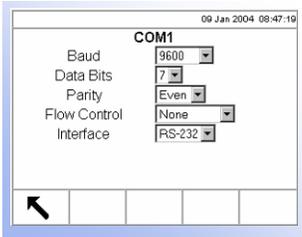
- Editing
- Deleting
- Inserting
- Clearing

Configure connection assignments by following the same procedures listed previously under template strings setup.

Refer to Appendix E, Connections for further information about connection setup.

Serial

Serial communication setup screens include COM1 and COM2.



COM1 and COM2

Use COM1 and COM2 setup to configure the COM1 and COM2 serial ports.

Baud

Use the Baud drop-down menu to set the baud rate for the serial port. Selections include:

- 300
- 2400
- 19200
- 115200
- 600
- 4800
- 38400
- 1200
- 9600
- 57600

Data Bits

Use the Data Bits drop-down menu to set the data bits to either 7 or 8 for the serial port.

Parity

Use the Parity drop-down menu to set the parity to None, Even, or Odd for the serial port.

Flow Control

Use the Flow Control drop-down menu to set the flow control to either None or XON-XOFF.

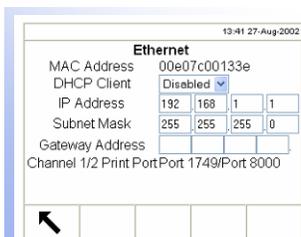
Interface

Use the Interface drop-down menu to select the serial port interface. Selections include:

- RS-232
- RS-485
- RS-422

Network

Network setup screens include Ethernet and FTP.



Ethernet

Ethernet is available for use in the same way as the serial connections. Setup for Ethernet allows static IP addressing only. If the DHCP Client setting is enabled, the IP Address, Subnet Mask, and Gateway Address fields become read-only. The Ethernet Channel 1 port is always 1749 and the Ethernet Channel 2 port is always 8000.

FTP		
User #	User Name	Access
1	ind310	Administrator

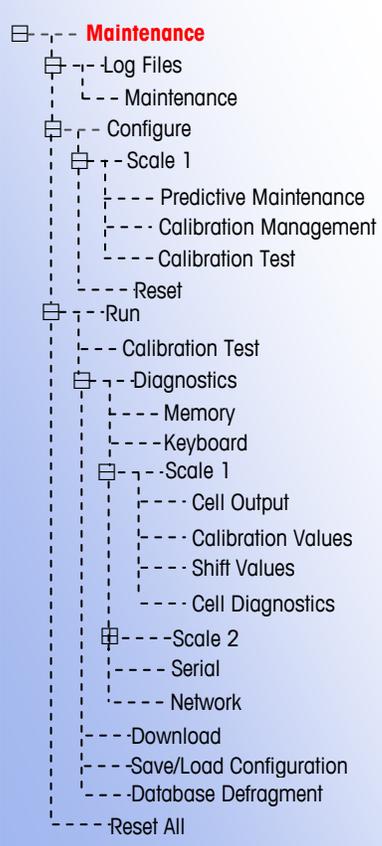
FTP

The setup screen for FTP displays a single user name and password for file download. This information is for reference purposes only and is not configurable.



Reset

The Reset setup screen resets setup values to factory default settings for the communication setup. Press the OK softkey  to complete the reset process.



Maintenance

The maintenance setup section includes:

- Log File
- Run

Log File

The log file is a record of routine transactions or activities such as capture span and capture zero. Maintenance is the only type of log file available.

User Name	Date	Time	Scale	Action
Tech1	05-Jan-2004	11:40:13	1	Span
Bob	05-Jan-2004	11:42:10	2	Zero

Maintenance

Information that displays on the Maintenance setup screen includes:

- User Name
- Date
- Time
- Scale
- Action

Configure

Use the Scale (Scale 1 or Scale 2) setup screens to configure:

- Predictive maintenance (POWERCELL scales only)
- Calibration management
- Calibration test

Predictive Maintenance

Symmetry Monitor

Options are None, Radial and Axial. This parameter determines which cells the system uses when measuring symmetry (similarity in output) among POWERCELL

load cells. Asymmetry in output can indicate that a cell is about to fail. The default value is None.

Start Threshold

To prevent a false trigger of a symmetry error due to light loads, the terminal allows for a symmetry check Start Threshold value. The parameter is set as a percentage of total calibrated cell capacity, with a default value of 1%. Symmetry checking will be triggered only if the load on the scale exceeds the start threshold value.

Difference Threshold

When the Symmetry Monitor is enabled, this parameter sets the maximum permissible difference between monitored cells, in percent of full calibrated cell capacity.

Execution of axial symmetry checking is based upon monitoring the change of the initial offset in the span output between the load cells in a symmetric pair. If the change from the initial offset exceeds the Difference Threshold value, a symmetry error is triggered.

Execution of radial symmetry checking is based upon monitoring the change in the initial load distribution for each cell. A symmetry error is triggered if the change in load distribution exceeds the Difference Threshold value.

On Failure

When the Symmetry Monitor is enabled and the Difference Threshold exceeded, this parameter determines the system's response. Options are No Action, Alarm Only, and Alarm & Disable Scale. The default value is Alarm and Disable Scale.

The Maintenance Log for the scale must be enabled for Alarms to be triggered. The alarm message will be displayed for 10 seconds on the System Line, and will reappear periodically after a fixed period of time if the error is not resolved.

Run Flat

In the event of an asymmetry that exceeds the Difference Threshold, Run Flat may be Disabled, triggered Manually, or triggered Automatically.

If the terminal determines that a load cell is operating out of tolerance or fails to detect communication with a single load cell, it can invoke the Run Flat algorithm to compensate for the cell's questionable readings until the cell can be replaced.

Load cell symmetry monitoring is required for the algorithm to run properly. There are 3 options for Run Flat:

- Disabled (Run Flat will not operate)
- Manual (user selects which cell to replace)
- Automatic (Run Flat algorithm uses threshold settings to determine which cell to replace)

Calibration Management

09 Jan 2004 08:47:19

Scale 1 Calibration Management

Maintenance Interval Days or Weighments

Last Service Date dd-mmm-yyyy

Next Service Date dd-mmm-yyyy

Weighments Left 102

On Expiration Alarm Only

Use the Calibration Management setup screen to configure parameters used for managing calibration activities.

Maintenance Interval

Specify maintenance intervals in days or weighments in the corresponding field text boxes.

Last Service Date, Next Service Date, and # Weighments Left

The last service date and next service date (if days is specified for intervals), or the number of weighments left until the next service (if weighments is specified for intervals), automatically calculate and display on this screen.

On Expiration

Use the On Expiration drop-down menu to configure the activity to occur upon failure. Settings include:

- No Action
- Alarm and disable scale
- Alarm only

Calibration Test

11 records Page 1 of 3 09 Jan 2004 08:47:19

Scale 1 Calibration Test

Step	Test Load	Tolerance
1	0.0	0.1
2	500.0	0.2
3	3000	0.5
4	10000	1
5	30000	2

Configure the steps for calibration testing including test loads and tolerances on the Calibration Test setup screen.

When the Calibration Test setup screen opens, the step numbers and their associated test loads and tolerances display. Calibration test steps can be configured by:

- Editing
- Inserting
- Deleting
- Clearing

Editing

When the Calibration Test setup screen opens, the first step in the list will have focus. Use the UP and DOWN arrow keys to select a step to edit. Press the EDIT softkey to open the setup screen for the step where edits can be made.

Entering a step number recalls that step's test load and tolerance data (if any). Edit the test step's test load and tolerance as desired. Press the EXIT softkey to save the edits and return to the Calibration Test setup screen.

Inserting

To insert a new step, press the NEW softkey to open the setup screen to create a new calibration test step. Press the EXIT softkey. The current screen data is stored

at the indicated step number, and any existing steps move down one record to make room for the new step.

Deleting

Use the UP and DOWN arrow keys to select a step to delete. Press the DELETE softkey  to delete the step.

Clearing

Press the CLEAR softkey  to clear all calibration test steps. A screen displays that asks for verification to clear all steps. Press the OK softkey to continue. A status message displays verifying that the clearing of the steps was successful.



Reset

The Reset setup screen resets setup values to factory default settings for the maintenance configuration setup. Press the OK softkey  to complete the reset process.

Run

The Run screens enable the operator to:

- Run the calibration test
- View and run diagnostic tests
- Reset all factory default settings

Run the Calibration Test

From the setup menu tree, expand Run under the Maintenance setup section. Move the focus to Calibration Test. Press the ENTER key to initiate the calibration test.

Refer to Chapter 4.0, Service and Maintenance, Internal Diagnostic Testing for more information about how to use the diagnostics screens.

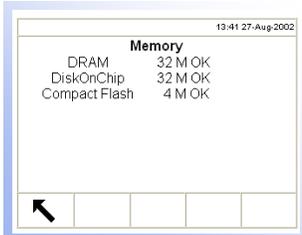
View and Run Diagnostic Tests

Diagnostic test setup screens include:

- Memory
- Keyboard
- Scale 1
 - Cell Output
 - Calibration Values
 - Shift Values
 - Cell Diagnostics
- Scale 2
 - Cell Output
 - Calibration Values
 - Shift Values
 - Cell Diagnostics
- Serial
- Network

Memory

The Memory screen displays total memory installed on the system. It does not indicate how much space is left over for user defined tables.



Keyboard

The Keyboard screen enables testing of an external keyboard. Press any key. The screen will display the key last pressed.



Scale 1

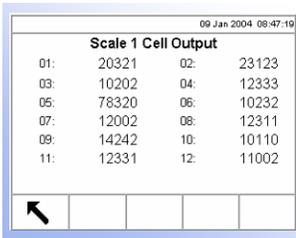
Scale 1 setup screens include

- Cell Output
- Calibration Values
- Shift Values
- Cell Diagnostics

Cell Output

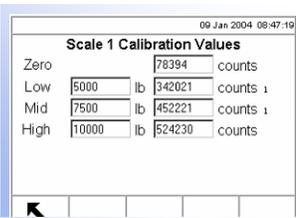
The Cell Output screen displays the current cell output for Scale 1.

- POWERCELL scales show multiple load cells per scale (up to 24). If more cells are required, scroll up/down. All other scale types have only a single load cell channel output.



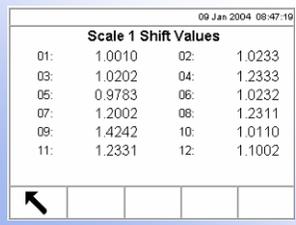
Calibration Values

The Calibration Values screen displays the current calibration values for Scale 1. On this screen, the zero and span values can be changed.



Shift Values

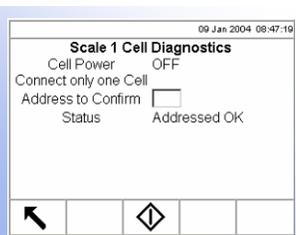
The Shift Values screen displays the current shift values for Scale 1 (POWERCELL scales only).



Cell Diagnostics

The Cell Diagnostics screen enables testing for confirmation of cell address for Scale 1 (POWERCELL scales only).

Cell Power



The Cell Power indicates the current status of the power output to the load cell. This is always shown as OFF or ON and is automatically switched off to perform the cell diagnostic operation.

Address to Confirm

Enter the cell address to be confirmed in this field text box.

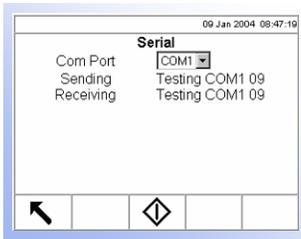
Press the START softkey  to initiate transmission of the test string. Pushing the START softkey, immediately turns it into a STOP  softkey. Press this key to end transmission of the test string.

Status

The Status message displays when the confirmation of the cell address is complete to verify that the cell address entered is valid.

Scale 2

Scale 2 setup screens are the same as the Scale 1 setup screens.



Serial

The Serial screen enables testing of the sending and receiving functions on the serial (COM) ports.

Com Port

Use the Com Port drop-down menu to select the serial port for testing.

Press the START softkey  to initiate transmission of the test string. Pushing the START softkey, immediately turns it into a STOP  softkey. Press this key to end transmission of the test string.

Sending

The Sending field displays testing status information for the sending function on the serial port.

Receiving

The Receiving field displays testing status information for the receiving function on the serial port.



Network

The Network screen enables testing and assists in determining the availability of network options.

Ping

Use the Ping drop-down menu to select a network option. Selections include:

- 127.0.0.1 (to test the TCP/IP stack)
- DNS host

- Own address
- Gateway address
- email host
- Cluster partners
- DHCP host

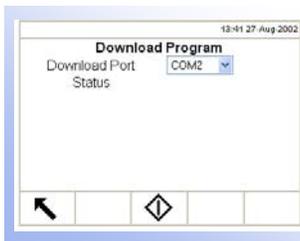
When any of the following Ping options are selected, a text box displays. Enter the IP address for the selection in the text box.

- email host
- DNS host
- Cluster partners
- DHCP host

Press the START softkey  to initiate transmission of the test string.

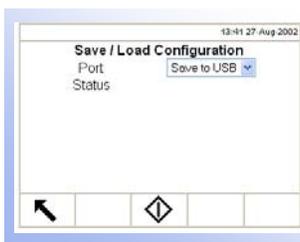
Status

The Status field displays messages that indicate the progress and outcome of the network diagnostic process. First, the status shows “Sending Package,” then “Receiving Package.” The final message shows the test results, such as “own address is available” or “own address is not available.”



Download Program

The Download Program screen enables downloading of data files to the IND310drive. Use the Download Port drop-down menu to select the appropriate port for the download (ports must be properly configured to enable downloading of data). Port selections are COM2, USB, or Ethernet. Press the START softkey  to initiate the download. The Status field displays the message “Downloading... please wait.” When the download is complete, the message changes to “Download successful.” See Chapter 4.0, Service and Maintenance, Updating Software for further information.

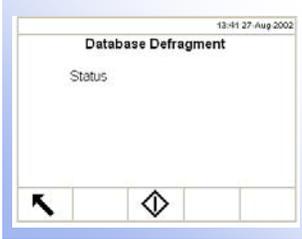


Save/Load Configuration

The IND310drive offers the capability to save all configuration and data files to a single file on the USB flash disk (Part No. 71208113). An empty file (backup.tar), which is located on the documentation CD, is required for the download to function properly. Place this file on the USB flash disk **before** inserting the USB flash disk into the IND310drive. The backup.tar file can be saved to a PC for archive purposes. If the user decides to change the file name for archiving, the file name must be changed back to backup.tar when placed on the USB flash drive to download (restore all the information back) to the IND310drive.

Use the Port drop-down menu to select either Save to USB or Load from USB. Press the START softkey  to initiate the save or load configuration process.

Database Defragment



Defragmentation is the process by which information is organized on the IND310 hard drive, which is a flash-based device referred to as the Compact Flash (Part No. 72225800). Periodic defragmentation ensures faster operation of the terminal. Version 2.5 and later software includes automatic defragmentation that can be scheduled to occur at a specific time every day or on the first day of every month (see the Terminal, Device, Auto Defrag section).

Use the Database Defragment screen to initiate the defragmentation process. Press the START softkey  to initiate defragmentation. During the process, a message displays "Defragmenting... please wait." Upon completion, the message changes to "Defragment successful." Press the ENTER key to acknowledge this message. The Status area will read "Defragment Complete."



Reset All Factory Default Settings

The Reset All setup screen resets all setup settings to factory default settings.

Press the ENTER key to select Reset All. A screen displays that asks for verification to reset all setup settings to factory default settings. Press the OK softkey  to continue. (Press the EXIT softkey  to abort the reset all operation.) A status message displays verifying that the reset of all settings was successful.

Restoring Factory Default Settings

Refer to Appendix C, Default Settings for a list of the factory default settings.

Factory default settings can be restored individually for blocks such as scale, application, and terminal, or globally with the Reset All screen under the Maintenance block.

To restore factory default settings for Scale 1 for example:

1. Press the SETUP  softkey. The setup menu tree displays (see Figure 3-14).

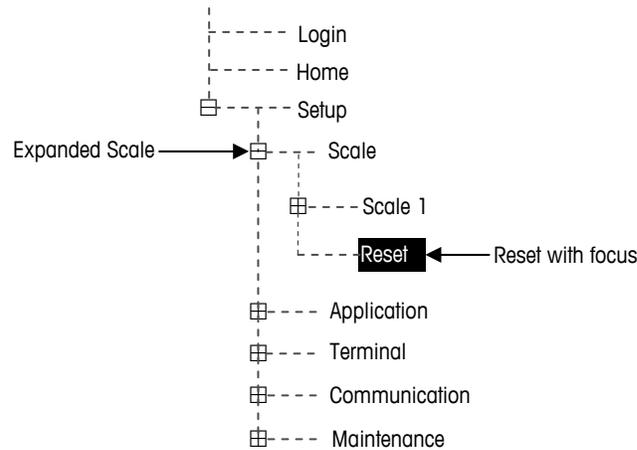


Figure 3-14: Setup Menu Tree—Reset

2. Use the DOWN arrow key to move the focus to Scale.
3. Press the RIGHT arrow key to expand Scale.
4. Use the DOWN arrow key to move the focus to Reset.
5. Press the ENTER key to open the Scale Reset screen (see Figure 3-15).

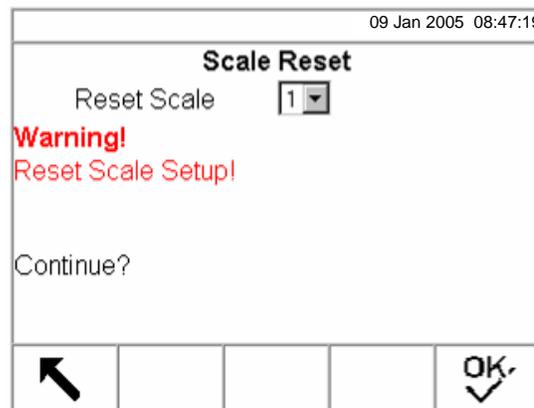


Figure 3-15: Scale Reset Screen

6. Ensure that the scale number in the Reset Scale field is the number of the scale base to be reset to factory default settings. If not
 - A. Press the ENTER key to select the data field and display the drop-down menu.
 - B. Use the DOWN arrow key to move the focus to the correct scale base number.
 - C. Press the ENTER key to accept the selection.
7. Press the OK softkey to reset the scale setup values to factory default settings.
8. A status message appears that verifies a successful reset.
- ▶ Scale reset does NOT include the reset of type, capacity, increment, or calibration data. Reset this data by selecting Maintenance, Reset All.
9. Press the EXIT softkey to return to the setup menu tree display.
10. Use the DOWN arrow key to move the focus to Application.
11. Press the RIGHT arrow key to expand Application.
12. Use the DOWN arrow key to move the focus to Reset.
13. Press the ENTER key to open the Reset screen (see Figure 3-16).

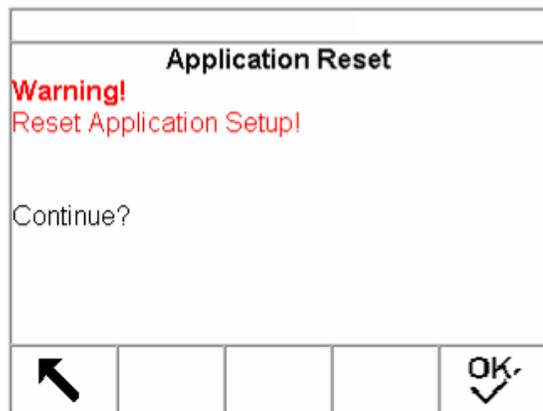


Figure 3-16: Setup Application Default Reset Screen

14. Press the OK softkey to reset the setup values to factory default settings, or press the EXIT softkey to exit without resetting the factory defaults.
15. A status message appears that verifies a successful reset.
16. Press the EXIT softkey to return to the setup menu tree display.
17. Repeat steps 10–16 to reset factory default settings for Terminal, Communication, and Maintenance.
- ▶ Select Reset All under Maintenance to restore all setup settings to factory defaults.

Exiting Setup Mode

To exit the setup mode:

1. From the setup menu tree screen, press the EXIT softkey (see Figure 3-17).

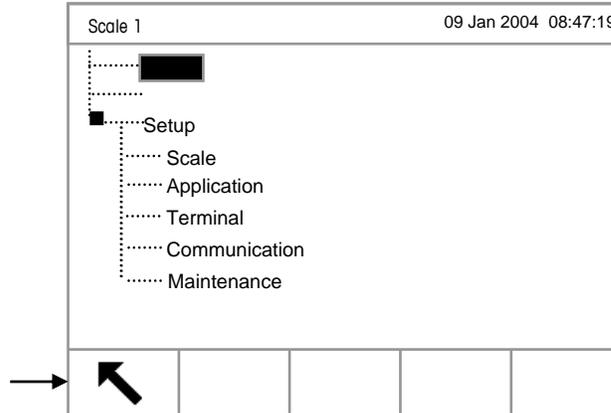


Figure 3-17: Setup Menu Tree Screen

2. The default weighing operation screen displays.

Chapter 4.0

Service and Maintenance

This chapter covers

- Cleaning and Maintenance
- Updating Software
- Service
- Troubleshooting

The IND310drive terminal is designed to be virtually error-free and reliable. If problems do occur, do not attempt to repair the scale or terminal before the source of the problem has been determined. Record as much information as possible about what has happened including any error messages and physical responses of the terminal and/or scale.

