METTLER TOLEDO

IND560

Terminal

User's Guide

FCC Notice

This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

RoHS Compliance Statement.

- The majority of our products fall within categories 8 and 9. Those categories currently do not fall within the scope of the Directive 2002/95/EG (RoHS) of January 27, 2003. If our products are intended for use in other products which themselves fall within the scope of the RoHS Directive, compliance requirements have to be separately negotiated contractually.

- Those products which fall within categories 1-7 and 10 will be in compliance with the EU RoHS Directive from no later than July 1, 2006.

- If it is not possible for technical reasons to replace any non-RoHS-compliant substances in any of the above products as required, we plan to inform our customers in a timely manner

Statement regarding harmful substances.

- We do not make direct use of harmful materials such as asbestos, radioactive substances or arsenic compounds. However, we purchase components from third party suppliers, which may contain some of these substances in very small quantities.

METTLER TOLEDO

CUSTOMER FEEDBACK

Your feedback is important to us! If you have a problem with this product or its documentation, or a suggestion on how we can serve you better, please fill out and send this form to us. Or, send your feedback via email to: quality_feedback.mtwt@mt.com. If you are in the United States, you can mail this postpaid form to the address on the reverse side or fax it to (614) 438-4355. If you are outside the United States, please apply the appropriate amount of postage before mailing.

Your Name:		Date:
Organization Name:		METTLER TOLEDO Order Number:
Address:		Part / Product Name:
		Part / Model Number:
		Serial Number:
		Company Name for Installation:
Phone Number: ( )	Fax Number: ( )	Contact Name:
E-mail Address:		Phone Number:

	Please check the appropriate box to indicate how well this product met your expectations in its intended use?
	Met and exceeded my needs
	Met all needs
	Met most needs
	Met some needs
	Did not meet my needs

Comments/Questions:

DO NOT WRITE IN SPACE BELOW; FOR METTLER TOLEDO USE ONLY

☐ Retail	☐ Light Industrial	☐ Heavy Industrial	☐ Custom

RESPONSE: Include Root Cause Analysis and Corrective Action Taken.

FOLD THIS FLAP FIRST

BUSINESS REPLY MAIL
FIRST CLASS   PERMIT NO. 414   COLUMBUS, OH
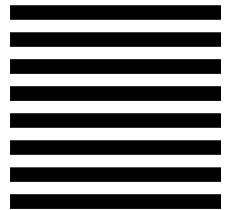
POSTAGE WILL BE PAID BY ADDRESSEE

Mettler-Toledo, Inc.
Quality Manager - MTWT
P.O. Box 1705
Columbus, OH 43216
USA

Please seal with tape

- READ this manual BEFORE operating or servicing this equipment and FOLLOW these instructions carefully.

- SAVE this manual for future reference.

	⚠ **WARNING!**
	FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.

	⚠ **WARNING!**
	IN ORDER TO INSTALL THE DIVISION 2 APPROVED IND560 PANEL-MOUNT OR HARSH TERMINAL UTILIZING THE U.S. APPROVAL, METTLER TOLEDO CONTROL DRAWING 72186884R MUST BE FOLLOWED WITHOUT EXCEPTION. IN ORDER TO INSTALL THE CATEGORY 3 IND560 PANEL-MOUNT OR HARSH TERMINAL UTILIZING THE EUROPEAN APPROVAL, THE DEMKO APPROVAL CERTIFICATE 06ATEX0514991X AND ALL LOCAL REGULATIONS MUST BE FOLLOWED WITHOUT EXCEPTION. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE. REFER TO THE IND560 DIVISION 2 AND ZONE 2/22 INSTALLATION GUIDE 64060405 FOR ADITIONAL INFORMATION.

	⚠ **WARNING!**
	EARLIER MODELS OF THE IND560 TERMINAL THAT ARE NOT MAKRED (FACTORY LABELED) AS DIVISION 2 OR EUROPEAN CATEGORY 3 APPROVED MUST NOT BE INSTALLED IN A DIVISION 2 OR 2/22 ENVIRONMENT.

	⚠ **WARNING!**
	IF THE KEYBOARD, DISPLAY LENS OR ENCLOSURE IS DAMAGED ON A DIVISION 2 APPROVED OR CATEGORY 3 MARKED IND560 PANEL-MOUNT OR HARSH TERMINAL THAT IS USED IN A DIVISION 2 OR ZONE 2/22 AREA, THE DEFECTIVE COMPONENT MUST BE REPAIRED IMMEDIATELY. REMOVE AC POWER IMMEDIATELY AND DO NOT REAPPLY AC POWER UNTIL THE DISPLAY LENS, KEYBOARD OR ENCLOSURE HAS BEEN REPAIRED OR REPLACED BY QUALIFIED SERVICE PERSONNEL. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

⚠ **WARNING!**
TO AVOID DAMAGE TO THE PCB OR LOAD CELL, REMOVE POWER FROM THE IND560 TERMINAL AND WAIT AT LEAST 30 SECONDS BEFORE CONNECTING OR DISCONNECTING ANY HARNESS.

⚡ CAUTION

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT AND/OR BODILY HARM.

⚠ CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

⚡ WARNING!

THE IND560 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.
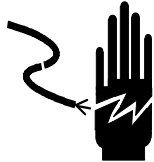
⚡ WARNING!

WHEN THIS EQUIPMENT IS INCLUDED AS A COMPONENT PART OF A SYSTEM, THE RESULTING DESIGN MUST BE REVIEWED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL COMPONENTS IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

IND560
Terminal

ServiceXXL

Tailored Services

Essential Services for Dependable Performance of Your IND9R86 Controller

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use of your new equipment according to this Manual and regular calibration and maintenance by our factory-trained service team ensures dependable and accurate operation, protecting your investment. Contact us about a ServiceXXL agreement tailored to your needs and budget. Further information is available at www.mt.com/serviceXXL.

There are several important ways to ensure you maximize the performance of your investment:

1. **Register your product:** We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.

2. **Contact METTLER TOLEDO for service:** The value of a measurement is proportional to its accuracy – an out of specification scale can diminish quality, reduce profits and increase liability. Timely service from METTLER TOLEDO will ensure accuracy and optimize uptime and equipment life.

   a. **Installation, Configuration, Integration and Training:** Our service representatives are factory-trained, weighing equipment experts. We make certain that your weighing equipment is ready for production in a cost effective and timely fashion and that personnel are trained for success.

   b. **Initial Calibration Documentation:** The installation environment and application requirements are unique for every industrial scale so performance must be tested and certified. Our calibration services and certificates document accuracy to ensure production quality and provide a quality system record of performance.

   c. **Periodic Calibration Maintenance:** A Calibration Service Agreement provides on-going confidence in your weighing process and documentation of compliance with requirements. We offer a variety of service plans that are scheduled to meet your needs and designed to fit your budget.

Contents

Chapter 1.0

Introduction

DIV 2 AND ZONE 2/22 INSTALLATION

IF YOU WISH TO INSTALL THE IND560 IN A DIVISION 2 OR ZONE 2/22 AREA, REFER TO THE DIVISION 2 AND ZONE 2/22 INSTALLATION INSTRUCTIONS INCLUDED ON THE RESOURCE CD PROVIDED WITH THE TERMINAL. FAILURE TO COMPLY WITH THE INSTRUCTIONS PROVIDED THERE COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

This chapter covers

- Safe Disposal Requirement
- Operating Overview
- Installation and Programming

The IND560 represents the latest in METTLER TOLEDO technology and is the most versatile weighing terminal available today. Choose from conventional strain gauge or high-precision electromagnetic force restoration weighing technologies. Specify direct PLC or PC communication interfaces or digital I/O control. Combine these selections with the option of panel or desk/wall/column-mounting, and the IND560 is the perfect match for nearly any weighing application in many industries, including:

- Basic Weighing
- In-Motion Weighing
- General Process Weighing
- Formulation
- Filling and Blending
- Over/Under Checkweighing

Enhance measurement or control applications with an ultra-fast A/D conversion rate of 366 Hz, patented TraxDSP™ digital filtering technology, and an I/O bus update rate of 50 Hz. The IND560 delivers precision measurement data from milligrams to tons in a single cost effective package that easily integrates into existing systems.

The versatile IND560 excels in controlling filling and dosing applications delivering best-in-class performance for fast, precise, accurate results in manual, semi-automatic, or fully automatic operations.

The IND560 promotes more cost-effective solutions too. Control up to 18 digital outputs through the IND560 without the use of a PLC. Target outputs are also latched, eliminating the need for external logic devices.

For more advanced filling, the Fill-560 Application Software adds additional sequences and component inputs. Without complex and costly programming, quickly configure standard filling sequences or create custom filling and blending applications for up to four components that cue operators for action and reduce errors.

Whether communicating weight data to a process PLC or providing an easier way to do terminal configuration via the InSite™ PC Tool, the IND560 offers multiple connectivity options to improve applications.

Direct PLC connectivity is available using 4-20mA Analog Output, Allen-Bradley RIO®, PROFIBUS DP®, DeviceNet™, EtherNet/IP or Modbus TCP protocols. Interfaces are also available for serial data via RS-232/422/485 and Ethernet TCP/IP networking.

IND560 Overview

The IND560 terminal is available in the following versions:

- Harsh enclosure with analog load cell connection
- Harsh enclosure with high-precision (IDNet) base connection
- Panel-mount enclosure with analog load cell connection
- Panel-mount enclosure with high-precision (IDNet) base connection

Standard IND560 Features

- Basic weighing terminal used in safe areas
- Panel-mount or harsh desk/wall-mount enclosures
- Connect one analog load cell scale base (or up to eight 350 ohm load cells) or an IDNet base depending upon the version of the IND560
- Operation as a Remote Display for another terminal
- 128×64 dot-matrix graphic vacuum fluorescent display (VFD) with 21mm-high weight display
- Real-time clock (battery backup)
- One serial port for asynchronous, bidirectional communication and print output
- 85–264 VAC power input range
- Support for the following option boards:
  - Analog Output interface
  - Ethernet TCP/IP with dual serial ports
  - Allen Bradley RIO® interface
  - DeviceNet™ interface
  - PROFIBUS® DP interface
  - EtherNet/IP interface
  - Modbus TCP interface
  - Relay Based Discrete I/O interface
- Basic weighing functions including zero, tare, and printing
- Selectable over/under classifying mode of operation with graphics
- Selectable material transfer mode for simple filling or dosing
- ID mode for prompted transaction sequencing

- Comparators, simple coincidence setpoints for comparison of weight or Rate with absolute target values or ranges

- SmartTrac™ graphical display

- Two memory tables—25 Tare records and 25 Target records

- Unit switching between three different units including custom units

- Alibi memory storage for up to 60,000 records

- Grand total and subtotal registers for accumulating weight

- Five customizable print templates and report printing

- TraxDSP™ digital filtering for analog load cells

- TraxEMT™ performance monitoring and recording

- CalFREE™ calibration without test weights

- Support of the following Application Software Modules:

    - Fill-560   - Drive-560

    - COM-560   - Dyn-560

- Support for TaskExpert™ custom application development software

IND560 Terminal Versions

The IND560 terminal is available in the following versions:

- Harsh enclosure with analog load cell connection

- Harsh enclosure with high-precision (IDNet) base connection

- Panel-mount enclosure with analog load cell connection

- Panel-mount enclosure with high-precision (IDNet) base connection

Specifications

The IND560 terminal conforms to the specifications listed in Table 1-1.

Table 1-1: IND560 Specifications

IND560 Specifications	
Enclosure Type	Panel-mount stainless steel front panel with an aluminum frame
	Harsh environment desk/wall/column-mount type 304L stainless steel enclosure
Dimensions (l × w × d)	Panel Mount: 265 mm × 160 mm × 92 mm (10.4 in. × 6.3 in. × 3.6 in.)
	Harsh Environment: 265 mm × 160 mm × 170 mm (10.4 in. × 6.3 in. × 6.7 in.)
Shipping Weight	3.5 kg (8 lb)
Environmental Protection	Panel-mount front panel sealing is UL-approved, and provides type 4x and type 12 protection – comparable to IP65 rating
	Harsh Environment is UL-approved, and meets IP69K requirements
Operating Environment	The terminal (both enclosure types) can be operated at temperatures ranging from −10° to 40° C (14° to 104° F) at 10% to 95% relative humidity non-condensing.
Hazardous Areas	Not all versions of the IND560 can 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.
Power	Operates at 85–264 VAC, 49–61 Hz, 750 mA (both enclosure types).
	Panel-mount version provides a terminal strip for AC power connections.
	Harsh environment version includes a power cord configured for the country of use.
	Note: When an IND560 is installed in an area classified as Division 2 or Zone 2/22, special AC wiring requirements must be met. See document 64060405, **IND560 Division 2, Zone 2/22 Installation Guide**.
Power Consumption	Refer to Table 1-2.

