Technical Manual

IND560x

Weighing Terminal

METTLER TOLEDO

IND560x Weighing Terminal

METTLER TOLEDO Service

Essential Services for Dependable Performance of Your IND560x Weighing Terminal

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 service agreement tailored to your needs and budget. Further information is available at www.mt.com/service.

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.
    d. **GWP® Verification**: A risk-based approach for managing weighing equipment allows for control and improvement of the entire measuring process, which ensures reproducible product quality and minimizes process costs. GWP (Good Weighing Practice), the science-based standard for efficient life-cycle management of weighing equipment, gives clear answers about how to specify, calibrate and ensure accuracy of weighing equipment, independent of make or brand.

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 expense.

- Declaration of Conformity is located on the documentation CD.

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

NOTE ON FIRMWARE VERSIONS

This manual describes features and functions of the IND560x terminal with version **4.xx** firmware. Terminals with other versions of firmware may differ in some areas.

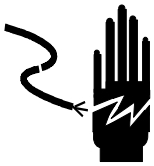
Statement regarding harmful substances

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.

Warnings and Cautions

- READ this manual BEFORE operating or servicing this equipment and FOLLOW these instructions carefully.
- SAVE this manual for future reference.

	**⚠ WARNING**
	DO NOT INSTALL OR PERFORM ANY SERVICE ON THIS EQUIPMENT BEFORE THE AREA IN WHICH THE IND560x IS LOCATED HAS BEEN SECURED AS NON-HAZARDOUS BY PERSONNEL AUTHORIZED TO DO SO BY THE RESPONSIBLE PERSON AT THE CUSTOMER'S SITE.
	**⚠ WARNING**
	NOT ALL VERSIONS OF THE IND560 ARE DESIGNED FOR USE IN HAZARDOUS (EXPLOSIVE) AREAS. REFER TO THE DATA PLATE OF THE IND560 TO DETERMINE IF A SPECIFIC TERMINAL IS APPROVED FOR USE IN AN AREA CLASSIFIED AS HAZARDOUS BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES.
	**⚠ WARNING**
	USE THE WEIGHING TERMINAL ONLY WHEN ELECTROSTATIC PROCESSES LEADING TO PROPAGATION BRUSH DISCHARGE IS IMPOSSIBLE.
	**⚠ WARNING**
	AVOID ELECTROSTATIC CHARGING DURING OPERATION AND MAINTENANCE.
	**⚠ WARNING**
	OPERATION IS ONLY PERMITTED WHEN OPERATIONAL AND PROCESS-RELATED ELECTROSTATIC CHARGES ARE ELIMINATED.
	**⚠ WARNING**
	KEEP THE TERMINAL AWAY FROM PROCESSES THAT GENERATE HIGH CHARGING POTENTIAL SUCH AS ELECTROSTATIC COATING, RAPID TRANSFER OF NON-CONDUCTIVE MATERIALS, RAPID AIR JETS, AND HIGH PRESSURE AEROSOLS.
	**⚠ WARNING**
	DO NOT USE DRY CLOTH TO CLEAN THE WEIGHING TERMINAL. ALWAYS USE A DAMP CLOTH TO CLEAN THE TERMINAL GENTLY.
	**⚠ WARNING**
	WEAR SUITABLE CLOTHING. AVOID NYLON, POLYESTER OR OTHER SYNTHETIC MATERIALS THAT GENERATE AND HOLD CHARGE. USE CONDUCTIVE FOOTWEAR AND FLOORING.

	**⚠ WARNING** **AVOID PLASTIC COVERS OVER THE TERMINAL.**
	**⚠ WARNING** **ENSURE PROPER EQUIPOTENTIAL GROUNDING OF THE TERMINAL, MOUNTING ACCESSORIES, AND THE SCALE BASE.**
	**⚠ WARNING** **IF THE IND560x KEYBOARD, DISPLAY LENS OR ENCLOSURE IS DAMAGED, THE DEFECTIVE COMPONENT MUST BE REPAIRED IMMEDIATELY. REMOVE POWER IMMEDIATELY AND DO NOT REAPPLY 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** **ONLY THE COMPONENTS SPECIFIED IN THIS MANUAL CAN BE USED IN THIS DEVICE. ALL EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS DETAILED IN THIS MANUAL. INCORRECT OR SUBSTITUTE COMPONENTS AND/OR DEVIATION FROM THESE INSTRUCTIONS CAN IMPAIR THE INSTRINSIC SAFETY OF THE TERMINAL AND COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.**
	**⚠ WARNING** **TO PREVENT IGNITION OF HAZARDOUS ATMOSPHERES, DISCONNECT THE IND560x FROM ITS POWER SOURCE BEFORE OPENING THE ENCLOSURE. KEEP COVER TIGHTLY CLOSED WHILE THE CIRCUIT IS ENERGIZED. DO NOT OPEN WHEN AN EXPLOSIVE DUST ATMOSPHERE IS PRESENT.**
	**⚠ WARNING** **FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD, CONNECT TO PROPERLY GROUNDED POWER SOURCE ONLY. DO NOT REMOVE THE GROUNDING CONNECTION.**
	**⚠ 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.**
	**⚠ WARNING** **ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THE IND560x. 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** **ALL EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS DETAILED IN THIS MANUAL. DEVIATION FROM THE INSTRUCTIONS CAN IMPAIR THE INTRINSIC SAFETY OF THE TERMINAL AND VOID THE AGENCY APPROVAL.**

⚠ 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.

NOTICE

BE CERTAIN THAT THE COMMUNICATION CIRCUITS ARE WIRED EXACTLY AS SHOWN IN THE INSTALLATION SECTION OF THIS MANUAL. IF THE WIRES ARE NOT CONNECTED CORRECTLY, THE IND560x TERMINAL OR INTERFACE BOARD MAY BE DAMAGED.

NOTICE

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

Disposal of Electrical and Electronic Equipment

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.

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1.1. IND560x Overview

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The IND560x represents the latest in METTLER TOLEDO technology and is the most versatile weighing terminal available today. The IND560x is suitable for use in industrial weighing applications inside hazardous (classified) areas. The IND560x terminal has global agency approvals that permit operation within Division 1 or Zone 1/21 hazardous locations.

The IND560x terminal is a high-performance single- or multiple-range weighing terminal designed for use with analog load cells or high-precision IDNet and SICSpro scale interfaces. The IND560x delivers precision measurement data from milligrams to tons in a single cost effective package that easily integrates into existing systems.

Power options include an external power supply that converts high level AC voltage to intrinsically safe DC voltages and is still suitable for installation inside the hazardous area. An external battery for use in mobile applications is also available for use with the harsh/analog model of the IND560x.

PLC and PC communication interfaces are available through easy to install safe area communication modules. Internal and remote digital I/O options provide control for process applications such as filling. The versatile IND560x can be upgraded with a variety of special application software packages that add performance features where needed. These features make the IND560x the perfect match for nearly any weighing application in many industries, including:

- Pharmaceuticals
- Petrochemicals
- Refining
- Milling
- Agriculture
- Cosmetics and Fragrance
- Specialty Chemical
- Coatings and Inks

1.2. IND560x Terminal Versions

Figure 1-1: Harsh (left) and Panel Mount (right) Enclosures for the IND560x

The IND560x terminal is available in the following versions:

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

1.3. Standard IND560x Features

- Basic weighing in hazardous (explosive) areas including zero, tare and printing
- Panel-mount or harsh desk/wall-mount enclosures
- Connect one analog load cell scale base (or up to four 350 ohm load cells), or an IDNet or SICSpro base depending upon the version of the IND560x
- 128 × 64 dot-matrix graphic backlit liquid crystal display (LCD) with 21mm high weight display
- Real-time clock (battery backup)
- Includes one intrinsically safe serial port (COM1) for asynchronous, bidirectional communication and print output
- Operates with the intrinsically safe APS768x or PSUx power supply. An external NiMH battery pack is available for use with the harsh/analog model
- Supports the following internal option boards:
  - Discrete I/O Interfaces

    Dual channel intrinsically safe current loop interface
    or
    Dual channel fiber optic interface

- Support for the following options utilizing the ACM500 communication module in the safe area:
  - Analog Output
  - EtherNet/IP™
  - Allen-Bradley® RIO
  - Ethernet TCP/IP with two serial ports (Ethernet/COM2/COM3)
  - DeviceNet™
  - PROFIBUS® DP
  - Modbus TCP
- ID mode for prompted transaction sequencing
- Selectable over/under classifying mode of operation
- Selectable material transfer mode for simple filling or dosing
- SmartTrac™ graphical display
- Comparators for simple comparison of weight or rate
- Two memory tables – store 25 Tare 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
  - FillPlus
  - COM-560
  - Drive-560
  - TaskExpert®

For information regarding METTLER TOLEDO Technical Training contact:

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1.4. Warnings and Precautions

Please read these instructions carefully before putting the new terminal into operation.

Although the IND560x is ruggedly constructed, it is nevertheless a precision instrument. Use care in handling and installing the terminal.

⚠ WARNING

DO NOT INSTALL OR PERFORM ANY SERVICE ON THIS EQUIPMENT BEFORE THE AREA HAS BEEN SECURED AS NON-HAZARDOUS BY PERSONNEL AUTHORIZED TO DO SO BY THE RESPONSIBLE PERSON AT THE CUSTOMER'S SITE.

⚠ WARNING

ONLY THE COMPONENTS SPECIFIED IN THIS MANUAL CAN BE USED IN THIS TERMINAL. ALL EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS DETAILED IN THIS MANUAL. INCORRECT OR SUBSTITUTE COMPONENTS AND/OR DEVIATION FROM THESE INSTRUCTIONS CAN IMPAIR THE INTRINSIC SAFETY OF THE TERMINAL AND COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

1.5. Equipotential Bonding (EB)

Equipotential bonding must be installed by an electrician authorized by the owner. METTLER TOLEDO Service performs only a monitoring and consulting function for this procedure.

Connect equipotential bonding of all devices (power supply unit, weighing terminal, interface converter and weighing platform) in accordance with the terminal diagram and all country-specific regulations and standards. In the process, it must ensured that:

- All device housings are connected to the same potential via the EB terminals.
- No circulating current flows via the cable shielding for intrinsically safe circuits.
- The neutral point for equipotential bonding is as close to the weighing system as possible.

1.5.1. Warnings

1.5.1.1. CENELEC

1.5.1.1.1. Connection of EB per Country-Specific Regulations

It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.

1.5.1.2. cFMus

1.5.1.2.1. Connection of EB per ANSI/NFPA 70, Article 504, and ANSI/IA RP 12.06.01 or Canadian Electric Code C22.2

It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.

1.6. Operating Environment

When selecting a location:s

- Use the weighing terminal only when electrostatic processes leading to propagation brush discharge is impossible.
- Keep the terminal away from processes that generate high charging potential such as electrostatic coating, rapid transfer of non-conductive materials, rapid air jets, and high pressure aerosols.
- Choose a stable, vibration-free surface to mount the terminal
- Ensure there are no excessive fluctuations in temperature and no direct exposure to sunlight
- Avoid drafts on the weighing platform (for example, from open windows or air conditioning)
- Calibrate the terminal after any major change of geographical location

1.6.1. Temperature and Humidity

The IND560x can be stored and operated at temperatures and relative humidity conditions as listed in Table 1-1.

1.6.2. Environmental Protection

The IND560x harsh and panel-mount terminals have environmental protection as listed in Table 1-1.

1.6.3. Hazardous Areas

The intrinsically safe IND560x terminal is designed to operate within an area classified as Division 1, Zone 1 or Zone 21.

IMPORTANT: Not all models in the IND560 terminal family can be operated in areas classified as Hazardous because of the combustible or explosive atmospheres in those areas. Before installation, check the data plate of the terminal to confirm it is marked with the approval for the environment in which it will be used.

1.7. 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 IND560x 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 IND560x terminal must be packed correctly to ensure its safe transportation.

The IND560x package should include:

- IND560x Terminal
- Bag of miscellaneous parts

- Printed Installation manual
- Documentation CD
- Gasket (panel-mount only)

1.8. Physical Dimensions

The dimensions for the panel-mount and harsh enclosures of the IND560x terminal are shown below.

1.8.1. Panel-mount Enclosure

The physical dimensions for the panel-mount enclosure of the IND560x terminal are shown in Figure 1-2 in inches and [mm].

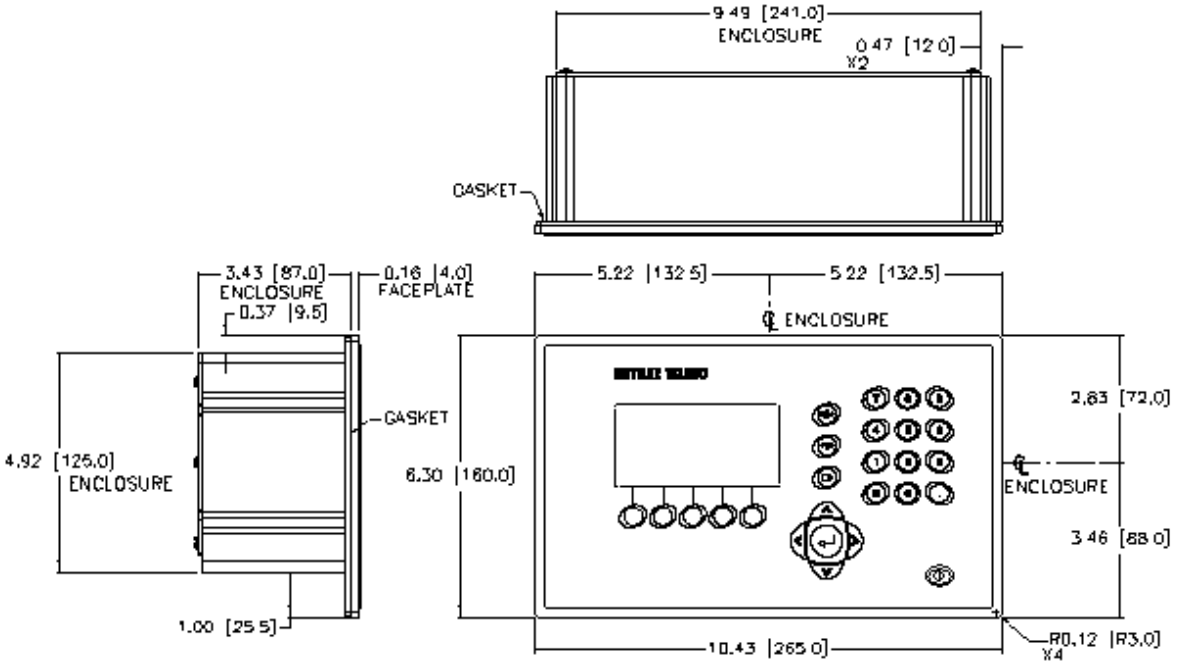


Figure 1-2: IND560x Panel-Mount Enclosure Dimensions

The physical dimensions for the panel cutout of the IND560x terminal are shown in Figure 1-3 in inches and [mm].

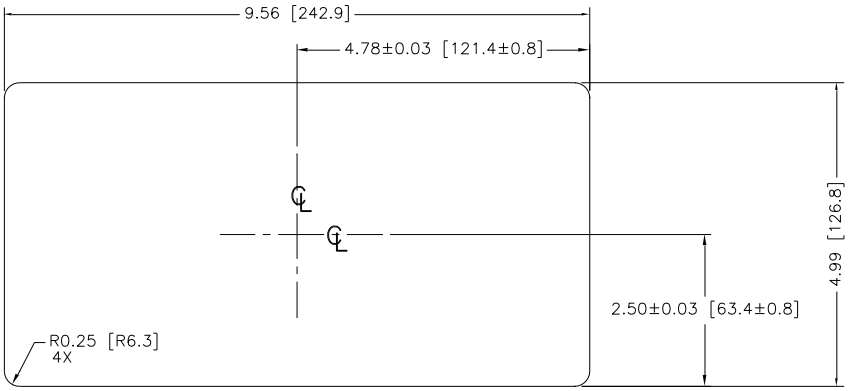


Figure 1-3: IND560x Panel-Mount Cutout Dimensions

1.8.2. Harsh Enclosure

The physical dimensions for the harsh desk and wall-mount enclosures of the IND560x terminal are shown in Figure 1-4 and Figure 1-5, in inches and [mm].

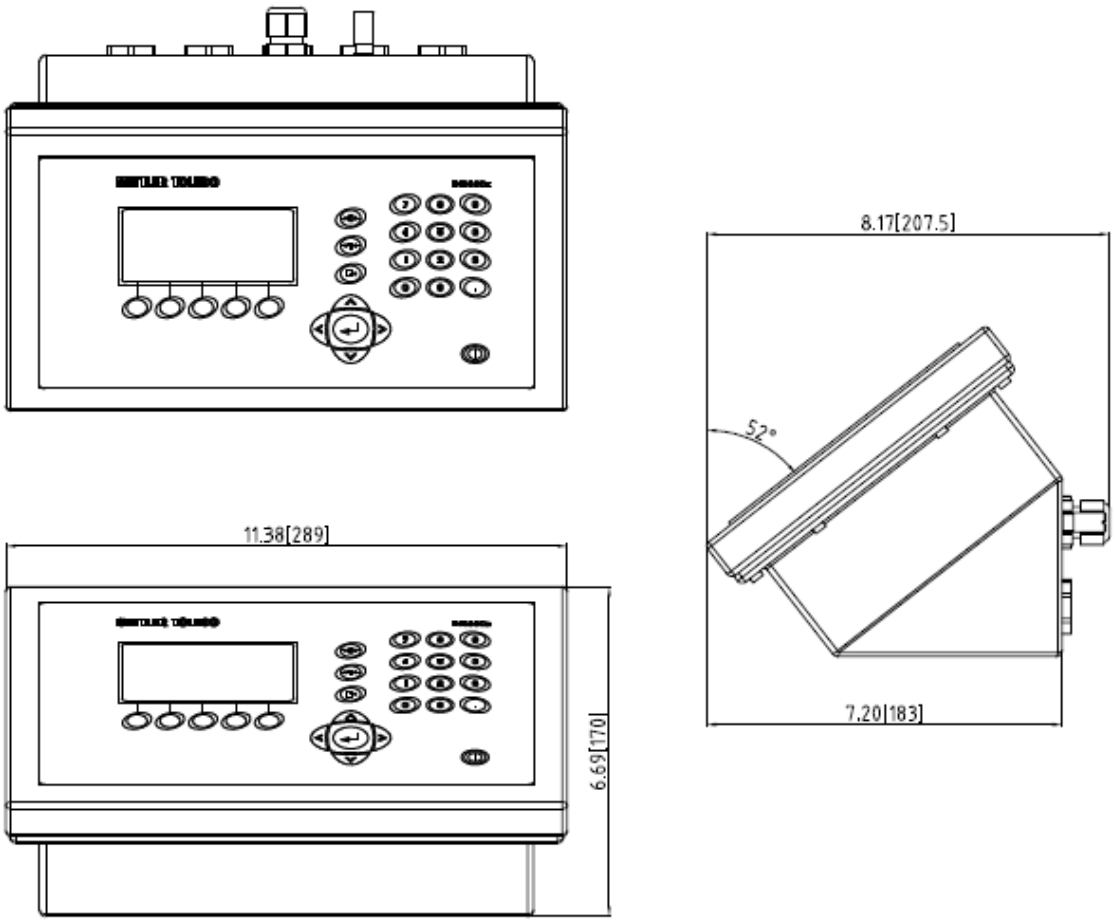


Figure 1-4: IND560x Harsh, Desk Mount Dimensions

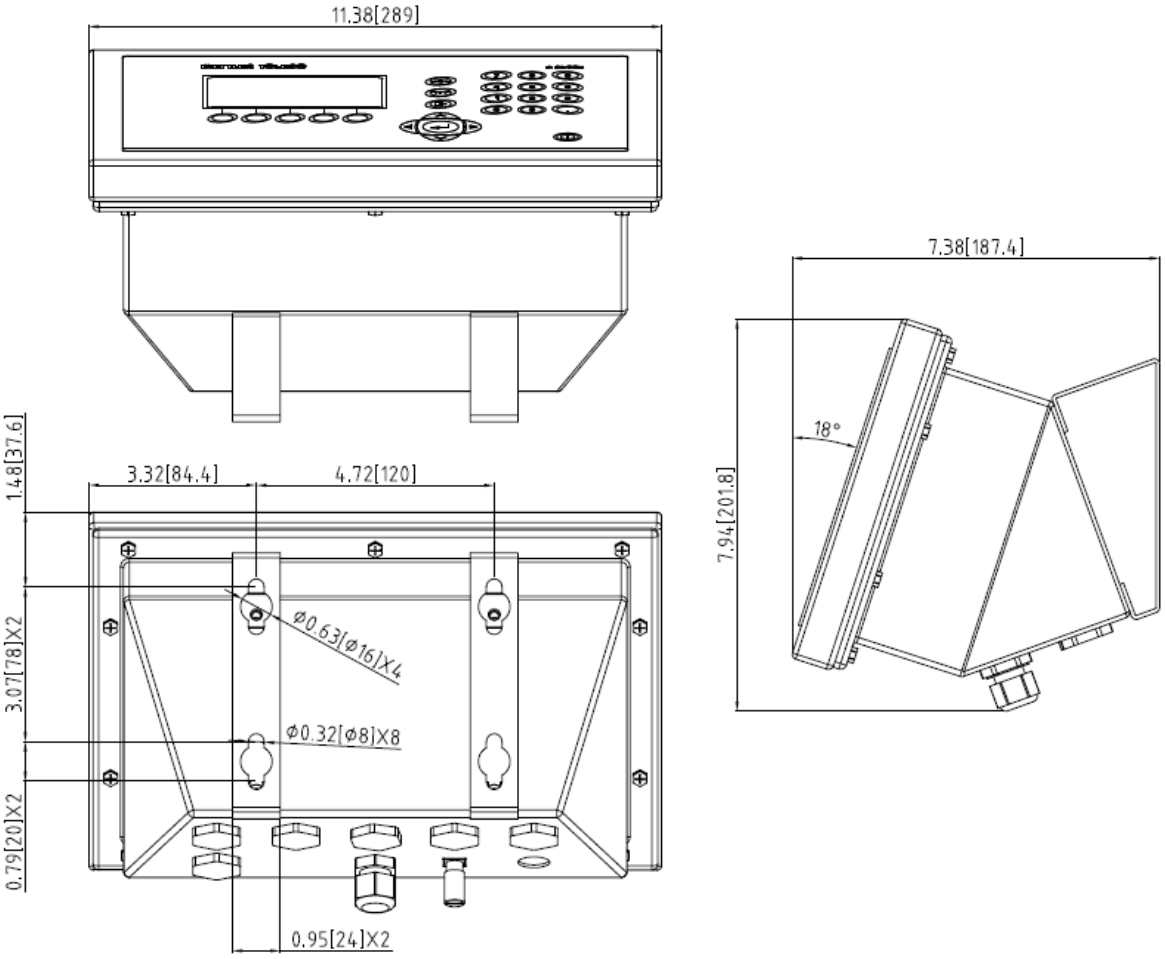


Figure 1-5: IND560x Harsh Wall Mount Dimensions - Shown With Optional Wall Mounting Bracket

1.9. Specifications

The IND560x terminal conforms to the specifications listed in Table 1-1.