If the IND310drive terminal is malfunctioning, perform the troubleshooting tests described in the next few pages to identify the problem before contacting METTLER TOLEDO.

Cleaning and Maintenance

Clean the IND310drive 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 IND310drive is a rugged stainless steel enclosed instrument; however the front panel is a vinyl covering over sensitive electronic switches and a lighted LCD display. Care should be taken to avoid any punctures to this surface or any vibrations or shocks to the instrument. Should the front panel become punctured, ensure that steps are taken to prevent dust and moisture from entering the unit.

Battery Maintenance

The battery is a rechargeable lithium battery that should not require replacement.

Display Backlight Maintenance

The display backlight life is 20,000 hours at 50 percent contrast. The display backlight is not field replaceable. Contact an authorized METTLER TOLEDO service representative to replace the display backlight.

Updating Software

IND310drive software updates are performed with a USB memory stick. Only a METTLER TOLEDO provided USB memory stick (available as CIMF number 71208113) should be used to perform this activity. To update software:

1. Use a personal computer to download the latest software (sabre.tar) as well as the executable file (tar).
2. Transfer the files onto the USB memory stick (see the Using a USB Memory Stick section, which follows).
3. Remove the front panel from the IND310drive terminal (see Appendix A, Installation).
4. Insert the USB device in the USB connector on the main PCB (Figure 4-1).

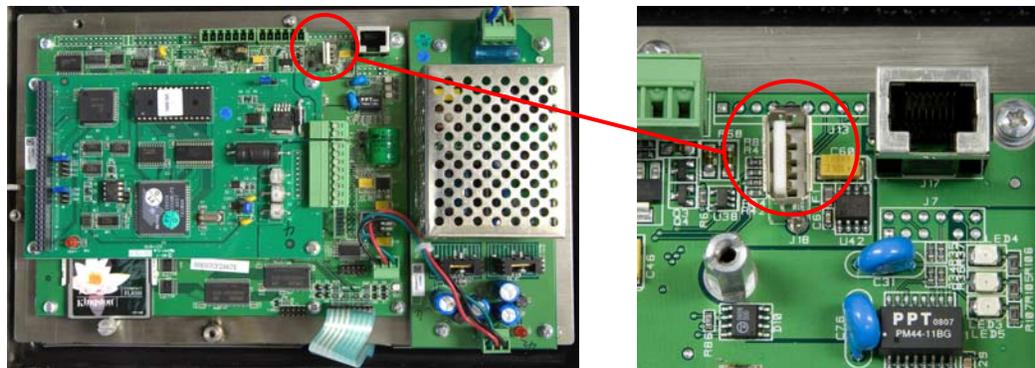
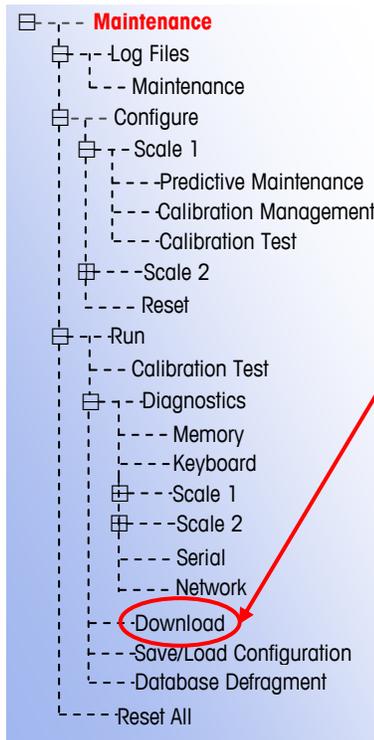


Figure 4-1: USB Connector Location



5. Place the Metrology Switch in the non-approved position (See Chapter 2.0, Operation, Metrology Switch).
6. Replace the front panel.
7. Power up the IND310drive.
8. Go to the setup menu and select Maintenance/Run/Download. The Download Program screen displays (Figure 4-2).

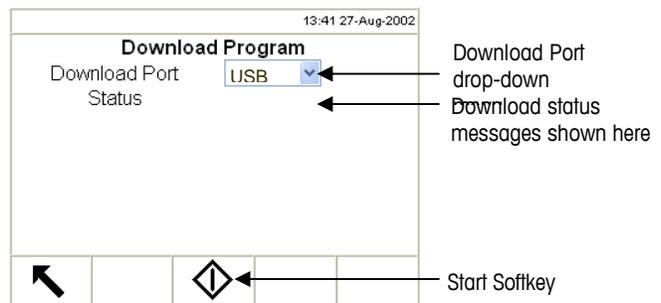


Figure 4-2: Download Program Screen

9. Select USB from the Download Port drop-down list. The message "Connection to USB" displays, followed by the message "Downloading... please wait." This process may take five to ten minutes.
 - The download process should always take more than 30 seconds.
10. When the process is complete, the message "Download successful. IND310drive will automatically reboot" displays. The boot-up procedure may take two to three minutes longer than usual. After reboot, remove the USB device.
11. Reconfigure the unit and return the Metrology Switch to the Locked position.

Using a USB memory Stick

The METTLER TOLEDO USB memory stick (Figure 4-3) plugs into a PC's USB connector and will be recognized by Windows® 2000 or XP. The program on the memory stick displays as a removable disk under the My Computer icon. Copying the **sabre.tar** and tar files to this stick is the same as copying a Windows file to a folder on a PC hard-drive. Just open the removable drive folder for the memory stick to drag and drop the **sabre.tar** and tar files.

Note: If a keyboard is plugged into the USB port, the IND310drive must be powered down and the keyboard unplugged. Restore power to the terminal and then plug in the USB memory stick. To reconnect the keyboard, remove power from the IND310drive, plug the keyboard into the USB port, and restart the terminal.



Figure 4-3: USB Memory Stick (METTLER TOLEDO Part No. 71208113)



WARNING!

ONLY A METTLER TOLEDO USB MEMORY STICK CAN BE USED TO UPDATE SOFTWARE. USE OF ANY OTHER TYPE OF USB MEMORY STICK COULD RESULT IN IND310DRIVE TERMINAL SYSTEM FAILURE.

CF Card

Overview

WARNING: The Compact Flash card **cannot be formatted, reprogrammed, or modified in a PC**. The format is IND310-specific and any changes to the Compact Flash card will render it unusable in the IND310.

The revised IND310 main PCB includes a CF (Compact Flash) memory card slot. The memory card is used to store setup parameters (not including metrologically significant data). If the data on the card becomes corrupted, a replacement part can be purchased from METTLER TOLEDO. Note that the CF card cannot be formatted or modified using a Windows PC; attempting to do so will render the terminal unusable.

The CF card is secured by a thumbscrew inserted into the main PCB backing plate. Figure 4-4 shows the CF card installed (left) with the thumbscrew in place, and removed (right).

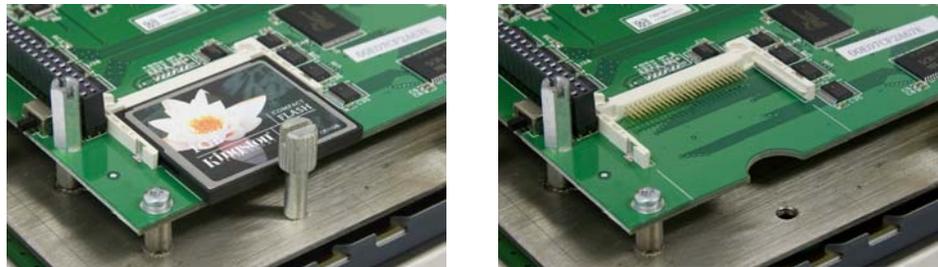


Figure 4-4: Compact Flash Card (METTLER TOLEDO Part No. 72225800)

Service

Information on installing, programming, and servicing the IND310drive terminal is available in the IND310drive Terminal Installation and Technical Manuals. Only qualified personnel should perform installation, programming, and service. Please contact a local METTLER TOLEDO representative for assistance.

In general, once the IND310drive is installed, programmed, and calibrated for a given application, only routine calibration service is required.

	<p>WARNING</p> <p>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.</p>
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Troubleshooting

Troubleshooting activities for the IND310drive include:

- AC power test
- Power supply voltage test
- Scale PCB voltage test
- Keyboard test
- Internal Diagnostic Testing
- RS-232 Serial Output Test

AC Power Test

Use a multi-meter to check the AC input power. Input power must be within -15% and $+10\%$ of the nominal AC line voltage.

Power Supply Voltage Test

The power supply provides 5 VDC at 1.5 amps and 12 VDC at 1.0 amps. Verify the voltage is between 11.5 and 12.5 volts between Pin 1 and Pin 3 (Ground). Verify the voltage is between 4.9 and 5.1 volts between Pin 2 and Pin 3 (Ground). If the voltages are absent or deviate from the specified range, replace the PCB. See Figure 4-5 for the locations of Pins 1, 2, and 3 on the power supply board.

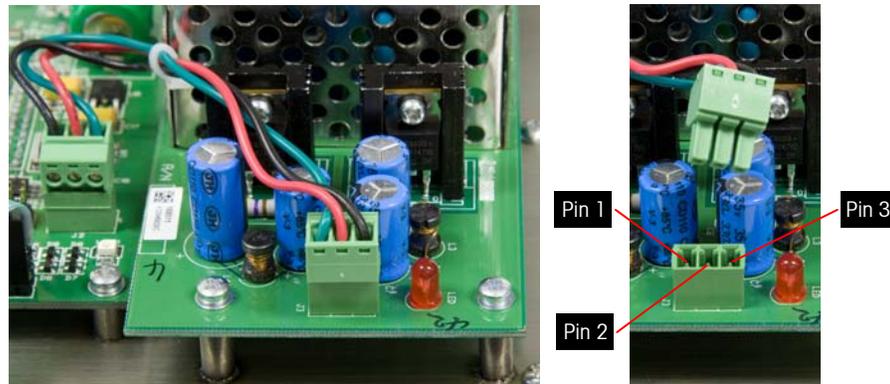


Figure 4-5: Pins 1, 2, and 3 on the Power Supply Board

Internal Diagnostic Testing

Perform internal diagnostic testing in setup mode. Press the SETUP softkey  to view the setup menu tree. Use the DOWN arrow key to scroll down the menu tree to Maintenance. Press the RIGHT arrow key to expand the menu tree selections for Maintenance. Scroll down and expand Run and Diagnostics. Available diagnostic setup screens include:

See
Keyboard Test for
information about
how to test the
keyboard.

- Memory—Displays current available memory
- Keyboard—Enables testing of the keyboard
- Scale 1
 - Cell Output—Displays the current cell output for the Scale 1
 - POWERCELL scales show multiple load cells per scale (up to 24). If more cells are required, scroll up/down. All other scale types have only a single load cell channel output.
 - Calibration Values—Displays the current calibration values for Scale 1
 - Shift Values—Displays the current shift values for Scale 1 (POWERCELL scales only)
 - Cell Diagnostics—Enables testing for confirmation of cell address for Scale 1
- Scale 2 (Same setup screens as Scale 1)
- Serial—Enables testing of the sending and receiving functions on the serial (COM) ports. Both COM ports can be checked if a loopback jumper is installed on the COM port connector to jumper transmit to receive.
- Network—Enables testing and assists in determining the availability of network options, which include:
 - 127.0.0.1 to test the TCP/IP stack
 - Own address
 - Gateway address
 - email host
 - DNS host
 - Cluster partners
 - DHCP host
 - IP config

Some diagnostic setup screens provide information on the current status of the system, such as Memory and Cell Output. Other diagnostic setup screens enable the transmittal of test strings for diagnostic testing, such as Serial and Network.

Diagnostic setup screens that enable diagnostic testing include a START  softkey. Press this key to initiate transmission of the test string. Pushing the START softkey, immediately turns it into a STOP  softkey. Press this key to end transmission of the test string.

RS-232 Serial Output Test

If the testing of the sending and receiving functions on the serial (COM) ports using the loopback test fails, use the following test procedure to determine whether the RS-232 serial port is operational.

1. Remove power from the IND310drive terminal and the printer.
2. Disconnect the data cable from the printer.
3. Set the voltmeter to read 20 VDC.

4. Connect the red lead to pin 3 of the printer end of the data cable and connect the black lead to pin 7.
5. Apply power. The meter should read as follows:
 - **Demand mode**—The meter should read between -5 and -15 with no fluctuation.
 - **Continuous mode**—The meter should fluctuate between -5 and $+5$ continuously. The constant fluctuation on the meter display indicates the scale/indicator is transmitting information.

To test Demand baud rates, press the PRINT key . The display should fluctuate between $+5$ volts to -5 volts for the duration of the transmission, then become stable again. This fluctuation indicates the terminal has transmitted data.

- When measuring the higher baud rates in the Demand mode, the meter display will fluctuate for a shorter period of time.

Chapter 5.0

Parts and Accessories

Tables 5-1 and 5-2 show parts and accessories for the IND310drive.

This table covers parts for the original and revised main PCB boards. Where two numbers appear, unless otherwise indicated the new part is not compatible with the original main PCB.

Table 5-1: IND310drive Parts

Part	Part Number	
	Original main PCB	Revised main PCB
Display Board	71207872	
Display Driver Board	71207873	
Power Supply Assembly	71207874	
Main Board	71207875	71207875
Sabre Single Analog Channel Board	71207876	
Sabre POWERCELL Board	71207877	
Sabre Dual Analog Channel Board	71207878	
US Line Cord	71207879	
Schuko Line Cord	71207880	
Swiss Line Cord	71207881	
UK Line Cord	71207882	
Australian Line Cord	71207883	
Danish Line Cord	71208510	
Indian Line Cord	71208201	
Kit 1 Front Enclosure Assembly (with standoffs, etc.)		
Front Cover	71207815	71210774
Keyboard & Overlay		
Gasket (attached)		
Kit 2 Back Enclosure Assembly		
Enclosure Base (with clips, standoffs, etc.)	71207816	

Part	Part Number	
	Original main PCB	Revised main PCB
Kit 3 Connector Kit (1) Connector, M25x1.5 (2) Connector, PG11 (2) Plastic Insert, PG11 (1) PG Insert, Big (2) PG Insert, Small	71207817	
Kit 4 Fastener & Sealing Kit (2) Nut, M3x16 (1) Sealing Cover (1) Sealing insert (1) Sealing Wire (1) Lead Wire, #14 (1) Screw, Sealing, M3x10 (5) Screw, GB9074.4, M3x10 (5) Screw GB9074.4, M4x10	71207818	71210775
Kit 5 Connector Kit (2) Connector, Terminal 7P, 3.81mm (2) Connector, Terminal, 1803617 (2) Connector, Terminal, 3P, 5.08mm	71207819	

Table 5-2: IND310drive Accessories

Accessory	Part Number
Analog Simulator	71207870
POWERCELL Simulator	71207871
USB Flash Disk (Memory Stick) [Compatible with both main PCB versions]	71208113
Disk-On-Chip [Not compatible with revised main PCB]	71208759
Compact Flash Card [Not compatible with original main PCB]	72225800

WARNING: The Compact Flash card **cannot be formatted, reprogrammed, or modified in a PC**. The format is IND310-specific and any changes to the Compact Flash card will render it unusable in the IND310.

Appendix A

Installation

Refer to the IND310drive Installation Manual for further information about installing the terminal.

This appendix provides installation instructions for the IND310drive terminal.

Mounting the Terminal

Mount the terminal on any flat surface or wall where viewing is optimal and the terminal keys are easily accessible. Observe location and environment considerations as described in Chapter 1.0, Introduction.

Mounting hole locations are shown in Figure A-1. The diameter of the mounting holes is 8 mm. The largest recommended bolt/screw size is M6.

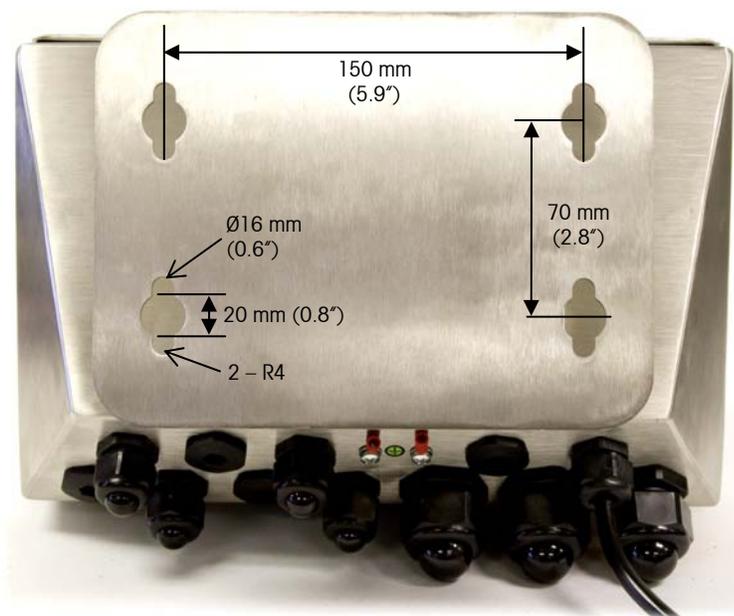


Figure A-1: Mounting Hole Locations

Connection to Peripheral Components

Use the following procedures to connect peripheral components.

Opening the Terminal Enclosure

The front panel of the IND310drive terminal is locked in place by four spring clips attached to the enclosure body. To gain access to the terminal's PCB for internal wiring and setting switches, separate the front panel from the enclosure as follows:

1. Insert the tip of a flat-blade screwdriver into one of the two slots located on the bottom of the front panel assembly (see Figure A- 2) and gently push in toward the enclosure. A "pop" sound is made when the cover is released.



Figure A- 2: IND310drive Terminal Access

2. Repeat Step 1 for the other slot.
3. After releasing the front panel, lift the bottom of the front panel up and out until it completely clears the enclosure.
4. Raise the top of the front panel until it clears the two top clips. The cover will swing down and is hinged by two wire cables at the bottom.

The openings on the bottom of the enclosure are for serial I/O, Ethernet, load cell, and other peripheral component cables.

Installing Cables and Connectors

The IND310drive terminal is designed to withstand harsh environments. However, care must be taken when installing cables and/or connectors that enter the terminal enclosure. To ensure a water tight seal:

- Pass the cables through an appropriately sized cable grip before connecting the wires. For example, the Ethernet and USB cables go through the large cable glands (see Figure A-3).



Figure A-3: IND310drive Cable Glands

- Insert the removable terminal strips or connectors in the appropriate sockets on either the main board or on the scale card.
- Ensure that the cable length from the terminal strip/connector to the terminal housing is sufficient so that no strain is placed on the connector assembly when the housing is in the fully open position.
- After re-securing the back cover, tighten the cable grip sufficiently to provide a water-tight seal around the cable. This procedure allows any internal cable slack to be received through the cable grip.

Making Connections

Once the IND310drive terminal is open, electrical connections can be made as shown in Figure A-4.

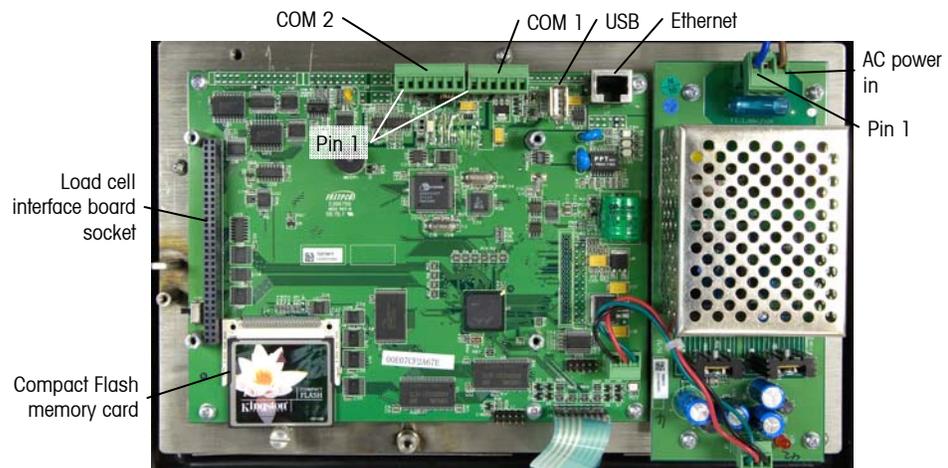


Figure A-4: PCB with Associated Connectors

Power Connection

A permanently attached line cord supplies the main power to the IND310drive terminal. No voltage or frequency settings are required since the terminal includes a universal power supply that operates from 87 to 264 VAC. The supply operates with a line frequency of 49 to 61 Hz.

- The integrity of the power ground for equipment is important for both safety and dependable operation of the terminal and its associated scale base. A poor ground can result in an unsafe condition should an electrical short develop in the equipment. A good ground connection minimizes extraneous electrical noise pulses. The IND310drive should not share power lines with noise-generating equipment. To confirm ground integrity, use a commercial branch circuit analyzer. If adverse power conditions exist, a dedicated power circuit or power line conditioner might be required.