IND560 Specifications	
Display	128 × 64 dot-matrix graphic VFD display, 21 mm Display Update Rate: 10/second
Weight Display	Displayed resolution of 100,000 counts for analog load cell scales Display resolution for high-precision IDNet bases is determined by the specific base used
Scale Types	Analog load cells or IDNet, High-Precision K Line (T-Brick type standard)
Number of Cells	Eight 350-ohm load cells (2 or 3 mv/V)
Number of Scales	Interface for one analog or one IDNet scale
Analog/Digital Update Rates	Internal: Analog: >366 Hz; IDNet: determined by base; Target Comparison: 50 Hz; PLC Interface: 20 Hz
Load Cell Excitation Voltage	10 VDC
Minimum Sensitivity	0.1 microvolts
Keypad	25 keys; 1.22-mm thick polyester overlay (PET) with polycarbonate display lens
Communications	**Serial Interfaces** Standard: One serial port (COM1) RS-232/RS-422/RS-485, 300 to 115,200 baud Optional Ethernet/Serial Ports: Ethernet 10 Base-T with two additional serial ports (COM2 and COM3) **Protocol** Serial Inputs: ASCII characters, ASCII commands for CTPZ (Clear, Tare, Print, Zero), SICS (most level 0 and level 1 commands) Serial Outputs: Continuous or Demand with up to five configurable print templates or SICS host protocol, report printing, interfaces with external ARM100 Remote Input/Output modules and DeviceNet Bridge. Optional COM-560 Application Software available for legacy serial protocols.

IND560 Specifications	
Approvals	**Weights and Measures**
	USA: NTEP Class II 100,000d; Class III/IIIL 10,000d; CoC #05-057A2
	Canada: Class II 100,000d; Class III 10,000d; Class IIIHD, 20,000d; AM-5593
	Europe: OIML Class II approved divisions determined by platform; Class III 10,000e; Class IIII 1,000e; Includes Alibi Memory; TC6812
	Australia: Class III 7,500e or 3 x 3,000e multiple range; NMI S483
	Product Safety
	UL, cUL, CE

Table 1-2: IND560 Power Consumption

U (V)	P (W)	I (mA)
85V/50 Hz	70	822
264 V/50 Hz	156	603
85 V/60 Hz	69	810
264 V/50 Hz	147	558
110 V/50 Hz	84	766
110 V/60 Hz	86	784
240 V/50 Hz	147	614
240 V/60 Hz	145	603

Test condition: IND560 with internal Ethernet/Serial, Analog Output and Discrete I/O options installed, input loaded to simulate 8 x 350Ω load cells.

Environmental Protection

	⚡ WARNING!
	THE STANDARD IND560 IS NOT INTRINSICALLY SAFE! DO NOT USE IN AREAS CLASSIFIED AS HAZARDOUS BY THE NATIONAL ELECTRICAL CODE (NEC) BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES.

When an approved IND560 is installed in an area classified as Division 2 or Zone 2/22, special AC wiring requirements must be met. See document 64060405, **IND560 Division 2, Zone 2/22 Installation 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.

Inspection and Contents Checklist

Verify the contents and inspect the package immediately upon delivery. If the shipping container is damaged, check for internal damage and file a freight claim with the carrier if necessary. If the container is not damaged, remove the IND560 terminal from its protective package, noting how it was packed, and inspect each component for damage.

If shipping the terminal is required, it is best to use the original shipping container. The IND560 terminal must be packed correctly to ensure its safe transportation.

The package should include:

- IND560 Terminal
- Installation manual
- Documentation CD (includes all manuals)
- Bag of parts including ferrites, grommets, etc., depending on terminal configuration

Model Identification

The IND560 model number is located on the data plate on the back of the terminal along with the serial number. Refer to Figure 1-1 to verify the IND560 that was ordered.
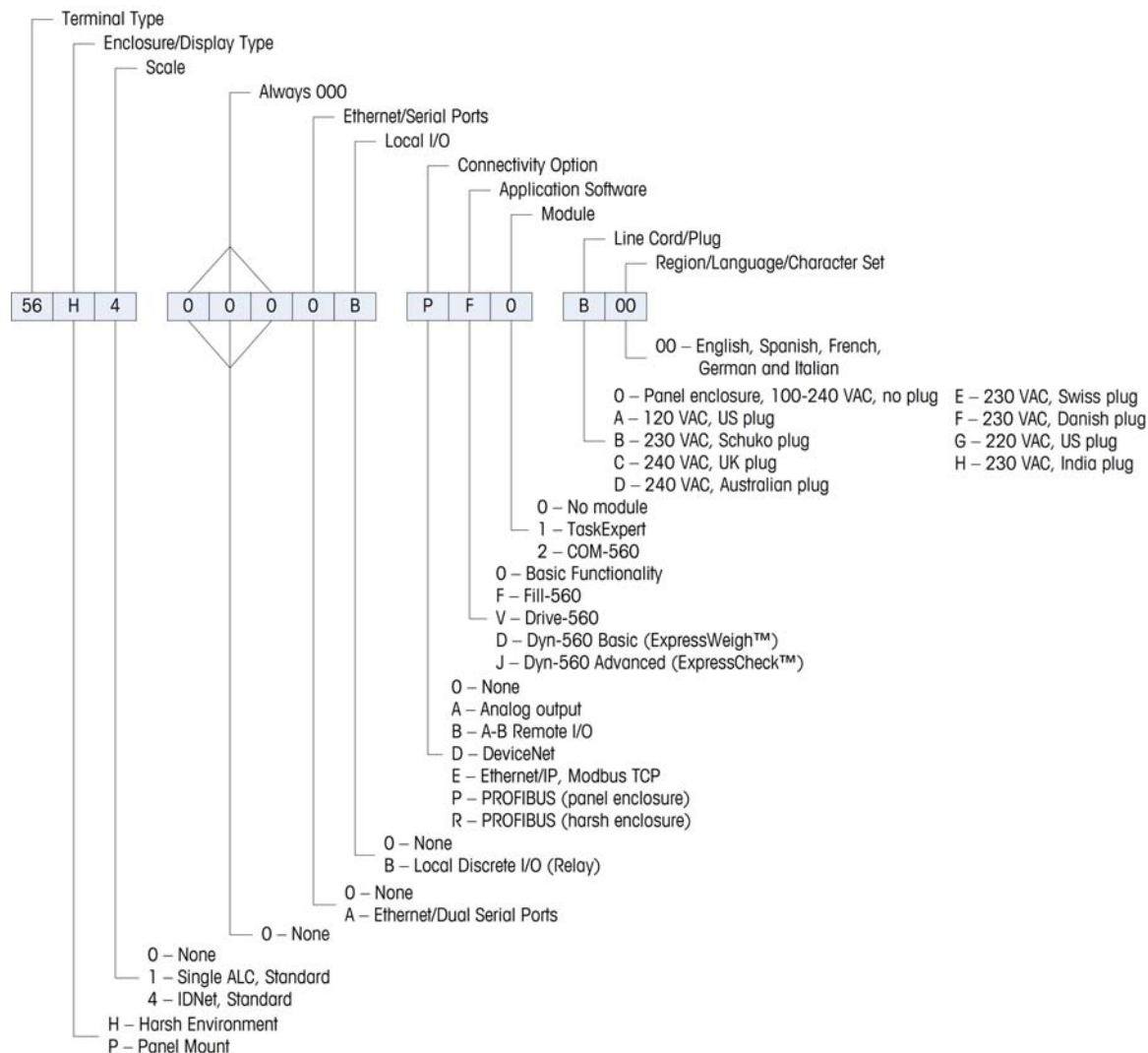
Figure 1-1: IND560 Model Identification Numbers

Physical Dimensions

The physical dimensions of the Panel Mount IND560 enclosure are shown in Figure 1-2 in inches and [mm]. Figure 1-3 shows the dimensions of the cutout required for the Panel Mount enclosure.
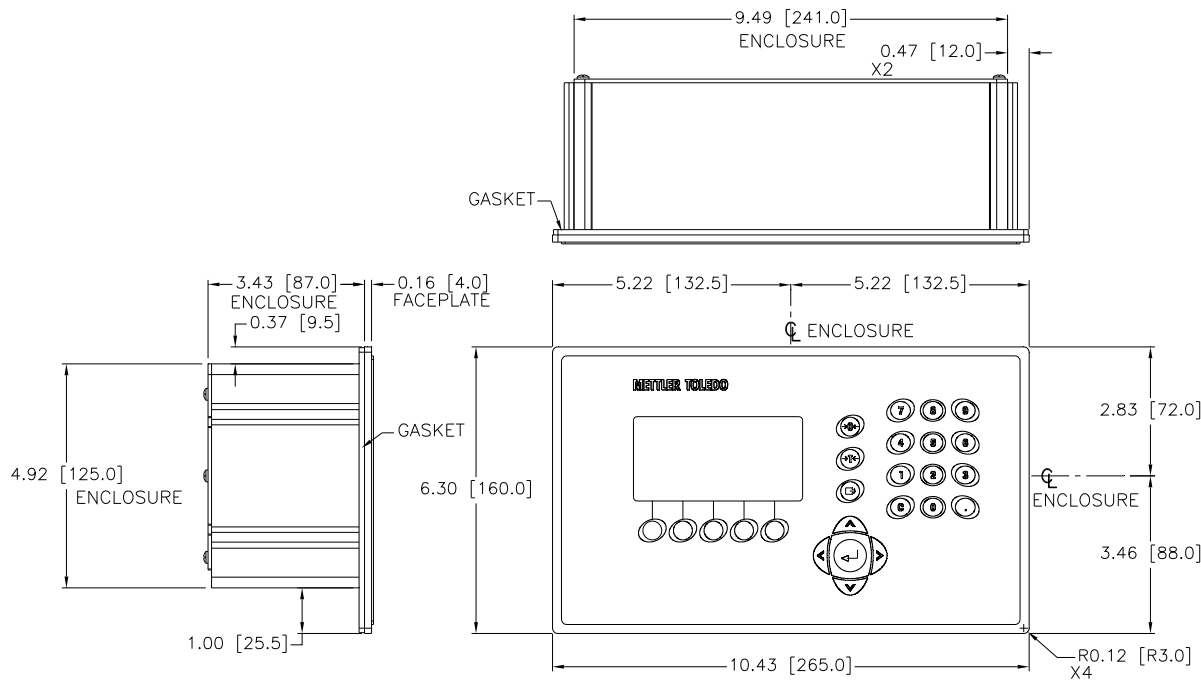