Table 1-1: IND560x Specifications

IND560x Specifications	
Enclosure Type	Panel Mount: stainless steel front panel with an aluminum chassis
	Harsh Environment desk/wall/column-mount: type 304L stainless steel enclosure
Dimensions (h × w × d)	Panel Mount: 160 mm x 265 mm × 92 mm (6.3 in. × x 10.4 in x 3.6 in.)
	Harsh Environment: 170 mm × 289 mm × 183 mm (6.7 in. × 11.4 in. × 7.2 in.)
Shipping Weight	3.5 kg (8 lb)

IND560x Specifications	
Environmental Protection	Panel Mount front panel sealing provides IP65 (comparable to TYPE 4 and TYPE 12 protection) - certified by DEKRA EXAM GmbH. Harsh Environment enclosure meets IP65 requirements certified by DEKRA EXAM GmbH, and IP68 and 69K certified by MTLS.
Storage Environment	The terminal can be stored at temperatures ranging from –20°C to 60° C (–4° to 140° F) at 10 to 95% relative humidity, non-condensing.
Operating Environment	The terminal 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	The IND560x is approved for use in Division 1 and Zone 1/21 2 GD hazardous areas. Note that not all models in the IND560 terminal family can be operated in areas classified as Hazardous because of the combustible or explosive atmospheres in those areas. Before installation, check the data plate of the terminal to confirm it is marked with the approval for the environment in which it will be used.
Power	All models of the IND560x can operate with the PSUx or APS768x intrinsically safe power supplies. The PSUx and APS768x both provide several intrinsically safe voltages to the IND560x for its correct operation. The PSUx and APS768x are available in either a 120 VAC or a 230 VAC version. The IND560x harsh/analog model with the IND560x-PAB option installed operates with the METTLER TOLEDO intrinsically safe, external NiMH battery pack (P/Ns 64060627 & 64060625).
Display	128 × 64 dot-matrix graphic LCD display with LED backlight. 21 mm weight digits. Display Update Rate: 10/second
Weight Display	Displayed resolution of 100,000 counts for analog load cell scales. Display resolution for high-precision IDNet and SICSpro bases is determined by the specific base used.
Scale Types	Analog load cells or High-Precision IDNet, Kx Line (T-Brick Ex T4 type) or High-Precision SICSpro, PBK9/PFK9 Category 2 bases (MPXI load cells) or Point Ex module. SICSpro High-precision platforms that include Advanced Setup Mode. Update rate approximately 50 Hz. NOT COMPATIBLE WITH THE OLDER, PIK EX MODULE.
Number of Analog Cells	Four 350-ohm load cells (87 ohm minimum resistance), 2 or 3 mv/V
Number of Scales	Interface for one analog **or** one IDNet scale or one SICSpro scale
Analog/Digital Update Rates	Internal: Analog: >366 Hz; IDNet: determined by base; SICSpro: 50 Hz for bases that include Advanced Setup Mode Target Comparison: up to 50 Hz; PLC Interface: up to 20 Hz

IND560x Specifications	
Interface and Function Update Rates	Weight display: 10 Hz Internal discrete I/O: 25 Hz External discrete I/O (ARM100): 25 Hz PLC cyclic data: 25 Hz SICS continuous (SIR): 20 Hz MT Continuous Output: 20 Hz Continuous Template (serial): 18 Hz (115.2Kbaud), 14 Hz (38400 baud) Continuous Template (Eprint): 20 Hz
Clock Accuracy	Nominal 2 seconds/day at 25°C consistent room temperature. Nominal 8 seconds/day maximum for the temperature range -10°C to 40°C (14°F to 104°F)
Load Cell Excitation Voltage	5 VDC
Minimum Sensitivity	0.3 μV/e approved
Keypad	26 keys; 1.5-mm thick polyester overlay (PET) with hardcoating. Polycarbonate display lens (PC).
Communications	**Standard Interfaces:** One intrinsically safe RS-232 serial port (COM1), 300 to 115,200 baud **Optional Interfaces:** Ethernet/2 Serial Ports: Ethernet 10 Base-T and two additional serial ports (COM2 and COM3) available with ACM500 in safe area. Optional fiber optic interface communicates to ACM500 or legacy dual channel fiber optic converter. -- or -- Optional dual-channel intrinsically safe current loop interface to ACM500 for PLC interface and/or Ethernet/COM2/COM3. -- or -- Optional dual-channel intrinsically safe current loop interface to one or two ACM200 modules for RS-232 serial port (COM4, COM5) -- or -- IND560x with intrinsically safe interface directly to IND226x with Interface-Remote installed for hazardous area remote display. **Protocols** Serial Inputs: Keypad input, 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 ACM500 in safe area for Ethernet, COM2, COM3 and PLC interface.
PLC Interfaces	Optional Allen-Bradley RIO, PROFIBUS DP, DeviceNet, EtherNet/IP, Modbus TCP or Analog output are available using an expansion slot in the ACM500 (Accessory Communication Module) in the safe area.

IND560x Specifications	
Approvals	**Weights and Measures** USA: 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 Rev 1 Europe: Class II, resolution determined by platform approval; Class III 10,000e; TC6812 Rev 5 **Hazardous Area** U.S.: Certificate FM16US0438X and supplements IS, Class I, II, III; Div 1; Groups A-G T4 Ta=-10ºC to +40ºC, IP65, Type 4 I/1/AEx ib IIC T4 ATEX: Certificate BVS 09 ATEX E 010X and supplements II 2 G Ex ib [op is Ga] IIC T4 Gb II 2 D Ex ib [op is Da] IIIC T60°C Db IP65 Canada: Certificate FM16CA0199X and supplements Class I, II, III; Div 1; Groups A-G T4 Ta=-10ºC to +40ºC, IP65 IECEx: Certificate IECEx BVS 10.0096X and issue numbers Ex ib [op is Ga] IIC T4 Gb Ex ib [op is Da] IIIC T60°C Db IP65

1.10. Manufacture Date

The product manufacturing date or the date code for the terminal can be found on the serial data plate (on the top of the enclosure).

1.11. Main PCB

The IND560x terminal's main printed circuit board (PCB) provides the scale interface for analog load cell, IDNet or SICSpro. The terminal must be ordered with the required scale interface - it cannot be modified later.

Note: Connections for both the Analog load cells and an IDNet/SICSpro base are present on the main board of the IND560x simultaneously. However, only one connection has been enabled in the firmware of the board.

The main board also contains the DC power input connections, keyboard interface, bus connector for the display, bus connector for the discrete I/O option board and a connector for the intrinsically safe current loop or the fiber optic interface board (COM4 and COM5) connections.

An additional option board known as the IND560x-PAB (Power Adapter Board) must be installed onto the main board of the IND560x to make the terminal compatible with the external NiMH battery

pack. The IND560x-PAB can only be used with revision D or higher of the analog version of the main board. Refer to Appendix A, **Installation** for more information regarding the IND560x-PAB.

- Note: The revision level is **not** indicated on the IND560x main board. Revision D (and higher) main boards can be identified by the presence of the W3 jumper. If a main board has a W3 main jumper, it is at least revision D or higher. If the W3 jumper is not present, the main board is lower than revision D and cannot be used with the IND560x-PAB.

1.11.1. Analog Load Cell Scale Base

The IND560x can provide power for up to an 87 ohm load (four 350-ohm analog load cells). A jumper permits configuration for 2mV or 3mV load cells; the 3mV position is selected at the factory. A removable terminal strip is provided for the load cell connection.

- Note: When installed, the IND560x-PAB will cover the mV jumper. Please take this into consideration during installation of the IND560x analog model.

1.11.2. IDNet™ Scale Base

The IND560x supports the newer T-Brick Ex T4 style of intrinsically safe high-precision base through the main board IDNet port. This port provides the power and communication required to operate this newer style base.

- Note: The older PIK Ex module is not supported by the IND560x.
- Note: IND560x IDNet terminals cannot be used with the IND560x-PAB and external NiMH battery pack.

1.11.3. SICSpro Scale Base

The IND560x supports a SICSpro platform through the main board's SICSpro port. The SICSpro interface supports PBK9 and PFK9 high-precision platforms with MPXI load cells. The IND560x SICSpro interface supports only those SICSpro platforms that include the Advanced Setup Mode (ASM).

1.11.4. COM1 Serial Port

The main board also contains the COM1 serial port that provides intrinsically safe RS-232 communication. The port is bidirectional and can be configured and used for various functions such as demand output, SICS host communications, continuous output, ASCII command input (C, T, P, Z), ASCII character input, report printing, Shared Data Server access, or connection with the InSite PC Tool.

- Note: The approval entity parameters for the COM1 serial port must be checked for compatibility with those of the remote device when making direct connections to this port inside the hazardous area. When connecting COM1 to a peripheral in the safe area, a barrier will be required to properly protect the port and ensure safety of the system. Compare entity values of the IND560x terminal and the barrier to confirm safe compatibility before connecting.

1.12. IND560x Options

Some of the options and accessories available for use with the IND560x are described in the following sections. Note that some options require the use of the ACM500 communication module in the safe area.

1.12.1. Hardware Options

The following internal hardware options are available for the IND560x terminal:

- Fiber optic interface to connect to the ACM500 accessory communication module
- Intrinsically safe current loop interface to connect to the ACM500 module or ACM200 module
- Intrinsically safe discrete I/O with 4 inputs and 6 outputs
- IND560x-PAB (Power Adapter Board) to make the IND560x terminal compatible with the external NiMH battery pack

1.12.1.1. Dual Channel Fiber Optic Interface

A dual channel fiber optic interface can be used to connect an IND560x terminal to the ACM500 located in the safe area. This interface also provides connectivity to the older, dual-channel fiber optic converter (from an 8141, 8525, Puma, or ID3sTx installation).

- The fiber optic interface provides one or two channels of communication designed to use a hard clad silica fiber optic cable. High speed transmitters and receivers are used to increase the throughput of data. When combined with the ACM500 communication module and its options, this permits remote (safe area) operation of COM2 and COM3 serial ports, Ethernet and PLC interfaces at distances up to 300 meters (1000 ft.) from the IND560x terminal.
- When used with the standard dual-channel fiber optic converter, this interface provides one or two additional bi-directional serial ports (COM4 and COM5) at the same distance.
- The fiber optic interface can be used to communicate directly between two IND560x terminals in a Master-Remote configuration

NOTE: Plastic core fiber optic cable can be used on short cable runs of 40 m (130 ft) or less.

1.12.1.2. Dual Channel IS Current Loop Interface

Instead of the fiber optic cable interface, an intrinsically safe, dual channel current loop (CL) interface can be used to connect an IND560x terminal to the ACM500 located in the safe area. This interface can also provide connectivity to the ACM200 converter in the safe area. Alternatively, the IND560x can be directly connected to an IND226x terminal acting as a remote display inside the hazardous area. In this scenario, the IND226x must be equipped with the Interface-Remote option.

- The current loop interface provides one or two channels of communication designed to use a copper wire cable. High speed transmitters and receivers are used to increase the throughput of data. When combined with the ACM500 communication module and its options, this permits remote (safe area) operation of COM2 and COM3 serial ports, Ethernet and PLC interfaces at distances up to 300 meters (1000 ft.) from the IND560x terminal.

- When used with the ACM200 safe area communication module, this interface provides an additional serial port (COM4 or COM5) at the same 300 meters (1000 ft.) distance from the IND560x terminal.
- This interface can also be used to operate an IND560x or IND226x terminal as a remote display to the IND560x. The remote terminal can be located up to 300 meters (1000 ft.) distance from the IND560x terminal.

1.12.1.3. Discrete I/O

Discrete I/O interface options include both internal and remote I/O. A maximum of 12 inputs and 18 outputs can be supported through a total of three options (internal and external, combined).

- The internal discrete I/O option is available in three different combinations of active/passive inputs and active/passive outputs. Both the inputs and outputs use solid state devices.
  - **Active inputs and active outputs**: The inputs are powered internally by the IND560x terminal and are designed for use with simple switches within the hazardous area. The inputs are not approved for direct connection to devices in the safe area - a remote ARM100 should be used for this. The outputs are also powered internally by the IND560x terminal and provide 12V switching at 50mA total. These outputs are intended for use with extremely low power intrinsically safe piezo electric solenoids.

    Note: The Active/Active I/O option is not available for use with the IND560x-PAB and external NiMH battery pack.
  - **Active inputs and passive outputs**: The inputs are powered internally by the IND560x terminal and are designed for use with simple switches within the hazardous area. The inputs are not approved for direct connection to devices in the safe area - a remote ARM100 should be used for this. Power to operate the outputs must be provided by an external power supply and intrinsically safe barrier. Refer to the approval entity values for restrictions and limitations.
  - **Passive inputs and passive outputs**: Power to operate both the inputs and outputs must be provided by an external power supply and intrinsically safe barrier.
- Safe area remote I/O can be configured to communicate to an ARM100 device (refer to page 1-20) using the ACM200 with the CL/RS-422/RS-485 option or the ACM500 configured with Ethernet/COM2/COM3 option (refer to page 1-18 for additional details on the ACM500 and page 1-20 for ACM200). One other possibility is to use COM1 on the IND560x main board. This signal can be passed through an intrinsically safe barrier (ISB) and then through an RS-232 to RS-485 converter, both located in the safe area. The ARM100 provides six dry-contact outputs and four passive low voltage DC inputs. An external 12 - 24 volt DC supply is required to operate the ARM100.

NOTE: The ARM100 is NOT approved for use inside hazardous classified areas. An ARM100 must be installed in the safe area only.

1.12.1.4. IND560x-PAB

NOTE: Due to space limitations and battery life limitations, the IND560x-PAB (Power Adapter Board) can only be used with the Harsh/Analog version of the IND560x. The IND560x-PAB will not work with any panel mount or IDNet or SICSpro models of the IND560x. The IND560x-PAB and external NiMH battery pack will also not support the Active-Active I/O option.

The IND560x-PAB option serves as a voltage splitter for the IND560x's external NiMH battery. The IND560x-PAB takes in the single voltage source from the external NiMH battery and splits it into the various voltages that are required for specific functions in the IND560x. The IND560x with PAB can only be used with the external, 8Ah NiMH battery pack, part #(s) 64060625 and 64060627.

1.12.2. Software Applications

The following add-on software applications are available for the IND560x terminal.

- Fill-560 (filling and dosing application)
- Fill-Plus (standard Fill-560 with a simple formula management add-on application)
- Drive-560 (simple vehicle management application)
- COM-560 (legacy host protocol application)
- TaskExpert (custom programming capability)

1.12.2.1. Fill-560

The Fill-560 is a special application that can be added to the IND560x terminal to provide material filling and dosing control for up to four materials. 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 Technical Manual on the documentation CD included with the Fill-560 option.

Only one formula can be structured at a time. Once a change is made to any formula, its previous configuration is lost.

1.12.2.2. FillPlus

FillPlus is an add-on program created for the Fill-560 application. Like Fill-560, FillPlus is a special application that can be added to the IND560x terminal to provide filling and dosing control for up to 4 materials.

FillPlus provides a formula management and storage program that adds the following features to the Fill-560 application software:

- Storage of up to 25 multiple material formulas
- Scaling of formulas
- A single auxiliary output assignable for each formula

The FillPlus application is written with TaskExpert™. The tasks associated with FillPlus run independently of the Fill-560 base code.

Additional information is available in the **Fill-560 & FillPlus Technical Manual**, part # 64057366, found on the documentation CD that accompanies the Fill-560 and FillPlus application software kits, or a terminal that has been configured at the factory with the Fill-560 or FillPlus software.

1.12.2.3. Drive-560

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

- Storage of 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
- Inbound weight/date/time available on both Inbound and Outbound tickets

Additional information can be found in the **Drive-560 Manual**, part # 64062160, found on the documentation CD that accompanies the Drive-560 application.

1.12.2.4. 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
- SMA Protocol

Additional information can be found in the COM-560 Technical Manual on the documentation CD included with the module.

1.12.2.5. TaskExpert™

TaskExpert functionality provides a way to modify the standard capabilities of the terminal so it can more closely align with specific 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.

1.13. Safe Area Communication Options

1.13.1. ACM500 Communication Module and Accessories

Figure 1-6: ACM500 Module

When Ethernet access, additional serial ports, or a PLC interface is required, an ACM500 communication module must be connected to the IND560x. The ACM500, which must be located in a non-hazardous area, receives data from the IND560x through the fiber optic interface or the intrinsically safe current loop interface. The ACM500 provides expansion slots for an Ethernet/COM2/COM3 option board and a single PLC option. Refer to the ACM500 Technical Manual or Installation Manual for details.

The following options for the IND560x require the use of the ACM500 communication module in the safe area:

- Ethernet/COM2/COM3
- Programmable Logic Control (PLC) interfaces
- Remote discrete I/O (in safe area) via ARM100 modules

1.13.2. Ethernet/COM2/COM3

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 demand templates, continuous data, for access to data via the shared data server and to send email alerts when calibration expires or fails. This port can also be used for backing up and restoring the terminal configuration, using the METTLER TOLEDO InSite™ SL program.

COM2 provides RS-232 communication at rates from 300 to 115.2k baud. COM3 supports the same baud rates and provides an RS-232, RS-422, or RS-485 connection. COM3 can be used to update the firmware of the IND560x using the InSite™ CSL program.

When using COM2 or COM3 serial ports in the ACM500, it is recommended to use a network transmission baud rate of at least 9,600 Baud. Using COM2 or COM3 serial ports with network

transmission baud rates of 4,800 Baud or less may result in continuous data lagging behind real time conditions, or a delayed response to on-demand data requests (e.g., SICS requests).

1.13.3. PLC Interfaces

The IND560x terminal requires the use of the ACM500 module in the safe area to provide a PLC interface. Interfaces supported include Analog Output, A-B RIO, DeviceNet, EtherNet/IP, Modbus TCP and PROFIBUS DP.

Additional details on these interfaces can be found in the **IND560 PLC Interface Manual** on the IND560x Documentation CD.

1.13.3.1. 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 or a rate. Another use for the 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 usually 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. Only one signal can be used at a time.

1.13.3.2. Allen-Bradley (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 terminal provides 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 terminal and the PLC for process control. Division, integer, and floating point values are supported.

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

1.13.3.3. DeviceNet

DeviceNet is an RS-485 based network utilizing CAN chip technology. The network can be configured to run up to 500Kbits per second depending on cabling and distances. Messages are limited to 8 un-fragmented bytes. The network is capable of supporting up to 64 nodes including the master, commonly called the scanner.

1.13.3.4. EtherNet/IP

EtherNet/IP, short for "EtherNet Industrial Protocol," is an open industrial networking standard that takes advantage of commercial, off-the-shelf EtherNet communication chips and physical media. This networking standard supports both implicit messaging (real-time I/O messaging) and explicit messaging (message exchange). The protocol is supported by ControlNet International (CI), the Industrial Ethernet Association (IEA) and the Open DeviceNet Vendor Association (ODVA).

1.13.3.5. 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.

1.13.3.6. PROFIBUS DP

The IND560x Terminal communicates to a PROFIBUS-DP master according to DIN 19 245. The PROFIBUS option consists of software that resides in the IND560x Terminal and a printed circuit board that installs in the ACM500 communication module to implement the data exchange.