	 WARNING
<p>FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.</p>	

Before applying power, confirm that the power cord is wired properly for the AC voltage where the terminal will be used (see Figure A-5). The power cord connects to the TB1 terminal strip on the controller PCB.

Power Requirements

The terminal requires 87 to 264 VAC with a line frequency of 47 to 61 Hz (20 watts maximum) of power and is internally fused at 1.6 amp, 250 volts. The fuse is located adjoining the main power connection on the power supply board as shown in Figure A-5. Should the fuse blow, always replace the fuse with the same voltage and amperage as specified.



Figure A-5: Power Supply Board

Load Cell Configuration Options

The IND310drive supports both analog and digital (POWERCELL) load cells and can be configured with a maximum of two scales. The following are the possible configurations:

- 31L10x: single analog card, one scale
- 31L20x: dual analog card, two scales
- 31L30x: single POWERCELL card, one scale
- 31L31x: single POWERCELL card and single analog card, two scales
- 31L33x: two single POWERCELL cards, two scales

The location and wiring connections depend on the configuration of the terminal.

CMOS and MTX POWERCELL

There is a fixed amount of current for each POWERCELL cell channel. If the IND310drive is configured for one scale (31L30x), then the limit is 800 mA, and if configured for two scales (31L31x or 31L33x), then each POWERCELL channel has only 500 mA available.

The maximum current that an MTX POWERCELL consumes is 75 mA. So if the IND310drive is configured with one POWERCELL card (31L30x), then $800\text{mA}/75\text{mA} = 10.7$. Rounded down, this value means that the **IND310drive supports only 10 MTX POWERCELLS without using an external power supply.** This is the typical configuration for replacing a METTLER TOLEDO Cougar terminal.

If the POWERCELL card is mixed with an analog channel or two POWERCELL cards are used simultaneously (31L31x or 31L33x), then $500\text{mA}/75\text{mA} = 6.7$. The value rounded down to six means the **IND310drive supports only 6 MTX POWERCELLS without using an external power supply in those configurations.**

The MTX POWERCELLS consume more current than the CMOS POWERCELLS. On the average the CMOS cells use 50–55mA and the MTX cells use 60–65mA. METTLER TOLEDO chooses to use the maximum current of 75mA per cell for calculations to ensure that the system will always have sufficient power supply current.

NMOS POWERCELL

The NMOS cells always use a pit power supply because they require different voltages than provided by the IND310drive and formerly by the METTLER TOLEDO Cougar terminal. The IND310drive only supplies voltage to a switch in the pit power supply to turn it on and off. However, the terminal voltage must be considered. The METTLER TOLEDO Cougar supplies between 21V–24V, and the IND310drive POWERCELL interface only supplies 12V.

The older pit power supply (09170168000) can operate with voltages from 5V to 30V and is completely compatible with the IND310drive. The new pit power supply (90898000A) cannot be used with the IND310drive because it requires an 18V to 24V input. The alternative (90898000B) accepts 9V–12V inputs and is compatible with the IND310drive.

Analog

Analog load cells look like resistors to the IND310drive. The specification states that the IND310drive supports eight 350-ohm load cells. The eight load cells connect in parallel so the equivalent resistance seen by the IND310drive is $350/8 = 43.75$ ohms. Note that the calculation, equivalent resistance = (ohms)/(number of load cells), only works if all load cells have the same resistance. It does not work if the scale has a mixture of resistances, such as mixing 1,000-ohm cells and 350-ohm cells.

The equivalent resistance of any scale must be greater than 43.75 ohms for the IND310drive to support it. As an example, consider the twelve 1,000-ohm load cells. The equivalent resistance is $1,000/12 = 83.3$ ohms, which is greater than 43.75 ohms; so the IND310drive will easily support twelve of the 1,000-ohm load cells.

To determine if the IND310drive can support twenty 750-ohm load cells use the calculation $750/20 = 37.5$ ohms. Since 37.5 ohms is less than 43.75 ohms, the IND310drive will not support twenty 750-ohm load cells. Table A-1 uses a similar calculation to show the maximum number of load cells the IND310drive can support for a given load cell resistance.

Table A-1: Maximum Number of Load Cells the IND310drive can Support for a Given Load Cell Resistance

Load Cell Resistance (Ohms)	Maximum Number of Load Cells Supported
350	8
750	17
1000	22
2000	45

Load Cell Connections



WARNING!

TO AVOID DAMAGE TO THE PCB OR LOAD CELL, REMOVE POWER FROM THE IND310drive TERMINAL AND WAIT AT LEAST 30 SECONDS BEFORE CONNECTING OR DISCONNECTING ANY HARNESS.

Analog Load Cell Connections

Analog load cell connections are made to the J1 or J2 connectors located on the Single or A/D Board as shown in Figure A-6.

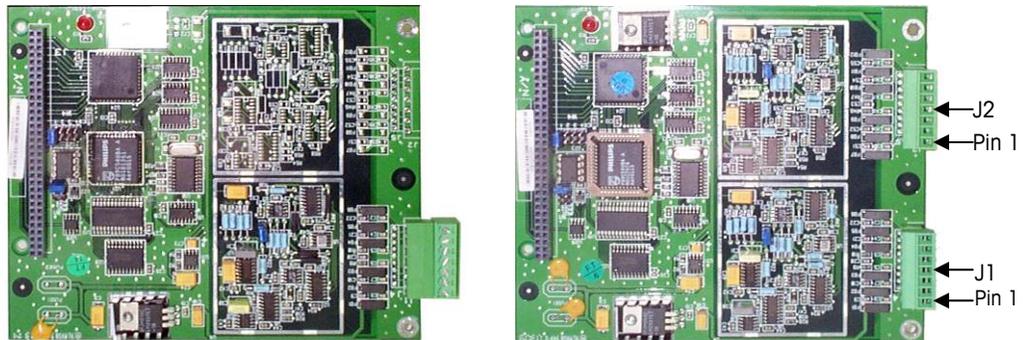


Figure A-6: Single (left) and A/D (right) Board Connector Locations

Total scale resistance (TSR) must be calculated to determine maximum cable length for analog load cell connections. To calculate TSR:

$$TSR = \frac{\text{Load Cell Input Resistance (Ohms)}}{\text{Number of Load Cells}}$$

Table A-2 provides recommended maximum cable lengths based on TSR and cable gauge.

Table A-2: Recommended Maximum Cable Lengths

TSR (Ohms)	24 Gauge (meters/feet)	20 Gauge (meters/feet)	16 Gauge (meters/feet)
350	243/800	610/2000	1219/4000
87 (4-350 Ω cells)	60/200	182/600	304/1000
45 (8-350 Ω cells)	30/100	91/300	152/500

The IND310drive terminal can support eight 350 Ohm analog load cells per channel, maximum of two channels. If a dual analog card is used, a total of sixteen 350 Ohm load cells are supported.

Figure A-7 and Figure A-8 show the analog load cell terminal strip J1/J2 wiring for standard 6-wire and 4-wire cable.

-EXC	7
-SEN	6
-SIG	5
Chassis GND	4
+SIG	3
+SEN	2
+EXC	1

Figure A-7: Standard 6-wire Cable

-EXC	7	
-SEN	6	
-SIG*	5	
Chassis GND	4	
+SIG*	3	
+SEN	2	
+EXC	1	

*If an increase in load results in a decrease in weight display, reverse the signal wires (+SIG and -SIG).

Figure A-8: Standard 4-wire Cable

POWERCELL Connections

POWERCELL load cells are connected to the POWERCELL board located inside the IND310drive terminal. J1 and J2 connectors are located as shown in Figure A-9.



Figure A-9: POWERCELL Board Connector Locations

The POWERCELLS should be wired to each PCB as shown in Table A-3.

Table A-3: POWERCELL Connector Termination

J1 Pin #	Function
1	COM A
2	COM B
3	Ground
4	Ground
5	Ground
6	+12 VDC
7	+12 VDC
8	+12 VDC
J2 Pin #	Function
1	+24 VDC
2	Ground

Power for ten POWERCELL load cells is supported by the terminal. If an external power supply is connected to J2, a total of 24 POWERCELL load cells are supported for the entire terminal, no matter how many POWERCELL boards are used. Jumper W2 needs to be changed on the POWERCELL Board to use the External Power Supply. See Table A-8.

Other Peripherals

Other peripheral connections include:

Serial Port COM1 Current Loop Ethernet USB

Figure A-10 shows connection locations on the revised main PCB.



Figure A-10: Main Board Connection Locations

Serial Port

The IND310drive terminal's printer port supplies RS-232/20 mA CL and RS485/422 serial interfaces for both input and output of serial data in either demand or continuous format output. Both serial ports can be configured for demand mode output. Either or both of the ports can be configured for demand continuous mode output. Information concerning serial data format can be found in the setup section of the IND310drive User's Guide. The maximum recommended cable length for RS-232 communications is 15.24 meters (50 feet). Table A-4 and Table A-5 provide printer port interconnect information.

Table A-4: Com 1 Port on Main Board

J15 Pin Number	IND310drive Signal Description J15
1	TxD1 RS-232C
2	RxD1 RS-232C
3	Ground
4	CLTX+ 20 mA
5	CLTX- 20 mA
6	+12 V

Table A-5: Com 2 Port on Main Board

J16 Pin Number	IND310drive Signal Description J16
1	TxD2 RS-232C
2	RxD2 RS-232C
3	Ground
4	TXD+ (RS485/422)
5	TXD- (RS485/422)
6	RXD+ (RS485/422)
7	RXD- (RS485/422)

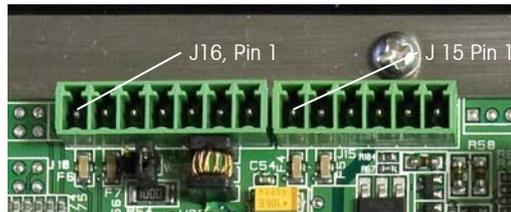


Figure A-11: J15 (COM 1) and J16 (COM 2) Pin Designations

COM1 Current Loop

Current loop systems use flow of current to transmit digital information. There are two types of 20 mA current loops: Active and Passive. Active systems have the current/voltage source built into the circuit. Passive systems require an external current/voltage source to complete the circuit. Normally one side of the current loop is active and the other passive. Two active current loop systems cannot be connected together.

The IND310drive current loop is a “passive” current loop system, that is it does not have a current or voltage source built in; however, the COM1 connector supplies a +12V source to activate the system. The advantage of this arrangement is that the IND310drive can be connected to a passive peripheral by using the +12V source on the COM1 connector or to an active peripheral by connecting the +20mA and –20mA lines to the respective lines of the peripheral.

Figure A-12 shows how to connect the IND310drive current loop to a passive and an active peripheral. Note that for a passive peripheral it is necessary to jumper pin 3 and pin 5 on J15 of the IND310drive main PCB.

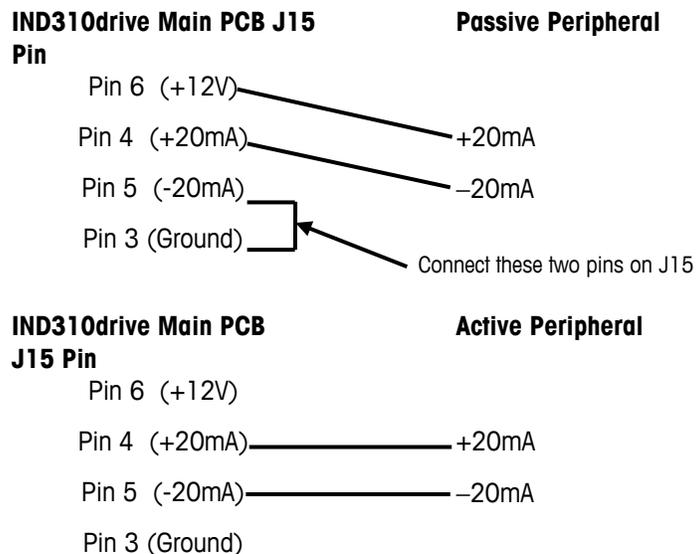


Figure A-12: Connecting the Current Loop to Passive and Active Peripherals

Ethernet

The Ethernet connection is used in the same way as the COM 1 and COM 2 connectors. See Figure A-10 for the location of the RJ45 Ethernet connector.

External Keyboard

A standard computer keyboard can be connected to the terminal via the USB port located on the main board. See Figure A-10 for the location of the connector.

PCB Jumpers and LEDs: Original Main PCB

Figure A-12 shows the locations of IND310drive jumpers and LEDs on the original main PCB.



Figure A-13: Jumper and LED Locations, Original Main PCB

All internal jumpers have been factory set and need not be reset unless a change in scale configuration or communication peripherals occurs. The IND310drive terminal as delivered from the factory can be configured five ways:

- Single analog
- Dual analog
- Dual POWERCELLs
- Single analog and one POWERCELL
- Single POWERCELL

To set up a configuration for:	Use table:
Single analog or dual analog	A-7
Single POWERCELL	A-8
Single analog (Scale 1) and a single POWERCELL (Scale 2)	A-7 (Single analog) A-8 (POWERCELL)
Two POWERCELL load cell boards	A-8 and A-9
Single POWERCELL load cell board as Scale 1 and a single analog load cell board as Scale 2	A-8 (POWERCELL-Scale 1) A-10 (Single analog-Scale 2)
Two single analog load cell boards	A-7 and A-10
Dual analog load cell board	A-7

The standard jumper settings are as follows:

Table A-6: Main Printed Circuit Board

Jumpers/LEDs	On	Off	Description
J1			J1 is a five-pin jumper set. It is used for factory setup only. No jumpers are to be installed on J1.
W2		X	Hardware reset. (Always off). This jumper performs the same functions as a power cycle. This jumper should not be used in the field.
W3		X	Software debug use. (Always on). This jumper should not be used in the field.
W4	X		Sets Com 2 to RS485 protocol.
		X	Sets Com 2 to RS422 protocol.
LED1	X		Power on.
		X	Power off. If unit is plugged in, check main power, power connections, and fuses before contacting service.
LED2	X		Application software running.
LED3	X		Ethernet link connected.
LED4	X		Ethernet is active.

Table A-7: Single and Dual Analog Load Cell—Scale 1

Jumpers/LEDs	On	Off	Description
W1 IRQ1 IRQ2 IRQ7	X	X	W1 is a three-position jumper set. Only one jumper should be connected.
W2	X		When closed, this jumper sets the connected scale's load cell setting to 2 mV/V.
		X	When open, this jumper sets the connected scale's load cell setting to 3 mV/V
W3 ²	X		This jumper sets Scale 2 to 2 mV/V.
W3		X	No jumper on W2 sets Scale 2 to 3 mV/V
W4 CS4 CS3 CS2 CS1	X	X	W4 is a four-position jumper set. Only one jumper should be connected.
LED1	X		Power on.
		X	Power off. If unit is plugged in, check main power, power connections, proper seating of the board, and fuses before contacting service.

² Jumper W3 is only available on dual analog load cell boards.

Jumpers/LEDs	On	Off	Description
	X	X	Flashing. Power is on and communication is ok.

The Dual analog board has the same jumper connections as a single analog board. It should always be configured as board 1.

Table A-8: POWERCELL Load Cell—Scale 1

Jumpers/LEDs	On	Off	Description
W1 IRQ1 IRQ2 IRQ7	X	X X	W1 is a three-position jumper set. Only one jumper should be connected.
W2			W2 is a three-pin configuration. If the jumper is in the 12V position, 12 volts is supplied from the IND310drive terminal. If the jumper is in the 24V position, 24 volts is supplied from an external power source. The external power source is connected to J2 on the POWERCELL load cell board. Pin 1 of J2 is +24V and Pin 2 of J2 is Ground. The external power source is not supplied with the IND310drive terminal.
W4	X		This jumper activates the internal terminating resistor for RS485.
W5 CS4 CS3 CS2 CS1	X	X X X	W5 is a four-position jumper set. Only one jumper should be connected.
LED1	X		Power on.
LED1		X	Power off. If unit is plugged in, check main power, power connections, proper seating of the board, and fuses before contacting service.
LED1	X	X	Flashing. POWERCELL is connected and communication is ok.

Table A-9: POWERCELL Load Cell—Scale 2

Jumpers/LEDs	On	Off	Description
W1 IRQ1 IRQ2 IRQ7	X	X X	W1 is a three-position jumper set. Only one jumper should be connected.

Jumpers/ LEDs	On	Off	Description
W2			W2 is a three-pin configuration. If the jumper is in the 12V position, 12 volts is supplied from the IND310drive terminal. If the jumper is in the 24V position, 24 volts is supplied from an external power source. The external power source is connected to J2 on the POWERCELL load cell board. Pin 1 of J2 is +24V and Pin 2 of J2 is Ground. The external power source is not supplied with the IND310drive terminal.
W4	X		This jumper activates the internal terminating resistor for RS485.
W5 CS4 CS3 CS2 CS1	X	X X X X	W5 is a four-position jumper set. Only one jumper should be connected.
LED1	X		Power on.
LED1		X	Power off. If unit is plugged in, check main power, power connections, proper seating of the board, and fuses before contacting service.
LED1	X	X	Flashing. POWERCELL is connected and communication is ok.

Table A-10: Single Analog Load Cell—Scale 2

Jumpers/ LEDs	On	Off	Description
W1 IRQ1 IRQ2 IRQ7	X	X X X	W1 is a three-position jumper set. Only one jumper should be connected.
W2	X		This jumper sets the connected scale's load cell setting to 2 mV/V.
		X	No jumper sets the connected scale's load cell setting to 3 mV/V
W3 ³	X		This jumper sets Scale 2 to 2 mV/V.
		X	No jumper on W2 sets Scale 2 to 3 mV/V
W4 CS4 CS3 CS2 CS1	X	X X X X	W4 is a four-position jumper set. Only one jumper should be connected.
LED1	X		Power on.

³ Jumper W3 is only available on dual analog load cell boards.

Jumpers/ LEDs	On	Off	Description
LED1		X	Power off. If unit is plugged in, check main power, power connections, proper seating of the board, and fuses before contacting service.
LED1	X	X	Flashing. Power is on and communication is ok.

Table A-11: Power Supply Board Standard Settings

Jumpers/ LEDs	On	Off	Description
LED	X		Indicates power is being supplied to the terminal. If main power is available to unit and LED is not on, check power supply fuse.

PCB Jumpers and LEDs: Revised Main PCB

Figure A-12 shows the locations of jumpers and LEDs on the revised main PCB.



Figure A-14: Revised Main PCB – Locations of Jumper W1 (left) and LEDs (right)

The revised main PCB has a single internal jumper, used to configure the COM 2 port on J16. The IND310drive terminal as delivered from the factory can be configured five ways:

- Single analog
- Dual analog
- One POWERCELL
- Single analog and one POWERCELL
- Two POWERCELLS

Jumper settings and LED indications are as follows:

Table A-12: Main Printed Circuit Board

Jumpers/LEDs	On	Off	Description
W1	X		COM 2 emulates RS-485

Jumpers/LEDs	On	Off	Description
		X	COM 2 emulates RS-422
LED 1	X		Power is supplied to main PCB
		X	Power off. If unit is plugged in, check main power, power connections, proper seating of board and fuses, before contacting service
	X	X	Flashing: Power on, load cell communication OK
LED 3	Ethernet link connected		
LED 4	Ethernet link active		
LED 5	N/A		

Capacity Labels

In accordance with regulations for specific locations, capacity labels should be displayed on the front of the IND310drive terminal—one for each scale (see Figure A-15). Max, min, and e information should be included on the labels. Written information must be a minimum of 2-mm or 0.08-in. high characters.



Figure A-15: IND310drive with Capacity Labels for a Two-Scale System

Weights and Measures Seal

A sealing kit is included with the terminal for weights and measures approved applications (see Figure A-16).



Figure A-16: Sealing Kit

Customers in EU countries have the option to seal internally near the metrology switch (Figure A-17 and A-18 for the original and revised main PCBs, respectively) or externally on the enclosure (Figures A-19). Customers in Canada and the US must seal terminals externally.



Figure A-17: Internal Sealing, Original PCB



Figure A-18: Internal Sealing, Revised PCB



Figure A-19: External Sealing

Power-up Sequence

For application-specific functions, refer to the IND310drive User's Guide.

The power-up sequence takes approximately 35 seconds (90 seconds for units with the original main PCB). The unit will beep when plugged in and will then display the METTLER TOLEDO logo. The display will be followed by another beep, a truck display, and a status message at the bottom of the screen that shows the progress of the initialization process. The software version number displays during the initialization process.

Appendix B

PCTools Operation

This appendix provides information about PCTools—software that provides a way to interface a PC to the IND310drive to setup the terminal as well as download and upload database and configuration information.

The IND310 version 2.5 comes with PCTools v2.5. All previous versions of PCTools should be removed from your PC and PCTools v2.5 installed. PCTools v2.5 will install two icons on the PC desktop: PCTools 2.02 and PCTools 2.5. You should use the PCTools 2.02 to back up information from IND310 units with software version 2.02 or earlier. PCTools 2.5 is only compatible with the IND310 version 2.5, but is able to read the configuration and database files from PCTools 2.02.