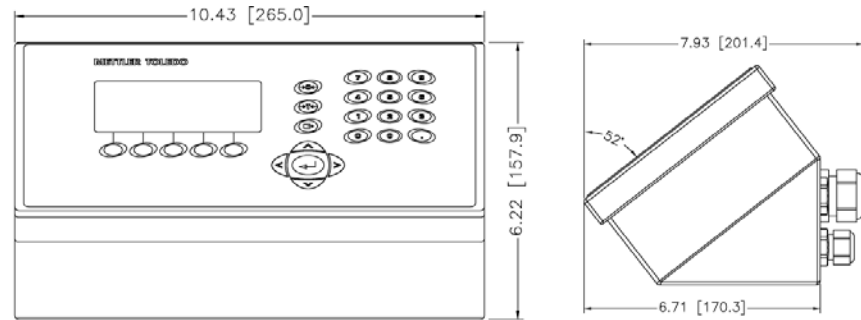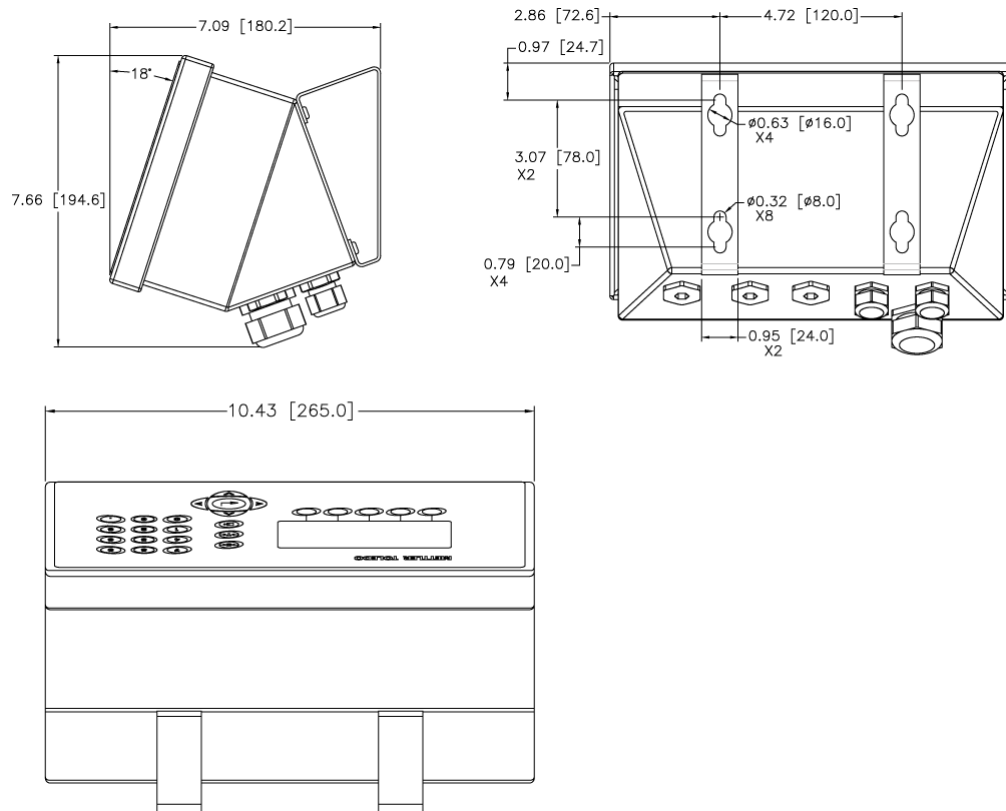**Figure 1-2: IND560 Panel Mount Enclosure Dimensions**
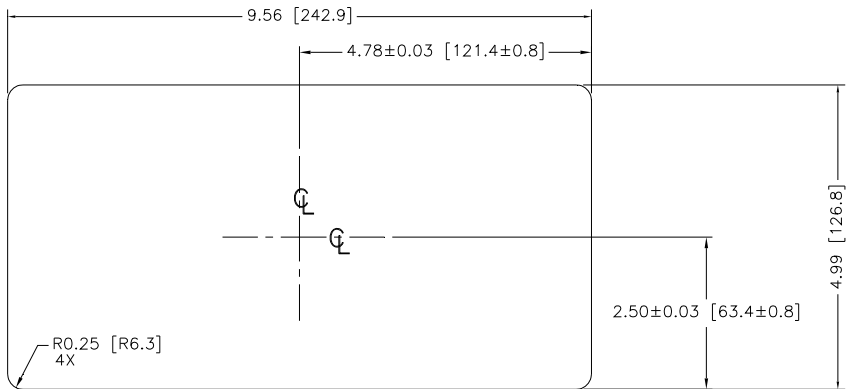
Figure 1-3: IND560 Panel Mount Cutout Dimensions

The dimensions of the harsh enclosure desk/wall-mount IND560 terminal are shown in Figure 1-4 and Figure 1-5 in inches and [mm].
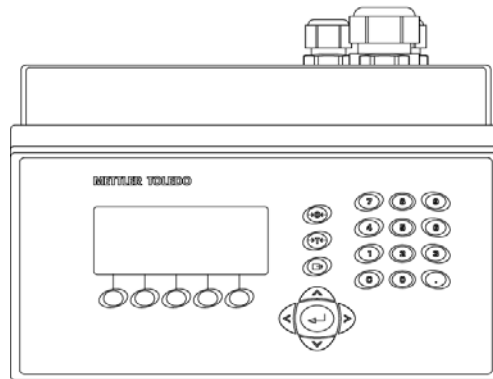
Figure 1-4: Harsh Environment Enclosure Dimensions

Figure 1-5: Harsh Environment Enclosure Dimensions with Optional Brackets

Main PCB

The IND560 terminal's main printed circuit board (PCB) provides the scale interface for analog load cell or IDNet.

The main board also contains the COM1 serial port that provides RS-232, RS-422, or RS-485 communication. The port is bidirectional and can be configured for various functions such as demand output, SICS host communications, continuous output, ASCII command input (C, T, P, Z), ASCII character input, report printing, totals printing, or connection to an ARM100 remote I/O module.

The main board also contains the AC power input connections, front panel keyboard interface and bus connectors for the option boards.

Scale Bases

The IND560 supports two types of scale bases: Analog or IDNet.

Analog Load Cell Scale Base

The IND560 supports this scale type by an analog load cell interface. The terminal can drive up to eight 350-ohm analog load cells.

IDNet™ Scale Base

The IND560 supports the newer T-brick style of high-precision base through the main board IDNet port. This port provides the +12 volts and communication required to operate this newer style base. The older K module and Pik-brick cells require the addition of an adapter board and new power supply (to support the +32 volt requirement) to the IND560. The adapter board and power supply are available as an option.

◄ Initial performance and compatibility testing was carried out on the IND560 and the following modules: K15, F15, K32 and T-Brick. Compatibility with other modules and bases is unknown.

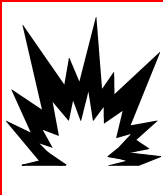# Options

The following options are available for the IND560:

- Discrete I/O

  Internal, high-level discrete I/O and remote discrete I/O via ARM100 module
- Ethernet/Dual Serial Ports
- Programmable Logic Control (PLC) interfaces, including:
  - Analog Output
  - Allen-Bradley® RIO
  - DeviceNet™
  - PROFIBUS® DP
  - EtherNet/IP™
  - Modbus TCP

- Fill-560 (application software)

- Drive-560 (application software)

- COM-560 (application software)

- Dyn-560 Basic and Advanced (application software)

- TaskExpert™ application development software

- Installation kit for older pre-2003 high-precision bases using a PIK-Brick weigh cell

- InSite™ Configuration Tool

- Various brackets for wall and column mounting of the harsh enclosure

Discrete I/O

The discrete I/O interface options include both internal and remote I/O.

- The internal version is available with dry-contact relay outputs. The relay contacts will switch up to 30 volts DC or 250 volts AC. The inputs are switch selectable as either active (for simple pushbutton control) or passive (for connection to PLCs or other devices that supply their own power for the I/O).

- The remote I/O is supported with the ARM100 remote module that provides dry-contact outputs. The inputs are passive on the ARM100. An external 10 to 32 VDC power supply is required to operate the ARM100.

- A total of 12 inputs and 18 outputs are supported through a maximum of three options.

> ⚠ **WARNING**
>
> **THE INTERNAL #71209093 DISCRETE I/O RELAY OPTION MUST NOT BE USED IN AN IND560 TERMINAL INSTALLED IN AN AREA CLASSIFIED AS DIVISION 2 OR ZONE 2/22. FAILURE TO COMPLY WITH THIS WARNING COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.**

Ethernet/Serial Ports

The Ethernet port can be used for FTP transfer of tare and target tables and complete setup files. It also provides a TCP/IP port to transmit a demand template, continuous data, for remote configuration using the METTLER TOLEDO InSite™ program, for direct access to data via a shared data server, and to send email alerts when calibration expires or fails.

COM2 provides RS-232 communication at rates from 300 to 115.2k baud. COM 3 supports the same baud rates and provides an RS-232, RS-422, or RS-485 connection.

PLC Interfaces

The IND560 PLC interface options include Analog Output, A-B RIO, DeviceNet, PROFIBUS DP, EtherNet/IP and Modbus TCP. Additional details about each of these

interfaces can be found in the **IND560 PLC Interface Manual**, provided on the documentation CD.

Analog Output

Analog Output refers to the representation of an internal system variable using a proportional electrical signal. Analog Output can be used to transmit a measured value, such as the gross or net weight. Another use for Analog Output is as a control signal for some external device, such as a control valve, where the amount of valve opening is proportional to the analog signal commanding its operation. Such outputs are used to control the flow rate of material into or out of a vessel.

Both 0-10 volt DC and 4-20 mA signals are provided.

A-B RIO

The A-B RIO option enables data exchange by bi-directional communications using the Discrete Data Transfer or Block Transfer mode. The IND560 Terminal initiates a communication exchange with the PLC approximately 20 times per second utilizing the Allen-Bradley Discrete Data Transfer protocol. This communication is a high-speed, real-time message interface between the IND560 Terminal and the PLC for process control. Division, integer, and floating point values are supported.

The IND560 A-B RIO interface also supports Block Transfer mode for transmission of larger amounts of data.

DeviceNet

DeviceNet is an RS-485 based network utilizing CAN chip technology. This network was created for bit and byte-level devices. The network can be configured to run up to 500Kbits per second depending on cabling and distances. Messages are limited to 8 unfragmented bytes. The network can include up to 64 nodes including the master, commonly called the scanner.

PROFIBUS DP

The IND560 Terminal communicates to a PROFIBUS-DP master according to DIN 19 245. The PROFIBUS option consists of a module and software that resides in the IND560 Terminal, which implements the data exchange.

EtherNet/IP

The IND560 supports communications of the EtherNet/IP interface option and the appropriate driver software.

Modbus TCP

Modbus/TCP is used to establish master-slave/client-server communication between intelligent devices. It is an open standard network protocol, widely used in the industrial manufacturing environment. The ModbusTCP protocol takes the

Modbus instruction set and wraps TCP/IP around it. The Modbus TCP protocol is supported by the EtherNet/IP interface board, version 1.32 or higher.

Application Software

Installing Application Software

When a hardware key (also referred to as an iButton) enabling IND560 application software is installed or removed, a pop-up message will appear instructing the user to perform a master reset. The master reset can be performed with or without resetting metrologically significant EEPROM (Scale) data, depending on the positions of switches SW2-1 and SW2-2. Both of these switches must be set to ON in order to reset EEPROM data to its factory default values. If either of them is set to OFF, EEPROM data is preserved. Refer to Chapter 4 of this manual, **Service and Maintenance**, for details on performing a master reset.

Fill-560

The Fill-560 is a special application that can be added to the IND560 terminal to provide additional filling and dosing control. It provides control for the following combinations of weigh-in and weigh-out sequences.

- Fill only
- Fill and dump
- Dose out only

- Fill and dose out
- Blend only
- Blend and dump

- Blend and dose out

Additional information can be found in the **Fill-560 Manual** on the documentation CD that accompanies the Fill-560 software kit or an IND560fill terminal.

COM-560

The COM-560 option is a specialized software module solution focused on the needs of users utilizing legacy communication protocols or that have special command requirements. The IND560com maintains all of the standard features and functions of the IND560 in addition to the specific features and functions of the COM-560. It provides the following features and functions:

- Custom ASCII command template
- Mettler Toledo Continuous Short output
- 8142 Host Protocol

- 8530 Host Protocol
- PT6S3 Protocol

Additional information can be found in the **COM**-560 **Manual** on the module's documentation CD.

Drive-560

The Drive-560 option is a specialized application solution focused on simple inbound-outbound vehicle weighing requirements. The IND560drive has two modes of operation: Temporary Tare ID Weighing and Permanent Tare ID Weighing. Some features of this software include:

- Ability to store up to 100 Permanent Tare IDs

- Totalization of Permanent Tare IDs

- One-Step processing of Temporary IDs

- Reprint of previous transaction ticket

- Storage of up to 2000 transactions

Additional information can be found in the **Drive-560 Manual** on the documentation CD that accompanies an IND560drive terminal.

Dyn-560

The Dyn-560 optional modules are specialized application solutions used for in-motion weighing of conveyor-born packages. They can be used with up to four 350 Ω load cells, and are compatible with the METTLER TOLEDO 9477 weighing conveyor. The IND560dyn is a stand-alone terminal. When that terminal is packaged with a variety of I/O options, it is known as the IND9D56. Both types are equipped with a version of the Dyn-560 software, which can be specified in either ExpressWeigh® or ExpressCheck® form.

ExpressWeigh functionality provides accurate in-motion package weighing with ID and additional data input. **ExpressCheck** includes an enhanced version of ExpressWeigh, and adds the ability to perform three-zone over/under checkweighing, using comparisons with a Target Table.

Additional information can be found in the Dyn-560 manuals found on the documentation CD that accompanies an IND560dyn or application software kit.

Special Requirements for Using Drive-560 and Dyn-560

Required Firmware Version

The Drive-560 and Dyn-560 applications are both written using Task Expert™. To run a TaskExpert application, the IND560 **must** have version 3.xx firmware or higher installed.

Required Mainboard Version

In addition to the software, the IND560 **must** have a main board version (V0.8) installed. V0.8 main boards include 8MB of Flash Memory. The version can be checked by pressing the Recall Info softkey 🔍 then the System Information softkey **i** and looking at the details for the analog or IDNet board under Hardware – Scale Type. If there is a (V0.8) after the Analog L/C or IDNet text, the main board contains the 8MB Flash Memory and will support running a TaskExpert application. If the version is (V0.2) or there is no version shown, there is only 4 MB of Flash Memory on the main board and the board must be replaced with a V0.8 version before the terminal can run a TaskExpert application.

Main boards with the smaller, 4MB, Flash Memory **will** support v3.00 firmware. However, they **will not** support Task Expert based applications such as the Drive-560 and Dyn-560.