1.13.4. ARM100 Module

Figure 1-7: ARM100 Module

The ARM100 Remote Discrete I/O Module is designed to extend the control network of METTLER TOLEDO industrial terminals. This high performance module provides four inputs and six dry-contact relay outputs at a remote location from a compatible terminal or communication module. Digital control information is communicated between the ARM100 and the terminal via an RS-485 communication link.

An external 10 – 32 VDC power supply is required to operate the ARM100 module. The ARM100 is only approved for installation in areas classified at SAFE.

1.13.5. ACM200 Safe Area Communication Module

Figure 1-8: ACM200 Safe Area Communication Module

The ACM200 converter can be used to convert the intrinsically safe current loop information from COM4 or COM5 of the IND560x terminal to an RS-232 signal inside the safe area. The ACM200 converter can be used to obtain demand or continuous RS-232 data from the IND560x or can convert RS-232 signals in the safe area to intrinsically safe ASCII data and send to the IND560x. For a CL20mA or RS-422 or RS-485 signal inside the safe area, the ACM200 configured with the CL/RS-422/RS-485 option can be used.If the ACM500 is already connected to the IND560x terminal, it is not possible to connect the ACM200 converter. This is because both devices require dedicated use of the COM4 and COM5 ports of the IND560x terminal. The ACM200 is designed to communicate to the IND560x terminal using a copper wire communication cable at distances up to 300 m (1000 ft).

1.14. Additional Accessories

Additional accessories include:

- InSite™ SL PC Configuration Tool
- Legacy, dual channel fiber optic converter (safe area) for RS-232 or 20mA CL
- Glass core or plastic fiber optic cable
- Various brackets for wall and column mounting of the harsh enclosure

1.14.1. InSite™ SL Configuration Tool

InSite™ SL is available to end users of IND560x terminals. The IND560x terminal can connect to a PC running InSite™ SL via Ethernet or Serial to provide the following:

- Saving configuration information locally on the PC
- Loading a saved configuration file into other devices
- Restoring to a known state for service purposes.

1.14.2. InSite™ CSL Configuration Tool

InSite™ CSL is available to certified Mettler Toledo service representatives.

The IND560x terminal can connect to a PC running InSite™ CSL 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.
- Performing firmware upgrade services for the IND560x.

1.14.3. Legacy Fiber Optic Converters

The 0964-0043, -0058, -0059 and -0060 dual channel fiber optic converters can be used with the IND560x terminal to provide one or two additional channels of bidirectional communication at distances up to 300m (1000 ft). The converters provide either RS-232 or 20mA current loop connectivity in the safe area, derived from the COM4 and COM5 ports of the terminal.

If the ACM500 is already connected to the IND560x terminal, it is not possible to connect the dual channel fiber optic converter. This is because both devices require dedicated use of the COM4 and COM5 ports of the IND560x terminal.

The IND560x and dual channel fiber optic converters are designed to use a hard clad silica fiber optic cable, but plastic core fiber optic cable can be used on short cable runs of 40 m (130 ft) or less.

1.15. Display and Keypad

The IND560x terminal has a Liquid Crystal Display (LCD), 128 × 64 dot matrix graphic type with a white LED backlight. Figure 1-9 shows the IND560x's display and keyboard layout.

Figure 1-9: The IND560x Display and Keyboard Layout

The display provides a system line at the top of the display for system messages and data; application area with weight display, legends, data entry, and other information in the middle; and softkey labels (icons) across the bottom.

The system line shows system messages and any asynchronous errors. The middle portion of the display is reserved for the weight display and/or SmartTrac display. Random data entry (e.g. tare or target ID) 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 is a reserved space 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 may be programmed, depending upon the weighing options and terminal functions enabled. These are presented in three sets of five softkeys. The softkey setup and key mapping capabilities of the terminal determine the positioning of the softkeys and locations where they display.

Three dedicated scale function keys are located to the right of the display. These are used 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 include a Clear key and a decimal point, and 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.

An On/Off power key is located at the lower right of the front panel. The On/Off power key is enabled and disabled by a jumper on the main board.

2 Operation

2.1. Overview

This chapter covers
- Overview
- Display Operation
- Understanding the Navigational Interface
- Home Screen
- Basic Functionality

This chapter provides information about navigation, basic functionality, and report generation using the IND560x terminal.

Operation of the terminal depends on enabled functions and parameters that are configured in setup as described in Chapter 3, **Configuration**. Navigation and basic functionality, as well as basic report generation are covered in the following sections.

2.2. Security

The IND560x supports the use of username/password for setup security at four levels. Refer to Appendix B to determine security levels assigned to specific parameters in setup.

2.2.1. 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 a username of "admin". The factory default password is null (no password). The pre-configured username (admin) cannot be changed; the password can only be added or modified. 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 region 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.

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

Refer to Appendix B, **Default Settings**, for the security level of all setup parameters.

- Once a password is set up, be sure to remember the password. If the password is changed or forgotten, access to the setup menu will not be available. Be sure to protect the password from access by unauthorized personnel. The password provides access to the entire setup menu, unless the metrology switch is placed in the approved position.

2.2.2. Maintenance

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

2.2.3. Supervisor

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

2.2.4. Operator

One default operator account with a username of anonymous and password null (no password) is provided. Sites with validation requirements might create many operator accounts, each with a username and password entry requirement.

2.2.5. Password

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.

2.2.6. 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 command carries out a rounded tare.
- If the approval is Canada, then the center of zero division is 0.2d. The default value 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.
- If the approval is Argentina, terminal functions are changed as follows:

- Access to the setup screens is prohibited while the metrology switch is engaged. If an attempt is made to access the setup menu, a message is displayed that says "Access denied. Scale is Approved."
- All shared data server write ability via COM1 (serial) and Ethernet is disabled. Information can still be read from shared data, but writing to shared data is not possible.
- The FTP server (both serial and Ethernet) can only read files from the terminal. It cannot write anything to the terminal. Shared data field nf0101 will automatically be set to 2.
- If SICS is selected as an assignment for a port, all SICS commands must be disabled. When a SICS command is received, an "EL" response is returned.
- A preset tare from the front panel, from the tare table, received serially (for example 1.00T via the CTPZ input assignment) or received from a PLC, can only be accepted if there is no motion on the scale. If motion is detected, the terminal should wait for the programmed stability timeout period and, if the motion continues, discard the request. The preset tare feature will therefore operate just like the semi-automatic tare feature.

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.

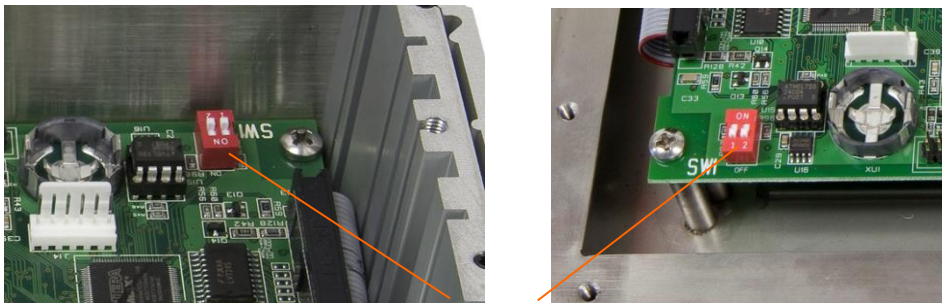


Figure 2-1: Metrology Switch Location, Panel (left) and Harsh (right)

- Refer to Appendix A, **Installation**, PCB Switch Settings for further information about SW1-1 and SW1-2 switch settings.

2.3. 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:

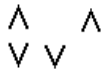
"Press START..." means to press the START softkey ◈.

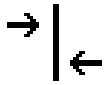
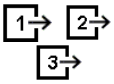
"Select an option..." means to use the UP or DOWN navigation keys to select a setting, then press ENTER.

2.3.1. 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. Items with an asterisk (*) require a supervisor level log-in or above to be in effect.

Table 2-1: Icons and Functions

Icon	Function	Icon	Function
Information Recall Options			
C	Clear All*		Recall information
C◊	Clear Subtotal*	i	System Information Recall
M	Metrology Recall		Total Recall
	Print*		Weight Recall
Softkey Menu and Setup			
	Enter Setup Menu		More Softkey Selections (scroll rows up and down)
Calibration Icons			
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			
	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)

Icon	Function	Icon	Function
	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)
	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)
	Transaction Counter		Reset Counter
	Time & Date		Print
	Repeat Print		Customized Print Triggers 1, 2 and 3
Editing			
C	Clear All*		Exit (return to previous screen)
	Delete		Insert
	Edit	OK	Validate Entry/Transaction (OK)
Esc	Escape (exit without storing)		Copy
Display Icons			
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
	Adjust Contrast		
Special Control			
	Target Control		Start
	Pause		Stop

Icon	Function	Icon	Function
	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

2.4. Understanding the Navigational Interface

Navigate in the applications and configure the IND560x using

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

2.4.1. 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

  Moves 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 two pages to display all of the associated configuration fields. The scroll bars indicate which page of the two is displayed.

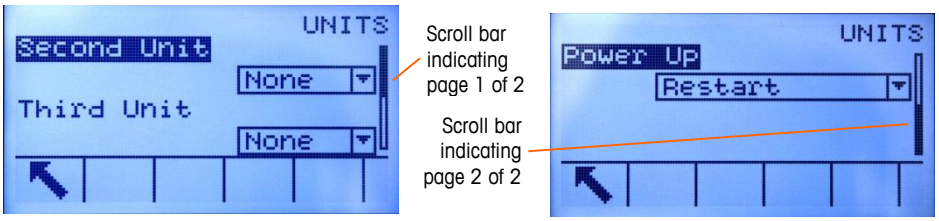


Figure 2-3: Example of Scroll Bars, Indicating Two Pages of Configuration Fields

  Press the DOWN navigation key to move from page 1 to 2, Press the UP navigation key to move from 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

2.4.2. 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.

Appendix E, **Softkey Mapping**, explains how softkeys can be configured in setup.

2.4.2.1. Customizing Softkeys

All the softkeys available for assignment to the home screen can be replaced with customized bitmap images.

The bitmaps must measure no more than 23 pixels wide by 15 pixels high. Each graphic must have a white border at least one pixel wide at left, right and top – see Figure 2-4.

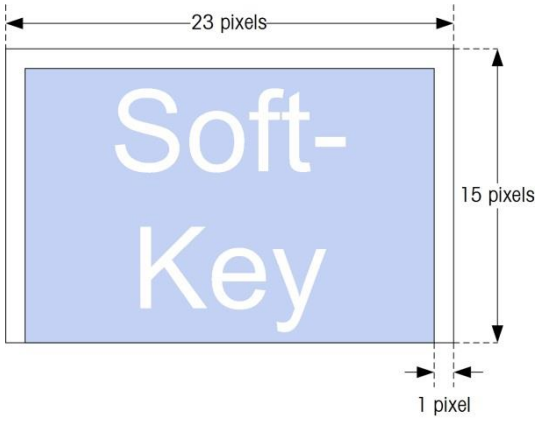


Figure 2-4: Softkey Graphic Dimensions

Graphics may be uploaded to the IND560x terminal using an ftp connection via Ethernet, or through a serial port. Refer to Appendix D, **Communications**, for details on these procedures.

New bitmap graphics must have the same filename as the graphic they replace. Table 2-2 lists the softkey graphics that can be replaced with customized images.

Table 2-2: Bitmap Graphic Filenames

Softkey	Default Image	Graphic File Name
Alibi	Alibi	alibi.bmp
Calibration Test		cal_test.bmp
Comparators		comprtr.bmp
ID	ID	Id.bmp
MinWeigh	Min-Weigh	minweigh.bmp
Recall Info		recall.bmp
Reports		reports.bmp

Softkey	Default Image	Graphic File Name
Setup		setup.bmp
SmartTrac	Smart -Trac	sm_trac.bmp
Tare Table		tare_mem.bmp
Target		target.bmp
Target Control		control.bmp
Target Start		start.bmp
Target Table		targ_mem.bmp
Trigger 1	1	trigger1.bmp
Trigger 2	2	trigger2.bmp
Trigger 3	3	trigger3.bmp
Time & Date		timedate.bmp
Unit Switching		select.bmp
X10 Display	x10	x10.bmp

2.4.3. 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 the tare weight using the numeric keys and then press the TARE scale function key. The terminal will display the net weight of the contents of the 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 an 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 2-9.

2.4.4. Alpha Keys

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

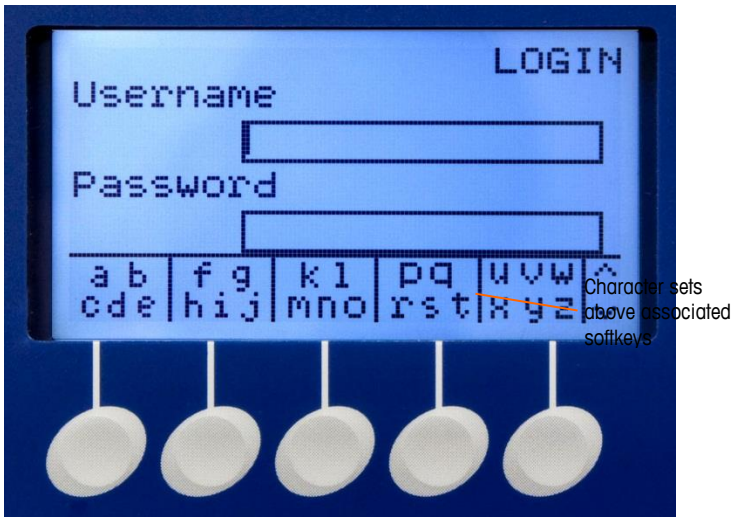


Figure 2-5: Alpha Keys

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 (Figure 2-5). Three additional sets of softkeys include lower-case letters and symbols. In each of these sets, a group of four to six characters is shown per softkey.

Figure 2-6: Additional Character Sets

To enter a character, use the UP and DOWN arrow keys to move to the row of keys that shows the group including the desired 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 2-7).

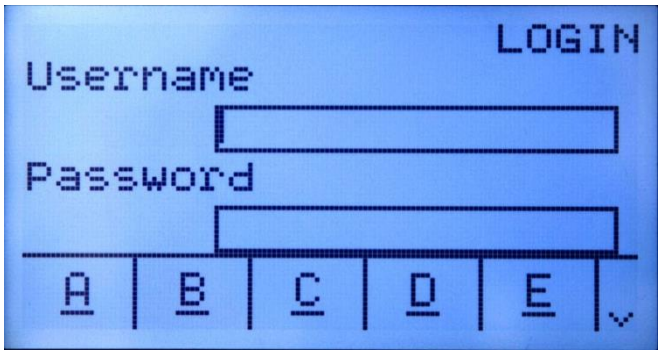


Figure 2-7: One Letter Per Softkey

Now, press the softkey that corresponds to the desired 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 2-8). If the wrong group of characters was selected, use this softkey to return to the character set selection screen.

Figure 2-8: ESC Character

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 2-6) 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.

2.4.5. 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.

2.5. Home Screen

The Home screen displays when the terminal is idle. The Home screen is the only screen that provides operator access to the programmable softkeys. Figure 2-9 shows a sample screen with a message showing in the system line.

Figure 2-9: Default Home Screen, System Line with 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 V or a MORE UP Λ symbol indicates that more softkey selections are available

2.6. Basic Functionality

This section provides information about the IND560x's basic functionality. Additional areas of functionality specific to application software available for the IND560x are addressed in the specific application manuals. Basic functions addressed in this section include:

- External Battery Compatibility
- 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
- ACM500 Reconnect

2.6.1. Compatibility with External Battery Pack

An external NiMH battery pack is available as a power option for the harsh/analog model of the IND560x terminal. Only the METTLER TOLEDO NiMH battery pack, part # 64060625, is approved for use with the IND560x. The IND560x terminal requires a specific software configuration to enable

system compatibility with NiMH battery part # 64060625. Additional software parameters exist to help extend the single charge life of the battery.

These battery-specific settings are found in the following locations within the terminal setup menu. The settings can be addressed in the following order to ensure proper setup for external battery compatibility.

2.6.1.1. Scale > Type

Load Cell parameters are shown only for IND560x analog main boards and only if scale type is selected as **Analog**. The Load Cell parameter default values are **1 x 350 Ω**. If scale type is set as **Remote**, the number of cells is automatically set to **0**.

- These settings are shown in the Setup menu for all analog terminals whether support for the battery has been enabled or not. However, only the harsh/analog model is physically capable of supporting the external NiMH battery.

It is important to enter the correct values for the Load Cell parameters, as the current demand from the load cells determines the switch off voltage set point of the external battery. Setting the Load Cell parameters correctly helps to:

- Ensure that all the available capacity of the battery is being utilized
- Protect the battery pack from a deep discharge that will harm the NiMH cells and shorten the lifespan of the pack

2.6.1.2. Terminal > Device > Battery Operation

This parameter is only shown in IND560x models with analog main boards. The default value is **Disabled**. Setting this parameter to **Enabled** will trigger the IND560x to use the Load Cell parameters established at **Scale > Type**. Enabling Battery Operation also unlocks an Auto Power Off parameter elsewhere in the Terminal branch of the Setup menu.

2.6.1.3. Terminal > Display

Once the Battery Operation parameter has been set to **Enabled**, users can choose to activate an auto-power off feature that will help to optimize single charge battery life. The **Auto Off Timer** parameter monitors scale motion and keypad operation. If no keypad activity occurs within the selected time value, the terminal automatically turns itself off. This auto-shutdown will occur with no warning to the operator.

2.6.1.4. Recommendations for Battery Powered Systems

Battery powered systems of all types should always avoid unnecessary power consumption. The following recommendations should be used whenever possible to prolong the single charge life and long term performance of the METTLER TOLEDO NiMH battery pack (P/N 64060625).

2.6.1.4.1. IND560x System Hardware Considerations

- Use high impedance scale bases and load cells when possible. When considering only NiMH battery single charge life, 1,000 Ohm load cells are preferred over 350 Ohm load cells. Single charge battery life will increase as load cell impedance increases.

- Only install options and connections that are required. If an option board has multiple connections, only physically connect the ports that are required. (e.g. if only COM4 is required, do not make a physical connection to COM5 also).

2.6.1.4.2. IND560x Software Considerations

- Enable Battery Operation at **Terminal > Device > Battery Operation**
- If feasible, enable the **Auto Power Off** setting at **Terminal > Device > Auto Power Off**
- If backlight is enabled, enable the **Backlight Timeout** setting found at **Terminal > Device > Display**.
- Disable all unnecessary communications that might be configured at **Communication > Connections**. This includes communications on COM4, COM5 or COM1.

2.6.1.4.3. General NiMH Battery Handling

- Recharge the NiMH battery as soon as possible after a "low battery" warning is seen on the screen of the IND560x terminal.
- Rechargeable batteries self-discharge. To prevent the NiMH battery packs from experiencing a damaging deep discharge, establish a quality control process to recharge them every three months, even if not in use.
- Do not store or charge the NiMH battery packs in hot places. High temperatures increase the rate of self-discharge.

2.6.1.4.4. Estimated Single Charge Battery Life

When users implement the recommendations listed above regarding IND560x hardware and software, as well as the general NiMH battery handling recommendations, the estimated single charge life of Mettler Toledo's NiMH battery pack (P/N 64060625) in various IND560x applications is shown in Table 2-3.

- All estimates assume use of a new, freshly charged NiMH battery pack (NiMH batteries experience up to 5-10% self-discharge in first 24 hours following charge.)
- All estimates assume use at 20ºC
- Approximate recharge time 6 is hours
- 500 recharge cycles is lifetime expectancy of NiMH battery pack P/N 64060625. Reduced runtime will occur at the end of battery lifetime.

Table 2-3: Estimated NiMH Battery Single Charge Life

Total Load Cell Resistance (TSR)	Installed IND560x Hardware Options	Approximate Current Consumption	Estimated Operating Time
87.5Ω	No options OR A/P Discrete I/O Only*	265 mA	25 hours
350Ω		225 mA	32 hours
1000Ω		215mA	35 hours
87.5Ω	CL or FO with or without A/P Discrete	275mA	24 hours
350Ω		240mA	30 hours

Total Load Cell Resistance (TSR)	Installed IND560x Hardware Options	Approximate Current Consumption	Estimated Operating Time
1000Ω	I/O*	230mA	32 hours

* The influence of the A/P Discrete I/O on overall operation time is negligible.

2.6.1.4.5. Low Battery Warnings and Battery Protection

When the battery voltage reaches a pre-defined value, a "Low Battery!" message will appear in IND560x system information line, blinking at three second intervals. The terminal will continue to operate for one hour or less (depending on system configuration and battery condition) after the "Low Battery!" message appears. During this period, turn the terminal off and either remove and charge its battery, or replace the battery with a fully-charged one.

- Note: Performance of the NiMH battery will be reduced if it is allowed to discharge too deeply. The low battery warning and shut-off functions are designed to protect the battery's efficiency and life-span.

If the shut-off voltage is reached before the battery is recharged or replaced, a message will appear on screen – "ALARM – Low Battery! Power off is in process!". This message will display for ten seconds, after which the terminal will power off automatically.