Upgrading Software

To upgrade an IND310 from version 2.02 or earlier to version 2.5, perform the following steps:

1. Use PCTools 2.02 to download Configuration and required data tables. See remainder of this appendix for details on how to download information with PCTools.
2. Reboot the IND310.
3. Place the IND310 version 2.5 software “sabre.tar” as well as the file “tar” on the USB stick (71208113).
4. Use the USB stick to download version 2.5 software into the IND310. See section regarding Updating Software.
5. Use PCTools 2.5 to upload the configuration and required data tables to the IND310. See remainder of this appendix for details on how to upload information with PCTools.
6. Reboot the IND310.

Connection to a PC

In order to use PCTools software a PC must be connected to the IND310drive with Ethernet.

There are two types of Ethernet cables: Patch and Crossover. Patch cables are used to connect a PC to a network or a hub. The easiest way to connect a PC to the IND310drive via Ethernet is to use a crossover Ethernet cable (Figure B-1). A

crossover cable connects directly from the PC Ethernet port to the IND310drive Ethernet port (no hubs or network needed). If a crossover cable is unavailable, it is possible to still connect with two patch cables and a hub (Figure B-2). Both types of Ethernet cables are readily available at stores that sell computer equipment.

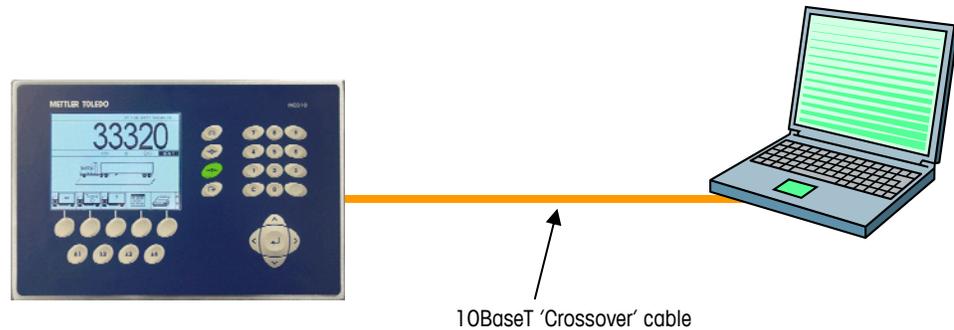


Figure B-1: Connecting the IND310drive to a PC with a Crossover Cable

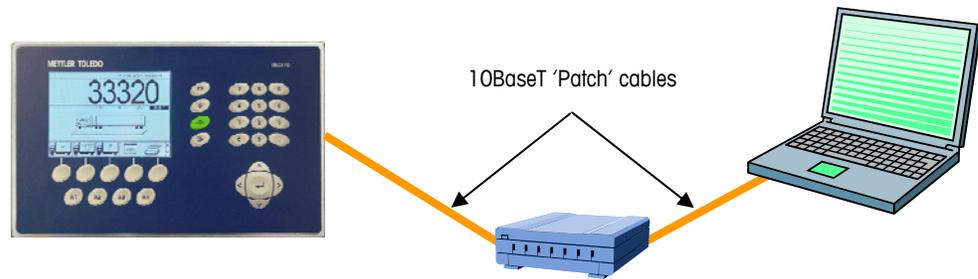


Figure B-2: Connecting the IND310drive to a PC with Patch Cables

IP Address Setup

The IP addresses must be setup on both the IND310drive and the PC as follows:

1. Check the IND310drive IP address and subnet mask and note the numbers to configure the PC. (See Chapter 3.0, Configuration, Communication, Network for information about network configuration.)
2. The PC and the IND310drive should have the same subnet mask.
3. The PC and the IND310drive must have unique IP addresses. The IP address numbers must be the same where the subnet mask is 255, but different where the subnet mask is 0. See the example in Table B-1 and Figure B-3, which follow.

Table B-1: IP Address Configuration Example (for Crossover or Hub Configuration)

IND310drive IP Address	192	168	0	1
Subnet Mask	255	255	255	0
PC IP Address	192	168	0	2



IND310drive Setup
 IP Address: 192.168.0.1
 Subnet Mask: 255.255.255.0

PC Setup
 IP Address: 192.168.0.2
 Subnet Mask: 255.255.255.0

Figure B-3: IP Address Configuration Example (for Crossover or Hub Configuration)

The PC IP address and subnet mask may be configured by accessing the screens shown in Figures B-4 through B-7 on the PC as follows:

1. Click on Start>Settings>Network Connections (Figure B-4).

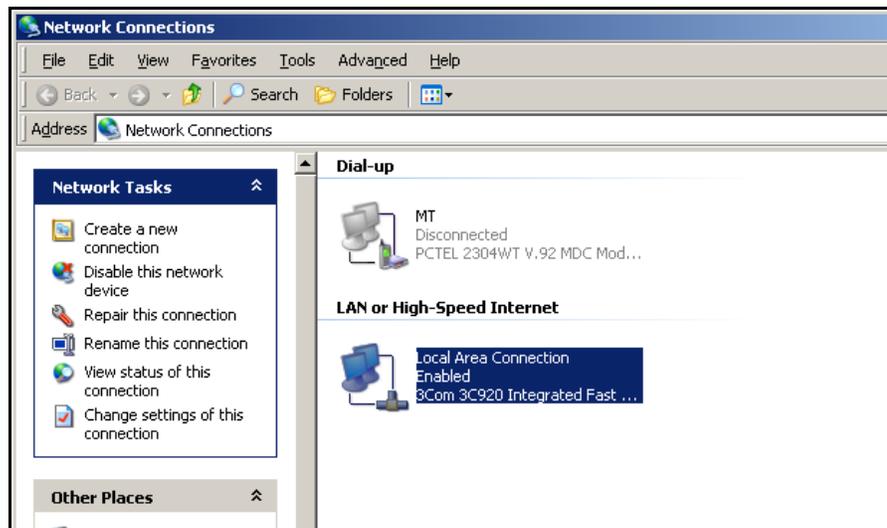


Figure B-4: Accessing the Network Connections Screen

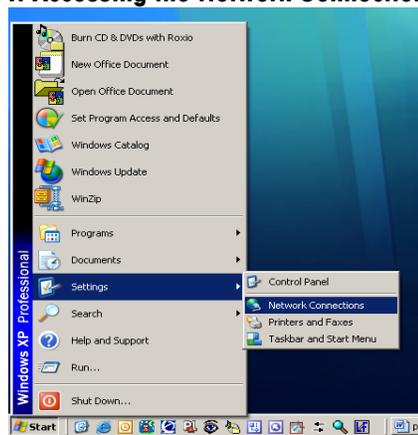


Figure B-5: Network Connections Screen

2. Select the local area internet connection.

3. Double click on the Local Area Connection. The Local Area Connection Properties setup screen displays (Figure B-6).

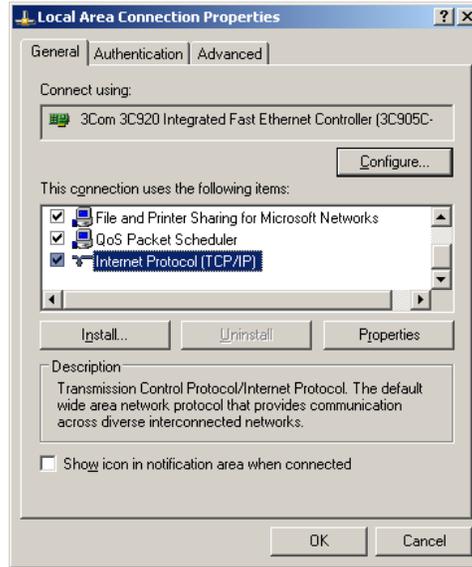


Figure B-6: Local Area Connection Properties Screen

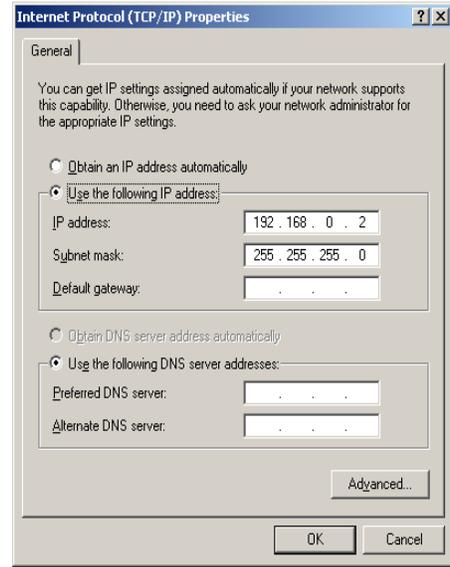


Figure B-7: Internet Protocol (TCP/IP) Properties Screen

4. Scroll down to Internet Protocol (TCP/IP) and select it.
 5. Click on the Properties button. The Internet Protocol (TCP/IP) Properties Screen displays (Figure B-7).
 6. Typically, "Obtain an IP address automatically" is checked. However, to connect to the IND310drive, set the PC IP address and subnet mask by selecting "Use the following IP address".
 7. Enter the IP address and subnet mask settings for the specific PC.
 8. Click on the OK button.
- ☛ After disconnecting from the IND310drive and before connecting back to the PC's normal network connection, remember to change the Internet Protocol (TCP/IP) Properties Screen setting back to "Obtain an IP address automatically" or to whatever setting was active when the screen was accessed.

Connecting PCTools to the IND310drive

To connect PCTools to the IND310drive:

1. Double click on the PCTools icon on the desktop to start PCTools. The main IND310drive PCTools screen displays (Figure B-8).

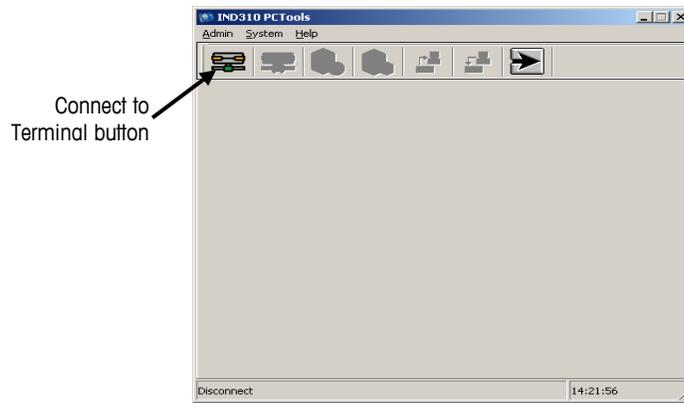


Figure B-8: Main IND310drive PCTools Screen

2. Connect to the IND310drive terminal by clicking the Connect to Terminal button (Figure B-8). The Connect Terminal dialog box displays (Figure B-9).



Figure B-9: Connect Terminal Dialog Box

3. Enter the Ethernet IP address for the IND310drive terminal and click on Yes.
4. Click on the User Login button (Figure B-10). The User Login dialog box displays (Figure B-11).

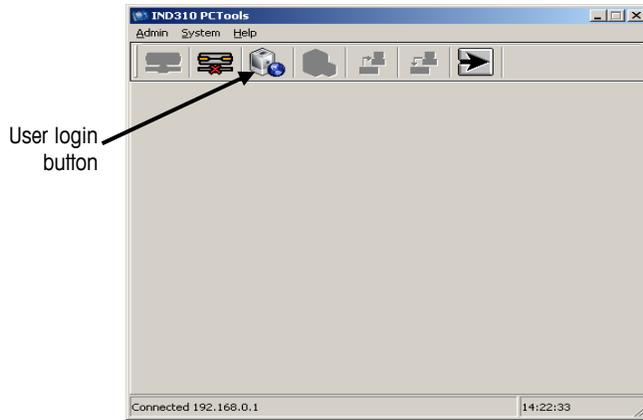


Figure B-10: User Login Button



Figure B-11: User Login

5. If a password has been set for the IND310drive, enter the password in the User Login dialog box. The default setup has no password, in which case the password box is left blank. The default user is ADMIN.
6. Click on the Yes button to complete the login. The main PCTools screen displays (Figure B-12) showing the same tree structure as the IND310drive terminal's setup menu. The PCTools menu tree functions in the same manner as the IND310drive terminal's menu tree. Refer to Chapter 3.0, Configuration for specific setup requirements.

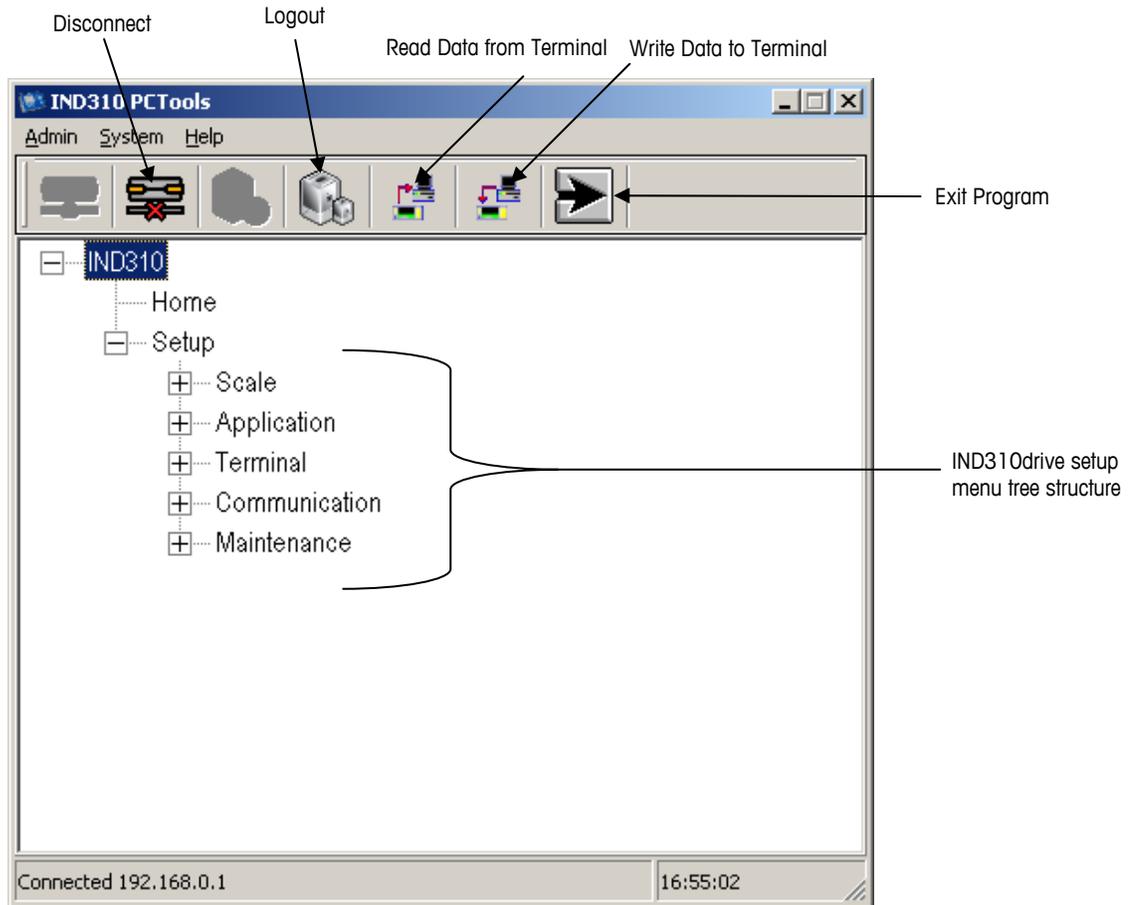


Figure B-12: Main PCTools Screen and Menu Tree

- To exit the PCTools program press the Exit Program icon (see Figure B-12). It is not necessary to logout and disconnect before exiting, but these buttons are provided for systems where multiple IND310drives are connected together with a hub network.

Memory Tables Download/Upload

To select memory tables to upload or download:

- Follow the menu tree structure to the desired data table. Figure B-13 shows an example selection of the A1 Table.

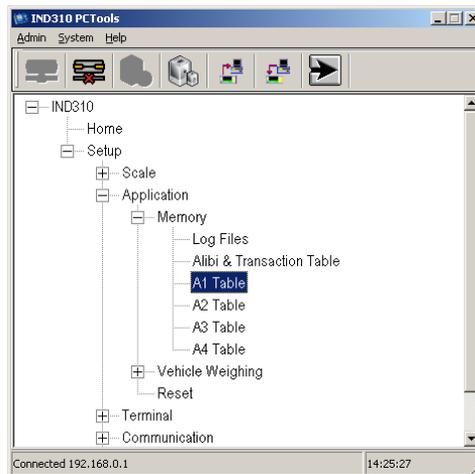


Figure B-13: A-1 Table Selected in the Menu Tree

- Double click on the selection to view the table information (Figure B-14).

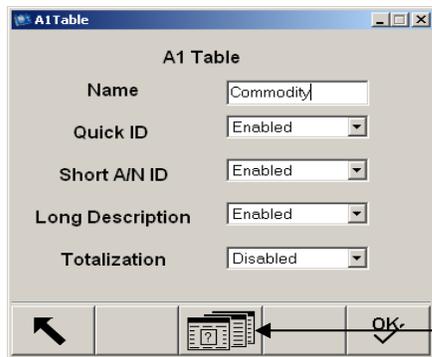


Figure B-14: A1 Table Information

- Click on the Database Query icon to display the contents of the A1 Table (Figure B-15).

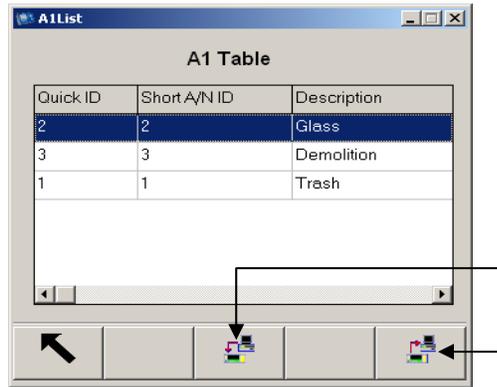


Figure B-15: A1 Table Contents

- To download the contents of the A1 Table to a Microsoft Excel spreadsheet, click on the Download Button (Figure B-15). The Export Success dialog box (Figure B-16) displays to indicate the table data was successfully retrieved.



Figure B-16: Export Success Dialog Box

- Click on OK to continue.
- The table data displays in Microsoft Excel (Figure B-17). The information in the spreadsheet can be edited and saved on the PC.

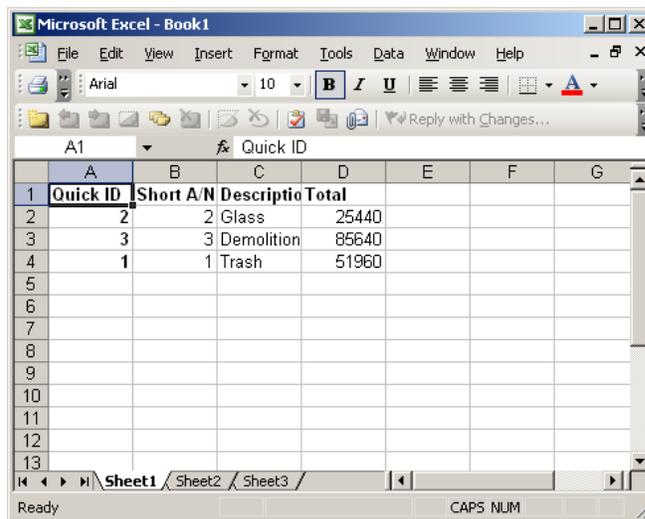


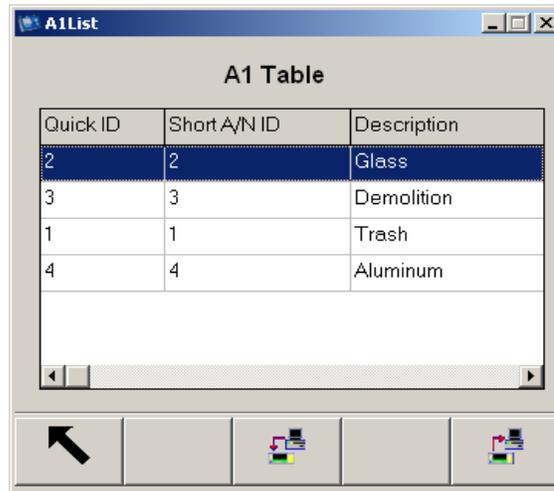
Figure B-17: A1 Table Contents in Microsoft Excel

- After editing/saving the information from Microsoft Excel, the table data can be uploaded into the IND310drive by clicking on the Upload button (Figure B-15).

Important: All columns in the Excel file must have data. Leaving any information blank will result in an import error.

The best practice is to save the table from the IND310drive into Excel, even if there is currently no data in the IND310drive. Then use the columns provided by the IND310drive and PCTools to fill in all the information before trying to upload data onto the IND310drive.

- PCTools will display a prompt requesting the filename and location of the file to be uploaded. Follow the Windows Explorer screens to navigate and select the Microsoft Excel file with the table data. After the upload is complete, the edited data will be displayed. The example shown in Figure B-18 shows the A1 Table after upload with the addition of Quick ID 4 and the description "Aluminum."



The screenshot shows a window titled "A1List" containing a table labeled "A1 Table". The table has three columns: "Quick ID", "Short A/N ID", and "Description". The data is as follows:

Quick ID	Short A/N ID	Description
2	2	Glass
3	3	Demolition
1	1	Trash
4	4	Aluminum

Below the table is a control bar with a back arrow, a refresh icon, and a save icon.