TaskExpert™

TaskExpert functionality provides a way to modify the standard capabilities of an IND560 so that it more closely aligns with the application requirements. TaskExpert is a combination of a programming visualization tool, an execution engine and the basic functionality of the terminal. Modifications may be made to the sequence of operation and additional functionality added to the basic operation of the terminal.

InSite™ Configuration Tool

The IND560 terminal can connect to a PC running InSite via Ethernet or Serial to provide the following:

- Viewing and/or changing configuration.

- Enabling device-free configuration work before hardware installation.

- Saving configuration information locally on the PC, loading a saved configuration file into other devices, or restoring to a known state for service purposes.

- WYSIWYG print template editing tool with expanded viewing area, cut/paste functions, stored clipboard library (MyData items), and template space usage display.

- Printing documentation of configuration for users' records.

The InSite Configuration Tool and Template Editor are provided free to users of Mettler Toledo products that interface with the InSite program.

Display and Keyboard

The IND560 terminal has a Vacuum Fluorescent Display (VFD), 128 × 64 dot matrix graphic type display. An example of the IND560 front panel is shown in Figure 1-6.
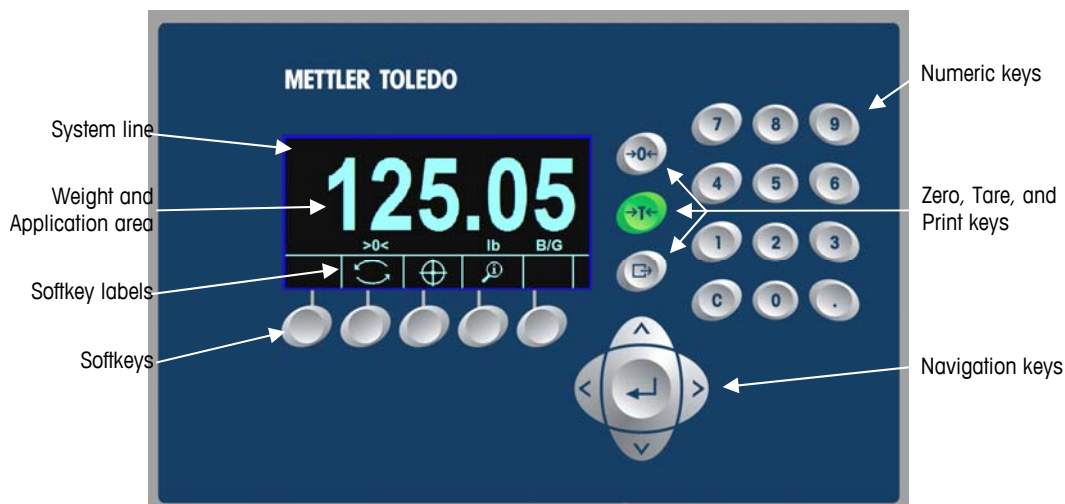
Figure 1-6: The IND560 Front Panel Layout

Display Layout

- A **system line** is reserved at the top to show system messages, messages sent remotely from a PLC, and any asynchronous errors.

- The middle portion of the display is reserved for the **weight display and/or SmartTrac display**. Random data entry is shown in the bottom of this area.

- The bottom of the display is reserved for showing the **graphic labels (icons) for the softkeys**. Display positions for up to five softkey icons are provided.

- To the right of the softkey icon area space is reserved for a MORE UP (⋏) or a MORE DOWN (⋎) indicator. If present, these indicate additional softkey selections are available by pressing either the UP or DOWN navigation keys. A total of 15 softkeys, presented in three sets of five, are programmable for the home position depending upon 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.

Front Panel Keys

Three dedicated scale function keys are located to the right of the display. These provide the interface to zero or tare the scale and to initiate a print.

The terminal's 12-key numeric keypad is used to enter data and commands. The numeric keys are located on the upper-right side of the terminal front panel.

Five navigation keys are located below the three scale function keys. These keys enable the operator to navigate through setup options in the menu tree and within setup and application screens.

Chapter 2.0

Operation

This chapter covers

- Security
- Display Operation
- General Navigation
- Home Screen
- Basic Functionality

Overview

The IND560 Terminal is a simple to use, yet sophisticated terminal with flexibility of configuration to meet a variety of operating requirements. The setup menu system provides the power of configuration in a user-friendly operational environment.

While reading this manual and operating the terminal, keep in mind that various functions may or may not be available and that the screens shown in this manual may vary from terminal-to-terminal based on the setup configuration.

This User Guide provides instructions for performing typical weighing operations and generating reports using the IND560 terminal. Detailed information about terminal configuration and setup is provided in the **IND560 Technical Manual**.

Security

The IND560 supports the use of username/password for setup security at four levels. Refer to the IND560 Technical Manual, Appendix B, Default Settings to determine security levels assigned to specific parameters in setup.

- **Administrator**   An Administrator has unlimited access to all areas of the operating and setup system. There can be multiple Administrator accounts. There is a Primary Administrator account, which can be changed but never deleted. The terminal is pre-configured at the factory with the Primary Administrator account with 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 are available to all users until a password for the Primary Administrator account is set up.

When the Metrology switch (SW1-1) is turned "on" (refer to the next section of this chapter) and a regional approval is selected in setup, all users with Administrator rights are reduced to the Maintenance level. This is done to protect metrologically significant parameters that cannot be changed when the terminal is approved. Refer to the **IND560 Technical Manual**, Appendix B, Default Settings for the security level of all setup parameters.

Similarly, the metrology switch can be used to prevent Adminstrator level users from accessing metrology features, even if the region approval is "none".

Once a password is set up, be sure to remember it. If the password is changed or forgotten, the setup menu will not be accessible. 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.

Maintenance   Access can be limited by configuring this security level as desired.

Supervisor   Access can be limited by configuring this security level as desired.

Operator   One default operator account is provided. Sites with validation requirements might create many operator accounts, each with a username and password entry requirement.

If a password has been programmed for the Primary Administrator username in Setup, a security challenge is presented when entering Setup and a username and password must be entered. The user can enter a password at any security level supported by the User configuration in the User setup.

The terminal is pre-configured at the factory to include an "anonymous" user account with a null (blank) password. The default anonymous user record can be edited or deleted. The user can increase to a higher level of security clearance by requesting a setup function and then meeting the associated security challenge.

If a login fails, the display exits the login page and returns to the home position.

Metrology Switch

If the metrology switch (SW1-1) is placed in the approved position (On) access to the Scale branch of setup and other metrologically significant areas is not permitted. The metrology switch can be used to prevent Administrator level users from accessing metrology features even if the region approval is "None".

Selecting a specific region approval and turning "on" the Metrology switch specifically alters some scale functions:

If the approval is Canada, then the keyboard tare carries out a rounded tare.

- If the approval is Canada, then the center of zero division is 0.2d, Default for non-approved mode is 0.25d.

- If the approval is OIML, then the power up zero range is +/- 10% and pushbutton zero range is +/-2%, For non-approved mode, this range can be selected by the user.

Access to the metrology switch may be sealed in conformity with local regulations in "legal-for-trade" applications. Figure 2-1 shows the location of the metrology switch.
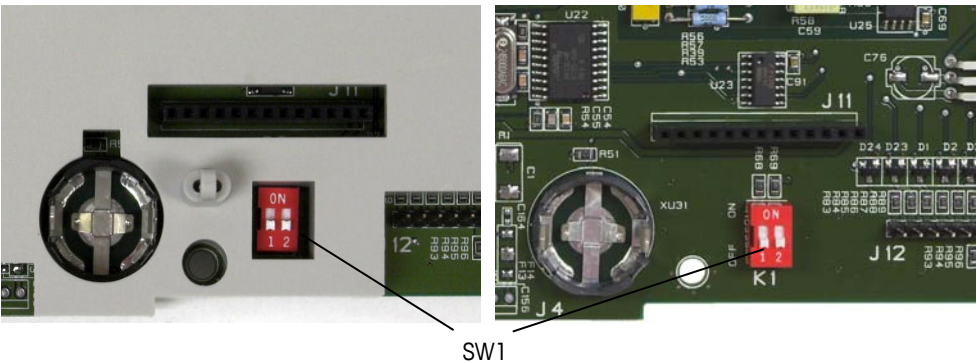
Figure 2-1: Metrology Switch

Refer Appendix A of the **IND560 Technical Manual**, Installation, PCB Switch Settings for further information about SW1-1 and SW1-2 switch settings.

Display Operation

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 START…" means press the START softkey ◇.

- "Select an option…" means use the UP or DOWN navigation keys to highlight a menu item, then press ENTER.

Softkeys and Icons

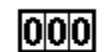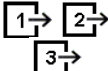Softkeys and application displays use graphic icons for identification. Table 2-1 shows graphic icons and their functions, categorized by where they are used.

Table 2-1: Icons and Functions

Information Recall Options			
Icon	**Function**	**Icon**	**Function**
C	Clear All*	i	System Information Recall
C◊	Clear Subtotal*	Σ	Total Recall
M	Metrology Recall	⬜	Weight Recall
🖨	Print*		

Softkey Menu and Setup			
Icon	**Function**	**Icon**	**Function**
⟠	Enter Setup Menu	∧ ∧ ∨ ∨	More Softkey Selections (scroll rows up and down)
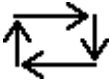
Calibration Icons			
Icon	**Function**	**Icon**	**Function**
Cal FREE	CalFREE™ Calibration	→⌷←	Capture Zero
→▼←	Capture Span	▰	Step Calibration
Srvc Mode	Service Mode (access the IDNet service mode)	◇	Start
▽↓	Run Calibration Test	ⓘ	Test Weight Information
⌒■■■	Skip (skips failed Calibration Test step and continues with the test)		

Table, Memory and Function Access			
Icon	**Function**	**Icon**	**Function**
⟁	Tare Memory (access the tare table)	⊕	Target Memory (access the target table)
Alibi	Alibi Memory	⊕	Target (view or edit active record values for the target comparison)
⌕	View Table (access a table to view or retrieve a record)	⚏	Search (begin the search of a table for a record or group of records)
→T←	Tare (captures live scale weight into the tare record – Tare Table edit only)	→|←	Comparators (view and edit Comparator Limit values)
▯	Reports (recall and print reports for Alibi Memory, Tare Table, or Target Table)*	ID	ID (initiates a programmed transactional sequence)
123	Transaction Counter	000	Reset Counter

Table, Memory and Function Access			
Icon	**Function**	**Icon**	**Function**
	Time & Date		Print
	Repeat Print		Customized Print Triggers 1, 2 and 3

Editing			
Icon	**Function**	**Icon**	**Function**
C	Clear All*		Exit (return to previous screen)
	Delete		Insert
	Edit	OK	Validate Entry/Transaction (OK)
Esc	Escape (exit without storing)		Copy

Display Icons			
Icon	**Function**	**Icon**	**Function**
x10	Times 10 Display (expands the displayed weight by 10)	Smart -Trac	SmartTrac (turns SmartTrac display off and on)
Min- Weigh	MinWeigh (enter MinWeigh mode)		Unit Switching

Special Control			
Icon	**Function**	**Icon**	**Function**
	Target Control		Start
	Pause		Stop
	No	C✻	Clear Total*
	Reset		

Task Selection Icons (only when TaskExpert™ is installed)	
Icon	**Function**
	Task List Displays list of assigned TaskExpert applications
1	Task 1 Starts TaskExpert application designated as Task 1
2	Task 2 Starts TaskExpert application designated as Task 2
3	Task 3 Starts TaskExpert application designated as Task 3

Understanding the Navigational Interface

Navigate in the applications and configure the IND560 using

- Navigation keys
- Alpha keys
- Softkeys
- Numeric keys
- Scale function keys

The locations of these keys and the display screen area are shown in Figure 2-2.
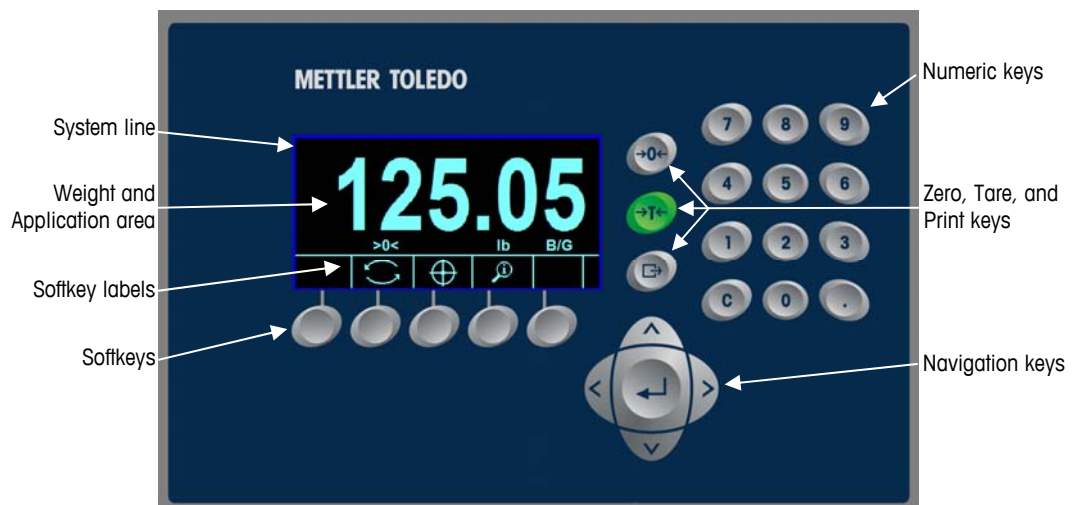
Figure 2-2: Key Locations and Display Screen

Navigation Keys

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

- UP and DOWN navigation keys—move the focus up or down to different setup options within the menu tree (focus is indicated by highlighted text), to different fields within a setup page, and to switch to another page of available softkeys.