2.6.2. Zero

The Zero function is used to set or reset the initial zero reference point of the IND560x. There are three types of zero setting modes:

- Automatic Zero Maintenance
- Power-Up
- Pushbutton

2.6.2.1. Automatic Zero Maintenance

Automatic Zero Maintenance (AZM) enables the IND560x to compensate for the buildup 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.

2.6.2.2. Power-Up Zero

Power-Up Zero enables the IND560x 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.

2.6.2.3. Pushbutton Zero

The pushbutton (semi-automatic) zero function can be accomplished by pressing the ZERO →0← 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.

2.6.3. 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 IND560x include:

- Pushbutton Tare
- Keyboard Tare (Preset Tare)
- Net Sign Correction
- Auto Tare
- Tare Clear
  - Manual Clear
  - Auto Clear

2.6.3.1. 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 IND560x 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 IND560x 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.

2.6.3.2. 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 enter a preset tare value manually, 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 Chapter 3, **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.

2.6.3.3. Tare Table

The IND560x 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 for 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) will be added to the total and the corresponding counter will be incremented by one.

A tare memory can be recalled by either picking from a list of all available records or if the ID for the tare value is know, it can be "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 Appendix C, Table and Log File Structure.

2.6.3.4. 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 either disabled or enabled on the IND560x. Refer to Chapter 3, Configuration, the Scale section, for further 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 and 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 weight. 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 2-4. In this example, the tare register value is 53 kg and the live weight on the scale is 16 kg.

Table 2-4: 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".

2.6.3.5. Auto Tare

The IND560x 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 IND560x 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.

2.6.3.6. Clearing Tare

Tare values can be cleared manually or automatically.

2.6.3.6.1. Manual Clear

Manually clear tare values by pressing the CLEAR key **C** on the numeric keypad when the IND560x 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 Chapter 3, **Configuration**, the Scale section, Auto Clear).

2.6.3.6.2. Auto Clear

The IND560x 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 IND560x 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 IND560x 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 Chapter 3, **Configuration**, the Scale section, Auto Clear for further information about configuring auto clear.

2.6.4. Unit Switching

In order to support locations and applications that utilize multiple measurement units, the IND560x 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 IND560x 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.

2.6.5. 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.

2.6.6. 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 2-9) appears for 5 seconds when the terminal is carrying out a print command.

2.6.6.1. Print Interlock

Print Interlock is designed to enforce a single print output per transaction. Print Interlock can be disabled or enabled. If 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 a "Print Not Ready" message appears in the system line.

2.6.6.2. 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.

2.6.6.3. 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.

2.6.6.4. Custom Print Trigger

The three custom print triggers 1 2 3 available in the IND560x function like the standard demand print, except that they will not trigger alibi logging, totalization or transaction counter update.

- NOTE: This is a change in functionality introduced in v4.03 firmware. It affects how the IND560 handles print templates containing metrologically sensitive data.

With firmware versions 3.04 and earlier, the intended use of custom print triggers was simply to transmit non-metrological data from the terminal. Over the life of the IND560, it became apparent that custom print triggers were being used to transmit metrologically sensitive information such as weight data. However, in all firmware versions prior to v4.03, the custom print triggers were not

subject to the same types of validity checks that the standard demand print was. Custom print triggers have historically been able to transmit metrologically sensitive weight data even under such circumstances as motion, over capacity, etc.

In terminals using v4.03 firmware, templates transmitted by a custom print trigger are evaluated for the following shared data types that indicate if the template contains metrologically sensitive scale information: ce, cs, tz, wk, wm, ws, wt. If the template includes any of these shared data fields, the following statuses are checked:

- Power Up Zero Not Captured
- Over Capacity
- Under Zero
- Data not OK
- Times 10 (x10) is enabled and terminal is in legal-for-trade mode
- Minimum print threshold not reached between print requests
- Print Interlock condition not met
- Motion

In v.4.03 firmware, except for motion each of these causes an immediate error. If there is motion, the terminal waits for the motion timeout period, and either prints (if stability is achieved) or displays an error.

2.6.7. 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 Chapter 3, **Configuration**, Scale, MinWeigh.

2.6.8. Information Recall

Press the INFORMATION RECALL softkey to access the recall screen where the softkeys shown below appear:

	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 Chapter 3, **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.
Σ	Totals 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. **Notes**: 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.

2.6.9. 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 IND560x and the IND560x 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 IND560x 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 IND560x target comparison rate (for analog load cell and SICSpro scales) is 50 comparisons per second. The comparison rate for high precision IDNet bases is dependent upon the module in the base.

Refer to Chapter 3, **Configuration**, the Application section, Memory, Target Table and Operation, Target for further information about configuring parameters for target comparison operations.

2.6.9.1. Material Transfer Applications

If the target comparison of the IND560x 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.

2.6.9.2. 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 2-10, Figure 2-11 and Figure 2-12.

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

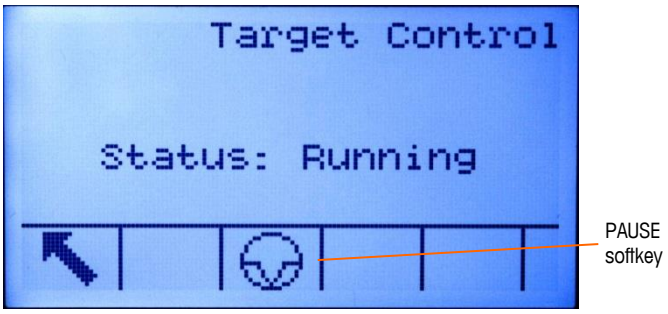


Figure 2-11: Example of Running State in Target Control

Figure 2-12: Example of Paused State in Target Control

2.6.9.3. Over/Under Applications

If the target comparison of the IND560x 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 IND560x 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 IND560x 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 IND560x provides 3 different classifications or "zones" in the Over/Under mode. The zones are Under, OK and Over.

2.6.9.4. Target Comparison Parameter Entry

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

2.6.9.4.1. Direct Editing of Active Records

To directly edit the active record:

1. Press the TARGET softkey . (Refer to Chapter 3, **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 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.

2.6.9.4.2. 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 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 IND560x, target records that utilize either second or third units can be retrieved from the Target Table into Active Target status. The IND560x 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.

2.6.10. 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 High Limit value must always be higher 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.

2.6.10.1. Using Comparators

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

2.6.10.1.1. 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.

2.6.10.1.2. 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.

2.6.11. ID

The ID function provides a convenient and simple way to ensure that a specific sequence of operation is carried out the same way each time. Each step can include an on-screen message that instructs the operator to perform an action, or a prompt asking the operator to enter some information. 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 EXIT softkey ↖ is pressed, or an ESC softkey 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, **Configuration**.

2.6.12. SmartTrac™

SmartTrac is a graphical display visualization of either the gross or net weight as selected in setup. SmartTrac on the IND560x uses a bar graph visualization type for Material Transfer mode and a three-zone graphic for Over/Under mode.

2.6.12.1. 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 2-13 shows the small size, Figure 2-14 shows the medium size, and Figure 2-15 shows the large size.

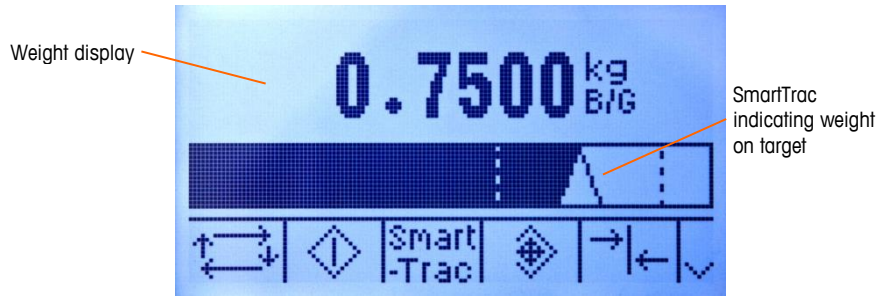


Figure 2-13: Material Transfer SmartTrac, Small

Figure 2-14: Material Transfer SmartTrac, Medium

Figure 2-15: 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 2-16 illustrates the ranges.

Figure 2-16: SmartTrac Bar Graph Display Ranges

2.6.12.1.1. Under Tolerance

The Under Tolerance range is labeled "A" in Figure 2-16. 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 populate the "A" range when more than 10% of the target has been added. Until reaching the 10% point, no fill is shown.

2.6.12.1.2. Acceptable Under Tolerance

Region B in Figure 2-16 represents the zone of acceptable tolerance below the target value.

2.6.12.1.3. On Target

When the measured value exactly equals the target value an unfilled triangle indication displays (see Figure 2-17).

Figure 2-17: On-Target Triangle

2.6.12.1.4. Acceptable Over Tolerance

Region C in Figure 2-16 represents the zone of acceptable tolerance above the target value.

2.6.12.1.5. Over Tolerance

Region D in Figure 2-16 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 and further increases in the measured value do not affect it.

2.6.12.2. 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 2-18 shows the small size, Figure 2-19 shows the medium size, and Figure 2-20 shows the large size. Note that Figure 2-18 shows a composite display with under, OK and over graphics displayed simultaneously.

Figure 2-18: Over/Under Display, Small

Figure 2-19: Over/Under Display, Medium

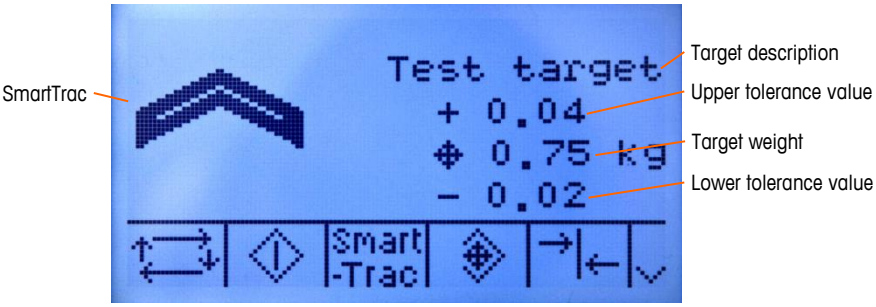


Figure 2-20: Over/Under Display, Large

2.6.12.2.1. 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.

2.6.12.2.2. Under Zone

The Under zone is shown in Figure 2-18 as the symbol to the left and also in Figure 2-19. 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.

2.6.12.2.3. 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 2-18 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.

2.6.12.2.4. Over Zone

The Over zone is shown in Figure 2-18 as the symbol to the right and also in Figure 2-20. 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.

2.6.13. 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)

2.6.14. Reports

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

- Alibi Memory
- 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 (Figure 2-21) displays.

Figure 2-21: 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* 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* does not display. Press the CLEAR TOTALS softkey C* 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. The CLEAR TOTALS and PRINT functions are only accessible to users with a log-in level of Supervisor and above.
6. Press the EXIT softkey to return to the home screen.
7. 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 2-22).

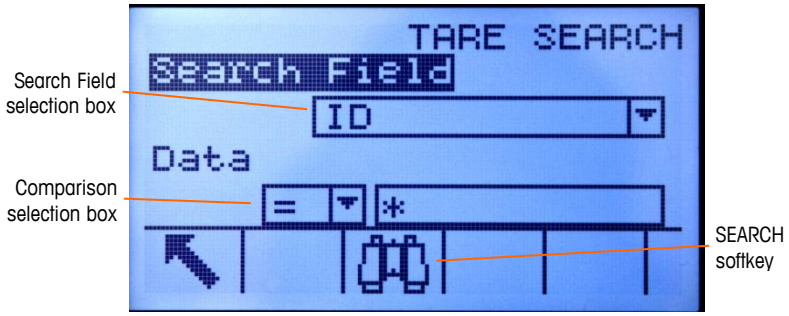


Figure 2-22: Search Screen (Tare Table)

8. Press the SEARCH softkey to view all data in the table. Only fields enabled in setup display in tables.
9. 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 (less than (<), less than or equal to (<=), equal to (=), greater than or equal to (>=), greater than (>), or not equal to (<>) are available in the selection box).

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). Use the arrow keys to scroll left and right to view additional columns. Figure 2-23 is an example of search results for a Tare Table, with a series of views showing all available columns of data.

Figure 2-23: Tare Table Search Results

2.6.15. Calibration Test

The IND560x 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, **Configuration**, Maintenance, Configure/View, Calibration Test.

2.6.16. CalFree™

The IND560x terminal provides a method to calibrate a scale without using test weights. This is based on manual entry of capacity and performance data from the load cell or load cell platform. This method of calibration can be used for initial check-out and testing of systems or when a large

structure is used as the weighing vessel and it is not possible to apply test weights to the structure. METTLER TOLEDO highly recommends that test weights be used whenever possible as this provides the most accurate method of calibration.

2.7. 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

2.7.1. 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.

2.8. Table Searches

A table search can be accessed using various methods, including the TARE MEMORY softkey, TARGET MEMORY softkey, ALIBI softkey **Alibi**, REPORTS softkey, and from the menu tree.

2.8.1. To search a table

1. Access the table to be viewed using the appropriate method. Refer to 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.

2.9. Remote Display

When properly configured, the IND560x can function as a remote display for another Mettler Toledo terminal capable of handling Mettler Toledo Continuous Output.

If the Remote IND560x will be used to issue simple commands to another terminal (referred to as the Master terminal), the Master must also be able to accept Command Inputs (CPTZ).

- IMPORTANT: Proper barriers or approved METTLER TOLEDO communication modules are required for safe installation and transmission of signals. Please refer to Appendix A or METTLER TOLEDO control drawing 72191600 for specific instrument properties and equipment guidelines.

2.10. Automatic Reconnection to ACM500 Communication Module

The communication protocol between the IND560x and the ACM500 requires that the ACM500 be powered up first. If the ACM500 experiences a power cycle, the message shown in Figure 2-24 will display. In the past when this occurred, users were required to acknowledge this pop-up message by pressing the ENTER key. Users were then further required to manually power cycle the IND560x to re-establish communication between the terminal and the ACM500.

Figure 2-24: ACM500 COM Error Message

A new setting in v3.04 firmware and higher provides the user with two options to re-establish communication automatically in the event of an ACM500 power loss. In setup, **Communication > Connections** includes a new setting called **Reconnect Mode**. Available settings include-**Manual** and **Automatic**.

2.10.1.1. Manual

When **Manual** is selected, the operator will be presented with two options when the ACM500 communication error (Figure 2-24) is shown on-screen. Pressing ESC will acknowledge and clear the error message, but no further action will be taken by the IND560x terminal. If OK is pressed, the error message is acknowledged and the IND560x will complete a power cycle in order to re-establish communication with the ACM500.

2.10.1.2. Automatic

If **Automatic** is selected, the ACM500 communication error pop-up message will not display on-screen and the user will not be given a choice of when the IND560x will go through a power cycle. Instead, once the IND560x detects that the ACM500 is back on line, the IND560x will automatically power cycle itself.

If the IND560x is performing a material transfer cycle, after the power cycle the terminal will re-start with the cycle paused. The operator will be able to choose between continuing or abandoning the cycle.

3 Configuration

This chapter covers
- Entering Setup Mode
- Exiting Setup Mode
- Setup Menu Tree
- Overview of Configuration
- Scale
- Application
- Terminal
- Communications
- Maintenance
- Restoring Factory Default Settings

This chapter provides information about how to configure the IND560x terminal's operating system. It describes access to the setup mode, where functions can be enabled, disabled, or defined by entering parameter values in specific setup screens.

3.1. Entering Setup Mode

The configuration of the IND560x terminal is accessed through the SETUP softkey . If password security has been enabled, a login screen (Figure 3-1) displays and the user must enter the correct password in order to advance into setup. (See the Security section in Chapter 2, **Operation**, and the Configuration Options, Terminal, Users section of this chapter for further information about password setup and security.) To exit back to the home screen without entering any login information, press the ESCAPE softkey Esc.

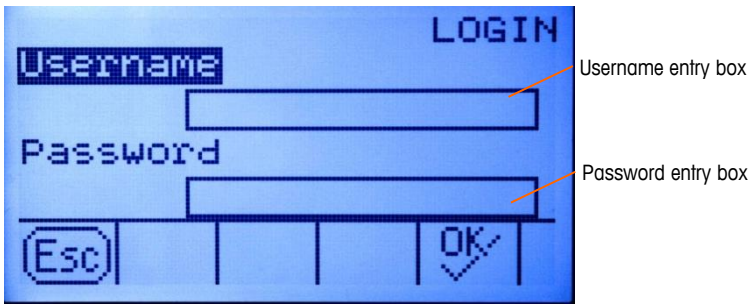


Figure 3-1: Login Screen

3.1.1. To enter a username

1. Press the ENTER key to access the Username entry box. The softkeys change to alpha keys (see Figure 3-2).

Figure 3-2: Login Screen (Alpha Keys)

2. Use the alpha keys to enter the username in the username entry box.
3. Press the ENTER key. The alpha keys no longer display.

3.1.2. To enter a password

4. With focus on the Password field label, press the ENTER key. The softkeys change to alpha keys (see Figure 3-2) and focus moves to the Password entry box.
5. Use the alpha keys to enter the password in the password entry box.
6. Press the OK softkey OK. If the username and password are correct, the terminal goes into setup mode. Once the terminal is in setup mode, the setup menu tree displays.

3.2. Exiting Setup Mode

To exit the setup mode, select Home from the setup menu tree and press ENTER. The default weighing operation screen displays.

- As an alternative, press the first softkey whenever the menu tree is displayed to exit the menu tree.

3.3. Setup Menu Tree

Each line of the setup menu tree is referred to as a branch (see Figure 3-3). Some branches have additional branches that become visible when the view of the main branch is expanded. If a branch has additional branches under it, the collapsed symbol (⊞) initially displays in front of the branch name. After the branch view has been expanded, the expanded symbol (⊟) displays in front of the branch name and the additional branches become visible. Any branch that is not expandable is called a leaf node.

The first branch of the menu tree shown with focus is the Scale branch (Figure 3-3).

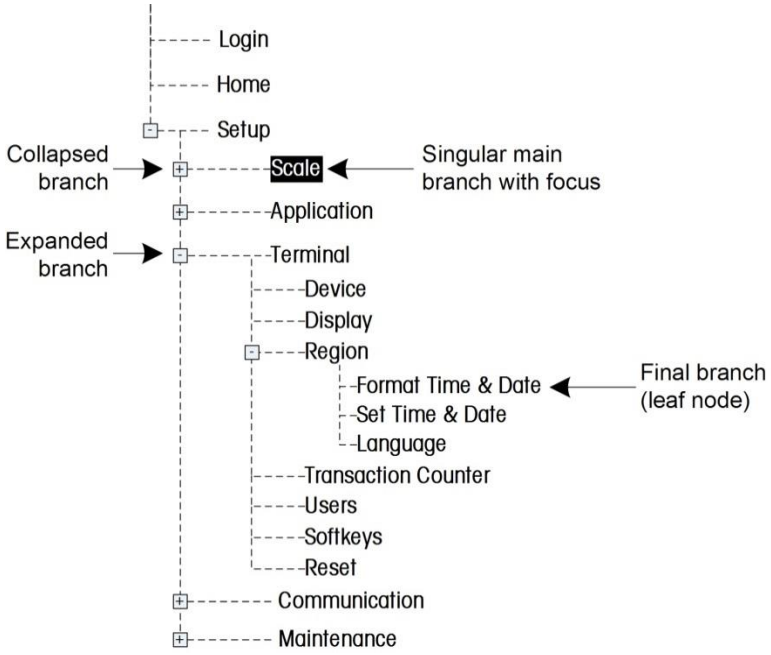


Figure 3-3: Setup Menu Tree Example

Use the UP and DOWN navigation keys to move focus through the branches of the setup menu tree.

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

When a leaf node (singular, non-expandable) branch such as Device or Display is in focus, press the ENTER key to display the setup screen for that function.

3.3.1.1. Setup Screens

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

3.3.1.2. Navigation

Press the UP and DOWN navigation keys to move through the field labels displayed on each setup screen, and to move to a second or third setup screen when more than one screen is used for configuration fields associated with a specific parameter (indicated by the presence of a scroll bar). The shaded portion of the scroll bar (see Figure 3-4) indicates which screen is displayed.

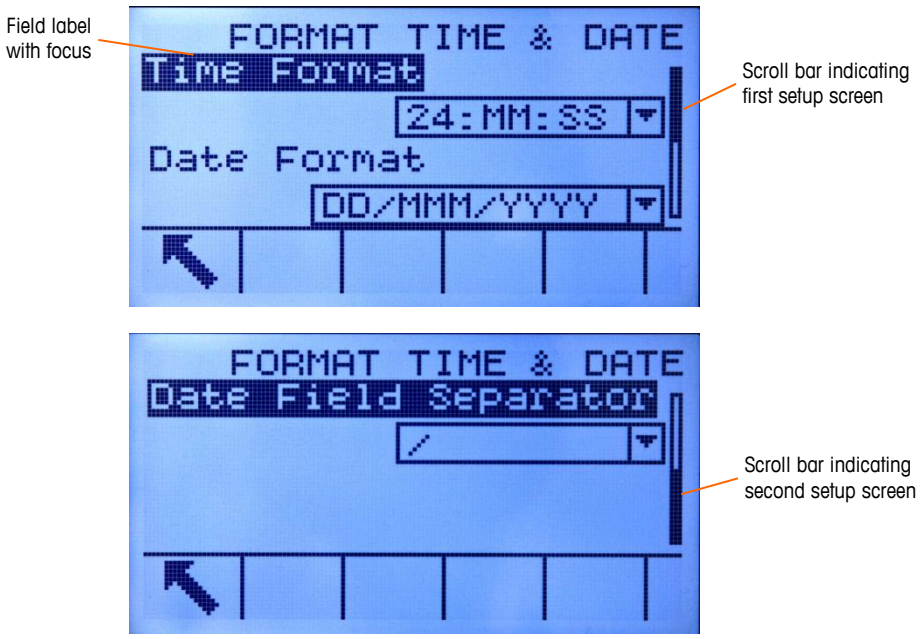


Figure 3-4: Examples of Setup Screens (Format Time & Date)

3.3.1.3. Data Entry

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

Figure 3-5: Setup Screen

If the field values are presented in a selection box, the current selection will have focus when the ENTER key is pressed.