Figure B-18: Example A1 Table After Upload

Alibi & Transaction Table Download

Downloading the Alibi & Transaction Table information is the same as for any data table except that no uploading is allowed. To download Alibi & Transaction Table information:

- Follow the setup menu tree to Alibi & Transaction Table (Figure B-19).

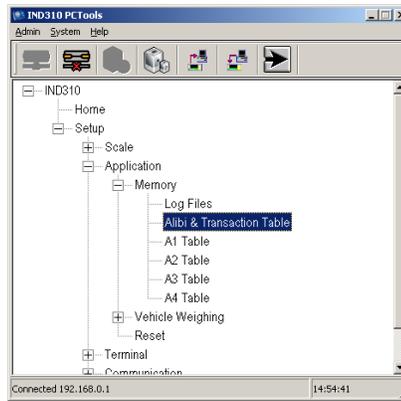


Figure B-19: Alibi & Transaction Table Selected in the Menu Tree

2. Double click on Alibi & Transaction Table. The transaction list displays the Alibi & Transaction Table data (Figure B-20).

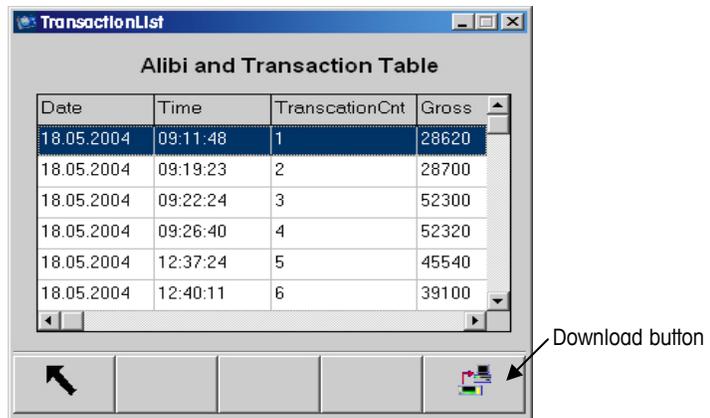


Figure B-20: Alibi & Transaction Table Data

3. To download the contents of the Alibi & Transaction Table to a Microsoft Excel spreadsheet, click on the Download Button (Figure B-20). The Export Success dialog box (Figure B-21) displays to indicate the table data was successfully retrieved.



Figure B-21: Export Success Dialog Box

4. Click on OK to continue.
5. The table data displays in Microsoft Excel (Figure B-22).

	A	B	C	D	E	F	G	H
1	Date	Time	Transacti	Gross	Tare	Net	Unit	
2	18.05.2004	09:11:48	1	28620	23400	5220	lb	
3	18.05.2004	09:19:23	2	28700	28620	80	lb	
4	18.05.2004	09:22:24	3	52300	28620	23680	lb	
5	18.05.2004	09:26:40	4	52320	28700	23620	lb	
6	18.05.2004	12:37:24	5	45540	25320	20220	lb	
7	18.05.2004	12:40:11	6	39100	23400	15700	lb	
8	18.05.2004	12:42:04	7	59660	28700	30960	lb	
9	18.05.2004	12:48:40	8	59680	28700	30980	lb	
10	18.05.2004	12:58:38	9	59660	23400	36260	lb	
11								
12								
13								
14								
15								
16								
17								

Figure B-22: Alibi & Transaction Table Data in Microsoft Excel

Vehicle ID Table Download/Upload

The procedures for downloading and uploading data from or to the Vehicle ID Table are identical to those described for uploading and downloading memory tables. To access the Vehicle ID Table for upload or download, double click Vehicle ID Table in the menu tree (Figure B-23) and proceed as described in steps 3 through 8 in the Memory Tables Download/Upload section.

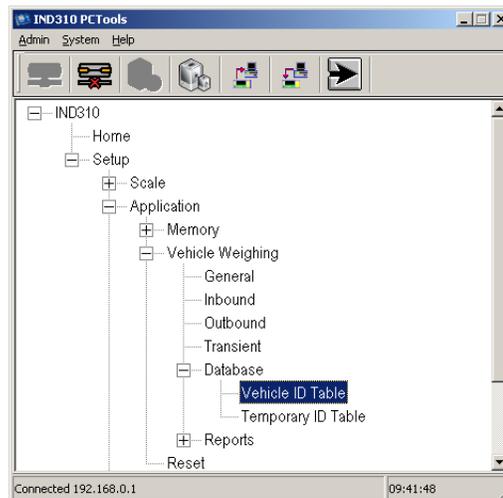


Figure B-23: Vehicle ID Table Selected in the Menu Tree

Template Download/Upload

The procedures for downloading and uploading templates are identical to those described for uploading and downloading memory tables. To access a template to

upload or download, double click appropriate template in the menu tree (Figure B-24 shows Template 1 for example) and proceed as described in steps 3 through 8 in the Memory Tables Download/Upload section.

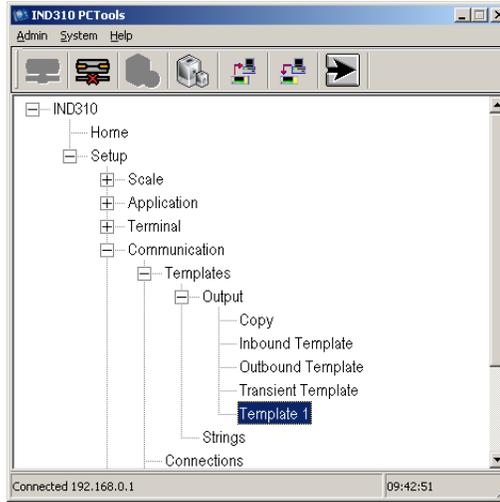


Figure B-24: Template 1 Selected in the Menu Tree

Cell Counts Download

The procedures for downloading cell counts are identical to those described for downloading Alibi & Transaction Table data. To access cell count information to download, double click on Cell Output in the menu tree (Figure B-25) and proceed as described in steps 3 through 5 in the Alibi & Transaction Table Download section.

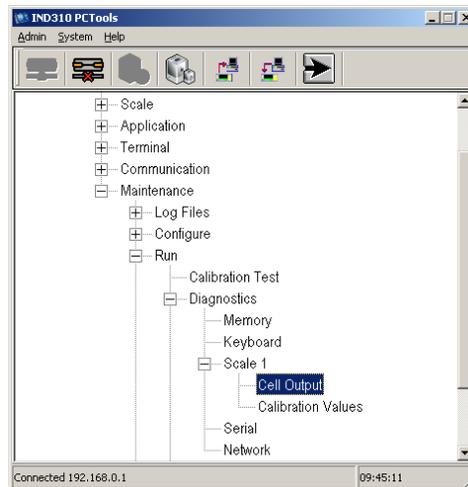


Figure B-25: Cell Output Selected in the Menu Tree

IND310drive Configuration Download

To download the IND310drive configuration:

1. Click on the configuration download icon (Figure B-26) to save the current scale configuration. The Download File dialog box displays (Figure B-27).

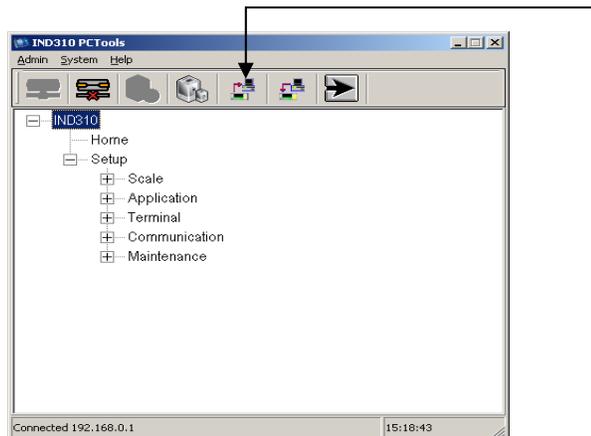


Figure B-26: Configuration Download

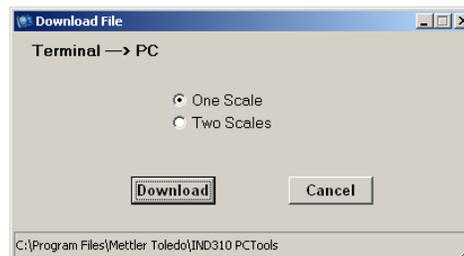


Figure B-27: Download File Dialog Box

2. Select One Scale or Two Scales depending on the number of scales configured on the terminal.
3. Click on the Download button to start downloading the configuration. A Windows Save As screen will display for saving and naming the file (Figure B-28).
4. Select the folder in which to save the file (temp2 in the example shown in Figure B-28) and enter a file name. Do not leave the *.ini in the file name box (see Figure B-28). Delete the * and replace it with the desired file name (backup.ini in the example shown in Figure B-28).

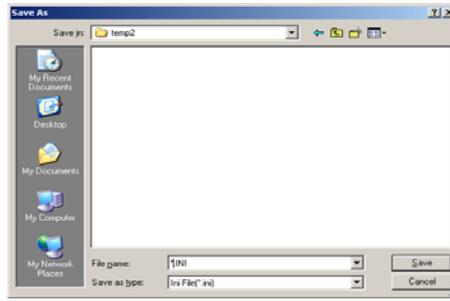


Figure B-28: Windows Save As Screen

5. A dialog box with the message Download Complete displays. Click on OK. The Download File dialog box displays again (Figure B-27).
6. Click on the Cancel button to exit and close the Download File dialog box.

IND310drive Configuration Upload

To upload a configuration to an IND310drive terminal:

1. Click on the configuration upload icon (Figure B-29) to save the current scale configuration. The Download File dialog box displays (Figure B-30).

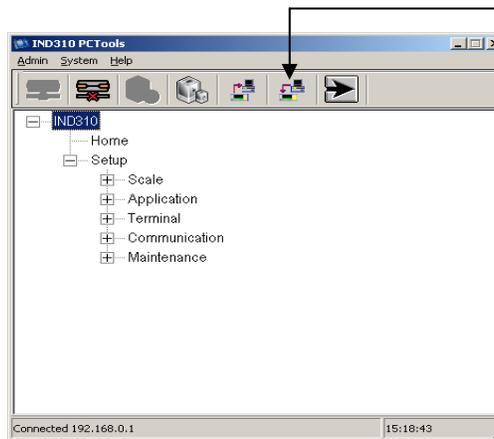


Figure B-29: Configuration Upload



Figure B-30: Upload File Dialog Box

2. Select One Scale or Two Scales depending on the number of scales configured on the terminal.

3. Click on the Upload button to start uploading the configuration to the IND310drive. A Windows Open screen will display (Figure B-31) for selecting which INI file to upload.

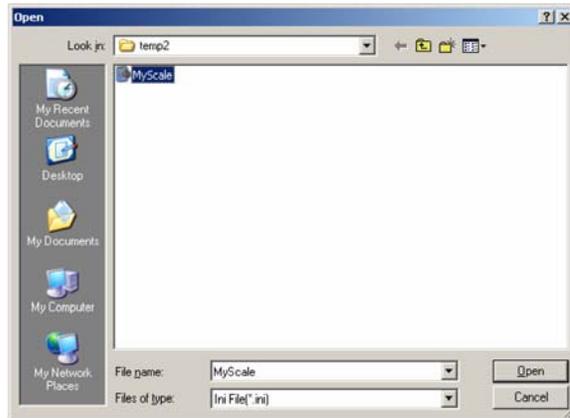


Figure B-31: Windows Open Screen

4. Select the appropriate folder/file and click on the Open button to continue.
5. A dialog box displays with a message that the IND310drive configuration will change. Click on OK.
6. The Upload File dialog box displays again (Figure B-30).
7. Click on the Cancel button to exit and close the Upload File dialog box.

Appendix C

Default Settings

The following tables list the factory default settings for the IND310drive terminal.

Setup Feature	Default Value
Login	
Username	
Password	
Scale 1 Type	
Name	
Scale Type	
Approval	None
# of Load Cells	
Scale 1 Manual Address	
Cell Power	OFF
Enter New Address	
Status	Addressed OK
Scale 1 Auto Address	
Cell Power	OFF
Status	Searching for Cell...
Scale 1 Address All 240	
Cell Power	OFF
Status	Addressed OK
Scale 1 Shift Adjust	
Adjust By	Cell
Cell Counts	
Place test weight on	Cell 1
Status	Capturing Weight
Scale 1 Capacity & Increment	
Primary Units	kg
Ranges/Intervals	1
> 1 < Capacity	2
> 1 < Increment	0.001 kg
Blank Over Capacity	5
Scale 1 Calibration	
Geo Code	16
Base Serial Number	
Calibration Units	Primary Units
Linearity Adjust	Disabled
Scale 1 Calibration/Capture Zero	
Status	Empty scale & press START

Scale 1 Calibration/Capture Span	
Test Load	
Status	Place Test Load
Scale 1 AZM & Display	
Auto Zero	Gross
Auto Zero Range	0.5
Center of Zero	Gross
Under Zero Blanking	5
Scale 1 Zero Ranges	
Power Up Zero	Enabled
Power Up Range	-2 +2
Pushbutton Zero	Enabled
Pushbutton Range	-2 +2
Scale 1 Tare Types	
Pushbutton Tare	Enabled
Keyboard Tare	Enabled
Additive Tare	Disabled
Tare Interlock	Disabled
Net Sign Correction	Disabled
Scale 1 Auto Tare	
Auto Tare	Disabled
Tare Threshold Wt.	2
Reset Threshold Wt.	1
Scale 1 Auto Clear	
Auto Clear Tare	Disabled
Clear after Print	Disabled
Clear Threshold Wt.	1
Motion Check	Enabled
Scale 1 Units	
Secondary Units	None
Power Up Units	Primary Units
Custom Factor	1
Custom Name	Custom
Custom Increment	1
Custom Resolution	X
Scale 1 Filter	
Low Pass Frequency	2
Stability Filter	Disabled
Scale 1 Stability	
Motion Range	1.0
No-motion Interval	0.3
Scale 1 Log or Print	
Minimum Wt.	0
Interlock	Disabled
Automatic	Disabled
Threshold Wt.	0
Reset on	Threshold
Motion Check	Disabled

Scale 1 Sequential Number	
Sequential Number	Disabled
Number Reset	Disabled
Next Value	00000001

Scale Reset	
Reset Scale	1

Log Files	
Maintenance Log Scale 1	Disabled
Maintenance Log Scale 2	Disabled

Alibi & Transaction Table	
Active Table(s)	None
#1	Vehicle ID
#2	Vehicle Desc
#3	None
#4	None
#5	None
#6	None
#7	None
#8	None
#9	None
#10	None

Alibi & Transaction Table/Search	
#1	None
#2	None
#3	None
#4	None

A1 Table (Commodity Disabled)	
Commodity	Disabled
Name	A1 Table
Long Description	Enabled
Totalization	Disabled

A1 Table (Commodity Enabled)	
Commodity	Enabled
Name	Commodity
Long Description	Enabled
Totalization	Disabled
Type/Decimals	Multiply/X

A1 Table/Search	
#1	None
#2	None
#3	None
#4	None

A2 Table	
Name	A2 Table
Long Description	Enabled
Totalization	Disabled

A2 Table/Search	
#1	None
#2	None
#3	None
#4	None
A3 Table	
Name	A3 Table
Long Description	Enabled
Totalization	Disabled
A3 Table/Search	
#1	None
#2	None
#3	None
#4	None
A4 Table (Index Disabled)	
Index	Disabled
Name	A4 Table
Long Description	Enabled
Totalization	Disabled
A4 Table/Search (Index Disabled)	
#1	None
#2	None
#3	None
#4	None
A4 Table (Index Enabled)	
Index	Enabled
Vehicle ID	Enabled
A1 Table	Enabled
A2 Table	Disabled
A3 Table	Disabled
Totalization	Disabled
Index Table/Search	
#1	None
#2	None
#3	None
#4	None
Vehicle Weighing General (Disabled)	
Overload check	Disabled
Var1 Name	
Var2 Name	
Default Auto Start	None
Vehicle Weighing General (Enabled)	
Overload check	Disabled
Value	
Permit Override	No
Var1 Name	
Var2 Name	
Default Auto Start	None

Vehicle Weighing Inbound	
Inbound	Disabled
A1 Table	Disabled
A2 Table	Disabled
A3 Table	Disabled
A4 Table	Disabled
Variables	None

Vehicle Weighing Outbound	
Outbound	Enabled
A1 Table	Disabled
A2 Table	Disabled
A3 Table	Disabled
A4 Table	Disabled
Variables	None

Vehicle Weighing Transient	
Transient	Disabled
A1 Table	Disabled
A2 Table	Disabled
A3 Table	Disabled
A4 Table	Disabled
Variables	None

Vehicle ID Table	
Long Description	Enabled
Totalization	Disabled

Vehicle ID Table/Search	
#1	None
#2	None
#3	None
#4	None

Temporary ID Table	
Automatic ID	Disabled
Long Description	Disabled

Temporary ID Table/Search	
#1	None
#2	None
#3	None
#4	None

Reports Format	
Format	Narrow (40)
Header	5
Title	Yes
Separator	None
Footer	5

Transaction Report (Disabled)	
Full	Enabled
Scale Name	Enabled
Type	Enabled
Vehicle ID	Enabled
A1 - A4 Table	Enabled
Var1 & Var2	Enabled

Transaction Report (Enabled)	
Full	Enabled
Vehicle ID Table Report	
Short A/N ID	Disabled
Long Description	Enabled
Temporary ID Table Report	
Date	Disabled
Time	Disabled
Short A/N ID	Disabled
Long Description	Disabled
A1 Table Report (Commodity Disabled)	
Short A/N ID	Enabled
Long Description	Enabled
A1 Table Report (Commodity Enabled)	
Short A/N ID	Disabled
Long Description	Disabled
Total	Disabled
A2 Table Report	
Short A/N ID	Enabled
Long Description	Enabled
A3 Table Report	
Short A/N ID	Enabled
Long Description	Enabled
A4 Table Report (Index Disabled)	
Short A/N ID	Disabled
Long Description	Disabled
Total	Disabled
A4 Table Report (Index Enabled)	
Vehicle ID	Enabled
A1 Table	Enabled
A2 Table	Disabled
A3 Table	Disabled
Total	Disabled
Reports Run/Custom	
Type	
Field 1	None
Start	
Stop	
Field 2	None
Start	
Stop	

Device		
Terminal ID	IND310	
Project ID		
Description	Mettler Toledo Industrial Terminal	
Alarm Beeper	Enabled	
Keypad Beeper	Disabled	
Defrag Time/Frequency	2:00 AM/MONTH	
Display		
Backlight Timeout	15	
Tare Display	Never	
Format Time & Date		
Time Format	24:MM:SS	
Date Format	DD MMM YYYY	
Date Field Separator	: (colon)	
Language		
Display Messages	English	
Keypad Selection	English	
External Keyboard	English	
Transaction Counter		
Transaction Counter	Enabled	
Counter Reset	Disabled	
Next Transaction	00000001	
Users/Edit		
User #	1	2
Access	Administrator	Operator
Username	ADMIN	Operator
Password		
Confirm Password		
Soffkeys		
Soffkey #		
Assignment, position 1	Vehicle ID	
Assignment, position 5	Contrast	
Application Keys		
A1	None	
A2	None	
A3	None	
A4	None	
Copy		
Copy from Template	Template 1	
To Template	Outbound	
Inbound Template	Refer to Appendix D, Database Structure and Use	
Outbound Template		
Transient Template		
Template 1		

(any) Template/Insert	
Element #	
Element Type	Field
Value	GrossWt
Repeat Count	
Format	Default 6
Leading Zero Fill	Disabled
Template Strings	
The default for the template strings is a blank table with no values listed.	
Template Strings/Insert	
String	
Text	
Connections	
The default for the connections is a table with the following values listed:	
Assignment	Port
Outbound	COM1
Template 1	COM1
Outbound	COM2
Template 1	COM2
Connections/Edit	
Port	COM1
Assignment	Template 1
Connections/Insert	
Port	COM1
Assignment	Template 1
Serial/COM1	
Baud	9600
Data Bits	7
Parity	Even
Flow Control	None
Interface	RS-232
Serial/COM2	
Baud	9600
Data Bits	7
Parity	Even
Flow Control	None
Interface	RS-232
Ethernet	
MAC Address	
DHCP Client	Disabled
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Gateway Address	0.0.0.0
FTP/Edit	
User #	1
Username	ind310
Password	sabre

Scale 1 Predictive Maintenance	
Symmetry Monitor	None
Start Threshold	1
Difference Threshold	2
On Failure	Alarm and Disable Scale
Run Flat	Disabled
Scale 1 Calibration Management	
Maintenance Interval (Days)	0
Maintenance Interval (Weighments)	0
Last Service Date	
Next Service	
On Expiration	Alarm Only
Calibration Test	
The default for calibration test is a blank table with no values listed.	
Scale 1 Calibration Test/Edit	
Step #	
Test Load	
Tolerance	
Scale 1 Calibration Test/Insert	
Step #	
Test Load	
Tolerance	
Scale 1 Calibration Values	
Zero	
Low	
Mid	
High	
Scale 1 Cell Diagnostics	
Cell Power	OFF
Address to confirm	
Status	Addressed OK
Diagnostics/Serial	
Com Port	COM1
Sending	
Receiving	

Appendix D

Database Structure and Use

This appendix provides detailed information about the IND310drive's database structure and use, including:

- Memory
- Templates
- Maintenance Log File
- Tables

Memory

The IND310drive has 8 Mbytes of memory to store table information such as "vehicleID", "tempID", and transactions. Unlike the METTLER TOLEDO Cougar terminal, where the number of items was fixed (99 vehicle IDs for example), the IND310drive is flexible and allows the user to store as much as will fit within the 8 Mbytes (8 Mbytes = 8,388,608 Bytes). Table D-1 shows the amount of memory that one record (one entry in the table) requires.