The UP and DOWN navigation keys are also used to move to a next or previous page when a scroll bar indicates that two or three pages are used for configuration fields associated with a specific parameter. The example in Figure 2-3 shows a configuration parameter that requires three pages to display all of its configuration fields. The scroll bars indicate which page of the three is displayed.
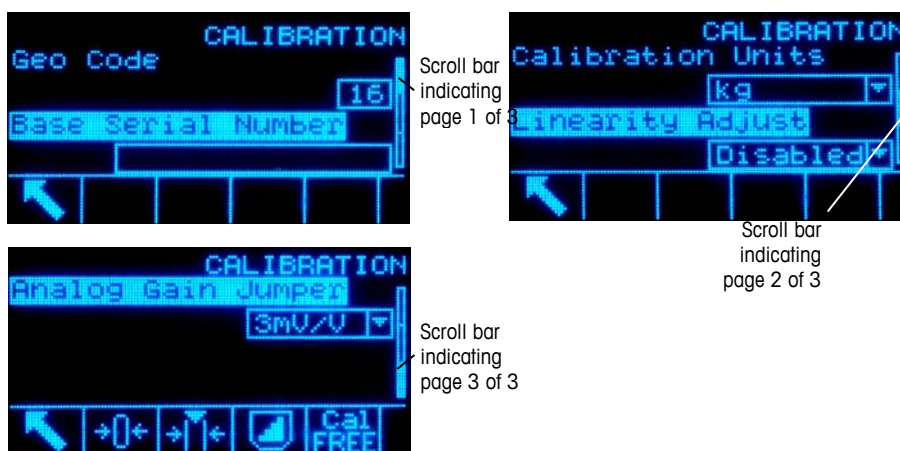
Figure 2-3: Example of Scroll Bars, Indicating Three Pages of Configuration Fields

Press the DOWN navigation key to move from page 1 to 2 or from page 2 to 3. Press the UP navigation key to move from page 3 to 2 or page 2 to 1.

- LEFT and RIGHT navigation keys

  - Expand (RIGHT navigation key) the setup options in the menu tree
  - Collapse (LEFT navigation key) the setup options in the menu tree
  - Move the cursor position to a specific character in text areas
  - Enable left and right scrolling to view all information available on a screen

- ENTER key

  - Opens the setup page for viewing and editing setup parameters
  - Moves the focus from a field label to a setup value for that field
  - Accepts new values entered in a field and moves the focus to the next field label

Softkeys

There is a softkey setup page that is used to

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

For example, a UNIT SWITCHING softkey ⟳ can be enabled for selecting alternate units of measure.

Five softkeys are located along the bottom of the display screen (see Figure 2-2). Some applications might have up to three pages of softkeys for a total of 15 possible functions. A MORE DOWN symbol ⩒ 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 navigation key to display additional softkey screens, and UP to display the previous softkey screen.

The **IND560 Technical Manual**, Appendix E, Softkey Mapping explains in detail how the softkeys can be edited in setup.

Scale Function Keys

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

→0←   Zero   When the scale platform or weighbridge is empty, the terminal should indicate zero. 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.

→T←   Tare   Tare is the weight of an empty container. Tare is normally used to determine the net weight of the contents of a container. Press the TARE scale function key when an empty container is on the scale. The terminal then displays a zero net weight. As the container is loaded, 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 container is a known value, enter th 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 container. Keyboard tare must be enabled in order to use this key in this manner.

⊏→   Print   Press the PRINT scale function key to initiate a demand print of ar assigned print template. A serial or Ethernet print connection must be configured to link a template or report to the selected serial or Ethernet port. When a print command is issued, Printing appears in the system line for 5 seconds – see Figure 2-8.

Alpha Keys

On some setup pages (see Figure 2-4), softkeys function as alpha keys that are used to enter alphabetic characters for setup parameters such as passwords.

Character sets above associated softkeys

Figure 2-4: Alpha Keys

The alpha keys are automatically displayed when the cursor is moved into a data entry box that supports alpha entry. The first set of softkeys shown is upper-case letters (showing in Figure 2-4). Three additional sets of softkeys (Figure 2-5) include lower-case letters and symbols. In each of these sets, a group of four to six characters is shown per softkey.

Figure 2-5: Additional Character Sets

To enter a character, move to the row of keys that shows the group of characters including the required character. If the set of keys shown does not include the required character, press the DOWN navigation key to view the next set. Press the DOWN navigation key and UP navigation key as required until the set of keys shows the required character. The presence of the MORE UP / MORE DOWN symbols to the right of the softkeys indicates that additional sets of characters are available. Once the correct row is showing, press the softkey under the group of characters that includes the required character.

At this point, the characters above the softkey will change to show one character per softkey (Figure 2-6).

Figure 2-6: One Letter Per Softkey

Now, press the softkey that corresponds to the required character. Also note that the MORE DOWN symbol is shown at the right of the softkeys. Press the DOWN navigation key to view the second row of characters. This group will include an ESCAPE softkey [Esc] (Figure 2-7). If the wrong group of characters was selected, use this softkey to return to the character set selection screen.

Figure 2-7: ESC Character Showing

Repeat this process until all alpha characters have been entered. The CLEAR key can be used to delete unwanted characters in the entry box. The ESCAPE softkey [Esc] on the symbol group of softkeys (see Figure 2-5) exits the data entry process without accepting any of the new data typed. The data in the entry field will revert to the original data (that was in the entry box before the new entry was initiated).

Once desired alpha characters have been entered in appropriate fields on the screen, press the ENTER key to accept the entries.

Numeric Keys

Use the terminal's 12-key numeric keypad (see Figure 2-2) 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 to enter decimal points where necessary.

The CLEAR key functions like a backspace key. Position the cursor at the end of data to be deleted and press the CLEAR key. Press the CLEAR key once for each character to be deleted. When first entering a data entry box, the previous entry will be in focus. Pressing CLEAR at this point will clear the entire previous entry.

Home Screen

The Home screen displays when the terminal is idle (see Figure 2-8). The Home screen is the only screen that provides operator access to the programmable softkeys.

Figure 2-8: Default Weighing Operation Screen, System Message Showing

The Home Screen includes:

- **System Line**   Displays system messages and application data
- **Application Area** Displays weight, units, and other application-specific weighing data
- **Softkey Icons**   Displays the icons for the active softkey functions. The appearance of a MORE DOWN symbol ∨ or a MORE UP ∧ symbol indicates that more softkey selections are available

Basic Functionality

This section provides information about the IND560's basic functionality. Additional areas of functionality specific to application software available for the IND560 are addressed in the specific application manuals. Basic functions addressed in this section include:

- Zero
- Tare
- Unit Switching
- Expand By 10
- Print
- MinWeigh

- Information Recall
- Target Comparison
- Comparators
- ID Mode
- SmartTrac
- Time and Date

- Reports
- Calibration Test
- CalFREE™
- Alibi Memory
- Table Searches
- Remote Display

Zero

The Zero function is used to set or reset the initial zero reference point of the IND560. There are three types of zero setting modes:

- Automatic Zero Maintenance

- Power-Up
- Pushbutton

Automatic Zero Maintenance

Automatic Zero Maintenance (AZM) enables the IND560 to compensate for the build up of small amounts of weight and track itself back to the center of zero. Within the AZM operating range (programmable from 0.00 to 10.00 divisions), when the terminal is in a no motion condition, it makes small adjustments to the current zero reading to drive the weight reading toward the true center-of-zero. When the weight is outside of the programmed AZM range, this feature is not functional.

Power-Up Zero

Power-Up Zero enables the IND560 terminal to capture a new zero reference point after power is applied. If there is motion during a power-up zero capture function, the terminal will continue to check for a no-motion condition until zero is captured.

Power-up zero can be disabled or enabled, and a range above and below calibrated zero can be configured. The range is programmable from 0% to 100% of capacity and can include a positive range and also a range below calibrated zero.

Pushbutton Zero

The pushbutton (semi-automatic) zero function can be accomplished by pressing the ZERO →[]← scale function key, programming a discrete input, a PLC command or serial command, or by an application.

The range for all types of semi-automatic zero is selectable (0% to 100%) plus or minus from either the calibrated zero point (if power-up zero is disabled) or from the initial zero setting point (if power-up zero is enabled).

Remote initiation of the semi-automatic Zero command is possible via a discrete input, an ASCII 'Z' command sent serially (CPTZ and SICS), a command initiated by the PLC interface, or from an application.

Tare

Tare is the weight of an empty container. A tare value subtracts from the gross weight measurement, providing the computation of the net weight (material without the container). The tare function can also be used to track the net amount of material being added to or removed from a vessel or container. In this second case, the weight of the material in the container is included with the tare weight of the container as tare. The display then reflects the net amount being added to or removed from the vessel.

Tare types and associated operations available on the IND560 include:

- Pushbutton Tare
- Keyboard Tare (Preset Tare)
- Net Sign Correction

- Tare Clear
  - Manual Clear
  - Auto Clear

- Auto Tare

Pushbutton Tare

Pushbutton tare can be configured in setup as enabled or disabled. When disabled, the TARE scale function key →T← cannot be used to obtain a tare.

If enabled, pressing the pushbutton TARE scale function key →T← initiates a semi-automatic tare. The IND560 will attempt to perform a tare process. If successful, the display changes to a zero net weight indication and the previous weight on the scale is stored as the tare value. The net mode will be indicated on the display.

Several conditions could inhibit the pushbutton tare function:

Motion—Pushbutton tare cannot be taken when the scale is in motion. If motion is detected when a pushbutton tare command is received, the IND560 will wait up to three seconds for a no-motion condition. If a stable (no motion) weight condition occurs before the three seconds expire, the pushbutton tare command is executed.

If there is still motion at the end of three seconds, the command is aborted and a "Tare Failure–In Motion" error displays.

Pushbutton Tare Disabled—If pushbutton tare is configured as disabled, the TARE scale function key will not initiate a semi-automatic tare.

Negative Gross Weight—Any pushbutton tare attempted when the gross weight is at or below zero is ignored and a "Tare Failed–Too Small" error displays. Ensure that the gross weight is above zero.

Keyboard Tare

A keyboard (preset) tare is a numeric tare that is entered manually through the numeric keypad, received serially from a peripheral, or retrieved from the Tare Table memory. The preset tare value cannot exceed the capacity of the scale. Data entered is interpreted to have the same units as the current displayed value. Motion does not impact the entry of preset tare values.

Keyboard tare can be configured in setup as enabled or disabled. When disabled, the numeric keypad and the TARE scale function key →T← cannot be used to obtain a tare.

To manually enter a preset tare value, use the numeric keypad to enter the tare value (the data entered will display above the softkey with a Data: label) and press the TARE scale function key →T←.

If configured in setup, remote equipment can enter a preset tare value using a serial command or PLC command (refer to the **IND560 Technical Manual**, Chapter 3.0, Configuration, the Communication section, Serial and PLC setup, for further information).

If the preset tare is successful, the display changes to a net weight indication, and the entered preset tare value is stored as the tare value in the Tare Table.

Several conditions could inhibit the preset tare function:

Keyboard Tare Disabled—If keyboard tare is configured in setup as disabled, the numeric keypad and the TARE scale function key →T← cannot be used to obtain a tare.

Over-Capacity or Under-Zero Conditions—Preset tare is not allowed when the weight display indicates over capacity or under zero conditions. Any preset tare attempted when the scale is over capacity is ignored and a "Tare Failed–Over Cap" error displays. Any preset tare attempted when the weight display indicates an under zero condition is ignored and a "Tare Failed–Too Small" error displays.

Preset tare can be entered in free format. If the entered value does not match the displayed weight decimal point location or display interval, the entered tare value is rounded to the nearest display interval and the decimal point adjusted to match the gross weight. The rounding method is that 0.5 or more of a display interval (d) is increased to the next display interval and 0.49 or less of a display interval is decreased to the next lower display interval.