To change the field value in a selection box:

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

If the field value is for a data entry box and alpha/numeric character entry is possible, the alpha keys will display.

To change the field value using alpha/numeric characters:

1. When a data entry box is first entered, the previous data (if present) is in focus. To replace previous data, use the alpha keys and the numeric keypad to enter the desired value.

   OR

2. Press the LEFT and RIGHT navigation keys to move the cursor into position if the value needs to be edited from a specific point rather than replaced. Position the cursor at the end of the data to be deleted and press the C key once for each character to be deleted.
3. Press the ENTER key to accept the entered alpha/numeric characters for the field. The entry displays as the value for the field and the focus moves to the next field label.
4. To exit a setup screen, press the EXIT softkey ↖, which is in the first softkey position. The setup menu tree displays with the focus on the branch for the setup screen that was exited.

3.4. Overview of Configuration

The setup menu tree can be expanded to show every branch and leaf node in the terminal's configuration. Use the navigation keys to select the desired setup screen.

There are five major branches in the setup menu:

- Scale
- Application
- Terminal
- Communication
- Maintenance

Details for each branch are provided in the following Configuration Options section. Figure 3-6 shows the setup menu tree with all branches expanded.

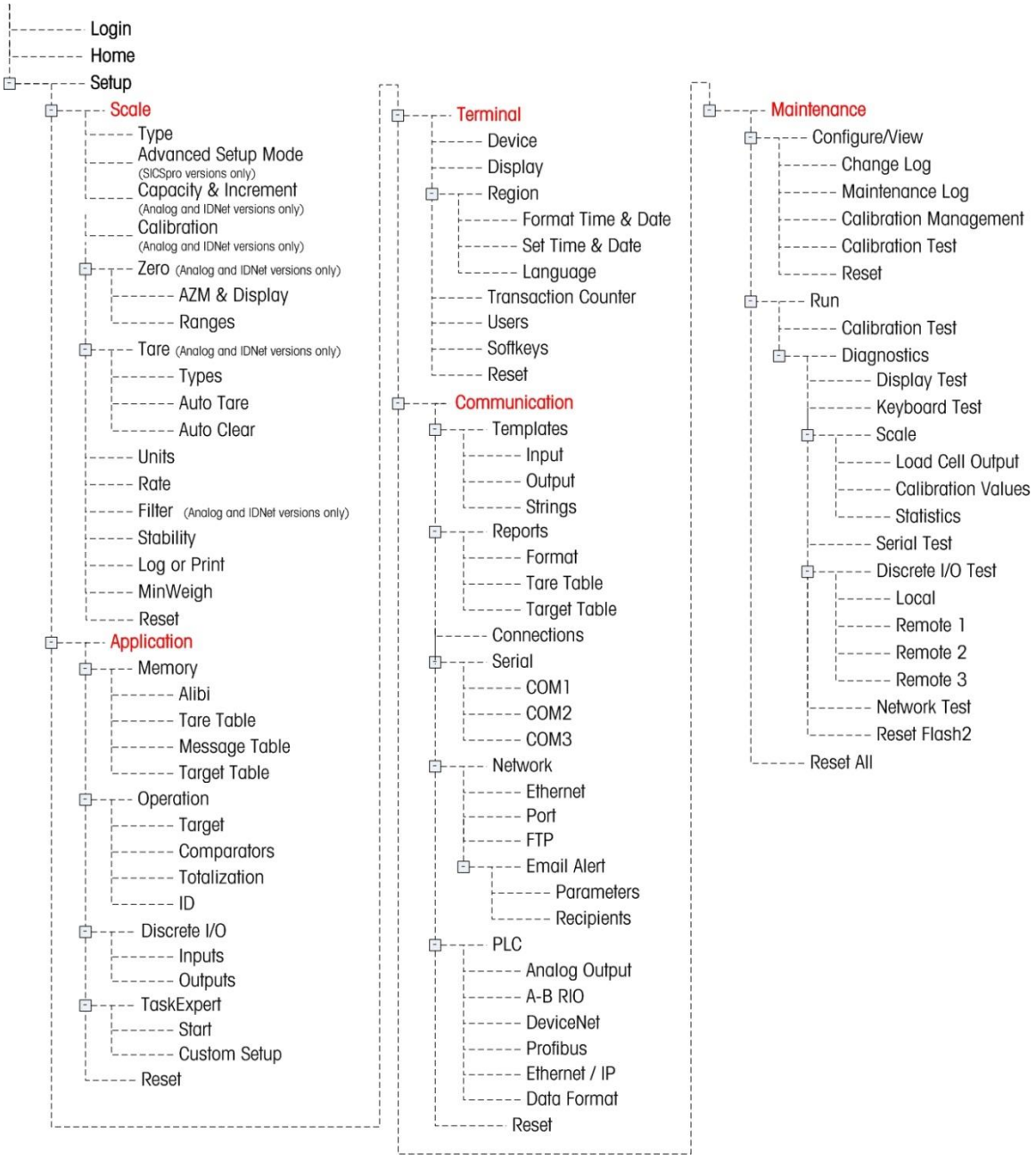


Figure 3-6: The IND560x Menu Tree with All Branches Expanded

- The TaskExpert leaf node is only available if the TaskExpert Application Software module has been installed into the IND560x.

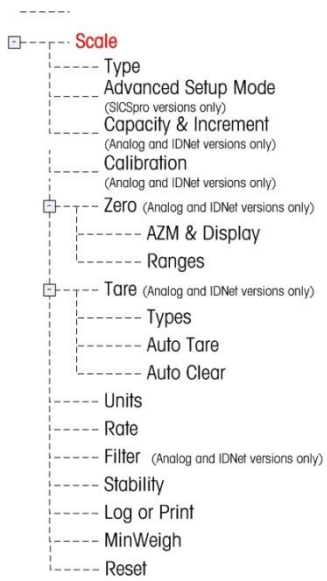
3.4.1. Configuration Options

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

- If the metrology switch is in the approved position (SW1-1 = ON), access to the Scale branch is not permitted. The Scale branch will be expandable and viewable, but changes to setup will not be permitted. Access will be denied.

3.5. Scale

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



- Type*
- Advanced Setup Mode (SICSpro version only)
- Capacity and increment values*†
- Calibration*†
- Zero parameters*†
- Tare parameters*†
- Units
- Rate parameters
- Filter parameters*†
- Stability parameters*†
- Log or print threshold parameters
- Minimum weight parameters

  - Leaf nodes that are marked with an asterisk (*) above will have different parameters depending on the connected scale type (analog, IDNet or SICSpro). Nodes marked with † appear within the Advanced Setup Mode (ASM) of the IND560x SICSpro terminal.

A Reset is present at the end of the branch to enable a limited reset to the factory default settings for the Scale branch parameters.

3.5.1. Type

The Scale Type screen permits a name to be assigned to the scale, displays the scale PCB Type in the terminal, provides a selection list for the Approval mode, and allows the IND560x to be configured as a Remote Display for another (Master) terminal. The EXIT softkey ↖ will return the display to the menu tree.

3.5.1.1. Name

The Name field enables entry of the scale identification. Enter the scale name (an alpha-numeric string of up to 20 characters) in the Name entry box.

3.5.1.2. Scale Type

The Scale Type field automatically shows the hardware configuration. This field will display either Analog, IDNet or SICSpro, along with Remote. If Remote is selected, the approval option will not be available.

3.5.1.3. Load Cells

Load Cell parameters are shown only for IND560x analog main boards, and only if scale type selection is **Analog**. Load Cell parameters must be set correctly for analog IND560x terminals that will operate under battery power, because the current demand from the load cells determines the switch off voltage set point of the external battery.

Setting the **Load Cell** parameters correctly helps to ensure that all available capacity of the battery is used, and protects the battery pack from a deep discharge that will harm the NiMH cells and shorten the lifespan of the battery pack

Default values of the **Load Cell** parameters are **1 x 350 Ω**. Enter the total number of analog load cells into the first field, and the impedance (resistance) of each individual load cell into the Ω (Ohm) field. If only the Total Scale Resistance is known, enter **1** as the number of load cells and the TSR into the Ω field.

If scale type is set as **Remote**, the number of cells is automatically set to **0**.

3.5.1.4. Approval

Approval (analog load cells only) refers to the metrological (weights and measures) approval configuration for the specific scale. The Approval selection is not present for IDNet scale bases, but rather is part of the Service Mode of the base. For SICSpro, this parameter is displayed in the Metrology branch of the Advanced Setup Mode (ASM) on the terminal. This parameter displays the approval region of the system as programmed in the ASM of the load cell. For analog load cells, the selection list can be set to:

- None – no approval is required
- USA
- OIML
- Canada
- Australia
- Argentina

If an approval (USA, OIML, Canada, or Australia) is configured and the metrology security switch, SW1-1, is set to ON, access to the Scale setup parameters in the menu tree will be limited to view only.

If the approval is configured as Argentina and the metrology security switch, SW1-1, is set to ON, access to the entire setup menu is prohibited. If an attempt is made to access the setup menu, an on-screen message will display stating "Access denied. Scale is Approved."

If an approval is selected but SW1-1 is not ON, it will not be possible to leave setup, and a message will appear: Switch UNSECURED.

3.5.2. Advanced Setup Mode (only in SICSpro version)

The Advanced Setup Mode provides access to program settings in the load cell. Refer to the manual of the SICSpro platform being connected for details of the setup steps included in ASM. Figure 3-7 provides an overview of the current ASM menu structure.

- The ASM menu can only display in English.

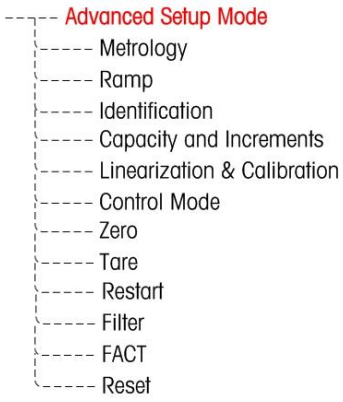


Figure 3-7: Advance Setup Mode Basic Menu Structure

3.5.2.1. Pairing Function

When a SICSpro base is connected via the pluggable, digital interface, and the system is in approved mode, the base-specific information is saved in the terminal to constitute a "paired" system to meet special legal requirements. The terminal uses the saved information to identify intentional or accidental manipulation of the approved system. The terminal checks pairing during each power up by reading the pairing parameters from the base and comparing with the parameters stored in the terminal. If Pairing fails, the terminal will display an "Approval Invalid" message in the system line every 5 seconds.

Pairing failure can occur if the wrong digital scale is connected to the terminal, or if the scale configuration was changed using another terminal, or if the terminal's configuration is reset.

3.5.3. Capacity and Increment

When IDNet scale bases are installed, the Capacity & Increment setup screen does not display. It is part of the Service Mode of the base.

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

- For SICSpro scales, the parameters described in sections 3.5.3.1 and 3.5.3.2 are displayed in the **Capacity and Increments** branch of the Advanced Setup Mode (ASM) on the terminal. The parameter displays the capacity and increment of the system as programmed in the ASM of the load cell.

3.5.3.1. Primary Units

Set the primary units from the selection box choices, which include:

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

3.5.3.2. #Ranges

The number of ranges settings are available for analog load cells only. Set the number of ranges from one to three in the selection box. Specify the capacity and increment size for each range.

3.5.3.3. Blanking Over Capacity

The blanking over capacity settings are available for analog load cells only. Blanking of the display is used to indicate an over-capacity condition. Set the blank over capacity for the divisions (d) (display increments) that the terminal is permitted to go over capacity. For example, if capacity is set at 500 kg by 0.1 kg increments and the blank over capacity setting is 5 d, the terminal can display weights up to 500.5 kg. At weights over 500.5, dashed lines will display instead of a weight.

3.5.3.4. X10 Always

The X10 Always selection is available for IDNet load cells only. X10 Always locks the IDNet base into a higher resolution weight display. If the X10 Always mode is enabled, the high resolution weight data from the IDNet base displays at all times and the EXPAND BY 10 softkey **x10** (if configured to display) is inactivated.

Ony the Primary Unit field displays and it is not selectable. The unit displayed is the unit in which the IDNet scale base was calibrated.

3.5.4. Calibration

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

3.5.4.1. Geo Code

Enter the geo code for the appropriate geo adjustment value for the current geographical location. Geo codes are numbered 0–31. (Refer to Appendix F.)

The Geo Code field does not display when the IDNet scale base is used.

3.5.4.2. Base Serial Number

Enter the scale base serial number in this field. An entry of up to 14 characters is possible.

For SICSpro, the platform serial number is shown as entered in the Advanced Setup Mode (ASM) of the load cell in the information **i** screen.

3.5.4.3. Calibration Units

The Calibration Units setting is available for analog load cells only. Calibration units are listed in the selection box and are the same as the primary units selections, which include:

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

3.5.4.4. Linearity Adjustment

The Linearity Adjustment setting is available for analog load cells only. Select the linearity adjustment from the selection box. Selections are as follows:

Disabled – Use only zero and one span point7

3 point – Use zero, midpoint, and highpoint

4 point – Use zero, lowpoint, midpoint, and highpoint

5 point – Use zero, lowpoint, midpoint, mid-highpoint, and highpoint

3.5.4.5. Analog Gain Jumper

The Analog Gain Jumper Setting is available for analog load cells only. The analog gain jumper setting on the Main PCB can be either 2 mv/V or 3 mv/V. The terminal is shipped from the factory in the 3 mv/V setting. In order for the CalFree™ feature to operate properly, this parameter must indicate the position of the jumper on the Main board. The jumper settings are:

2 mv/V – Jumper installed on both pins
3 mv/V – Jumper removed

3.5.4.6. Calibration Softkeys

The Calibration setup screen displays softkeys that can be used for calibration procedures, including:

Capture Zero	→0←
Capture Span	→|▼|←
Step Calibration	
CalFree	Cal FREE
Service Mode (IDNet scales)	Srvc Mode

3.5.4.6.1. Capture Zero

The Capture Zero function in the Calibration setup is available for analog load cells only. The CAPTURE ZERO softkey →0← triggers an independent operation to reset the zero condition of the scale. A status message displays when this softkey is pressed that directs the user to empty the scale and press the START softkey ◈. The status of the capture zero operation displays. When the

operation is complete, a final status message displays that verifies the completion of the capture zero operation.

- If motion is present during the zero capture process, the terminal will average the weight readings then display an error message indicating unstable weight values were used. This message must be acknowledged to save the these values.

3.5.4.6.2. Capture Span

The Capture Span function in the Calibration setup is available for analog load cells only. The CAPTURE SPAN softkey →|▼|← initiates a sequence to capture span that can be performed independently of capturing zero.

To capture span:

1. Press the CAPTURE SPAN softkey →|▼|←. The Capture Span setup screen displays.
2. Enter the weight for test load 1 and all other test loads if linearity has been enabled. Press the ENTER key.
3. Place test load weight 1 on the scale.
4. Press the START softkey ⏀. The status of the weight capture operation displays. When the operation is complete, a status message displays that verifies the completion of the weight capture.

- Press the ESCAPE softkey Esc to abort the calibration process and return the display to the previous screen.

5. After the first calibration step has completed, the menu will either display a prompt for the next calibration weight to be added (if 2, 3, or 4 test load steps are enabled by the linearity adjustment parameter) or will show a successful or failed calibration sequence.

- If motion is present during the span capture process, the terminal will average the weight readings then display an error message indicating unstable weight values were used. This message must be acknowledged to save the these values.

6. Repeat steps 3–4 for test loads 2, 3, and 4 if enabled by linearity adjustment.
7. If the capture span operation was successful, a verification message that reads "Capture Span OK" displays If the capture span operation was not successful, an error message that reads "Calibration Failure" displays. If the calibration fails, repeat the capture span procedures. If the calibration continues to fail, contact a local METTLER TOLEDO representative for assistance.
8. Press the EXIT softkey ↖ to return to the Calibration screen.

3.5.4.6.3. Step Calibration

The Step Calibration function in the Calibration setup is available for analog load cells only. The STEP CALIBRATION softkey initiates a procedure that enables a "build-up" calibration for tanks and hoppers. For step calibration, the same amount of test weight is added for each step of the calibration procedure.

To perform a step calibration:

1. Press the STEP CALIBRATION softkey . The Step Calibration setup screen displays.
2. Enter the target weight for the test load (the same amount of test load weight is used in each step).
3. Press the START softkey . The Step Calibration screen displays. This screen shows an active (live) weight display (using the current span factor), the intended target weight as entered on the previous screen, and the next step for the operator "Add test weight."
4. Add test weight to the tank/hopper as prompted by the display. Each time test weight is added to the scale, the active display shows the weight.
5. When the full amount of test weight has been added, press the OK softkey . The test load is captured and span factors are saved. During the time the weight is captured and the new span factor is being calculated, the display "Add test weight" changes to "Capturing span." The display then changes to the next prompt "Remove test weight then fill to target."
6. Remove the test weight. The active display returns to zero.
7. Fill the tank/hopper with a substitute material up to the target weight.
8. Press the OK softkey . The target weight value recalculates to show the substitute material weight plus the initial intended target weight. The display changes to the next prompt "Add test weight."
9. Add test weight to the tank/hopper. The active display shows the weight.
10. Press the OK softkey . If the actual weight does not equal the target, a new span factor calculates and the display changes to "Capturing span." The active weight display changes to match the target weight value. The display changes to the next prompt "Remove test weight then fill to target."
11. Remove the test weight. The active display returns to the previous weight that displayed for the last test load.
12. Repeat steps 7 through 11 until an appropriate number of calibration steps have been completed for the specific application.
13. Press the EXIT softkey at any step in the procedure to stop the step calibration process and return to the Calibration screen.

3.5.4.6.4. CalFree

The CalFree procedure is applicable for analog load cells only. The CALFREE softkey Cal FREE provides access to the span calculation screen for precalibration of a scale without test weights. High-precision scale bases are precalibrated when received from the factory so this feature is not used.

To perform precalibration of span using CalFree:

1. Press the CALFREE softkey Cal FREE. The CalFree screen displays.
2. Enter the load cell capacity and rated load cell output values in the associated fields:

- The total load cell capacity should be entered here. For example, for a tank with three 5000 kg cells, cell capacity would be 3 x 5000 kg or 15000 kg.
- If multiple load cells are used, the average output of all cells should be entered here.

3. Enter an estimated preload value in the associated field. Estimated preload is an optional entry. During calculation, the terminal also tests for analog/digital (A/D) converter input saturation at full scale capacity. Estimated preload is included in this calculation if entered in this field. If the preload is unknown, leave this field blank.

- This preload value is used only to determine overload conditions and is not used as a zero reference point. The zero reference point must be captured using the normal zero calibration procedure.

4. Press the OK softkey OK. The span is calculated using the parameters entered.
5. If the calibration operation was successful, a verification message that reads "Calibration OK" displays If the calibration operation was not successful, an error message that reads "Calibration Failure" displays. If the precalibration fails, repeat the CalFree procedures. If the precalibration continues to fail, contact a local METTLER TOLEDO representative for assistance.
6. Press the ESCAPE softkey Esc to return to the Calibration screen.

3.5.4.6.5. Service Mode

Service Mode is available for IDNet load cells only. This screen displays a single box that shows messages from the IDNet base up to 16 characters. When either the OK (Yes) or ⊘ (No) softkey is pressed, the terminal sends the respective response to the scale base and the next message to be displayed is transmitted back to the terminal from the base. This sequence remains constant during the complete service mode communication sequence. Refer to the service mode flow chart for the IDNet base used to view the exact sequence.

After the last communication from the scale base has been completed, the display returns to the Scale Type screen.

3.5.5. Analog Saturation Test

During the calibration process, the IND560x will determine if there is a potential for analog section saturation. The IND560x will compare the available number of counts with the captured span to confirm that the desired capacity is achievable. If the potential exists to saturate the analog section before system capacity is reached, the IND560x will display a warning message and recommendation that the system be recalibrated with a new, lower, capacity.