Table D-1: Amount of Memory One Record Requires

Table Name	Maximum Memory Used (Bytes per Record)
Vehicle ID	126
Temporary ID	306
A1-A4 Tables	101
Index Table	57
Transaction Table	414
Alibi only table	63

For example, a customer needs to store 200 vehicle IDs, needs to track 80 commodities in table A1, track 30 customers in table A2, and needs to store 5,000 transactions in the transaction table. The memory usage can be calculated as follows.

- 200 vehicle IDs × 126 Bytes = 25,200 Bytes
- 80 commodities × 101 Bytes = 8,080 Bytes
- 30 Customers × 101 Bytes = 3,030 Bytes
- 5000 Transactions × 414 Bytes = 2,070,000 Bytes

The total comes to 2,1063,10 Bytes, which is far less than the 8,388,608 Bytes available in the IND310drive, so there is still room for more data. Using a calculation like this will provide a rough estimate for the amount of memory needed for a specific customer application.

The transaction table has three configurations:

- Alibi Only
- Alibi & Transaction FIFO (first in, first out)
- Alibi & Transaction

The first two are limited to 5,000 records and operate as memory FIFO loops. This means that after transaction number 5,000, the IND310drive starts at transaction 1 again and overwrites any information.

Customers who want to store more transactions can do so by choosing to use Alibi & Transaction, which is limited only by the available memory. When the memory is 95% full, the IND310drive displays a message alerting the user that the memory is low. In the example above with 200 vehicle IDs, 80 commodities, and 30 customers, the IND310drive would store approximately 20,000 transactions.

Templates

There are several templates in the IND310drive to facilitate printing:

- Inbound Template
- Outbound Template
- Transient Template
- Template1

Each template operates in the same manner for the purpose of printing an inbound, outbound, transient, or demand print ticket respectively.

Template Memory Usage

Each template provides 1,000 bytes of memory storage. To effectively use a template it is necessary to understand how each element in the template consumes memory. An element consists of a TYPE with a corresponding VALUE. Table D-2 shows all the possible TYPES with some examples of the VALUES the TYPE may have.

Table D-2: Template Memory Usage

Type	Example Value	Description	Memory Used
Field	GrossWt	Print the Gross Weight	23 bytes
	Time	Print the Time	23 bytes
	String1	Similar to a "JagXtreme Literal"	23 bytes
String	"Print this string"	User defined string to print	String size + 10 bytes
Special Character	CR/LF	Send a carriage return/line feed	20 bytes (2 characters)
	STX	Special command character	9 bytes
	ESC	Special command character	9 bytes
End	No Value	This is hidden at the end of each template	7 bytes

The TYPE field can be given VALUES to print Gross/Tare/Net weight and can also be assigned date and time information. The TYPE field can be assigned the VALUE of one of twenty predefined Strings known as String1 through String20. The pre-defined Strings correspond to the literals used in the IND310drive terminal and are configured in the setup menu under Communication/Templates/Strings. The TYPE "String" is a group of characters that is put directly in the template. As a general rule, if the "user-defined" string is 13 characters or more, one should use the TYPE field and assign one of the 20 available Strings (Literals).

User-defined strings are the biggest issue with regard to memory usage. One character takes 1 byte. For example, printing the letter "A" takes 1 byte of memory; however, the Memory Usage Table shows memory used for a user-defined string is calculated as: String Size + 10 bytes. Therefore, printing the letter "A" uses 1 + 10 = 11 bytes of memory.

String format and length are also important. If the string "Tare" is left justified with length 6 by default looks like "Tare__" and the string size is 6 bytes (4 bytes for the characters plus 2 bytes for the 2 spaces). Using "Tare" right justified with length 7 will look like "__Tare" and has a string size of 7 bytes (3 bytes for the 3 spaces + 4 bytes for the characters).

Figure D-1 shows an example of a ticket along with the template elements and memory size calculation.

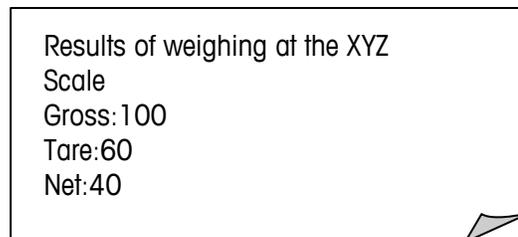


Figure D-1: Ticket Example with Template Elements and Memory Size Calculation

The following elements are required:

1. Field with value "String1", where String1 is "Results of weighing at the XYZ Scale" (23 bytes)
2. Special Character "CR/LF", used to print on the next line (20 bytes)
3. String with value "Gross:", left justified with length6 (6 bytes + 10 bytes overhead = 16 bytes)
4. Field with value "GrossWt" (23 bytes)
5. Special Character "CR/LF", used to print on the next line (20 bytes)
6. String with value "Tare:", left justified with length 5 (5 bytes + 10 bytes overhead = 15 bytes)
7. Field with value "TareWt" (23 bytes)
8. Special Character "CR/LF", used to print on the next line (20 bytes)
9. String with value "Net:", left justified with length 4 (4 bytes + 10 bytes overhead = 14 bytes)
10. Field with value "NetWt" (23 bytes)
11. Special Character "CR/LF", used to print on the next line (20 bytes)

The memory usage for each element equals a total of 217 bytes; however, each template has a hidden element of TYPE "End" that requires 7 bytes. The total memory used in this case would then be 217 bytes + 7 bytes = 224 bytes.

Defragmenting

The IND310drive terminal automatically initiates the defragmenting process on the first day of every month or every day, depending on the setting selected in setup. The default frequency for defragmentation to occur is monthly. The default time for defragmentation to occur is 2 a.m. A different time for defragmentation can be configured in set up. (See Chapter 3.0, Configuration, Terminal, Device for information about configuring automatic defragmentation time and frequency.) During defragmentation, a message displays on the IND310drive terminal: "Defragmenting please wait". The defragmenting process takes no more than five minutes to complete.

Defragmentation also occurs automatically when the Alibi & Transaction Table is cleared.

Defragmentation can be initiated manually at any time in order to optimize the IND310 drive terminal's performance. To initiate manual defragmentation, go to the Maintenance, Run, Database Defragment setup screen. Press the START softkey  to initiate defragmentation. If configured in setup, a DEFRAGMENT softkey **Defrag** can also be used to initiate manual defragmentation. (See Chapter 3.0, Configuration for more information about the Database Defragment screen and configuring softkeys.)

Maintenance Log File

The maintenance log file tracks any calibration changes in the terminal. The maintenance log file cannot be modified, only viewed and cleared completely. An example of a maintenance log file is shown in Figure D-2.

09 Jan 2005 08:47:19				
Maintenance				
User Name	Date	Time	Scale	Action
Tech1	09-Sep-2003	11:40:13	1	Span
Bob	09-Sep-2003	11:42:10	2	Zero

Figure D-2: Maintenance Log File Example

The maintenance log file can only be cleared in setup mode. To clear the maintenance log file:

1. Press the SETUP Soffkey . The setup menu tree displays.
2. Use the DOWN and RIGHT arrow keys to scroll through and expand the setup menu tree to Application, Memory, Log Files.
3. Press the ENTER key to open the Log Files setup screen (see Figure D-3).

09 Jan 2005 08:47:19	
Log Files	
Maintenance Log	
Scale 1	Enabled ▾
Scale 2	Disabled ▾

Figure D-3: Log Files Screen

4. Use the Scale 1 and Scale 2 drop-down menus to enable or disable maintenance logging per scale. (Maintenance logging per individual item cannot be disabled.)
5. Press the RESET soffkey  to reset the log files. A screen displays that asks for verification.

6. Press the OK softkey  to continue. A status message displays verifying that the reset was successful.

Tables

See Table Searches for information about how to search tables. See Table Reports for information about how to print tables.

The tables are:

- Alibi Memory/Transaction
- A1- A4
- Vehicle ID
- Temporary ID
- Index

Users can search and print all tables.

Alibi Memory

Alibi memory stores transaction information that is not definable by the operator. The alibi memory table includes:

- A transaction count value, which is a unique numeric field that identifies the transaction (the transaction counter must be enabled in terminal setup to activate the transaction count value)
- Date and time stamp fields
- Gross, tare, and net weights, including weight unit

Transaction

The transaction table is linked to the alibi memory table to provide additional operator-selectable fields. The additional fields store custom transaction data.

The transaction table always includes:

- A transaction count value
- Date and time stamp fields

These parameters are a common link between the alibi memory and transaction table.

The transaction table may also include up to ten operator-selected additional fields from the following list:

- Scale name
- Sequence number (selected scale's identification number)
- A1 value (selected value from the A1 table)
- A2 value (selected value from the A2 table)
- A3 value (selected value from the A3 table)
- A4 value (selected value from the A4 table)
- Vehicle ID
- Vehicle description
- Variable O1 value
- Variable O2 value
- Transaction type

A1–A4 User-Defined

The A1–A4 user-defined tables can be structured to meet operational requirements and include three selectable fields

- **Short A/N (alpha/numeric) ID**—A short alphanumeric string (16 characters) that also enables a quick search
- **Description**—A long alphanumeric string (40 characters) that describes the table entry
- **Total**—A field that tracks totals based on each specific item in the table (For example, in a customer table the total weight for all transactions involving each customer.)

The A4 table also includes a selection that enables it to act as an index table for other table values. See Index table for further information.

Vehicle ID

The vehicle ID table includes

- **Short A/N ID**—A short alphanumeric string (16 characters) that also enables a quick search
- **Description**—A long alphanumeric string (40 characters) that describes the vehicle and is used as the value for a search
- **Tare**—The tare weight of the vehicle
- **Total**—A field that tracks totals based on each specific vehicle in the table

Temporary ID

The temporary ID table includes

- **Short A/N ID**—A short alphanumeric string (16 characters) that also enables a quick search
- **Description**—A long alphanumeric string (40 characters) that describes the vehicle
- **Stored Weight**—A field that stores nonpermanent weights for inbound vehicles.

Using Short A/N ID

Descriptions must be in the tables for Short A/N ID to be available for use. A description cannot be changed on the operation weight screen, but can only be replaced with another description from the table.

If Short A/N ID is enabled, it can be used as the look up only **after** pressing the VEHICLE ID, TEMPORARY ID, or INDEX soffkeys.

If Short A/N ID is enabled for the A1–A4 tables and the corresponding A1–A4 application keys are assigned to Select Table in the setup, the user can enter a Short A/N ID and press the ENTER key to populate a database field with the description for the table entry.

For example, an A1 table defined as Customer Table could include data as shown in Table D-3.

Table D-3: Customer Table (A1 Table)

Short A/N ID	Description	Total
Abc78	Red Trucking	12500 lb
Xyz98	Big Truck	24000 lb
444aaa	Small Truck	10000 lb

In this example, (assuming that Short A/N ID is enabled) the user can populate the A1 database field on an operation weight screen by entering a Short A/N ID of Abc78 in the A1 text box and then pressing the ENTER key. Red Trucking will automatically be entered in the A1 text box. If the user enters Abc678 in the A1 text box and then presses the ENTER key, the message “A1 ID NOT FOUND” will display because there is no Short A/N ID for Abc678.

The user can press the DATABASE QUERY soffkey  to search the A1 table or try again with a different Short A/N ID.

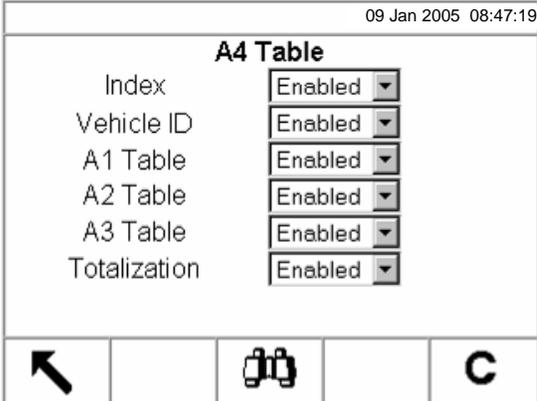
Index

The index table is comprised of ID keys that are used to reference data located in other tables. Index ID keys point to data already stored in other tables to enable quick references for multiple items.

Enabling the index table precludes the use of the A4 table.

The following are examples of a possible configuration of the index table and sample contents of tables.

An example of a possible configuration of the index table is shown in Figure D-4.



09 Jan 2005 08:47:19

A4 Table

Index	Enabled
Vehicle ID	Enabled
A1 Table	Enabled
A2 Table	Enabled
A3 Table	Enabled
Totalization	Enabled

Navigation icons: back arrow, printer, and C.

Figure D-4: Index Table Configuration Example

Figure D-5 illustrates how data in the index table is connected to data in the Vehicle ID, A1, A2, and A3 tables.

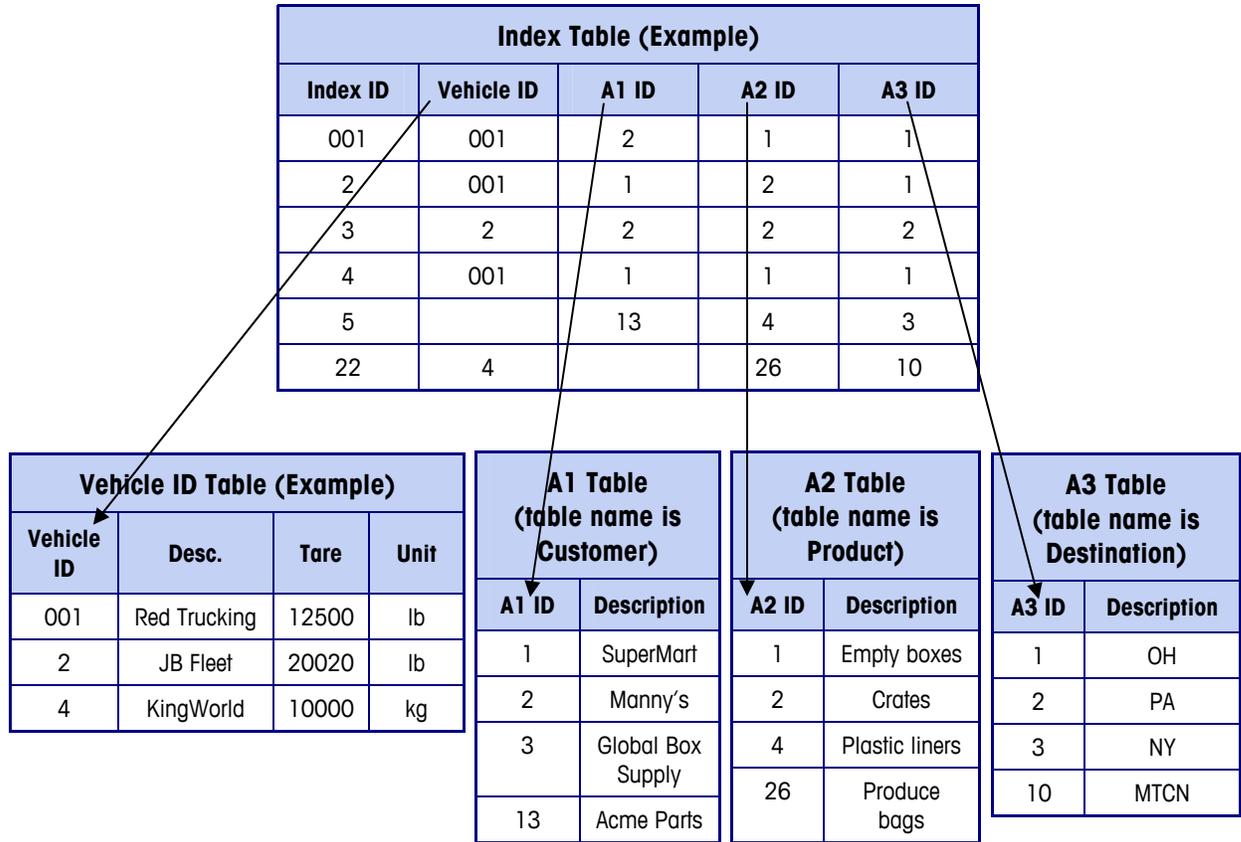


Figure D-5: Index Table Data Connections with Vehicle ID, A1, A2, and A3 Tables

An example of how the index table is used based on the table data shown in Figure D-5 is as follows:

An operator selects Index weighing by pressing the INDEX softkey . He or she enters an ID of 001.

The system looks up index ID 001 in the index table, which points to data already stored in the other tables. Based on the index ID of 001, the system references and returns data from the other tables as follows:

- Vehicle ID table for ID 001 (Red Trucking, 12500 lb tare)
- A1 table for ID 2 (Manny's)
- A2 table for ID 1 (Empty Boxes)
- A3 table for ID 1 (OH)

The system uses the descriptions and tare information (shown in parentheses above) to automatically populate the associated fields on the vehicle weighing operation screen.

Table Reports

Table reports can be either standard or custom.

Refer to Chapter 3.0, Configuration, Memory and also Vehicle Weighing Reports Setup for more information about table and report configuration.

Standard Table Reports

Standard table report structures are based on the fields defined in table and report configuration. If a table field is disabled, that field cannot be reported and is not selectable in the reports configuration section. If all table fields are configured as enabled, they are all available to be enabled or disabled in the table's configured fields for the report.

Figure D-7 is an example of a standard report configuration setup screen that shows the A1 table configured with Short A/N ID and Description enabled. Either of these fields can be included in a report; however, only Short A/N ID and Description are enabled for the report in this example. When the report is run, only time and date and the enabled table report fields (Short A/N ID and Description) will print.

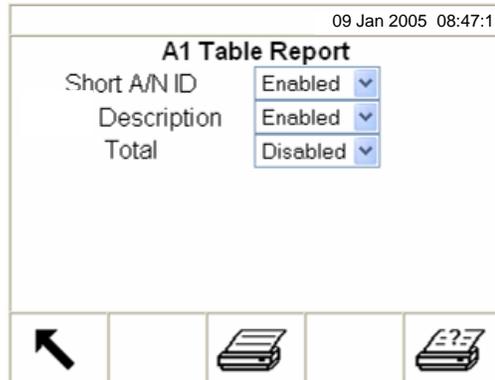


Figure D-7: Example Standard Table Report Configuration Screen

Custom Table Reports

Custom reports limit the records that are included in a report. The report structure remains the same as defined in report configuration, but two field selections are available to limit the reported records. The range of reported field values is specified by the start and stop values. If the stop is left blank, then anything after the start value is included in the report. If the start is left blank, then anything before the stop value is included in the report. The wildcard (*) query operation also applies so this character can also be included in the entry values. Figure D-8 shows an example of a custom table report configuration screen.

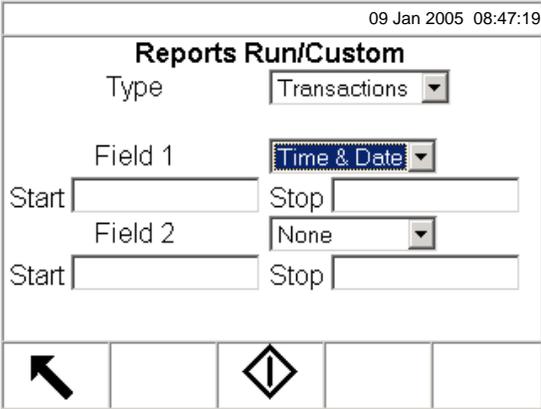


Figure D-8: Example Custom Table Report Configuration Screen

Table Report Examples

The following are examples of table reports:

Product Report

Quick ID: 1
 Short A/N ID: 1
 Description: Grain

Quick ID: 2
 Short A/N ID: 2
 Description: Rock

Quick ID: 3
 Short A/N ID: 3
 Description: Soy Beans

Quick ID: 4
 Short A/N ID: 4
 Description: Waste

Vehicle ID Report

Quick ID: 1
 Short A/N ID: 1
 Description: Eric
 Tare WT: 11680.000 lb

Quick ID: 2
 Short A/N ID: 2
 Description: Amiel
 Tare WT: 12500.000 lb

Quick ID: 3
 Short A/N ID: 3
 Description: Jonsey
 Tare WT: 14260.000 lb

Vehicle ID Report

Quick ID: 1
 Short A/N ID: 1
 Description: Eric
 Tare WT: 11680.000 lb

Quick ID: 2
 Short A/N ID: 2
 Description: Amiel
 Tare WT: 12500.000 lb

Quick ID: 3
 Short A/N ID: 3
 Description: Jonsey
 Tare WT: 14260.000 lb

Quick ID: 4
 Short A/N ID: 4
 Description: Kale & Wyde
 Tare WT: 13200.000 lb

Outbound Ticket

09:55:54 16 Feb 2004

Vehicle ID: 4

Description: Kale & Wyde

Product: Rock

Customer: Boggsarama

 Gross Weight: 65920lb
 Tare Weight: 13200lb
 Net Weight: 52720lb

Transaction Count: 30
 Time & Date: 2004-02-03 16:48:24
 Vehicle ID: 3
 Vehicle Desc: Jonsey
 Gross WT: 64280.000 lb
 Tare WT: 14260.000 lb
 Net WT: 50020.000 lb
 A1 Table: Grain
 A2 Table: Boggsarama
 A3 Table:
 A4 Table:
 Var1 Table: Rain
 Var2 Table: Corky

Table Queries

All table query functions operate the same way unless specified otherwise. Table values are case-sensitive. The fixed format for dates is YYYY-MM-DD for all queries. When a query function is included in an application operation, the syntax shown in Table D-4 is used as part of the value to indicate query operations.