When entering a preset tare value less than 1.0, the operator can enter the data without the leading zero (left of the decimal point), but all subsequent display, storage, or printing of this value will include the leading zero. For example, a preset tare entry of .05 will display as 0.05.

If a preset tare has already been established and another preset tare is entered, the second preset tare replaces the previous value (it does not add to the previous value). The replacement tare can be larger or smaller than the original tare value.

Tare Table

The IND560 terminal contains a tare table with 25 records for storing tare weights that can be recalled by the operator, instead of manually entering them for each transaction. This is especially useful when certain tare values are used repeatedly.

A 20 character description can be included with each record. This can be used to help distinguish one tare record from another. Each tare record in the tare table also contains a totalization field. When totalization is enabled for the tare table, each time a transaction is completed using a specific tare ID, the selected weight value (gross or net weight) is added to the total and the corresponding counter will be incremented by one.

A tare memory can be recalled either by picking from a list of all available records or – if the ID for the tare value is known – "quick" accessed (refer to the Quick Access section, below). A printed report of the records in the Tare Table is also available. Additional details about the tare table are explained in the **IND560 Technical Manual**, Appendix C, Table and Log File Structure.

Net Sign Correction

Net sign correction enables the terminal to be used for both shipping (inbound empty) and receiving (inbound loaded) operations. Net sign correction can be disabled or enabled. Refer to the **IND560 Technical Manual**, Chapter 3.0,

Configuration, the Scale section, for information about disabling and enabling net sign correction.

If net sign correction is disabled in setup, any stored weight value in the tare register is assumed to be a tare regardless of the gross weight present on the scale at the time of the final transaction. Net values can be negative.

If net sign correction is enabled, the terminal will switch the gross weight and tare weight fields when 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 value. Net sign correction affects the display, stored data, weight recall and printed data.

Net sign correction will operate with pushbutton tare, preset tare, or tare memories. An example of weight values with and without net sign correction is shown in Table 2-2. In this example, the tare register value is 53 kg and the live weight on the scale is 16 kg.

Table 2-2: Weight Values With and Without Net Sign Correction

	Net Sign Correction	
Printed and Displayed	**Disabled**	**Enabled**
Gross	16 kg	53 kg
Tare	53 kg	16 kg
Net	−37 kg	37 kg

When net sign correction is enabled, the tare weight field in the recall display will be labeled with the letter "M" to indicate "Memory" instead of "T" or "PT".

Auto Tare

The IND560 can be configured so that tare is automatically taken (auto tare) after the weight on the scale exceeds a programmed tare threshold weight. Auto tare can be configured in setup as enabled or disabled. When auto tare is enabled, the display changes to a zero net weight indication after the weight exceeds the threshold value. The previous weight on the scale is stored in the Alibi Table as the tare value. Auto tare operations involve:

Tare Threshold Weight—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.

Motion Check—A motion check is provided to control the re-arming of the auto tare function. If disabled, the auto tare trigger will be reset as soon as the weight falls below the reset value. If enabled, the weight must settle to no-motion below the reset threshold before the next auto tare can be initiated.

Several conditions could inhibit the auto tare function:

Motion—Auto tare cannot be taken when the scale is in motion. If motion is detected after the weight on the scale exceeds a preset tare threshold weight, the IND560 will wait for a no-motion condition. If a stable (no motion) weight condition occurs within three seconds, the auto tare command is executed.

Auto Tare Disabled—Auto tare can be configured in setup as enabled or disabled.

Clearing Tare

Tare values can be cleared manually or automatically.

Manual Clear

Manually clear tare values by pressing the CLEAR key $\mathbf{C}$ on the numeric keypad when the IND560 is in the net mode and has completed the weighing operation. Motion on the scale will not impact a manual clear.

If configured in setup, pressing the ZERO scale function key →[]← will first clear the tare, then issue a zero command (refer to the **IND560 Technical Manual**, Chapter 3.0, Configuration, the Scale section, Auto Clear).

Auto Clear

The IND560 can be configured to clear tare automatically when the weight returns to a value below a programmable threshold, or when a print command is issued. Once the tare is cleared, the display returns to the gross weighing mode.

Auto clear is disabled or enabled in setup. If auto clear is enabled the following parameters, configured in setup, affect the auto clear operation:

Clear Threshold Weight—The clear threshold weight is the gross weight value below which the IND560 will automatically clear a tare after settling to a value above this threshold value.

Motion Check—A motion check is provided to control the automatic clearing of tare. If the motion check is disabled, the tare value is cleared as soon as the weight drops below the threshold weight (auto clear threshold), regardless of the motion status.

If the motion check is enabled, after meeting the requirements for weight value above and then below the threshold weight (auto clear threshold), the IND560 waits for a no-motion condition before automatically clearing the tare.

Clear After Print—If enabled, tare is automatically cleared and the scale returned to the gross mode after data has been transmitted by pressing the PRINT scale function key ⬚→, or from a remote source.

Refer to the **IND560 Technical Manual**, Chapter 3.0, Configuration, the Scale section, Auto Clear for further information about configuring auto clear.

Unit Switching

In order to support locations and applications that utilize multiple measurement units, the IND560 supports unit switching. The UNIT SWITCHING softkey ⟳ enables switching between primary units (the main unit of measure) and alternate units (second or third units).

When the UNIT SWITCHING softkey ⟳ is pressed, the display changes from the primary unit to the second unit. When this softkey is pressed again, the display switches to the third unit (if one has been programmed) or returns to the primary unit. Each subsequent time the UNIT SWITCHING softkey ⟳ is pressed the IND560 continues to switch the unit through the same sequence.

When units are switched, the units value changes to the correspondingly selected units, and the conversion of the display value occurs. The display division changes to an equivalent weight value in the switched unit (for example, from 0.02 lb to 0.01 kg) and the decimal location switches to accommodate the conversion.

When switching units, the capacity of the converted units is dictated by the original number of divisions established in the capacity and increments area of setup. In some situations, this may reduce the capacity of the terminal when converting to second or third units.

Expand By 10

The EXPAND BY 10 softkey **x10** is used to increase the selected weight display resolution by one additional digit. For example, a weight display of 40.96 could increase by one additional digit to display as 40.958. The Expand By Ten mode is indicated on the display by x10, which displays below the weight display. When the EXPAND BY TEN softkey **x10** is pressed again, the display reverts to the normal display of weight.

If programmed as approved with the metrology switch (SW1-1) ON, the Expand By Ten mode is displayed for five seconds then automatically returns to normal resolution. Printing is disabled when the weight is expanded and the terminal is programmed as approved.

Print

The print function (demand print) can be initiated by pressing the PRINT ⇨ function key on the main keyboard, by using custom print trigger softkeys or by automatic print settings. Demand printing of data may also be initiated as part of a particular sequence of operation or special application software. A 'Printing' system message (visible in Figure 2-8) appears for 5 seconds when the terminal is carrying out a print command.

Print Interlock

Print Interlock is designed to enforce a single print output per transaction. Print Interlock can be disabled or enabled. If it is enabled, the print command is ignored

until the measured gross weight exceeds the print interlock threshold. After the first print command is executed, subsequent print commands are ignored until the gross weight indication falls below the print interlock reset threshold. If a print command is blocked by print Interlock, a synchronous "2nd Print Prohibited" error is generated and displayed.

Automatic Print

Automatic initiation of a demand print occurs after the gross weight exceeds the minimum threshold and there is no motion on the scale. After initiation, the gross weight must return below the reset threshold before a subsequent automatic print can occur.

Automatic print may be disabled or enabled. Automatic print can be triggered and reset by weight exceeding thresholds or by weight deviation from a previously stable reading.

Repeat Print

The Repeat Print softkey permits the output of the most recent Demand Print or a Custom Print from an application, to be printed again with a DUPLICATE header or footer to distinguish it from the original print.

To enable the Repeat Print function, simply add the Repeat Print softkey to the Home Page. Pressing this softkey will initiate a repeat print of the last Demand Print connection listed in the assignments found in Setup at Communication > Connections.

An output template can be flagged with a "DUPLICATE" header or footer to indicate that the data in the output template was generated as a repeat of a previous communication.

MinWeigh

Certain industries such as pharmaceutical and food require a guarantee that the weighing equipment selected for a particular measurement is adequate for the task. One way to ensure that appropriate weighing equipment is selected is by the creation and use of a minimum weighment value (MinWeigh), below which a particular piece of weighing equipment cannot be used.

When the MinWeigh function is enabled, the MINWEIGH softkey Min-Weigh can be pressed to initiate the MinWeigh function, which compares the current net weight with the programmed MinWeigh value. If the net weight is greater than or equal to MinWeigh, all equipment functions behave normally. If the absolute value of the net weight is less than MinWeigh, the weight display includes a flashing MinWeigh symbol to the left of the weight. If the user attempts to record the weight while in this condition, the printout will include an asterisk (∗).

For specific step-by-step instructions on how to set up MinWeigh, refer to the **IND560 Technical Manual**, Chapter 3.0, Configuration, Scale, MinWeigh.

Information Recall

Press the INFORMATION RECALL softkey 🔍 to access the Recall screen where the following softkeys are available:

🔲	Weight Recall	Displays the Gross, Tare, and Net active weight readings for the scale.
i	System Information	Displays system information, including the model and serial number, Terminal ID #1, Terminal ID #2, Terminal ID #3, and software and hardware information. This ID information is entered in the Setup mode (Refer to the **IND560 Technical Manual**, Chapter 3.0, Configuration, Terminal, Device, for more information about entering Terminal ID information).
M	Metrology Recall	Displays the terminal metrology control number (MCN), whether the terminal is programmed as approved or not, and the last calibration time and date. On the high-precision IDNet version, the Ident Code (calibration tracking) is also displayed.
◈	Total Recall	Displays the sub-total and grand-total transaction count and total weight for the terminal. Press the CLEAR SUBTOTAL softkey C◊ to clear the sub-total amounts. Press the CLEAR softkey C to clear both the grand-total and sub-total amounts. Press the PRINT softkey 🖨 to print a report of the totals. Note that if either Clear Total or Clear Subtotal After Print is enabled in setup these values will clear after printing.
		Table clear and print functions are accessible only to users with Supervisor level log-in and above.

Target Comparison

Target comparison is used to compare either the gross or net weight on the scale to a predetermined target value. This feature can be useful in both automatic and manual processes. As an example, an automatic filling system using target comparison could provide a Start signal to the IND560 and the IND560 could control the feeder system to fill a container to a desired target.

An example of a manual process could be a checkweighing station where an operator is checking net weight of packages. The IND560 can use its target comparison feature to provide a bright **Over** - **OK** - **Under** indication to help the operator determine if the weight of each package is acceptable or not compared to an ideal weight.

Target (setpoint) comparison is most often used in two types of applications:

- **Material transfer applications**—Requires that a control device deactivate when a target value is achieved

- **Over/Under applications**—Classify a load placed on the scale platform as above or below the target value or within the target tolerance range

The IND560 target comparison rate (for analog load cell scales) is 50 comparisons per second. The comparison rate for high precision IDNet bases is dependent upon the module in the base.

Refer to the **IND560 Technical Manual**, Chapter 3.0, Configuration, the Application section, Memory, Target Table and Operation, Target for further information about configuring parameters for target comparison operations.

Material Transfer Applications

If the target comparison of the IND560 will be used to control the flow of material, the application can be classified as a Material Transfer application. These types of applications are usually automated but can also be manual. A single or two-speed feeding system is used to either add weight to or remove weight from the scale. The terminal monitors the change in weight and compares it to a previously entered target and other control parameters.

The following definitions explain some terms used in Material Transfer applications:

|	
Abort	After a target comparison process has been paused, it can be totally stopped by pressing the Abort softkey ⊗ under the Target Control softkey ⇌ or by triggering a Target Pause/Abort discrete input. If abort is selected, the target comparison process is aborted.
Coincidence Outputs	A coincidence output is always active and does not require a start or stop signal. If the weight on the scale is below the target minus the spill value, the outputs are "on". If the weight is above the target minus the spill value, the outputs are "off". This type of output typically requires external logic to provide the required control for feeding systems.
Concurrent Outputs	This describes the operation of the feed output in a 2-speed feeding system. If the feeder type is programmed as concurrent, the feed output will turn on when the fast feed output turns on and continue to operate until the weight reaches the target minus the spill value. Both the fast feed output and the feed output are active at the beginning of a target comparison. It is the opposite of independent outputs.
Fast Feed Output	This refers to the physical output connection that is used for the faster feed in a 2-speed feeding system. This output is not used in a single speed feeding system.
Feed Output	This refers to the physical output connection that is used for the slower feed in a 2-speed feeding system or the only feed output in a single speed feeding system.
Fine Feed	The value entered for the amount of material that will be fed in the slower rate of feed in a 2-speed feeding system. This value and the spill value are subtracted from the target to determine the point that the fast feed output turns off.