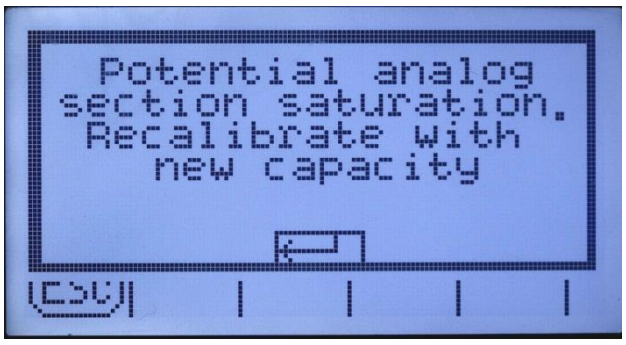


Figure 3-8: Analog Saturation Warning

This message functions only as a recommendation to recalibrate. After the warning message is acknowledged by pressing the ENTER key, the user is presented with the "Capture Span OK" screen and the BACK softkey. Service personnel should then carry out the following:

- Confirm that the analog gain jumper on the main board is set correctly for the actual load cell output, either 2mV/V or 3mV/V (refer to Appendix A, **Installation**, for jumper positions).
- If the analog gain jumper is correctly set, the scale should be recalibrated with a lower capacity. Potential analog section saturation does not force a failure in calibration.

IMPORTANT: It is critical that service personnel follow the recommendation to recalibrate or confirm that the analog output jumper is properly positioned on the main board. Analog section saturation will result in a 'freeze' of the display, where the display is no longer showing increases in weight, creating the possibility of overfills and spills during the weighing process.

3.5.6. Zero

This section provides access to Auto Zero Maintenance (AZM) settings, under zero blanking, power-up zero, and pushbutton zero parameters.

For SICSpro, this parameter is shown in the Advanced Setup Mode (ASM) branch of the terminal menu.

3.5.6.1. AZM & Display

AZM is a means of tracking zero when the scale is empty. AZM compensates for conditions such as terminal or load cell drift or debris on a scale platform.

3.5.6.1.1. Auto Zero

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

3.5.6.1.2. Auto Zero Range

Analog load cells: Set the auto zero range for the number of divisions (d) around the current zero setting in which auto zero will operate.

IDNet load cells: Either enable or disable the auto zero function.

MPXI (SICSpro) load cells: This parameter is shown in the Advanced Setup Mode (ASM) branch of the terminal menu.

3.5.6.1.3. Under Zero Blanking

The Under Zero Blanking function in the Zero setup is available for analog load cells only. Blanking of the display is used to indicate an under-zero condition when the weight on the scale falls below the current zero reference. Set the under zero blanking for the number of divisions (d) that the terminal is permitted to go under zero before blanking.

- A value of 99 disables blanking under zero and the terminal will display a weight as far under zero as possible.

3.5.6.1.4. Power Up

A Power Up setting of Restart enables the terminal to save and reuse the last zero reference weight after a power cycle so it returns to the same gross weight value. If reset is selected, the last zero

calibration value will be used as the zero reference point. Select either Reset or Restart from the Power Up selection box.

3.5.6.2. Ranges

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

3.5.6.2.1. Power Up Zero

The Power Up Zero function in the Zero setup is available for analog load cells only. If Power Up Zero is enabled, the terminal tries to capture zero upon power up.

3.5.6.2.2. Range

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

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

- If Power Up Zero capture is enabled and the weight on the scale is outside of the zero capture range, the display will indicate EEE until the weight is removed and zero is captured.

3.5.6.2.3. Pushbutton Zero

If Pushbutton Zero is enabled, the front panel ZERO pushbutton will operate to capture zero reference points.

- If Pushbutton Zero is Disabled, execution of a remote Zero is still possible via SICS, CPTZ, or SMA commands, discrete inputs or from the PLC commands.

3.5.6.2.4. Range

The Range setting for Pushbutton Zero is available for analog load cells only. If Power If Pushbutton Zero is enabled, –Range and +Range fields will display for setting the range around the original zero condition for the scale within which Pushbutton Zero can be applied. The range units are percent.

For example, if the +Range setting for Pushbutton Zero is set at 2%, the Pushbutton Zero can only be used when the weight reading on the scale is at or below 2% of the original zero condition. If the –Range setting for Pushbutton Zero is set at 2%, the Pushbutton Zero can only be used when the weight reading on the scale is at or above –2% of the original zero condition.

3.5.7. Tare

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

Three setup screens are available to configure tare:

Tare Types Auto Tare Auto Clear

For SICSpro, this parameter is shown in the Advanced Setup Mode (ASM) branch of the terminal menu.

3.5.7.1. Tare Types

Use the Tare Types setup screen to enable or disable pushbutton tare, keyboard tare, net sign correction, terminal tare (IDNet load cells only).

3.5.7.1.1. Pushbutton Tare

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

- If Pushbutton Tare is Disabled, execution of a remote Tare is still possible via SICS, CPTZ, or SMA commands, discrete inputs or from the PLC commands.

3.5.7.1.2. Keyboard Tare

When keyboard tare is enabled, the known value for the empty weight of a container (tare) can be entered manually. The terminal will then display the net weight of the contents of the container. Keyboard tares are automatically rounded to the closest display division.

3.5.7.1.3. Net Sign Correction

Net sign correction enables the IND560x terminal to be used for both shipping (inbound empty) and receiving (inbound loaded) operations. If net sign correction is enabled, the terminal will switch the gross and tare weight fields on the printed ticket, if necessary, so that the larger weight is the gross weight, the smaller weight is the tare weight, and the difference is always a positive net weight. Net sign correction affects the printed data output, the recalled weigh display and the displayed weight. Continuous data output will continue to show a negative net weight value.

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 3-1. In this example, the tare register value is 53 kg and the live weight on the scale is 16 kg.

Table 3-1: 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".

3.5.7.2. Terminal Tare

The Terminal Tare field only displays when an IDNet scale base is connected. Terminal Tare is **disabled** by default. When Terminal Tare is disabled, all Tare commands received by the IND560x

via SICS, CTPZ, PLC or keypad will be passed through to the IDNet base for execution. The base will calculate the tare and net weight values and pass this information back to the IND560x. When Terminal Tare is **enabled**, tare and net weight values are calculated in the terminal and not in the high precision IDNet base.

When Terminal Tare is **enabled**, the stability timeout value will be set to 3 seconds, but can be set to any value between 0 and 99 at **Scale > Stability**. A value of "99" instructs the terminal to wait indefinitely for a stable condition – a Tare command would never be aborted due to motion.

When Terminal Tare is **disabled**, the stability timeout value defaults to "99", and cannot be modified. The terminal will not display or transmit Net status, Net weight or Tare weight until it receives this information from the scale base. Only when the IDNet base responds will the terminal display and transmit the tare value and Net status to the PC/PLC.

Terminal Tare should be **disabled** for approved (legal-for-trade) systems.

3.5.7.3. Auto Tare

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

3.5.7.3.1. Auto Tare

When auto tare is enabled, the tare weight is taken automatically when a container above the threshold weight is on the scale and settles to no-motion.

3.5.7.3.2. Tare Threshold Wt.

When weight on the scale platform exceeds the tare threshold value and settles to no-motion, the terminal automatically tares.

3.5.7.3.3. 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, depending upon the programming of motion checking.

3.5.7.3.4. Motion Check

Enable the motion check setting to prevent auto tare reset rigger from occurring when the scale is in motion. When enabled, the scale must detect a non-motion condition below the reset value to reset the trigger.

3.5.7.4. Auto Clear

Use the Auto Clear screen to enable or disable auto clear tare, clear after print, to set the clear threshold weight, and enable or disable motion checking for auto clearing of tare.

3.5.7.4.1. Auto Clear Tare

To clear tare automatically when the scale returns to below the threshold weight, enable the auto clear tare setting.

3.5.7.4.2. Clear Threshold Wt.

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

3.5.7.4.3. Motion Check

The Motion Check field displays only when Auto Clear Tare is enabled. Enable the motion check setting to prevent auto clear from occurring when the scale is in motion.

3.5.7.4.4. Clear After Print

The Clear After Print field displays only when Auto Clear Tare is enabled. To clear tare automatically after printing, enable the clear after print setting.

3.5.7.4.5. Clear With Zero

To clear tare automatically when capturing zero, enable the clear with zero setting.

3.5.7.4.6. Power Up

A Power Up setting of Restart enables the terminal to save and reuse the last tare weight after a power cycle. If Reset is selected, the terminal returns to gross mode upon power up and the last tare weight after the power cycle is cleared. Select either Restart or Reset from the Power Up selection box.

3.5.8. Units

This setup screen enables the selection of a second and a third unit and power up units.

3.5.8.1. Second Unit and Third Unit

Use the Second Unit and Third Unit selection boxes to select second and third weighing units, configure custom second and third units, or to select none. Only one custom unit is possible.

If printing of two units is required, establish Third Units. Both Primary and Third units can be printed simultaneously in an output template.

Available weighing units include:

Custom	Pounds-Ounces (lb-oz)
Pennyweight (dwt)	Ounces (oz)
Grams (g)	Troy Ounces (ozt)
Kilograms (kg)	Tonnes (t)
Pounds (lb)	Tons (ton)

3.5.8.2. Power Up

Power up units defines the units the terminal defaults to after power up. Use the selection box to select either Primary Units or Restart, which makes the power up units those that were active when power was removed.

3.5.8.3. Custom Units

If Custom is selected for second or third units, three additional fields display for configuring custom units. The terminal displays the first three letters of the custom name in the units area of the display when custom units are in use.

3.5.8.3.1. Custom Factor

Enter a multiplication factor for the custom unit in this field, such as 0.592 or 1.019. The primary unit is multiplied by the custom factor to obtain the custom value.

3.5.8.3.2. Custom Name

The softkeys turn into alpha keys when this field is selected. Use the alpha keys to enter the name for the custom unit. Up to 12 characters may be entered.

3.5.8.3.3. Custom Increment

Enter a custom increment in this field, such as 0.1 or 0.5. This step controls both the decimal position and the increment size of the custom unit value.

3.5.9. Rate

A Rate, expressed as change in primary or secondary weight units per time unit, may be programmed for display on the IND560x (Figure 3-9) and/or used in controlling discrete outputs – for example as the source for a Comparator (described later in this chapter).

- The Rate display is over-ridden by SmartTrac. If SmartTrac is enabled, the Rate display option is not available in the **Terminal > Display** screen.
- If the weight information in the terminal becomes invalid, the Rate display will show 0.000.

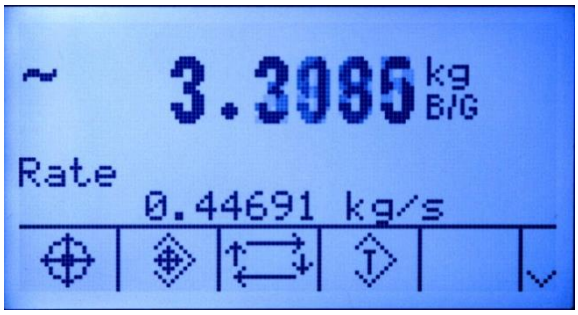


Figure 3-9: Rate Display on Home Screen

The following Rate parameters can be configured:

3.5.9.1.1. Weight Units

Weight Units may be set to None, Primary or Secondary. The Primary and Secondary selections correspond to the Units setting in the **Scale > Capacity & Increment** screen. Secondary units must be enabled at **Scale > Units** in order for secondary to be a unit selection for the Rate function. When the default value, None, is selected, the rate function is disabled. If the unit is a Custom Unit, a Custom Unit Name of up to 3 characters can be displayed.

3.5.9.1.2. Time Units

Time Units may be set to Seconds, Minutes or Hours. The default value is Seconds.

3.5.9.1.3. Measurement Period

The Measurement Period value sets the frequency of weight measurements. 1 second is the default value. Other options are 0.5 and 5 seconds.

3.5.9.1.4. Output Average

Output from the rate function is set by a computed rolling average of measurements. This possible range of values is 1 to 99 seconds, with a default value of 1. The Output Average value should be sufficiently larger than the Measurement Period to allow the terminal to take multiple measurements for each average.

3.5.10. Filter

The IND560x terminal has a low-pass, multi-pole vibration filter that can be set for several conditions when using analog load cells. The heavier the filtering, the slower the display settling time will be.

For SICSpro, this parameter is shown in the Advanced Setup Mode (ASM) branch of the terminal menu.

3.5.10.1. Low Pass Frequency

Low Pass Frequency configuration is available for analog load cells only. Low pass frequency is the frequency above which all disturbances are filtered out. The lower the frequency, the better the disturbance rejection, but the longer the settling time required for the scale.

3.5.10.2. Low Pass # of Poles

Low Pass # of Poles configuration is available for analog load cells only. The number of poles determines the slope of the filtering cutoff. For most applications, a slope value of 8 is acceptable; however, decreasing this number will improve settling time slightly.

3.5.10.3. Notch Filter Frequency

Notch Filter Frequency configuration is available for analog load cells only. The notch filter allows selection of one specific frequency below the low pass filter value that can also be filtered out. This enables setting the low pass filter higher to filter out all but one frequency (that the notch filter will handle) and obtain a faster settling time. Values from 0 (disable) to 99 are possible.

3.5.10.4. Stability Filter

Stability Filter configuration is available for analog load cells only. The stability filter works in conjunction with the standard low pass filter to provide a more stable final weight reading. The stability filter should only be used in transaction weighing applications, since the nonlinear action of the filter switching may cause inaccurate cutoffs in batching or filling applications. The stability filter can be enabled or disabled on this setup screen.

3.5.10.5. IDNet Filtering

Configuration for IDNet filtering parameters is performed on the Filter screen. Use the Vibration selection box to select a condition setting that reflects the specific location's conditions. Selections include:

Ideal Conditions	The weighing platform operates very quickly. However, it is very sensitive. This setting is suitable for a very calm and stable weighing location.
Average Conditions	This is the factory default setting and is suitable for most normal environments.
Extreme Conditions	The base reacts to changes in weight more slowly but is much more stable in unstable environments.

Use the Weighing Process selection box to select the specific weighing process in use. Selections include:

Fine Filling	Used when liquid or fine powders are being weighed
Universal Weighing	For solid materials coarse filling or checkweighing
Static Weighing	For solid materials and weighing under extreme conditions such as strong vibrations
Dynamic Weighing	For weighing products that will not be fully stable or still during the weighing process. Not intended for animal weighing.

3.5.11. Stability

The IND560x terminal includes a stability detector (weight in motion). For analog load cells, the Stability setup screen enables setting a motion range, no-motion interval and timeout period. For IDNet bases, a stability measure and timeout period may be set. For SICSpro bases, a timeout period may be set.

3.5.11.1. Analog Load Cell Stability

3.5.11.1.1. Motion Range

Sets the motion range to the weight value (in divisions) that the weight is permitted to fluctuate and still have a no-motion condition. Values from 0.1 to 99.9 are possible with the default value being 1.0.

3.5.11.1.2. No-motion Interval

The no motion interval defines the amount of time (seconds) that the scale weight must be within the motion range to have a no-motion condition. Values from 0.0 (motion detection disabled) to 2.0 are possible, the default value being 0.3 seconds. A shorter interval means that a no-motion condition is more likely, but may make weight measurement less precise.

3.5.11.2. IDNet Stability

3.5.11.2.1. Stability

Stability settings for IDNet load cells are configured by selecting a number setting of 0 (disabled), 1 (fast display, good repeatability), 2 (slow display, better repeatability), 3 (slower display, better repeatability), or 4 (very slow display, very good repeatability) in the Stability selection box.

3.5.11.3. SICSpro Stability

3.5.11.3.1. Timeout

Defines the period (in seconds) after which the terminal stops attempting to perform a function that requires a no-motion condition (such as a zero, tare or print command) and aborts the function. This timeout is used regardless of the source of the command such as the keypad, discrete input, PLC or SICS. Values from 0 to 99 are possible with the default value being 3 seconds. A smaller value means that less time will be used to check for no-motion before aborting a command. When a value of 0 is entered, there must be no-motion when a command is given or it will fail immediately. A value of 99 is a special condition which permits the terminal to wait indefinitely for a no-motion condition - a command would never be aborted.

3.5.11.4. Log or Print

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

The weight values entered are the gross weight values in primary units. Gross weight in primary units is used regardless of whether the IND560x is in Gross or Net mode and regardless of the units that are displayed.

3.5.11.4.1. Minimum Weight

The minimum weight setting is the threshold below which log or print functions will not initiate. Primary units are displayed for this field.

3.5.11.4.2. Interlock

Interlock prevents repeat logging and printing. If enabled, interlock requires that the weight reading be reset per the Reset on parameter setting (see below) and then settle to a weight greater than the minimum print value before responding to the next log or print request.

3.5.11.4.3. Automatic

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

If Automatic is set to Disable, the Threshold Weight field does not appear.

3.5.11.4.4. Reset on

The resetting of auto printing or logging can be based on weight threshold or weight deviation values. Select Return (the weight must return to below this value to reset) or Deviation (the weight must change more than this value to reset) from the selection box and enter the weight value in the "Reset on" field.

If both Interlock and Automatic settings are disabled, the Reset on field does not display.

If Reset On is set to Deviation, The Threshold Weight and Motion Check fields do not display.

3.5.11.4.5. Threshold Weight

The Threshold Weight is the value above which an Automatic logging or printing of data can/will occur. Threshold Weight does not appear if Automatic is set to Disabled or if Reset On is set to Deviation.

3.5.11.4.6. Motion Check

Enable the motion check setting to prevent interlock and automatic log and print functions from resetting when the scale is in motion below the "Reset On" return point. Motion Check does not appear if Reset ON is set to Deviation.

3.5.12. MinWeigh

Enable the MinWeigh function to compare the current net weight with a MinWeigh value. If the net weight is greater than or equal to the MinWeigh value, all terminal 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 (*).

3.5.12.1. Entry Method

The MinWeigh value entry method can be either calculated by the IND560x or directly entered.

3.5.12.1.1. Calculated

MinWeigh is composed of 4 factors, each determined independently:

$$\text{MinWeigh} = \frac{U_0 \times SF \times 100\%}{T - (c \times SF \times 100\%)}$$

Where:

- U_0 = Uncertainty in measurement as the applied load approaches 0. U_0 is computed differently in each country and is entered in Primary units of measure.
- T = Tolerance in percent, which reflects the tolerances required for the specific process and facility. The range is 0.1%–99.9%.
- SF = Safety factor, which is another adjustment means. Usually SF = 1. The integer value range is 1–10.
- c = Uncertainty factor related to the portion of uncertainty in measurement that is proportional to the applied load. For reference only, $c = (U_{MAX} - U_0)$ / Max, where Max = maximum weighment and U_{MAX} = measurement uncertainty at maximum weight.

When **Calculated** is selected, the user is prompted to enter the uncertainty U_0, c factor, tolerance percent, and safety factor in data entry boxes. The new MinWeigh value is then computed by the weighing equipment.

3.5.12.2. Direct

For direct entry of a MinWeigh value, user enters the desired value for MinWeigh directly in the MinWeigh data entry box. The MinWeigh value is entered in Primary units of measure.

3.5.13. Scale Type: Remote

When properly configured, the IND560x can function as a remote display for another IND560x terminal or for another Mettler Toledo terminal capable of handling Mettler Toledo Continuous Output. If the remote IND560x 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).

3.5.13.1. Physical Connection of Master and Remote Terminals

Communication for the remote display function occurs over a single serial connection. The configurable serial ports (COM1, COM2, COM3, COM4, COM5) in the IND560x can support one output and one input simultaneously, so only a single port is necessary for remote operation.

The standard COM1 port on the main board of the IND560x, COM4 and COM5 (on the optional fiber optic and current loop interface boards), and the optional COM2 and COM3 ports which would be installed in the ACM500, each support all three of the assignments used in the remote display function: Remote Display, Continuous Output and CTPZ Input. Communication can occur via RS-232, RS-422 or RS-485, but serial port parameters (baud, data bits, parity, flow control) must be the same for the Master and Remote terminals. Serial port configuration information can be found in Appendix D, **Communications**.

IMPORTANT: Direct connection of COM1 on the IND560x to another Mettler Toledo terminal will require the use of an appropriate signal barrier! Refer to Appendix A, **Installation** for details on barriers known to work with the IND560x.

3.5.13.2. Remote Terminal Communication via COM1

If the IND560x will function as the Remote terminal, and the communication will take place over COM1, the **Scale > Type** setting must be Remote, as shown in Figure 3-10. Note that the Approval option is not available in this configuration.

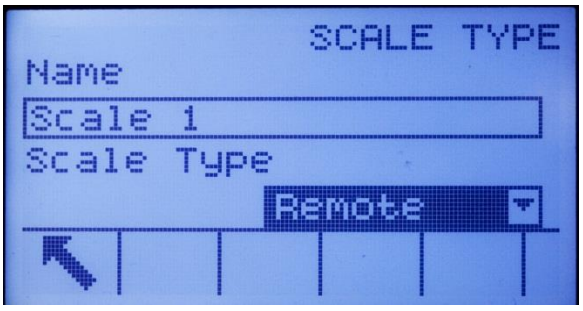


Figure 3-10: Scale Type Setting for Remote Operation

In addition, at **Communication > Connections**, the COM1 port must be assigned to Remote Display, as shown in Figure 3-11.

Figure 3-11: COM1 Connection Configured for Remote Operation

- IMPORTANT: An appropriate signal barrier is required when connecting a non-intrinsically safe device up to COM1 on the intrinsically safe IND560x.