Table D-4: Table Query Syntax

Syntax	Query Operation Return Information
Blank	All stored records
Exact Value	Specific record (equals exactly)
>Value	Anything alphabetically after or numerically greater than the value
>=Value	Anything alphabetically after or numerically greater than the value, and includes the value (=> is also acceptable)
<Value	Anything alphabetically before or numerically less than the value
<=Value	Anything alphabetically before or numerically less than the value, and includes the value (=< is also acceptable)
Value*	Anything containing the value indicated before the * character, can be used in combination with the >, >=, <, and <= (wildcard operation)

The example shown in Figure D-9 enables a search of the A1 table for the record matching a short A/N ID of 001 and a description of Blue Trucking. Since the short A/N ID is a unique field, the query result should contain a single record (if it matches the description).

A1 Table/Search

Enter Search Mask (blank matches all)

#1	Short A/N ID	001
#2	Description	Blue Trucking
#3	None	
#4	None	

⬅
⬆

Figure D-9: Example of an A1 Table Query (single record)

Figure D-10 shows another example of an A1Table query for multiple records that:

- Match every short ID beginning with HA
- Were stored after July 15, 2002
- Have an exact description of Blue Trucking

The screenshot shows a window titled "A1 Table/Search" with a timestamp of "13:41 27-Aug-2002". Below the title is the instruction "Enter Search Mask (blank matches all)". There are four search criteria listed:

- #1: Short A/N ID (dropdown menu) with the value "HA*" entered in the text field.
- #2: Description (dropdown menu) with the value "Blue Trucking" entered in the text field.
- #3: Date (dropdown menu) with the value ">2002-07-15" entered in the text field.
- #4: None (dropdown menu) with an empty text field.

At the bottom of the window, there are four buttons: a left-pointing arrow, a diamond-shaped button with a vertical line through it, and two empty buttons.

Figure D-10: Example of an A1 Table Query (multiple records)

Based on example information as listed in Table D-5 – Table D-7, the results of the query would be determined in steps 1–3 as follows:

1. Use only short IDs beginning with HA, which are displayed in the highlighted table rows in Table D-5.

Table D-5: Table A1 Records with Short A/N IDs Beginning With HA

Short A/N ID	Description	Time	Date
AM1234	Blue Trucking	12:00	2003-10-23
BK2312	Blue Sky	12:00	2003-07-14
HAJ78GH	Red Ball	14:45	2002-08-09
HD121	Blue Trucking	12:00	2003-07-14
MMT19000	Blue Trucking	12:00	2003-10-23
HAC9803	Blue Trucking	12:00	2002-08-09
HAA3456	Green VanLine	12:00	2002-08-09
HA1209	Black & Black	12:00	2003-07-14
HAD1	Blue Trucking	12:00	2003-07-19
HS4567	Green VanLine	12:00	2003-10-23
HAD2	Blue & Black	12:00	2002-08-09
HAD3	Blue Trucking	12:00	2003-07-14
HAMhds	Blue & Black	12:00	2003-07-19
HJY768	Green VanLine	12:00	2003-10-23
HAA349	Blue Trucking	12:00	2003-07-19
HAA350	Blue Trucking	12:00	2003-07-09
HAA351	Blue Trucking	12:00	2003-07-12

- From this subset, find only records with a description equal to Blue Trucking. The results are shown in the highlighted rows in Table D-6.

Table D-6: Table A1 Records with Short IDs Beginning with HA and a Description of Blue Trucking

Short A/N ID	Description	Time	Date
HAI78GH	Red Ball	14:45	2002-08-09
HAC9803	Blue Trucking	12:00	2002-08-09
HAA3456	Green VanLine	12:00	2002-08-09
HA1209	Black & Black	12:00	2003-07-14
HAD1	Blue Trucking	12:00	2003-07-19
HAD2	Blue & Black	12:00	2002-08-09
HAD3	Blue Trucking	12:00	2003-07-14
HAMhds	Blue & Black	12:00	2003-07-19
HAA349	Blue Trucking	12:00	2003-07-19
HAA350	Blue Trucking	12:00	2003-07-09
HAA351	Blue Trucking	12:00	2003-07-12

- From this subset, find only the records greater than (stored after) July 15, 2002. The results (which are the results that display on the search screen) are shown in the highlighted rows in Table D-7.

Table D-7: Table A1 Records with Short IDs Beginning With HA, a Description of Blue Trucking, and Stored After July 15, 2002

Short A/N ID	Description	Time	Date
HAC9803	Blue Trucking	12:00	2002-08-09
HAD1	Blue Trucking	12:00	2003-07-19
HAD3	Blue Trucking	12:00	2003-07-14

Appendix E

Connections

This appendix provides information about terminal connections and communications.

Continuous Mode Output

The continuous output mode of the IND310drive can be used to continuously send weight data and scale status information to a remote device such as a PC or a remote display. Continuous mode transmits a predetermined 18-byte string of data from the communications (Ethernet or serial) port five or more times a second (without any request). This mode is used typically when continuous monitoring of the scale weight is required by an external device. Typically, continuous output is used to drive a remote display, scoreboard, or PC interface.

Continuous mode can be assigned to COM1, COM2, Ethernet Channel 1 or Ethernet Channel 2. It can also be assigned to COM1 w/cksum (with checksum), COM2 w/cksum, Ethernet Channel 1 w/cksum, or Ethernet Channel 2 w/cksum. A data string will be output once each A/D cycle or approximately 10 times per second. The format is fixed, except for baud rate, parity, data flow (Xon, Xoff), and interface. The data consists of 16 or 18 bytes transmitted in a 10-bit ASCII frame consisting of:

- 1 start bit
- 7 data bits
- 1 even parity bit
- 1 stop bit

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 E-1 shows continuous format output.

Table E-1: Continuous Format Output

Character	1	Status			Indicated Weight					Tare Weight					17	18		
		2	3	4	5	6	7	8	9	10	11	12	13	14			15	16
Data	STX	SWA	SWB	SWC	MSD	-	-	-	-	LSD	MSD	-	-	-	-	LSD	CR	CHK
Note	A	B			C					D					E	F		

Continuous Format Notes

- A. ASCII Start of Text character (02 hex), always transmitted
- B. Status words. Refer to Tables E-2, E-3, and E-4 for details.

- C. Displayed weight. Either gross or net weight. Six digits, no decimal point or sign. Insignificant leading zeroes are replaced with spaces.
- D. Tare weight. Six digits of tare weight data. No decimal point in field.
- E. ASCII Carriage Return <CR> character (0D hex)
- F. 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.

Tables E-2, E-3, and E-4 detail the standard status bytes for standard continuous output.

Table E-2: Status Word A Bit Definitions

Bits 2, 1, and 0			
2	1	0	Decimal Point Location
0	0	1	XXXXX0
0	0	0	XXXX00
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 E-3: Status Word 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

Status Bits	Function
Bit 4	lb = 0, kg = 1 (see also Status Byte C, bits 0-2)
Bit 5	Always = 1
Bit 6	Zero Not Captured = 1

Table E-4: Status Word 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	troy ounces (ozt)
1	0	1	penny weight (dwt)
1	1	0	tons (ton)
1	1	1	custom units
Bit 3			Print Request = 1
Bit 4			Expand Data x 10 = 1
Bit 5			Always = 1
Bit 6			Always = 0

Multicontinuous 1 Mode Output

This continuous output is used with multi-scale scoreboards (except 8616). The string consists of separate messages for every enabled scale and the sum of the structure for each scale's message is shown in Table E-5.

Table E-5: Multicontinuous 1 Format Output

ADR	SWA	SWB	SWC	X	X	X	X	X	X	X	X	X	X	X	X	CR	CKS
1	2 STATUS BYTES		3 GROSS / NET WEIGHT						4 TARE WEIGHT				5	6			

■ Multicontinuous 1 Format Notes

1. ASCII Character in hex that represents the scale address 01=scale A, 02=scale B, 03=scale C, 04=scale D, 05=scale E (sum)

2. <SWA>, <SWB>, <SWC> Status Word Bytes A, B, and C. Refer to the Standard Bit Identification Tables for individual bit definition.
3. Displayed weight, either Gross or Net weight. 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.
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.

Multicontinuous 2 Mode Output

This continuous output is used with multi-scale remote displays and the 8618 scoreboard (set for protocol P:22). The string consists of separate messages for every enabled scale and the sum of the structure for each scale's message is shown in Table E-6.

Table E-6: Multicontinuous 2 Format Output

STX	SWA	SWB	SWC	X	X	X	X	X	X	X	X	X	X	X	X	CR	CKS
1	2 STATUS BYTES			3 GROSS / NET WEIGHT						4 TARE WEIGHT				5	6		

■ Multicontinuous 2 Format Notes

1. <STX> ASCII Start of Text Character, Hex 02.
2. <SWA>, <SWB>, <SWC> Status Word Bytes A, B, and C. Refer to the Bit Identification Tables for individual bit definition.
3. Displayed weight, either Gross or Net weight. 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.
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.

■ Note: The scale must be set up for sum and cannot have continuous output selected on any other port.

Template 1 Continuous

If continuous template is selected as the assignment for a connection, a custom string of data can be configured using one of the ten available templates. When a continuous template output is selected, the output rate will depend on the size of the template and the baud rate selected. The rate will vary from approximately once per second up to approximately 20 times per second. Refer to Table E-7 for estimated output rates of a 160 byte template.

Table E-7: Continuous Template Output Rate

Baud Rate	Outputs/Second	Baud Rate	Outputs/Second
300	1	9600	10
600	2	19200	12
1200	4	38400	14
2400	6	57600	16
4800	8	115200	18

The template can include any combination of elements. Note that the output rate may be adversely affected by transmitting a large template or selecting a slow baud rate.

The template is configured as explained above in the Demand Output Mode, Output Template section. The template used in continuous output must not exceed 200 characters.

CTPZ

The CTPZ data stream sends commands to the IND310drive to perform several basic functions when a control character is received. Remote ASCII control characters and the IND310drive terminal responses 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.

-  ASCII control characters can be sent in upper- or lower-case.

The ASCII control character pertains to the scale currently selected unless a scale designation character is included in the ASCII control command. The scale can be specified to receive the control character by preceding the command character(s) with the designation "A" for Scale 1 or "B" for Scale 2. If a scale designation

character (A or B) is used, it must be followed by the command character(s) within three seconds or the command will be discarded.

Examples:

To take a Pushbutton tare on Scale 1, regardless of which scale is selected, send the command AT. Alternately, the command BT takes a Pushbutton tare on Scale 2, regardless of the selected scale. A command of T will take a Pushbutton tare on the scale currently selected by the terminal.

It is possible to enter Keyboard Tare by preceding the "T" with a numeric value. For example, 1000T enters a tare value of 1,000 on the currently selected scale. For two scales, enter Keyboard Tare using the designation A or B before the tare value. AT2000 enters a tare value of 2,000 on Scale 1.

PT6S3 Protocol

PT6S3 protocol includes the commands of its predecessors, notably PT6S2, the most common, in order to maintain full compatibility of the functions. This protocol allows the replacement of an old model charge measurer in an existing installation. This installation interrogates uniquely with upper-case letters commands. New functions are obtained from commands with lower-case letters.

Overview

The "slave" charge measurer recognizes certain ASCII characters transmitted by the "master" terminal (computer or automaton). This protocol therefore contains all of the functions of PT6S2 necessary for a charge measurer with a single measuring channel. The functions related to the f commands issued by a master terminal are shown in Table E-7.

Table E-7: Functions Related to the f Commands Issued by a Master Terminal

P	Request for the value of the weight displayed on the indicator
M	Request for zeroing the weight indicator
T	Request for semi-automatic taring with weighing in net or return to gross weighing if the tare is already activated.
R	Request for gross weighing

The new commands specific to PT6S3 are shown in Table E-8:

Table E-8: New Commands Specific to PT6S3

p -	Request for a reading of the weight displayed on the main indicator of the charge measurer
m -	Request for zeroing the main indicator of the charge measurer

t -	Request for semi-automatic taring with weighing in net or return to gross weighing if the tare is already activated
n -	Request for net weighing
r -	Request for gross weighing
g -	Reading of the metrological parameters
z -	Reading of the minimum weighing capacity
w -	Reading of the maximum weighing capacity
q -	Request for simultaneous reading of the displayed weight and of the ticket number (5 digits) for charge measurer with a printer (with DTR management)

Principle of Operation

The character frame, represented below, can be programmed. This permits obtaining either a "simple format" identical to the format used in PT6S2, or a more flexible "extended format".

P1	Body of the response	P2	CKS	P3
----	----------------------	----	-----	----

P1, P2, P3: Characters which can be programmed, chosen between 000 and 255 (decimal). By default, the following characters are installed when the device is powered on.

P1 = CR (013)

P2 = 000

P3 = 000

Zero values are not transmitted; therefore, in this case the format is similar to the PT6S2 format.

Characteristics of the Simple Format (PT6S2 Style)

The frame is represented in Figure E-1.

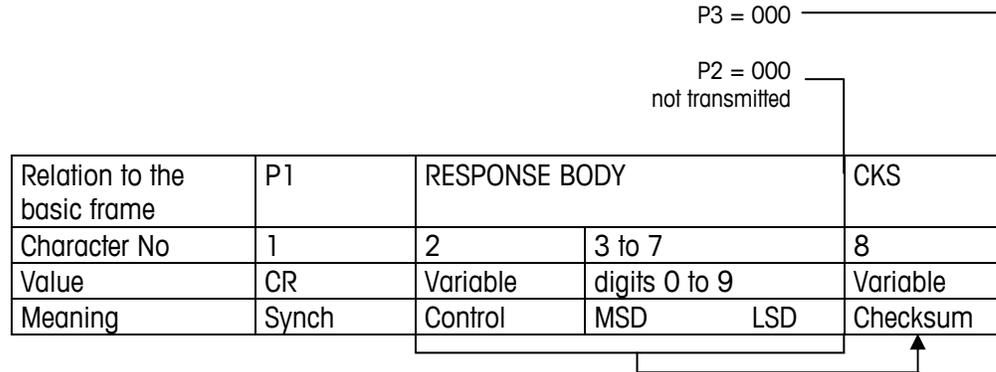


Figure E-1: Character Frame

The checksum is obtained by binary addition without carryover of Characters No 2 to 7.

The control character (No 2) can contain the information shown in Table E-9.

Table E-9: Control Character (No 2) Information

I	Value of the weight stable
SPC (space)	Value of the weight, not stable
D	Indication of under tare (minimum extinction)
S	indication of overload (maximum extinction)
*	Request from the master has been executed
#	Request from the master cannot be executed. Characters No 3 to 7 contain the gross weight, stable or not

Response to a Command Using an Upper-Case Letter

Table E-10 shows the P, M, T, R commands defined previously. The body of the response made up of the 5 characters No 3 to 7 is shown, with character 7 giving the least significant digit.

Table E-10: P, M, T, R Commands

P	5 digits of the weight of the indicator (GROSS or NET)
M	5 digits at 0 if the setting to 0 was executed. 5 digits of the weight if the command was not executed.
T	5 digits of the weight displayed after the request (0 or gross weight).
R	5 digits of the GROSS weight.

- Functions M and T can be executed only if immobility is effective at the time of the request. If not, an answer with a "#" control character is made.

Response to a Command Using a Lower-Case Letter

Some of the commands using lower-case letters, such as p, m, t, r, are identical to those made in upper-case letters. When using a lower-case letter the:

- Response is obtained in the same format.
- Control character takes one of the information items defined for PT6S3.
- The checksum is different because it is calculated by taking into account character No 1 (013).

Characteristics of the Extended Format

Response Frame

The various commands supported are defined previously. Two types of responses are given, depending on their size.

Commands p, m, t, r, g, z, w give responses with the same size (six-character response body). In this case, the frame layout is as shown in Figure E-2.

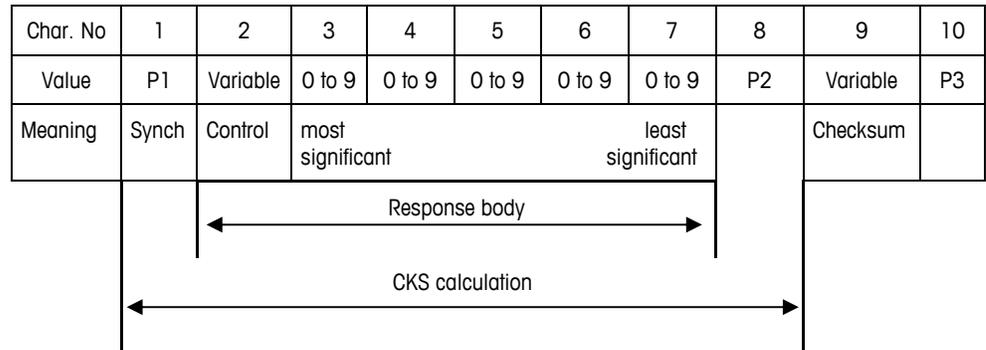


Figure E-2: Frame Layout

The "q" command generates a response with a bigger size.

The response body is increased by five digits for the ticket number, and a separating space.

The frame is composed as shown in Figure E-3.

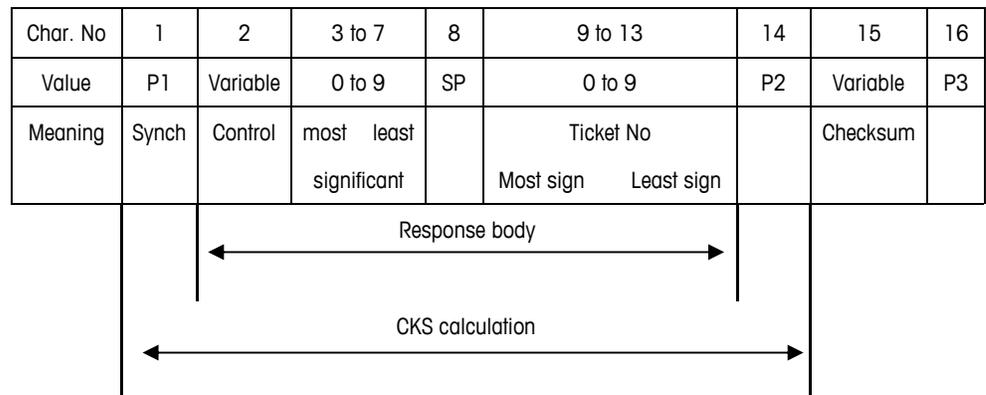


Figure E-3: Frame Composition

Calculation of the Checksum Character (CK-S)

To calculate the checksum character, the following operations are performed successively:

1. Binary sum, without carryover, of all the characters composing P1 + Response body + P2.

2. Comparison of this result to 20 (hex) by applying a 7f mask.
3. If the result is lower than 20 (hex), 20 (hex) is added to it.

This last result is the checksum It is therefore always comprised between 20 (hex) and 7f (hex) (Printable character).

Indication of Control Character

Indication of the control character and specific contents of the response body for each of the "lower-case" commands is as follows:

p – Request for reading the weight displayed on the main indicator

Response—Character No 3 to 7—five digits of the displayed weight (gross or net)

Character No 2 (Control)

"1"	if gross positive immobile
"l"	if gross negative immobile
" "	if gross positive not immobile
"_"	if gross negative not immobile
"N"	if net positive immobile
"n"	if net negative immobile
"B"	if net positive not immobile
"b"	if net negative not immobile
"D"	if indicator in under tare
"S"	if indicator in overload
"Z"	if indicator on metrological zero, unstable
"z"	if indicator on metrological zero, stable

m – Request for zeroing the indication of the charge measurer

Condition: Weight stable and comprised in a range of $\pm 2\%$ of the weighing capacity around the initial zero.

Response—Characters No 3 to 7—All at 0, if the command is executed. The gross or net displayed weight in the measuring range, if the command is not executed.