Independent Outputs	This describes the operation of the feed output in a 2-speed feeding system. If the feeder type is programmed as independent, the feed output does not turn on until the fast feed output turns off. Only one feeder speed is active at a time. It is the opposite of concurrent outputs.
Latched Outputs	Latched outputs turn off at the target weight minus the spill value and remain off (regardless of additional weight changes) until a "start" signal is received. These types of outputs do not usually require external logic to perform standard weigh-in or weigh-out sequences.
Material Transfer Mode	The target comparison mode that provides control for delivering a measured amount of material from one container or vessel to another. The transfer can apply to material entering or leaving a container or vessel. It includes the traditional terms such as weigh-in, weigh-out, filling, and dosing.
Pause	A pause function is provided in target comparison control in case a target comparison must be temporarily paused. This can be done by pressing the Pause softkey ⊗ under the Target Control softkey ⇄↓ or by triggering a discrete input programmed as Target Pause/Abort. When paused, power is removed from the Feed and Fast Feed (if used) discrete outputs. After a target comparison has been paused, the process can either be resumed or aborted.
Resume	After a target comparison process has been paused, it may be resumed by pressing the Resume softkey ◇ or by triggering a discrete input programmed as Target Start/Resume. When a target comparison is resumed, it continues to use the original target values.
Spill	The amount of material that will be added (on a weigh-in) or removed (on a weigh-out) from the scale after the final feed is turned off. In a weigh-in process, this is the material in suspension that will still fall onto the scale when the feed is turned off. This value is subtracted from the target value to determine when the feed output turns off.
Start	When using latched targets, the default condition is with the latch set or in the "off" condition. To turn any outputs "on", a start signal is required. This could be the Start softkey ◇, a discrete input programmed as Target Start/Resume, or via the Target Control softkey ⇄↓.
Target	The target is the weight value that is the end goal of the material transfer process. If a container should be filled with 10 kg of material, the target value is 10 kg.
Tolerance	The weight range above and below the target value that will be acceptable as an "in tolerance" target comparison. The tolerance can either be entered as a weight deviation from the target or a percentage deviation from the target depending upon setup.

Target Control

Two different levels of target control are provided by the terminal for the Material Transfer mode. Latching outputs must be enabled to utilize either type of

automated control. For simple applications, only the START softkey ◇ is needed to begin the target comparison process. No other control is provided. The comparison runs to completion then the latch sets the outputs FALSE until the START softkey ◇ is pressed the next time.

For those applications where more control is needed for an occasional pause or to abort a comparison process, the TARGET CONTROL softkey ⭭ is used. Pressing the TARGET CONTROL softkey provides a dedicated display for the target comparison with the comparison status and appropriate softkeys shown. Possible status modes are "Ready", "Running" or "Paused". The appropriate control softkeys include START ◇, PAUSE ⬡ and STOP ⬣.

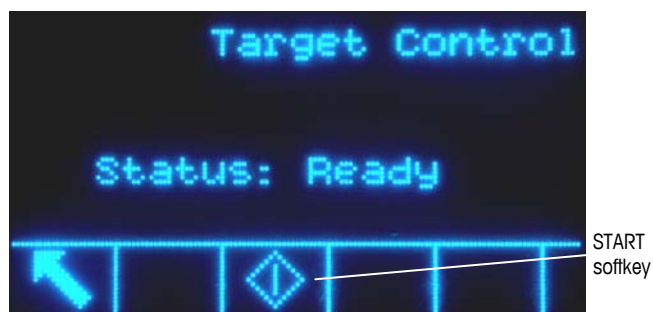An example of each target control display is shown in Figure 2-9, Figure 2-10 and Figure 2-11.

START softkey

Figure 2-9: Example of Ready State in Target Control

PAUSE softkey

Figure 2-10: Example of Running State in Target Control

RESUME (START) softkey

ABORT (STOP) softkey

Figure 2-11: Example of Paused State in Target Control

Over/Under Applications

If the target comparison of the IND560 will be used to checkweigh the weight of a product, the application can be classified as an Over/Under application. These types of applications are usually manual processes but can also be automated. The SmartTrac display indicates the classification of the weight placed on the scale and discrete I/O can be used to trigger external lights or other controls. The terminal compares the current weight to a previously entered target with tolerance values or to zone limits and indicates the results. The following definitions will explain some terms used in Over/Under applications. The following definitions apply to over/under applications:

Over Limit	If a tolerance mode of "Weight value" is selected in setup, the IND560 does not require the entry of a target value. In this mode, only the upper and lower limits for the OK zone are entered. When programmed for this mode, the over limit value is the maximum weight that will be classified as OK. Any weight above than this value will be classified as Over.
Over/Under Mode	The target comparison mode that provides three zone classifications for weight placed on the scale. The classification can be Under if the weight is below the target minus the − tolerance, OK if within the tolerance range or Over if the weight is above the target plus the + tolerance.
Target	The target is the ideal weight value for the product being tested. If a container should weigh exactly 10 kg, the target value is 10 kg.
Tolerance	The weight range above and below the target value that will be acceptable as "OK" in the target comparison. The tolerance can either be entered as a weight deviation from the target, a percentage deviation from the target or as absolute weight (zone edges) depending upon setup.
Under Limit	If a tolerance mode of "Weight value" is selected in setup, the IND560 does not require the entry of a target value. In this mode, only the upper and lower limits for the OK zone are entered. When programmed for this mode, the under limit value is the minimum weight that will be classified as OK. Any weight below than this value will be classified as Under.
Zones	The IND560 provides 3 different classifications or "zones" in the Over/Under mode. The zones are Under, OK and Over.

Target Comparison Parameter Entry

To enter target comparison parameters, either edit the active records directly or load them with data from a record in the Target Table.

Direct Editing of Active Records

To edit an active record directly:

1. Press the TARGET softkey ⊕. (Refer to the **IND560 Technical Manual**, Chapter 3.0, Configuration, the Terminal section, Softkeys, for information about how to setup softkey display.) The Active Values screen displays.

2. Use the UP and DOWN navigation keys to scroll through the fields available for editing.

3. Press the ENTER key to select a field to edit.

4. Depending whether the mode is material transfer or over/under, and the type of tolerance selected, the active target record will show different fields to edit. Use the navigation and numeric keys to enter values for all of the fields as needed.

Material Transfer, Either Mode	Over/Under	
	Weight Deviation or % of Target	Weight Value
Target	Target	Over Limit
Spill	+ Tolerance	Under Limit
Fine Feed	- Tolerance	
+ Tolerance		
- Tolerance		

5. Use the alpha keys to enter a description.

6. Press the OK softkey $\overset{OK}{\checkmark}$ to accept the edits to the active record.

7. Press the ESCAPE softkey (Esc) to return to the weighing operation screen without saving the active record edits.

Loading Records from the Target Table

The Target Memory softkey ⬖ can be used in two ways to load records from the Target Table: Quick Access and List Selection.

Quick Access to Records

Use the Quick Recall mode when the ID of the Target Table record to be loaded is known. Use the numeric keypad to enter the ID and then press the Target Memory softkey ⬖ to load the record. If the record is available, the data is loaded. If the record is not found, an "ID not found" error displays.

List Selection

Use the List Selection mode when the ID of the Target Table record is unknown. To use the List Selection mode:

1. Press the Target Memory softkey ⬖ without any preceding data entry. The Target Search screen displays.

2. Enter any search restrictions required or leave selections as they are to retrieve all records.

3. Press the SEARCH softkey to view the selected records in the table.

4. Use the UP and DOWN navigation keys to scroll through the list until the desired record is highlighted.

5. Press the OK softkey $\overset{OK}{\checkmark}$ to load the selected record from the list.

6. Press the ESCAPE softkey (Esc) to return to the weighing operation screen without loading the record.

Record Selection Using Shared Data

Alternatively, the Shared Data server can be used to activate target records stored in the Target Table. Refer to the Shared Data Access section of Appendix D, Communications, and the Shared Data Reference found on the documentation CD for specific instructions.

Target Units

If second and/or third units are established in the IND560, target records that utilize either second or third units can be retrieved from the Target Table into Active Target status. The IND560 will convert the retrieved record into active units when the record is recalled. Pressing the TARGET softkey ⊕will show the original units as recalled from the Target Table.

If an attempt is made to retrieve a record from the Target Table that does not use primary, second or third units, a "Units Mis-match" error will display indicating that record recall was unsuccessful.

Comparators

Comparators are simple targets, five of which can be configured in setup. They are controlled either by coincidence or by comparison with a range. The source for comparison can be the Gross Weight, Displayed Weight, Rate or assigned by a custom TaskExpert application. When assigned to the home screen, the Comparator softkey →|← permits direct access to the Comparators. This screen displays each Comparator's ID, Description, Limit, Unit, High Limit (if applicable) and Active operator. Only the limit value/s can be edited. To edit parameters other than limits, the Comparator configuration screen must be accessed in setup.

To access a comparator's limit editing page directly from the home screen, press the ID number of the Comparator, then the Comparator softkey. If the ID number is not known, press the Comparator softkey →|←, use the UP/DOWN keys to select the desired Comparator from the list, and press the Edit softkey ✎.

◀ For Range comparators, the value for the High Limit must always be greater than the Limit value.

When the Active value is <, <=, =, >= or >, the selected source is compared to a target weight. When the Active value is within (>_ _<) or outside (_< >_) a range, the selected source is compared to a range defined by the Limit and High Limit values.

Using Comparators

To use a Comparator, it **must** be assigned to a discrete output.

Target Value Comparators

In this case, the output will be triggered depending on the Active setting. For example, if the Active operator is <= (less than or equal to) and the Limit is 1000 kg, the output will turn off when the measured value reaches 1000 kg.

Range Comparators

In the case of a Range mode Comparator, the Limit value sets the lower of the two rates that define the range, within or outside (depending on the operator) which the output is active. For example, if the Active operator is Within (>_ _<), the Limit is 3.0 kg/sec and the High Limit is 8 kg/sec, the output will be active provided the rate remains between 3 and 8 kg/sec. If the rate falls below 3 or exceeds 8 kg/sec, the output will turn off.

◀ Note that the Rate value configured in setup at Scale > Rate permits weight and time units to be defined, together with the period between measurements and the number of measurements to average to generate the output value.

◀ If the weight information in the terminal becomes invalid, the Rate display will show 0.000.

A Range Comparator can also use displayed or gross weight as its source. For example, if displayed weight (possibly a net value, allowing for the weight of a hopper) is the source, the Active operator is Outside, and the Limit and High Limit are 1000 kg and 1500 kg respectively, the output will remain active as long as the source value is below 1000 kg. In this case a large enough value for the High Limit should be set to ensure that, once the Limit is reached and the output turned off, there is not sufficient spill to reach the High Limit and reactivate the output.

ID Mode

ID Mode is a convenient and simple way of ensuring that a series of a operations is carried out the same way each time. Each step can be accompanied by an on-screen prompt that instructs the operator to perform an action, or by a message indicating that the terminal is carrying out a function. These steps may include data entry (using the numeric keypad, alphanumeric keys, or some other input such as a barcode scanner) and actions (such as placing a package on the scale, taking a tare, or printing a ticket for the transaction). When a step is completed, pressing the ENTER key moves to the next one.

As many as 20 steps may be programmed, and the sequence can be triggered in one of two ways:

- **Manually**, using the ID softkey **ID**
- **Automatically**, by threshold and reset weight readings from the scale

If the sequence is triggered **manually**, it may be programmed to loop, repeating all steps until either the BACK softkey ◥ is pressed, or an ESC softkey $\boxed{\text{Esc}}$ is pressed while an alphanumeric entry field is selected.

When ID mode is set to function **automatically**, placing on the scale a weight that exceeds a pre-configured threshold value initiates the sequence. When all the steps have been performed and the weight is removed, the reading from the scale falls below a reset value. At this point the terminal is ready to begin the next ID sequence.

For details on ID mode configuration, refer to Chapter 3.0, Configuration, of the **IND560 Technical Manual**.

SmartTrac™

SmartTrac is a graphical display visualization of either the gross or net weight as selected in setup. SmartTrac on the IND560 uses a bar graph visualization type for Material Transfer mode and a three-zone graphic for Over/Under mode.

Material Transfer Mode

The operator adds material until the measured value is within an acceptable tolerance limit. Normally an operator will add material quickly when the container is not nearly full and more slowly as the target value approaches.

The SmartTrac display may be configured in setup as Small, Medium or Large. Each size provides different target and weight information on the display. Figure 2-12 shows the small size, Figure 2-13 shows the medium size, and Figure 2-14 shows the large size.