3.5.13.3. Remote Terminal Communication via COM2 or COM3

If the IND560x will function as the Remote terminal and the communication will take place over COM2 or COM3 in the ACM500, the **Scale > Type** setting must be Remote, as shown in Figure 3-10. In addition, COM4 must be set as ACM500, as shown in Figure 3-12. Finally, COM2 or COM3 can be assigned as Remote Display as shown in Figure 3-13

Figure 3-12: COM4 Connection Configured for ACM500

Figure 3-13: COM2/COM3 Connection Configured for Remote Operation

3.5.13.4. Remote Terminal Communication via COM4 or COM5

If the IND560x will function as the Remote terminal and the communication will take place via a legacy fiber optic converter, another IND560x with fiber optic interface installed or the ACM500

(COM4 or COM5), the **Scale > Type** setting must be **Remote**, as shown in Figure 3-10. In addition, COM4 or COM5 must be set as Standard on the Connections setup page, as shown in Figure 3-14. Finally, COM4 or COM5 can then be assigned as Remote Display on the Connections View page as shown in Figure 3-15.

- NOTE: The IND560x cannot function as a remote display for another IND560x if the current loop interface is used. The current loop connection used in a remote display configuration requires one active and one passive end in the communication link, and only an active current loop interface is approved for use in the IND560x.

Figure 3-14: COM4 or COM5 Connection Configured for Fiber Optic Converter or ACM200

Figure 3-15: COM4 or COM5 Connection Configured for Remote Operation

3.5.13.5. Master Terminal Configuration

The Master terminal must have a port configured to send display information to the Remote terminal. At **Communication > Connections** the serial port assignment must be Continuous Output. If the Remote terminal will be used to send commands to the Master terminal, then the same port must have a second connection assignment for CTPZ Input.

Figure 3-16 shows a typical Remote Display setup, with the Master terminal able to receive commands sent from the Remote IND560x.

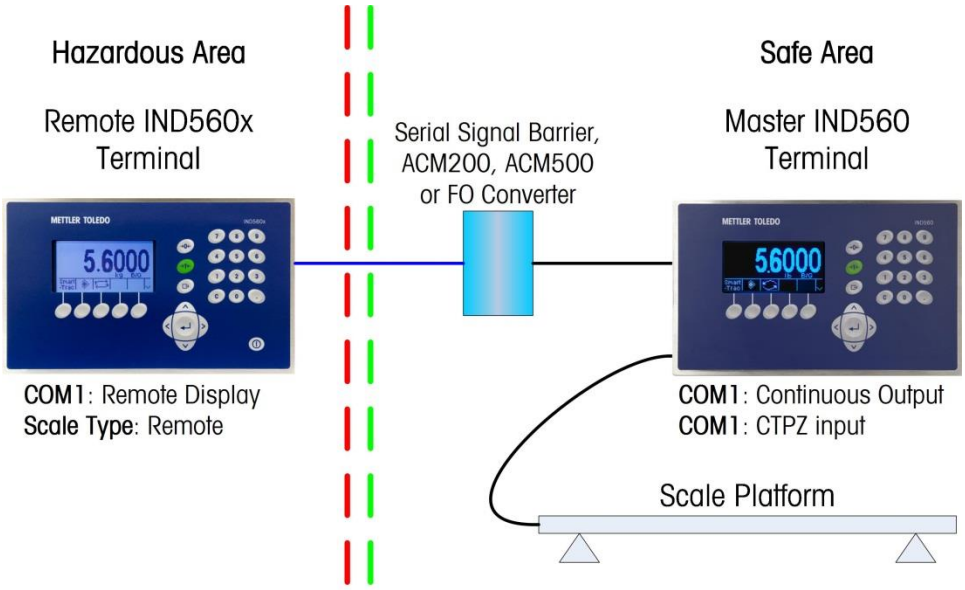


Figure 3-16: Example of Terminal Configuration for Remote Display Function

3.5.14. Reset

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

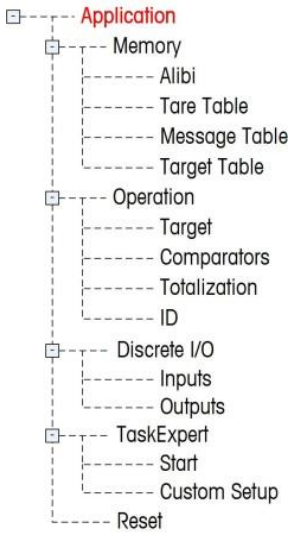
3.5.14.1. Scale Reset

To initiate a reset, press the OK softkey OK. If the reset was successful, a verification message that reads "Reset Successful" displays. If the reset was not successful, an error message that reads "Reset Failure" displays. If the reset fails, try to initiate the reset again. If the reset continues to fail, contact a local METTLER TOLEDO representative for assistance.

Press the ESCAPE softkey Esc to exit without resetting.

- Scale reset does NOT include the reset of metrologically significant parameters – scale type, approval, weight units, capacity, increment, or calibration data. This data is reset only by performing a Master Reset with both switches 2-1 and 2-2 in their ON positions, or a Reset function in the IDNet or SICSpro load cell.

3.6. Application



Use application setup screens to configure:

- Memory and tables
- Operation of targets, totalization and the ID function
- Discrete I/O

3.6.1. Memory

Memory setup screens include:

- Alibi
- Tare Table
- Message Table
- Target Table

3.6.1.1. Alibi

The Alibi Memory can be enabled or disabled in the selection box. Alibi memory is configured as a "ring" buffer that overwrites the oldest record when it reaches its memory limit. Alibi memory can hold approximately 60,000 transactions before it reaches its limit and begins overwriting old transactions. More detailed information about Alibi memory can be found in Chapter 2, **Operation**, and in Appendix C, **Table and Log File Structure**.

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

- Date and time stamp
- Transaction counter value
- Gross, tare, and net weights and weight unit
  - If the IND560x terminal has been programmed as "approved", Alibi Memory enabling or disabling is only accessible if the security switch (SW1-1) is in the OFF position.

3.6.1.2. Tare Table

The Tare Table displays stored tare records, including:

- Tare record ID
- Tare weight value and unit
- Description
- Total number of transactions using each stored tare record
- Total (accumulation of tare weights for each stored tare record)

More detailed information about the tare table memory can be found in Chapter 2, **Operation**, and in Appendix C, **Table and Log File Structure**.

Use the Tare Table setup screen to enable or disable description and to configure totalization.

Description

Description is an alphanumeric string that describes the Tare Table entry. Use the Description selection box to enable or disable Description in the Tare Table structure.

Totalization

Totalization is a field that tracks the total weight for all transactions involving each tare in the table. Use the Totalization selection box to select None, Displayed Weight, or Gross Weight for totals in the Tare Table structure.

Press the CLEAR softkey C to reset the table. Log-in must be at supervisor level or above to reset the table.

To view Tare Table records:

Press the VIEW TABLE softkey The Tare Search screen displays.

1. Use the selection boxes and associated fields to enter specific search information to limit the search, or enter * (the "find all" character) to view all Tare Table information.
2. Press the START SEARCH softkey . The Tare Search View screen displays with the search results. Only records with non-null tare values display. Records are ordered by ID, with the lowest ID number shown first.
3. Press the UP, DOWN, LEFT, and RIGHT navigation keys to scroll up and down and across the screen in order to view all data and all records listed.

To modify or add Tare Table records:

4. Press the UP and DOWN navigation keys to select (highlight) a record in the table.
5. Press the EDIT softkey to open the setup screen for editing a record or press the INSERT softkey to open the setup screen to create a new table record.
6. Press the UP and DOWN navigation keys to move the focus to the field name to be edited or inserted.
7. Press the ENTER key to select a field value to edit or insert. The alpha keys display.
8. Use the alpha keys and the numeric keypad to edit or enter the desired value.
9. Press the TARE softkey →T← to capture the current live scale weight and unit, which will display in the Tare field.
10. Press the OK softkey to accept the modifications or additions to the Tare Table.
11. Press the ESCAPE softkey Esc to return to the Tare Search View screen without saving modifications or additions.
12. Press the DELETE softkey to delete a tare record in the list.
13. Press the PRINT softkey to print the list. Login must be at supervisor level or above to print the table.
14. Press the EXIT softkey to return to the Tare Search Screen.

3.6.1.3. Message Table

The Message Table displays stored text messages and corresponding ID numbers that can be used to print templates. Only message records with non-null values display.

Press the CLEAR softkey C to clear the entire table. Login must be at supervisor level or above to clear the table.

To view Message Table records:

1. Use the selection boxes and associated fields to enter specific search information to limit the search, or do not enter any search limits to view all Message Table information.
2. Press the START SEARCH softkey  . The Message Search View screen displays with the search results. Records are ordered by ID, with the lowest ID number shown first.
3. Press the UP and DOWN navigation keys to scroll up and down the screen in order to view all data and all records listed.
4. Modify or add Message Table information by editing, inserting, or deleting information as described previously under Tare Table.
5. Press the PRINT softkey  to print the list.
6. Press the EXIT softkey  to return to the Search Screen.

3.6.1.4. Target Table

Target comparison can be used in two types of applications: material transfer and over/under. Material transfer applications require 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.

Values in the active record registers such as the target weight and tolerance, which can be manually modified or loaded from the Target Table, are compared with either the displayed or gross scale weight.

Use the Target Table setup screen to select the mode, tolerance type, and output type for use in target comparison.

More detailed information about the target table can be found in Chapter 2, **Operation**, and in Appendix C, **Table and Log File Structure**.

3.6.1.4.1. Mode

Use the Mode selection box to select the type of application for target comparison. Selections include:

- None
- Material Transfer
- Over/Under

3.6.1.4.2. Tolerance Type

Use the Tolerance Type selection box to select the type of tolerance to be used for target comparison. Positive tolerance and negative tolerance values can be entered as a deviation weight

value in the same units as the target (Target Deviation) or as a percent of the target value (% of Target).

When over/under mode is selected, a weight value choice is available as a tolerance type. In this mode, there is no target value used – only under limit and over limit values are used as zone edges for OK.

3.6.1.4.3. Output Type

The Output Type field is available only when the Material Transfer mode is selected. Use the Output Type selection box to select the type of two-speed output to be used in the target application. Selections include:

Concurrent	Both outputs operate at the same time
Independent	One output operates at a time (Fast Feed then Feed)

Press the CLEAR softkey C to reset the entire target table. Log-in must be at supervisor level or above to clear the table.

To view Target Table records:

1. Press the VIEW TABLE softkey The Target Search screen displays.
2. Use the selection boxes and associated fields to enter specific search information to limit the search, or do not enter any search limits to view all Target Table records.

- Search fields that display in the Search Field selection box vary depending on the selections made on the Target Table setup screen.

3. Press the START SEARCH softkey. The Target Search View screen displays with the search results. Only records with non-null values display. Records are ordered by ID, with the lowest ID number shown first.
4. Press the UP, DOWN, LEFT, and RIGHT navigation keys to scroll up and down and across the screen in order to view all data and all records listed.

Target Table records include different information, depending on the selections made on the Target Table setup screen. For example, Over Limit and Under Limit data displays only when the Over/Under mode is selected with Weight Value tolerance type.

Target Table records can include the following fields:

ID	Identification number for the active record
Description	Descriptive identification for the active record
Target	The desired measured value for a weighment
Target Units	The units of measure for the target weight (the target record units and the comparison units can be a combination of primary, second or third units)
Spill	The amount of material delivered after the control device is signaled to stop
Positive Tolerance	The highest acceptable tolerance above a target value

Negative Tolerance	The lowest acceptable tolerance below a target value
Fine Feed Value	For two-speed applications, the fine feed value determines when the Fast Feed output turns off.

Modify or add Target Table information by editing, inserting, or deleting information as described previously under Tare Table.

Press the PRINT softkey to print the list. Login must be at supervisor level or above to print the table.

Press the EXIT softkey to return to the Search Screen.

3.6.2. Operation

Operation setup screens include:

- Target
- Comparators
- Totalization
- ID

3.6.2.1. Target

Use this setup screen to select which live measurement data stream (source) to use as input for target comparison and to enable or disable latching.

3.6.2.1.1. Source

Select which source to use as input for target comparison, either Displayed Weight or Gross Weight.

3.6.2.1.2. Motion Check

This parameter is shown only if target mode is set to Over/Under (at **Application > Memory > Target Table**). The default value is disabled. If Motion Check is enabled, the discrete outputs for Over, Under and OK are only activated when a no-motion condition is detected.

3.6.2.1.3. Latching

If the Target Table mode selection is Material Transfer, output latching can be selected. When output latching is enabled, the target comparison outputs remain latched (OFF) after the output switching threshold is exceeded until the latch is reset by a start input (softkey or discrete input).

If latching is disabled, the outputs will operate as coincidence-type outputs with no interlocks.

3.6.2.2. Comparators

The Comparators screen permits the configuration of simple targets controlled either by coincidence or by comparison with a range, and used as an assignment for Discrete I/O outputs. Comparators are controlled either by coincidence or by comparison with a target or range. The source for comparison can be the Gross Weight, Displayed Weight, Rate or assigned by a custom TaskExpert application.

3.6.2.2.1. Home Screen Comparators Softkey

The Comparator softkey →|← can be assigned to the weight display home screen. It opens the Comparators view screen, which displays the ID, Description, Limit, Unit, High Limit and Active values for each Comparator. An EDIT softkey opens a screen that display's the selected Comparator's Description, and permits its Limit and High Limit values to be modified. Changes can be saved (OK) or discarded (Esc) when returning to the Comparators view screen.

3.6.2.2.2. Comparators Configuration Screen

Source, Active, Description and Limit values can only be set from the Application > Operation > Comparators screen. This screen displays all five Comparators, and contains columns for ID, Description, Source, Limit, Unit, High Limit, and Active condition. From here, it is possible to EDIT a Comparator, delete one, or clear C all Comparators.

Once parameters have been set in the Comparator Edit screen, they can be saved by pressing OK, or discarded by pressing ESCAPE Esc. In either case, the view returns to the Comparators screen.

3.6.2.2.3. Source

The default value for Source is None, meaning that the comparator is disabled, and no other parameter fields are displayed. Other choices for the Source are Displayed Weight, Gross Weight, Rate and Application. If a weight field is selected as the Source, the weight unit will be primary units. If Rate is selected as the Source, then the unit will be the same as selected for Rate in the **Scale > Rate** branch. If Application is selected, no other parameter fields are displayed. This selection allows a TaskExpert custom application to control the source assignment for the Comparators.

3.6.2.2.4. Active

The Active setting determines the range of other options available in the Comparator Edit screen. These options are summarized in Table 3-2.

When Active is set to less than (<, the default value), less than or equal to (<=), equal to (=),greater than or equal to (>=), greater than (>), or not equal to (< >), the output is active depending on the relationship between the current Source value and the Limit. When Active is set to within (>_ _<) or outside (_< >_) a range, the source value is compared to the target value range set in the Limit and High Limit fields.

Table 3-2: Comparator Configuration

Source	None*, Displayed Weight, Gross Weight, Rate	
Active	<*, <=, =, >=, >, < >	>_ _< (within), _< >_ (outside)
Description	20 character alphanumeric string	
Limit	Target value	Lower target value for the comparison range
High Limit	n/a	Upper target value for the comparison range

3.6.2.2.5. Description

The description is an alphanumeric string that is used to identify the type and purpose of the comparator. This string appears, together with the automatically assigned ID number (1-5), in the list that displays when the Comparator softkey is pressed.

3.6.2.2.6. Limit

The Limit either sets the target weight value to which the actual source value is compared, or the lower target value for the range to which the currently measured source value is compared.

3.6.2.2.7. High Limit

The High Limit is available only for Range mode, and sets the upper target value for the range to which the currently measured source value is compared. Its value must be higher than the Limit – if a lower value is entered, the terminal will show an **Invalid Value** message when the OK softkey OK is pressed. The value is expressed in the programmed Rate unit.

3.6.2.3. Totalization

Knowing how many weighing transactions were performed and how much material was processed during a particular period of time is useful information for many weighing applications.

The IND560x terminal provides both grand total (GT) and subtotal (ST) registers and counters. Counters have a limit of 1,500,000 and registers will accumulate up to 11 digits of weight including any decimal places to the right of the decimal point. For example, a scale programmed for 500 x 0.1 kg will accumulate weight values up to 9999999999.9 (11 total digits). If either of these limits is exceeded, an error message will display and the totals must be reset before additional weights or counts will be added.

Use the Totalization setup screen to select parameters for totalization operations, including which source to use as input for totalization, settings for grand totals and subtotals, and to enable or disable the conversion of second or third unit weights for totalization.

3.6.2.3.1. Mode

Select which source to use as input for totalization comparison – either Displayed Weight or Gross Weight. A selection of None disables totalization.

3.6.2.3.2. Clear GT on Print

GT can be configured to clear automatically after printing the Totals report. If Clear GT on Print is enabled, the subtotal also clears automatically after printing the Totals report.

3.6.2.3.3. Subtotal

ST can be separately disabled while GT continues to accumulate weights. Choose to either enable or disable the subtotal register.

3.6.2.3.4. Clear ST on Print

Clearing the subtotal on print and not clearing the grand total on print allows the subtotal register to totalize sub-sets of weighments and to be reset while the grand total continues to track the grand total of weight. Choose to Clear ST on Print or not by selecting enabled or disabled in the selection box.

3.6.2.3.5. Convert Weight

The total registers always store weights in primary units. If Convert Weight is disabled, scale weights other than primary units are not accumulated. If Convert Weight is enabled, then the weight is converted to primary units, then accumulated.

3.6.2.4. ID

The ID function is a simple but powerful means of facilitating specific data input from the operator or causing a specific action to take place. The prompt list may include up to 20 steps, each step containing a command that determines the action the IND560x terminal will take when the step is executed.

The sequence can be programmed to run once (for example, when initiated by the pressing the ID softkey ID) or to loop continuously until terminated. It can also be initiated and restarted automatically, triggered by weight input from the scale. In either case, the operator works though a prompted series of actions or data entries. For example, the operator could place a package on the scale, be prompted to enter his or her name, enter a pre-set tare value, scan a bar code on the package, and generate an automatic print before finally removing the package from the scale. The printed data could include the net weight value, together with the scanned package information and the operator's name. The content and format of the printed information is determined by the template assigned to the demand output.

3.6.2.4.1. ID Mode – None

If None is selected as the ID Mode, then the ID function is disabled.

3.6.2.4.2. ID Mode – Automatic

Automatic Mode triggers the ID sequence when a weight above the Threshold weight value is placed on the scale and a no-motion state is detected. The sequence trigger rearms again after the weight falls below the Reset weight value. Press the EXIT softkey to exit the sequence.

3.6.2.4.3. ID Mode – Softkey

In this mode, the ID softkey ID triggers the sequence, which either runs once (if Looping is Disabled) or continuously (if Looping is Enabled). In either case, pressing the EXIt softkey exits the sequence.

3.6.2.4.4. Configuring ID Sequence Steps

Once the Mode Parameters have been set, ID sequence steps can be viewed, created, edited or deleted by pressing the VIEW TABLE softkey.

1. The ID Search screen displays, permitting the search results to be filtered by #, Type, Length or Prompt.
2. Either select a field to search and enter a comparative operator (<, <=, =, >=, >, <>) and alphanumeric information in the Data fields; or leave the wildcard asterisk (*) in the Data field to view all existing steps.
3. Press the START SEARCH softkey to display the ID View screen. From here, ID steps can be edited, created, erased and printed.

4. The # value is automatically assigned. It determines the order in which the steps will execute. Steps may be inserted into an existing sequence by selecting an entry and pressing the NEW softkey to define a new step. The newly created step will appear in the sequence before the selected entry, and all subsequent # values will increase by one. To move a step in the sequence, it must be deleted and re-entered in the appropriate position.

5. The ID Edit screen is accessed by pressing the NEW softkey or the EDIT softkey . The parameters that can be set for each step depend on the Type of step selected are shown below:

Type	Parameters	Options
Alphanumeric Numeric	Prompt	Enter up to 20 characters as the text or prompt for the step to display on-screen during the ID sequence.
	Length	Enter numeric value (0 - 40) to constrain the length of the response input after the prompt. If length of 0 is entered, the prompt is shown without an entry field. The step is then displayed as an instruction in the sequence. In this case, ENTER must be pressed to move to the next step. During entry, once the length value is met, the terminal will not accept further input; incorrect entries can be deleted using the CLEAR key.
	Clear Data	Disabled, Enabled. Permits the entered response (e.g., Operator's name) to be retained from one cycle to the next. If disabled, the next time the field displays it contains the data entered during the previous cycle, and pressing ENTER accepts the value and moves to the next step. If enabled, the entry field will be blank when viewed the next time.
Clear Tare Print Tare – Auto	None	
Tare – Preset	Prompt	See Prompt, above
	Length	See Length, above
	Clear Data	See Clear Data, above

6. As many as 20 steps can be created. They can be printed at any point using the PRINT softkey . Return to the setup menu tree by pressing the EXIT softkey three times.

3.6.3. Discrete I/O

Discrete I/O setup screens include:

- Inputs
- Outputs

3.6.3.1. Inputs

The Discrete Inputs screen displays discrete input assignments, including the input assignment address, polarity, and function. Only records with non-null values display.

To clear the entire table, press the CLEAR softkey C, then press OK to confirm the action. Login must be at supervisor level or above to clear the table.

Press the UP and DOWN navigation keys to scroll up and down the screen in order to view all of the possible discrete input assignments.