Character No 2 (Control)

"m"	if command executed
"#"	if command not executed (instability, out of range, ...)

t – Request for semi-automatic taring with weighing in net, or return to weighing in gross if the tare is already activated

Condition: Weight stable

Response—The control character contains:

"t" if the request was executed. (Characters No 3 to 7 represent the weight displayed after the request: 0 or gross weight)

"#" if taring cannot be executed. (Characters No 3 to 7 represent the gross weight, within the measuring range).

n – Request of passage into net mode (taring) with single effect

Condition: Stable weight

Response—The control character contains:

"n" if the response was executed. Characters no 3 to 7 are at 0.

"#" if not executed. Characters No 3 to 7 represent the unsigned gross or net weight in the measuring range.

- For functions "m", "t", and "n" to be executed, immobility must be effective at the time of the request. If immobility is not set, the slave answers #.

r – Request for gross-mode weighing

Response—The control character contains:

"t" if the request is executed. (Characters No 3 to 7 contain the gross weight).

"#" if the request cannot be executed. (The contents of characters No 3 to 7 is not significant.)

- Commands "n" and "r" are complementary. With command "t", they permit all the possibilities of semi-automatic taring and of return to gross weigh mode.

g – Reading of metrological parameters

Response

Character No	2	3	4	5	6	7
Symbol	C.C.	Spc	V	U	P	Z

C.C.: Control character with the value:

"g" if request is accepted

"#" if request cannot be executed

spc: defines a space (ASCII code 20H)

V: Number of digits before the decimal point (including non significant zero)

U: Weight measurement unit, with the values:

"t" for ton

“k” for kilogram

P: Weight unit step, value 1, 2 or 5

Z: Number of fixed zeros, with value 0 or 1.

z – Reading of minimum weighing capacity

Response—The control character contains:

“z” if the reading was made. (Characters No 3 to 7 represent the minimum weighing capacity)

“#” if the reading is impossible (Characters No 3 to 7 are not significant)

w – Reading of maximum weighing capacity

Response—The control character contains:

“w” if the request is executed. (Characters no 3 to 7 return the value of the weighing capacity recorded in the memories of the measurer).

“#” if the reading cannot be executed. (In this case characters no 3 to 7 are not significant).

- ◀ All lower-case commands above are common to the measurers of the series TX30.....TX40. The “q” command described hereafter does not apply to the TX30 measurer, only to those that have several simultaneous links.

q – Request for simultaneous reading of the displayed weight and of the five-digit ticket (use with a printer and DTR management)

Master's command: q

The response body was described in Characteristics of the Extended Format, the Response Frame section.

Necessary condition: Weight stable within the measuring range.

The control character (No 2) takes the following forms:

- All of the forms obtained in response to command “p” (see p – Request for reading the weight displayed on the main indicator) if the request is executed.
- “!” in case of printer fault

In this latter case, the value returned for the weight is null. The ticket number is not incremented (it keeps the last value taken).

- ◀ The ticket number increments by one unit at each valid response of the “q” function. The ticket number is never reset to zero.

Response to a Command Using an Upper-Case Letter

In this case the response is forced into the PT6S2 simplified format and the

- Frame is given with P1 = CR (013), P2 and P3 are forced to 0
- Control character also takes simplified forms
- Checksum also is simple

Response to an Unknown Command

Case Where P1 = CR, P2 = P3 = 0

PT6S2-style protocol (simple)

The response will be made in the PT6S2 format as follows, irrespective of the (lower- or upper-) case of the unknown command letter.

Character No	1	2	3	4	5	6	7	8
	CR 013	?	0	0	0	0	0	<

CKS

Case Where P1 ≠ CR, P2 ≠ 0, P3 ≠ 0

PT6S3 style protocol (extended)

The response will be made in the PT6S3 format as follows, irrespective of the (upper- or lower-) case of the unknown command letter.

Character No	1	2	3	4	5	6	7	8	9	10
Value	P1	?	0	0	0	0	0	P2	CKS	P3

Response to an Invalid Command

A response is sent for each request. If the response is not valid, another request must be made. This protocol avoids blocking the data processing system dialog.

Appendix F

Softkey and Application Key Mapping

This appendix provides information about softkey and application key mapping, which includes defining softkey and application key functions and positions.

Introduction

Softkeys provide quick access to setup pages or application functions, and are located at the bottom of weight display screens. Up to ten softkeys can be defined. A maximum of five softkeys display at one time on any given screen.

Follow the softkey configuration steps provided in this section to configure the IND310drive softkeys to display in the most convenient manner.

Softkey Setup and Navigation

See [Chapter 2.0, Operation, Table 2-1](#) for a complete list of graphic images and icons, including icons used for softkeys.

Two softkeys, RECALL  and SETUP , are always located together in pre-defined positions. Figure F-1 shows a weight display screen with four softkeys.

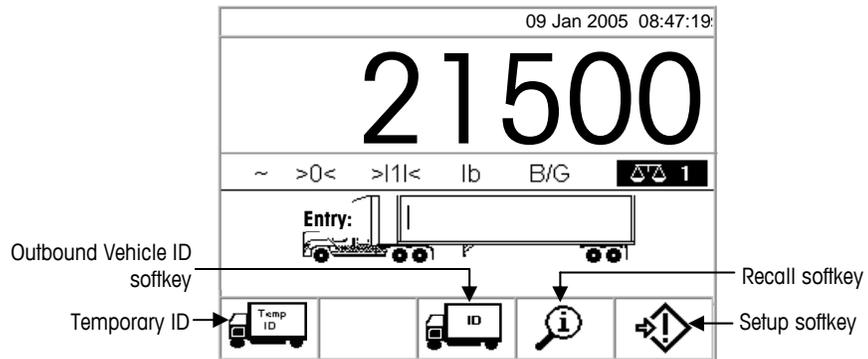


Figure F-1: Weight Display Screen with Four Softkeys

When more than five soffkeys are defined, a down arrow icon ▼ displays to the right of the soffkeys. Press the DOWN navigational arrow key on the keypad (or on an external keyboard if available) to advance to the second screen of soffkeys. Three screens of soffkeys may be available, depending on how soffkey positions are defined. Press the DOWN arrow key again to scroll to a third screen of soffkeys if available. On the last available screen of soffkeys, an up arrow icon ▲ displays to the right of the soffkeys. Press the UP navigational arrow key to return to the first screen of soffkeys.

Figure F-2 shows an example where five soffkeys are configured. The rest of the available soffkeys will then show up on the next screen when the up arrow button is pressed.

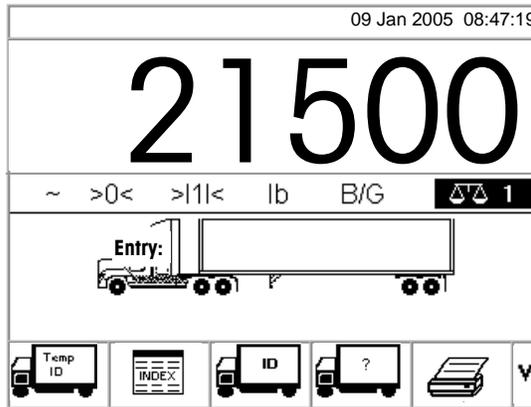


Figure F-2: Example of the First Soffkey Screen (Total of Ten Soffkeys Available)

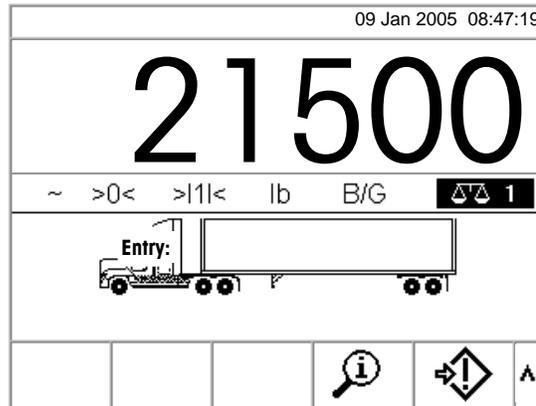


Figure F-3: Example of a 2nd Soffkey Screen

Softkey Configuration

See Chapter 3.0, Configuration, Entering Setup Mode for further information about navigating in the setup menu tree and setup screens.

Add or rearrange the display of softkeys on the main weighing screen by configuring parameters on the softkeys setup screen, which is located under terminal in the setup menu tree. When the softkeys setup screen opens, focus is on the softkey position numbers located above the icons (see Figure F-4).

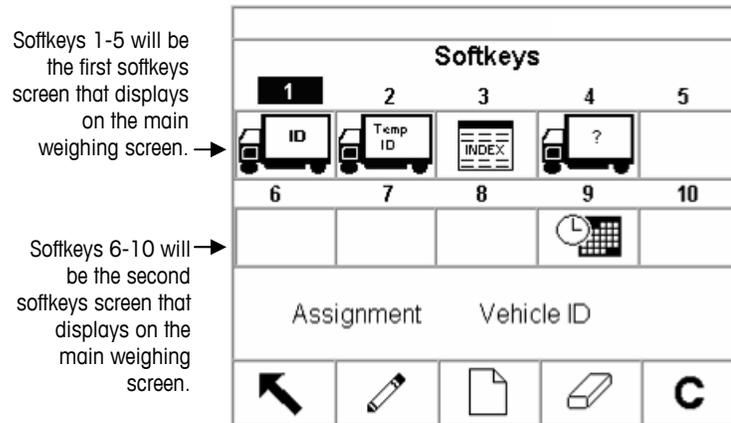


Figure F-3: Softkeys Setup Screen

The softkey assignment value at the bottom of the screen changes according to the softkey assignment associated with the position number currently in focus. For example, in Figure F-4 focus is on position number one, which is assigned the Vehicle ID (Inbound/Outbound) softkey. Press the RIGHT arrow key to move focus to softkey position two. The assignment value changes to Temporary ID. Softkey positions that show no icon have an assignment value of None.

The RECALL  and SETUP  softkeys are automatically placed in the softkey setup. The default setting for the placement of these softkeys is in position numbers four and five. If a different softkey is placed in position four or five, the RECALL and SETUP softkeys automatically shift to positions nine and ten. If a different softkey is placed in position nine or ten, the RECALL and SETUP softkeys automatically shift to positions fourteen and fifteen.

Use the arrow navigational keys to scroll to a softkey position number to edit, insert, or delete a softkey.

Editing Softkeys

To edit softkeys:

1. Use the arrow navigational keys to move the focus to the position number of the softkey to be edited.
2. Press the EDIT softkey.  The Softkeys/Edit screen (Figure F-5) displays. The softkey selected for editing is shown on the screen along with the current assignment and the icon associated with that assignment.

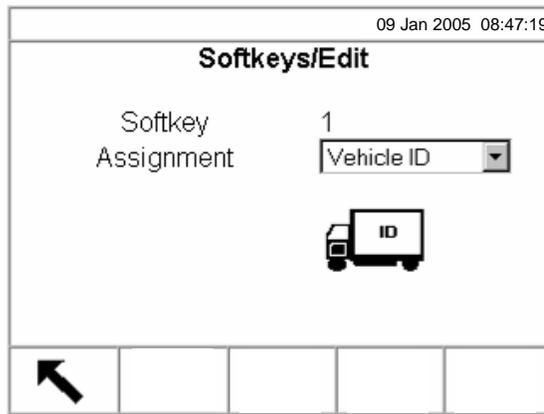


Figure F-4: Softkeys/Edit Setup Screen

3. Press the ENTER key to select the assignment drop-down menu.
 4. Use the UP or DOWN arrow keys to scroll through the menu until focus is on the desired assignment.
 5. Press the ENTER key to select the assignment. The icon changes to show the icon associated with the new assignment. If None is selected for the assignment, no icon displays and the softkey assignment is reserved as a blank space.
 6. Press the EXIT softkey to return to the Softkeys setup screen.
- There is no limit on the number of positions that can have the same softkey assignment. For example, the CONTRAST softkey will display on each softkey screen if it is assigned in a 1-5 (first screen) position and a 6-10 (second screen) position.

Inserting Softkeys

To insert softkeys:

1. Use the arrow navigational keys to move the focus to the position number of the softkey to be inserted.
2. Press the NEW/INSERT softkey.  The Softkeys/Insert screen displays. The softkey position selected is shown on the screen along with the current assignment and the icon associated with that assignment, or None if the position has no softkey currently assigned.
3. Follow steps 3–6 under Editing Softkeys. The new softkey will display on the Softkey setup screen in the position where it was inserted. All other softkeys located after that position increase position number by one. For example, if a softkey is inserted at position number one, then the softkey that previously held position one will move to position two, the softkey at position two will move to position three, and so on. If a softkey is at position ten, it will be lost (except for the RECALL or SETUP softkeys, which automatically shift to positions fourteen and fifteen).

Deleting Softkeys

To delete softkeys:

1. Use the arrow navigational keys to move the focus to the position number of the softkey to be deleted.
2. Press the DELETE softkey.  The softkey is removed from the Softkey setup screen. All other softkeys located after that position decrease position number by one. For example, if a softkey is deleted at position number one, then the softkey that previously held position two will move to position one, the softkey at position three will move to position two, and so on.

Clearing All Softkeys

To clear all softkey assignments, press the CLEAR softkey.  A screen displays that asks for verification to clear all softkeys. Press the OK softkey

 to continue or press the EXIT softkey  to return to the Softkeys setup screen.

Application Key Configuration

Application (A1, A2, A3, A4) keys can be assigned to perform specific functions (see the assignment drop-down menu shown in Figure F-6 for functions that can be assigned) during weighing operations. Configure application key function assignments on the application keys setup screen (Figure F-6), which is located under terminal in the setup menu tree.

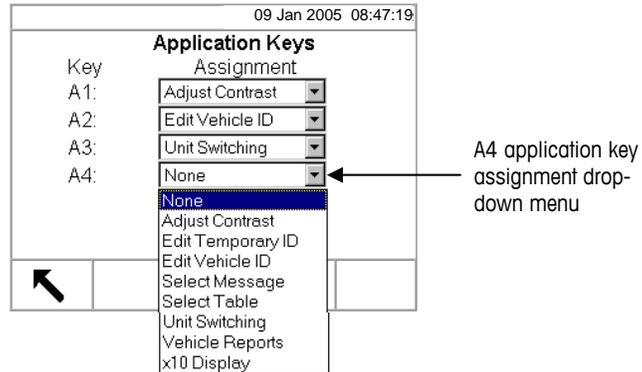


Figure F-5: Application Keys Setup Screen

1. Use the DOWN arrow key to move the focus to the desired application key.
2. Press the ENTER key to select the assignment drop-down menu.
3. Use the UP or DOWN arrow keys to scroll through the menu until focus is on the desired assignment.
4. Press the ENTER key to select the assignment. If None is selected for the assignment, no function will occur when the application key is pressed.
5. Press the EXIT softkey to return to the setup menu tree.

Appendix G

Geo Codes

See Chapter 3.0, Configuration, Configuration Options, Scale Calibration for more information about the Scale Calibration setup screen.

Change the geo adjustment value after a major change of geographical location according to Table G-1 on the following pages. The scale must be readjusted accordingly when the geo adjustment value changes.

Set the geo adjustment value by entering the associated geo code on the Scale Calibration setup screen.

Table G-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

Table G-1: Geo Adjustment Values (continued)

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	
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
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	19	18

Table G-1: Geo Adjustment Values (continued)

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	
58° 17'–59° 32'	24	23	23	22	22	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

Appendix H

Glossary

Additive tare	A tare value that is added to an existing tare weight value to establish a new tare weight value. If additive tare is enabled, the user can add a tare weight value using the numeric keypad while the terminal is in the net weight mode. The tare value entered is added to the existing tare weight value. Tare interlocks inhibit this mode.
Alibi memory	Stores basic transaction information that is not user-definable.
Alpha keys	The softkeys and application keys function as alpha keys on some setup and operational screens for entering alphabetic characters.
Application keys	“A” keys (A1–A4) located beneath the softkeys that can be assigned specific functions for different operations depending on configuration.
Auto clear	Enables the terminal to clear tare automatically when the scale returns to the center of zero.
Auto Zero Maintenance (AZM)	AZM is a way for the terminal to gradually rezero itself in order to compensate for small changes in zero. Class III legal-for-trade vehicle scales use an AZM range of ± 3 displayed increments above/below gross zero. AZM is active any time the weight on the scale is stable and is within the AZM range.
Auto tare	An auto tare is taken by pressing the TARE key when an empty vehicle is on the scale. The terminal then displays a zero weight in net mode. The vehicle is loaded and driven back onto the scale. The terminal then displays the net weight of the contents. If the TARE key is pressed while the terminal is in the net mode, the current weight on the scale becomes the new tare value. Tare interlocks inhibit replacement auto tare.
Capacity	Maximum amount of weight that can be placed on a scale
Focus	Items on a screen that display in reverse video or highlighted text indicate where the current focus is located. For example, a field label on a setup screen that displays focus appears as follows: Motion Check

Geo code	A code associated with a geo adjustment value, which is used for scale calibration.
Highlighted text	Items on a screen that display in reverse video to indicate where the current focus is located. For example, a field label on a setup screen that displays (highlighted text) appears as follows: Motion Check
Increment	The value of the finest division of a scale
Index weighing	In index weighing mode, an index file enables a relational ID to be used to select the values for the enabled table information, including vehicle ID.
Keyboard tare	When keyboard tare is enabled, the known value for the empty weight of a vehicle (tare) can be entered manually. Use the numeric keypad to enter the known tare weight. The terminal will then display the net weight of the contents of the vehicle.
Manually-Entered tare weights	Manually-entered tare weights can be used for Temporary ID weighing transactions if enabled in the scale tare setup. Manually-entered tare weights are entered before the Temporary ID softkey is pressed.
Mode (of operation)	A sequence of operational functions or processes that defines a complete procedure; a mode can consist of several processes.
Navigation keys	Keys located below the numeric keypad that include arrow keys for navigating in operation and setup screens, and an ENTER key for accepting data entries.
Net sign correction	Net sign correction enables the IND310drive terminal to be used for both shipping (inbound empty) and receiving (inbound loaded) operations. If net sign correction is enabled, the terminal will swap the gross and tare weight fields on the printed ticket, if necessary, so that the larger weight is the gross weight, the smaller weight is the tare weight, and the difference is always a positive net weight.
Numeric keys	Keys located near the upper-right corner of the terminal face in a 12-key numeric keypad for entering numerical data.
OIML	International Organization of Legal Metrology
One-pass weighing	One-pass weighing is a mode where the user has a fleet of vehicles with known empty (tare) weight. The tare weight is recalled by ID with the loaded vehicle on the scale.

Process	A series of actions or steps; a process is part of a mode of operation.
Pushbutton tare	When pushbutton tare is enabled, the user can press the TARE scale function key when an empty vehicle is on the scale to determine tare. The terminal displays a zero weight and net mode. When the vehicle is loaded and driven back onto the scale, the terminal displays the net weight of the contents. If the TARE key is pressed while the terminal is in the net mode, the current weight on the scale becomes the new tare value.
Pushbutton Zero	Pushbutton Zero is a way for the operator to capture a new gross zero reference point. The weight on the scale must be stable and be within the pushbutton zero capture range, typically $\pm 20\%$ of full scale capacity. The zero of the scale can change because material builds up on the scale or because the temperature changes.
Scale function keys	Keys located along the right side of the display screen that perform specific actions including: <ul style="list-style-type: none"> • Select scale • Zero • Tare • Print
Setpoints	Setpoints are on/off outputs that indicate whether the weight displayed on the scale is greater than or less than a preprogrammed weight value. Setpoints are typically used in material filling applications in order to fill a vehicle to a preset weight.
Softkeys	Keys located at the bottom of the display screen that can change position and/or function depending on operation setup and configuration.
Tare	Tare is the empty weight of a vehicle. Tare is normally used to determine the net weight of the contents of a vehicle. Also see auto tare, pushbutton tare, keyboard tare, additive tare, tare interlock, and net sign correction.
Tare interlocks	A set of restrictions on how tare can be used that are required by some local weights and measures regulations. If tare interlocks are enabled, the terminal must be at gross zero to clear a tare weight or to enter a keyboard tare. Tare interlocks also prevent the terminal from replacing an existing tare with a new auto tare.

Temporary ID weighing	The weighing mode that involves the use of the Temporary ID Table to record tare weights for inbound transactions and to recall these weights on outbound transactions. Manually-entered tare weights can also be used for Temporary ID Weighing.
Transaction table	A user-configurable table that is linked to the alibi table (see alibi memory) by the transaction counter value. The transaction table consists of up to ten extra data fields that can be selected for use.
Transient vehicle weighing	The weighing mode used when vehicle information should not be stored in memory or included in table totals.
Vehicle ID weighing	The weighing mode that involves the use of the Vehicle ID Table, where vehicle IDs, descriptions, and permanent stored tares are entered prior to operation. This information is recalled during Vehicle ID weighing transactions. Totals for vehicle weights are also maintained in the Vehicle ID Table (if enabled in setup).
Zero	Zero is the empty weight of the scale platform or weighbridge. The gross zero reference is recorded during calibration. Also see Pushbutton Zero and AZM.



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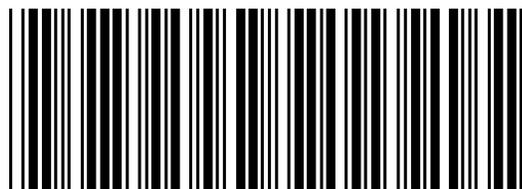
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