Figure 2-12: Material Transfer SmartTrac, Small

Figure 2-13: Material Transfer SmartTrac, Medium

Figure 2-14: Material Transfer SmartTrac, Large

While the bar graph display appears to be one continuous bar graph, it can actually be broken into four separate sections or ranges. Depending upon the target and tolerance values used, there could be one, two, or three speeds at which these graphical sections are filled in. Figure 2-15 illustrates the ranges.

Figure 2-15: SmartTrac Bar Graph Display Ranges

Under Tolerance

The Under Tolerance range is labeled "A" in Figure 2-15. This range represents the amount of material from 10% of the target value to the target minus the negative tolerance value. The bar graph begins to fill the "A" range when more than 10% of the target has been added. Until the 10% point is reached, no fill is shown.

Acceptable Under Tolerance

Region B in Figure 2-15 represents the zone of acceptable tolerance below the target value.

On Target

When the measured value exactly equals the target value an unfilled triangle indication displays (Figure 2-16).

Figure 2-16: On-Target Triangle

Acceptable Over Tolerance

Region C in Figure 2-15 represents the zone of acceptable tolerance above the target value.

Over Tolerance

Region D in Figure 2-15 represents the zone of unacceptable tolerance above the target value. In Region D, the fill rate reverts to the same rate as used in Region A. If the measured value is large enough that the number of dot columns required for display exceeds the number available, the display saturates. Further increases in the measured value do not affect the graphical display.

Over/Under Mode

There are three sizes of Over/Under SmartTrac selectable in setup. Each size provides different target and weight information on the display. Figure 2-17 shows the small size, Figure 2-18 shows the medium size, and Figure 2-19 shows the

large size. Note that Figure 2-17 shows a composite display with under, OK and over graphics displayed simultaneously.


Weight display

SmartTrac

Figure 2-17: Over/Under Display, Small

Weight display

SmartTrac

Target description

Target weight

Figure 2-18: Over/Under Display, Medium

SmartTrac

Target description

Upper tolerance value

Target weight

Lower tolerance value

Figure 2-19: Over/Under Display, Large

Less than 10% of Target

Until the weight on the scale reaches 10% of the target value, the Under symbol is shown as a dashed line symbol ⟨⟨⟨ or ▽ and the discrete outputs are disabled. The Under zone symbol becomes solid and the discrete outputs become active when more than 10% of the target has been added.

Under Zone

The Under zone is shown in Figure 2-17 as the symbol to the left and also in Figure 2-18. This zone classification is shown when the weight on the scale is greater than 10% of the target but less than the target value minus the -tolerance value. If a discrete output has been assigned to the Under Zone, that output will be "on" when the weight is in this zone.

OK Zone

When the weight on the scale is between the target minus the -tolerance and the target plus the +tolerance, the OK symbol is shown. This symbol is the same

symbol for all sizes of SmartTrac and shown in Figure 2-17 as the center symbol. If a discrete output has been assigned as Tolerance - OK, that output will be "on" when the weight is in this zone.

Over Zone

The Over zone is shown in Figure 2-17 as the symbol to the right and also in Figure 2-19. This zone classification is shown when the weight on the scale is greater than the target value plus the +tolerance value. If a discrete output has been assigned to the Over Zone, that output will be "on" when the weight is in this zone.

Time and Date

Time and date are used for reporting, error and transaction log timestamps, and triggering service events. The Time & Date softkey ⌚ enables access to the Set Time & Date screen where the user can set the time and date, including the hours, minutes, day, month, and year. When the time is set, seconds are set to 0.

Although the format for the time and date can be selected according to local preferences, the use of a timestamp in log files is not selectable. Timestamp formats are always fixed as:

Date: YYYY/MM/DD (for example, July 23, 2005 becomes the fixed format date 2005/07/23)

Time: HH:MM:SS stored in 24 hour format (for example, 10:01:22 PM becomes the fixed format time 22:01:22)

Reports

Reports may be generated, viewed, and printed from database tables including:

- Alibi Memory (view only)
- Tare Table
- Target Table

The REPORTS softkey ▤ must display on the operational screens to generate table reports. Otherwise, table reports can only be generated from within setup.

To generate a report:

1. Press the REPORTS softkey ▤. The Reports screen displays (see Figure 2-20).

Figure 2-20: Reports Screen

2. Use the UP and DOWN navigation keys to select the desired type of database table report in the selection box.

3. The CLEAR TOTALS softkey $C\ast$ displays when the Tare Table is selected that has totals enabled in setup. If Clear after Print is enabled in setup for the selected table, the CLEAR TOTALS softkey $C\ast$ does not display. Press the CLEAR TOTALS softkey $C\ast$ to clear the totals in the selected table. A warning displays that requires verification that the user wants to clear the table totals.

4. Press the PRINT softkey on this screen to print the entire selected report.

5. Press the EXIT softkey to return to the home screen.

6. Press the VIEW TABLE softkey to select a sub-set of records from the table. The Search Screen for the selected report type displays (see Figure 2-21).

Figure 2-21: Search Screen (Tare Table)

7. Press the SEARCH softkey to view all data in the table. Only fields enabled in setup display in tables.

8. To limit the data

   A. Use the Search Field selection box to select a desired search field (for example, search fields for the Tare table include Description, ID, n, Tare, and Total).

   B. Use the Comparison selection box to select how the data will be limited. Available options are: Less than ($<$), less than or equal to ($<=$), equal to ($=$), greater than or equal to ($>=$), greater than ($>$), and not equal to ($<>$).

   C. Use the numeric keypad to enter the limiting factor in the text box (the * character is the "wild-card" character and returns all results).

   D. Press the SEARCH softkey to view the limited data in the table. Search result records are always listed in order by ID (lowest to highest ID

numbers). Figure 2-22 is an example of search results for a Tare Table, with three views showing all available columns of data.

Figure 2-22: Tare Table Search Results

Calibration Test

The IND560 terminal provides a programmable Calibration Test sequence that can contain up to 25 individual steps. The Calibration Test is designed to lead the tester through a set of predetermined steps and compare the terminal calibration with known test weights.

The test is accessed by pressing the CALIBRATION TEST softkey ⬚ ↓ on the home page. A screen displays where the name of the tester can be recorded and the serial number and capacity of each of the test weights used can be entered. This provides a traceable record for the calibration test.

The calibration test is started by pressing the START softkey ◇. A display is shown that provides the active scale weight, the target and tolerance weight values, and two lines of instructions (as to where to place the weights). When the tester completes these instructions, he or she presses the OK softkey ✓ and the terminal compares the actual weight on the scale to the programmed target weight for this step. If the comparison passes, the test continues to the next step. If it fails,

a message displays that indicates a failure. After acknowledging the error, the tester can abort the test, retest this step, or skip this step knowing that it failed.

At the end of the complete test, a print can be initiated that prints all the data of the calibration test. A full description of the calibration test can be found in Chapter 3.0, Configuration, of the **IND560 Technical Manual**.

CalFREE™

The IND560 terminal provides a programmable Calibration Test sequence that can contain up to 25 individual steps. The Calibration Test is designed to lead the tester through a set of predetermined steps and compare the terminal calibration with known test weights.

Alibi Memory Direct Access

The Alibi Memory stores transaction data that can be retrieved in order to verify transaction information.

The information stored in the Alibi Memory includes:

- Transaction counter value
- Date and time of transaction
- Gross, net, and tare weights including units of measure

To view and print the Alibi Memory:

1. Press the Alibi softkey **Alibi** if programmed as one of the home position softkeys or press the REPORTS softkey if programmed as one of the home position softkeys then select Alibi Memory from the selection box.

2. Press the VIEW TABLE softkey . The Alibi Search View screen displays.

3. Use the selection boxes and data entry fields to enter specific search information to limit the search, or do not enter any search limits to view all Alibi Memory Table information.

4. Press the START SEARCH softkey . The Alibi Search View screen displays the search results. Records are ordered by date and time with the most recent record shown last.

5. Press the PRINT softkey on this screen to print the entire selected Alibi Memory Table.

Table Searches

Searching a table can be accessed by various methods including the TARE MEMORY softkey , TARGET MEMORY softkey , ALIBI softkey **Alibi**, REPORTS softkey , and from the menu tree.

To search a table:

1. Access the table to be viewed using the appropriate method. Refer to the **IND560 Technical Manual**, Appendix C, Table and Log File Structure for more information about how to access specific tables.

2. Press the VIEW TABLE softkey ⌕▤. The Search View screen displays.

3. Use the selection and data entry boxes to enter specific search information to limit the search, or enter * (the "wild-card" character) to view all table information.

4. Press the START SEARCH softkey 🔍🔍. The Search View screen displays with the search results.

Remote Display

When properly configured, the IND560 can function as a remote display for another IND560 terminal or for another Mettler Toledo terminal capable of handling Mettler Toledo Continuous Output. If the Remote IND560 will be used to issue simple commands to another terminal (referred to as the Master terminal), the Master must be able to accept command Inputs (CPTZ).
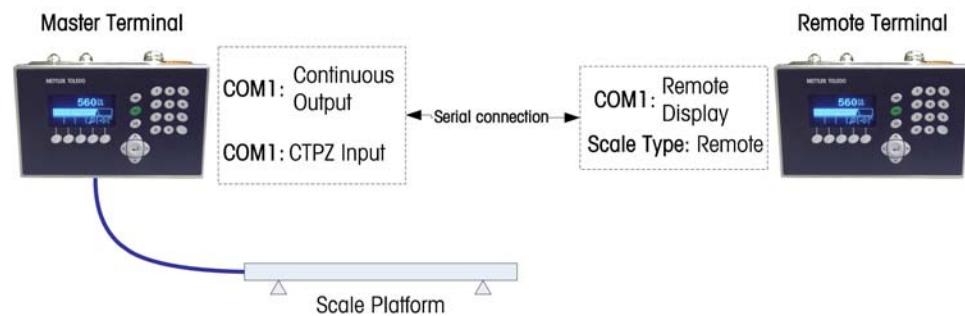
Figure 2-23: Example of Terminal Configuration for Remote Display Function

Chapter 3.0

Service and Maintenance

This chapter covers

- Service
- Cleaning and Maintenance
- Upgrading Firmware
- Troubleshooting

Service

The IND560 terminal is designed to be virtually error-free and reliable. If problems do occur, METTLER TOLEDO recommends that service be performed only by qualified, trained personnel. To assist in this repair, record as much information as possible about what has happened, including any error messages and physical responses of the terminal and/or scale.

Information on installing, programming, and servicing the IND560 terminal is available in the **IND560 Terminal Installation Manual** and **Technical Manual**. Only qualified personnel should perform installation, programming, and service. Please contact a local METTLER TOLEDO representative for assistance.

In general, once the IND560 is installed, programmed, and calibrated for a given application, no other routine service is required.

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

⚡ **WARNING!**
IF THE KEYBOARD, DISPLAY LENS OR ENCLOSURE IS DAMAGED ON A DIVISION 2 APPROVED OR CATEGORY 3 MARKED IND560 PANEL-MOUNT OR HARSH TERMINAL THAT IS USED IN A DIVISION 2 OR ZONE 2/22 AREA, THE DEFECTIVE COMPONENT MUST BE REPAIRED IMMEDIATELY. REMOVE AC POWER IMMEDIATELY AND DO NOT REAPPLY AC POWER UNTIL THE DISPLAY LENS, KEYBOARD OR ENCLOSURE HAS BEEN REPAIRED OR REPLACED BY QUALIFIED SERVICE PERSONNEL. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

Cleaning and Maintenance

Clean the IND560 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 IND560 is a rugged stainless steel enclosed instrument; however, the font panel is a vinyl covering over sensitive electronic switches and a lighted display. Care should be taken to avoid any punctures to this surface or any vibrations or shocks to the instrument. Should the front panel become punctured, ensure that steps are taken to prevent dust and moisture from entering the enclosure until the terminal can be repaired.

Upgrading Firmware

The InSite™ configuration tool program is used to flash new terminal software through the COM1 serial port or Ethernet port. The software update and the InSite configuration tool program must be saved on a PC that will be connected to the terminal for software flashing. Refer to the **IND560 Technical Manual**, Chapter 4.0, **Service and Maintenance**, for detailed procedures for upgrading firmware.

Troubleshooting

Troubleshooting activities for the IND560 include an AC power test.

AC Power Test

If the display is blank or if intermittent problems are occurring, the condition of the AC power source should be checked by a qualified electrician. Use a multi-meter to check the AC input power. Input power must be within −15% to +10% of the standard 100–240 voltage range. Refer to the **IND560 Technical Manual**, Chapter 4.0, **Service and Maintenance**, Troubleshooting for detailed AC Power Test procedures.

If the AC power input is confirmed as acceptable, contact your local authorized METTLER TOLEDO service representative to have the IND560 terminal serviced.

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