To modify or add discrete inputs:

1. Press the UP and DOWN navigation keys to select (highlight) a discrete input.
2. Press the EDIT softkey to open the setup screen for editing an input assignment or press the INSERT softkey to open the setup screen to create a new input assignment.
3. Enter the input assignment address. The input address is shown as [x.y.z] where x indicates the input location, y indicates the slot address of the I/O option, and z indicates the input position. The input address digits are:

Location – The first digit represents whether the I/O is local (0) or remote (1–3).

Slot Address – The second digit will always be a 1 for the IND560x internal I/O and a 0 for the remote I/O (ARM 100).

Position – The third digit refers to the position (1–4) of the discrete input option (internal or remote) that is being assigned to a function.

Valid address numbers are:

Local – 0.1.1, 0.1.2, 0.1.3, 0.1.4

Remote #1 – 1.0.1, 1.0.2, 1.0.3, 1.0.4,

Remote #2 – 2.0.1, 2.0.2, 2.0.3, 2.0.4,

Remote #3 – 3.0.1, 3.0.2, 3.0.3, 3.0.4

Examples:

Address 0.1.1 = Local discrete board , position 1.

Address 1.0.3 = Remote address #1, position 3.

4. The inputs can be programmed to accept either a + True or – True polarity level as "ON". Use the Polarity selection box to select + True or – True.
5. Use the Assignment selection box to select an input assignment. Selections are:

- None
- Blank Display*
- Calibration Test
- Clear Tare
- Disable Keypad*
- Disable Setup
- Enter
- Print
- SmartTrac
- Tare
- Target Pause/Abort
- Target Start/Resume
- Trigger 1
- Trigger 2
- Trigger 3
- Unit Switching
- Unit - primary
- Unit - second
- Unit - third
- Zero

* Blank Display and Disable Keypad are designed to be continuously and semi-continuously activated by a simple press-and-hold or key and lock mechanism

6. Press the OK softkey to accept the entry.
7. Press the ESCAPE softkey Esc to return to the Discrete Inputs screen.

8. Press the DELETE softkey to delete an input assignment.

3.6.3.2. Outputs

The Discrete Outputs screen displays discrete output assignments, including the output assignment address and function. Only records with non-null values display.

To clear the entire table, press the CLEAR softkey C, then press OK to confirm the action. Login must be at supervisor level or above to clear the table.

Press the UP and DOWN navigation keys to scroll up and down the screen in order to view all of the possible discrete output assignments.

To modify, add, or delete discrete outputs, follow the same procedures described for inputs. Valid address numbers are:

Local – 0.1.1, 0.1.2, 0.1.3, 0.1.4, 0.1.5, 0.1.6

Remote #1 – 1.0.1, 1.0.2, 1.0.3, 1.0.4, 1.0.5, 1.0.6

Remote #2 – 2.0.1, 2.0.2, 2.0.3, 2.0.4, 2.0.2, 2.0.6

Remote #3 – 3.0.1, 3.0.2, 3.0.3, 3.0.4, 3.0.5, 3.0.6

Examples:

Address 0.1.1 = Local discrete board , position 1.

Address 1.0.3 = Remote address #1, position 3.

The selections for output assignments are:

- None
- Center of Zero
- Comparator 1
- Comparator 2
- Comparator 3
- Comparator 4
- Comparator 5
- Fast Feed
- Feed
- Motion
- Net
- Over Capacity
- Over Zone
- Tolerance - OK
- Under Zero
- Under Zone

3.6.4. TaskExpert

The TaskExpert screens allow you to set up a TaskExpert program, and to access custom setup screens defined by your TaskExpert application.

- Note that TaskExpert setup screens are not accessible unless the TaskExpert option is enabled in the terminal. TaskExpert is enabled in the terminal by installing the TaskExpert Application Software key (iButton).

3.6.4.1. Start

The TaskExpert Start screen allows you to list your TaskExpert programs and associate each of them to a Task number. Each task can be set to run automatically on startup or after leaving Setup, or started manually using the Task List, or the Task 1, Task 2 or Task 3 softkeys.

Press the CLEAR softkey C to reset the table.

To modify the TaskExpert Start list:

1. Use the arrow keys to select the task to be edited or deleted. With the record selected:

   Press the EDIT softkey to modify a record. Note that the Task number cannot be modified.

   Press the DELETE softkey to delete a record.

2. To create a new task press the NEW softkey. A TASK EXPERT EDIT screen will display.
3. The Task number will be assigned automatically. Enter the name of the TaskExpert file in the File Name field.
4. Set Auto Start to Enabled or Disabled. If Enabled is selected, the task will run each time the indicator is powered up or when Setup is exited.
5. Set Manual Start to Enabled or Disabled. This will cause the program to run when selected and started.
6. Press OK to save changes or Esc to exit without saving.

3.6.4.2. Custom Setup

The Custom Setup menu is defined by the TaskExpert application. For details, refer to the **TaskExpert Reference Manual**, provided with TaskExpert.

3.6.5. Reset

The Reset setup screen resets setup values to factory default settings for the Application branch setup. Login must be at supervisor level or above to perform a reset.

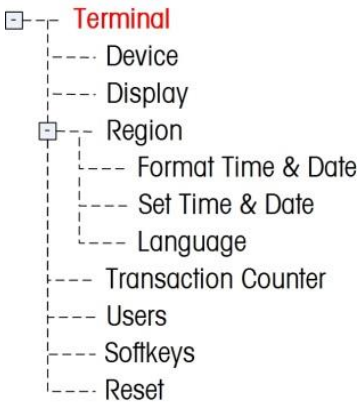
3.6.5.1.1. Application Reset

To initiate a reset, press the OK softkey OK. If the reset was successful, a verification message that reads "Reset Successful" displays If the reset was not successful, an error message that reads "Reset Failure" displays. If the reset fails, try to initiate the reset again. If the reset continues to fail, contact a local METTLER TOLEDO representative for assistance.

Press the ESCAPE softkey Esc to exit without resetting.

- Application reset does NOT include the reset of information in Alibi Memory or tables. This data can only be reset by selecting Maintenance, Reset All.

3.7. Terminal



Setup screens for Terminal setup include:

- Device*
- Display*
- Region
- Transaction counter
- Users
- Softkeys

Leaf nodes that are marked with an asterisk (*) above will have different parameters depending on the connected scale type (analog or IDNet).

Use these setup screens to configure:

- External battery compatibility and power saving options
- Trax EMT™ ID fields
- SmartTrac display settings
- Time and date format and settings
- Language
- Transaction counter settings
- Users
- Softkeys

3.7.1. Device

Use the Device setup screens to enable harsh/analog terminal compatibility with the external NiMH battery pack and to enter data for the three terminal IDs and terminal serial number.

3.7.1.1. Battery Operation

This parameter is only shown in IND560x models with analog main boards. The default value is **Disabled**. Setting this parameter to **Enabled** will cause the IND560x to use the Load Cell parameters established at **Scale > Type**. Enabling Battery Operation also unlocks an Auto Power Off parameter at **Terminal > Device.> Display**.

3.7.1.2. Terminal ID

Up to three terminal IDs can be entered on the Device setup screen. When the Terminal ID text box is selected, the softkeys become alpha keys. Use the alpha keys to enter up to three terminal IDs. Press the ENTER key to accept the ID entered. These ID fields display in the information recall when the SYSTEM INFORMATION softkey is pressed after the RECALL softkey.

3.7.1.3. Serial Number

When the Serial Number text box is selected, the softkeys become alpha keys. Use the alpha keys to enter the terminal's serial number. The serial number is located on the back of the terminal. Press the ENTER key to accept the serial number entered.

3.7.2. Display

Use the Display setup screen to set the screensaver timeout and the SmartTrac™ size settings.

3.7.2.1. Screensaver

Enter the number of minutes (up to two digits) that must elapse with no scale motion and no keypad activity before the screensaver is shown (replaces the view on the display screen). If motion is detected or any key is pressed, the screen saver automatically exits and its time is reset. A keystroke used to exit the screen saver mode is ignored for all other purposes.

A setting of 0 in the Screensaver field will disable the screensaver.

3.7.2.2. Backlight

The IND560x is equipped with a backlight for improved viewing in some conditions. The backlight can be enabled or disabled. If the backlight is enabled, an additional selection for Backlight Timeout appears.

3.7.2.3. Backlight Timeout

Allowable values for Backlight Timeout are 0 (always on) to 99 minutes. The default setting is 10 minutes.

3.7.2.4. Auto Off Timer

If the **Battery Operation** parameter at **Terminal > Device** has been **Enabled**, users can choose to activate an auto-power off feature that will help to optimize single charge battery life. The **Auto Off Timer** parameter monitors scale motion and keypad operation. If no keypad activity occurs within the selected time value, the terminal automatically turns itself off. This auto-shutdown will occur with no warning to the operator.

Choices are:

- Disabled (default)
- 10 minutes
- 30 minutes
- 60 minutes

3.7.2.5. SmartTrac Size

SmartTrac refers to a graphical display visualization used to represent measured values. The display is either a bar graph (if material transfer is selected as the target mode) or an over/under display (if over/under is selected as the target mode).

The graphical display varies in terms of the amount of data displayed. While the SmartTrac graphic remains constant in size, the "small" setting includes minimal information, while the "large" setting displays the description as well as the target and limit values.

Examples of different sizes of SmartTrac displays are as follows:

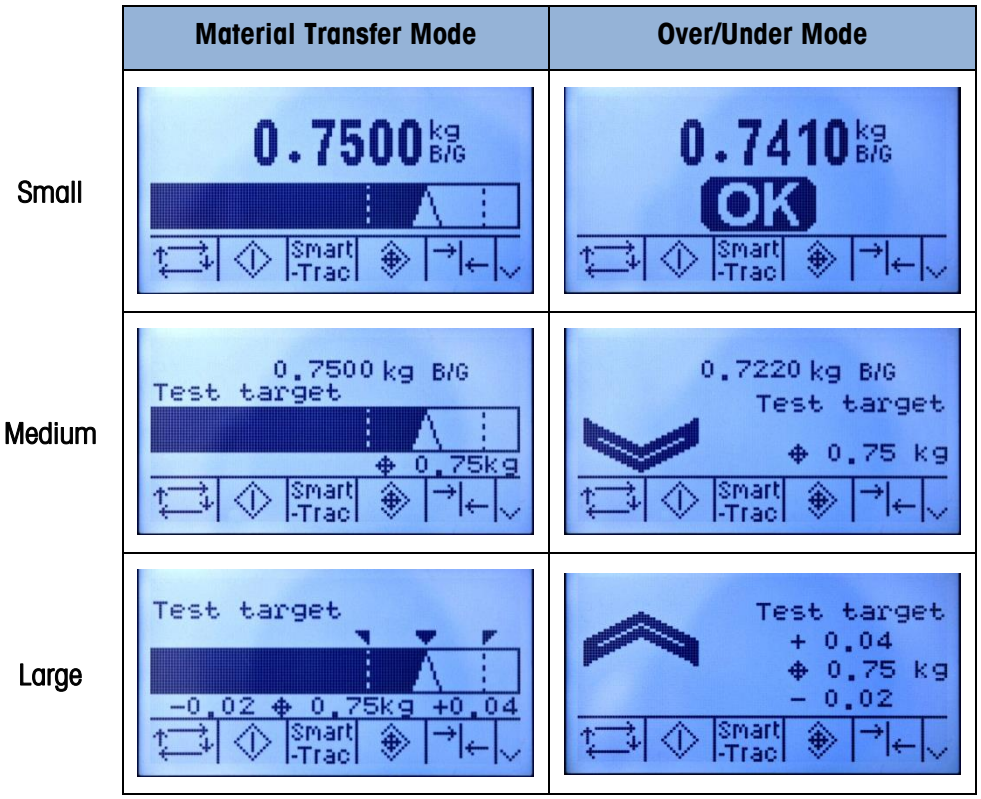


Figure 3-17: SmartTrac Display Sizes, Material Transfer and Over/Under Modes

Use the SmartTrac Size selection box to select a setting for the SmartTrac graphical display. Selections include None, Large, Medium, and Small.

- If this parameter is set to None, SmartTrac will not display when the SmartTrac softkey is pressed at the home screen. Instead, a message will display: "This Function is disabled."

3.7.2.6. Rate Display

If a Rate is configured at **Scale > Rate**, it may be displayed on the home screen or not, depending on whether this value is set to Enabled or Disabled. The option to display Rate does not appear when SmartTrac is set to any value other than None.

3.7.3. Region

The region setup screens enable configuration of:

Time and date format

Time and date settings

Language

3.7.3.1. Format Time & Date

Selection boxes on this setup screen enable formatting of:

3.7.3.1.1. Time Format

12:MM (12-hour clock with hour and minutes displayed)

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

24:MM (24-hour clock with hour and minutes displayed)

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

3.7.3.1.2. Date Format

DD MM YY (Two-digit day, month, year)

DD MMM YYYY (Two-digit day, three-character month, four-digit year)

MM DD YY (Two-digit month, day, year)

MMM DD YYYY (Three-character month, two-digit day, four-digit year)

YY MM DD (Two-digit year, month, day)

YYYY MMM DD (Four-digit year, three-character month, two-digit day)

3.7.3.1.3. Date Field Separator

/ (slash)

- (dash)

. (period)

(space)

None

3.7.3.2. Set Time & Date

Enter the hour, minutes, day, month, and year on this setup screen's text fields and selection boxes. The terminal automatically adjusts the date for a leap year, and a battery backup maintains the time and date settings in the event of a power outage.

- Manual setting of the time is necessary for daylight savings time adjustments.

3.7.3.2.1. Hour

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

3.7.3.2.2. Minutes

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

3.7.3.2.3. Day

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

3.7.3.2.4. Month

Use the Month selection box to select the month.

3.7.3.2.5. Year

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

3.7.3.3. Language

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

3.7.3.3.1. Display Messages

Use the Display Messages selection box to select the language for messages that display on the terminal. Choices are:

- English
- French
- German
- Italian
- Spanish
- Custom
- Custom2

3.7.3.3.2. Keypad Selection

Use the Keypad Selection selection box to select the language for the keypad characters that display on the terminal. This selection determines which international characters are available in the alphabetic data entry softkeys. Choices are:

- Dutch
- English
- French/German
- Nordic/German
- Spanish/Italian/Portuguese
- Russian

3.7.4. Transaction Counter

The transaction counter is a seven-digit register that tracks the total transactions that are completed on the terminal. When the value reaches 1,500,000, the next transaction causes a roll-over to 0000001. Use the Transaction Counter setup screen to configure transaction counter operations.

3.7.4.1. Transaction Counter

Use the Transaction Counter selection box to enable or disable the transaction counter.

3.7.4.2. Counter Reset

Use the Counter Reset selection box to enable or disable manual resetting of the counter.

3.7.4.3. Next Transaction

The value for the counter for the next transaction displays in the Next Transaction field. The RESET COUNTER 000 softkey can be assigned to the home screen (refer to Appendix E, Softkey Mapping), giving direct access to the Transaction Counter screen. If Counter Reset is enabled, the counter can be set to 0000000001 by pressing the RESET softkey. A value greater than one can also be entered manually in the Next Transaction field.

3.7.5. Users

The IND560x terminal is pre-configured with two usernames: "admin" and "anonymous". Neither of these usernames has a password. Without passwords, there will be no security challenge for entering setup and making changes. If a password is entered for "admin", a login will be required before changes can be made in setup. These two default usernames cannot be deleted but passwords may be entered for them. All functions of the terminal will be available to all users until a password is entered for the default **admin** user.

To modify and/or enter a password for a username:

1. Move focus to the username to be edited.
2. Press the EDIT softkey to access the User Edit screen.
3. Press the DOWN navigation key to view the second screen, which displays the Password and Confirm Password fields.
4. Enter the desired password in the Password and Confirm Password fields.
5. Press the OK softkey to accept the password as entered.
6. Press the ESCAPE softkey Esc to exit without saving the password.

- Passwords are case-sensitive.
- All numbers and all characters available in the alpha keys are valid for use in passwords.
- Be sure to store a record of the password in a safe place. Without the correct password access to the setup menu will not be possible.

To enter a new username and password:

1. Press the INSERT softkey to access the User Edit screen.
2. Enter the desired username in the Username field.
3. Use the Access selection box to assign the appropriate access level to the user. The following access levels are available:
   - Administrator – An administrator has unlimited access to all set-up parameters in the terminal. There can be multiple administrator users.
   - Maintenance – Next lower level of access.
   - Supervisor – Next lower level of access.
   - Operator – Lowest level of access.
4. Press the DOWN navigation key to view the second screen, which displays the Password and Confirm Password fields.
5. Enter the desired password in the Password and Confirm Password fields.
6. Press the OK softkey to accept the username and password as entered.
7. Press the ESCAPE softkey Esc to exit without saving the username and password.
8. Press the DELETE softkey to delete a username from the table on the Users screen. Usernames "admin" and "anonymous" cannot be deleted.

9. To restore the factory default setting (by deleting all users except the "Admin" and "Anonymous" users and restoring the passwords to null), press the CLEAR softkey C and then OK to confirm the action.

3.7.6. Softkeys

Add or rearrange the softkeys on the terminal's main menu on the softkeys setup screen. Appendix E, **Softkey Mapping**, provides a more detailed explanation of the softkeys.

When the softkeys setup screen opens, focus is on the softkey position numbers located above the icons.

Two softkeys, INFORMATION RECALL and SETUP, are automatically placed in the softkey setup. The default setting for the placement of these softkeys is in positions 9 and 10.

The INFORMATION RECALL and SETUP softkeys must always be assigned a position. They can be moved or multiple copies of them can exist but there must always be at least one appearance of them. They cannot be deleted. All other softkeys may be added or deleted as desired.

Adding a softkey to the home pages of the terminal does not automatically enable the softkey's function. Most softkeys must also be enabled in setup too. For instance, adding the UNITS SWITCHING softkey does not automatically enable units switching – the units must also be enabled in the Scale branch of setup. If a softkey has been added in setup but does not appear on the home page, check that the setup parameters for that function have been enabled.

The following softkeys are available for assignment to the home page:

- None
- Alibi Memory
- Calibration Test
- Comparators
- Custom Trigger 1
- Custom Trigger 2
- Custom Trigger 3
- ID
- MinWeigh
- Recall Info*
- Repeat Print
- Reports
- Reset Transaction Counter
- Setup*
- SmartTrac
- Tare Table
- Target
- Target Control
- Target Start
- Target Table
- Task 1**
- Task 2**
- Task 3**
- Task List**
- Time & Date
- Unit Switching
- x10 Display

* Cannot be removed from home screen or edited.

** Only available when TaskExpert™ or an application is installed.

Press the UP, DOWN, LEFT and RIGHT navigation keys to navigate among the softkey position numbers. Softkeys can be added, removed, and positioned using the softkeys:

Edit — Changes the softkey in the selected position to another softkey or to none, which leaves the softkey position blank. Editing a blank position does not move the position of following softkeys.

	Insert	Inserts a softkey into a selected position. All other softkeys located at or after that position increase position number by one.
	Delete	Deletes a softkey in a selected position. All other softkeys located at or after that position decrease position number by one.
C	Clear	Clears all softkey assignments except INFORMATION RECALL and SETUP softkeys. These will be shown in positions 1 and 2 respectively.

3.7.7. Reset

The Reset setup screen resets setup values to factory default settings for the Terminal branch of setup.

3.7.7.1.1. Terminal Reset

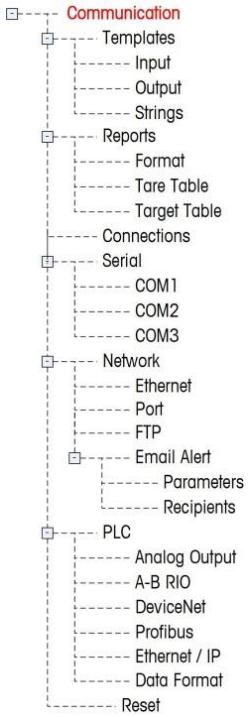
To initiate a reset, press the OK softkey OK. If the reset was successful, a verification message that reads "Reset Successful" displays If the reset was not successful, an error message that reads "Reset Failure" displays. If the reset fails, try to initiate the reset again. If the reset continues to fail, contact a local METTLER TOLEDO representative for assistance.

Press the ESCAPE softkey Esc to exit without resetting.

3.8. Communication

Setup screens for Communication setup include:

- Templates
- Connections
- Network
- Reports
- Serial
- PLC



Use these setup screens to configure:

- Input and Output Template Setup
- Report Structure
- Connection Assignments
- Serial Port Parameters
- Network Parameters, including Email Alert settings
- PLC Interfaces

3.8.1. Templates

The IND560x terminal utilizes five output templates (1,000 bytes in size) to define the format of data output following a weighing operation.

An input template is also available to receive a string input (such as from a bar code gun) and use it as data entry for ID 1, Tare, Tare ID or

Target ID. When the Fill-560 Application Software is installed, the input template can also be assigned for Target Weigh-In or Target Weigh-out.

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

3.8.1.1. Input

Use the Input Template to remove extra characters from an input string of data. Setup parameters include:

Preamble Length – Defines how many characters are skipped at the beginning of an input string before the desired data.

Data Length – Defines the maximum length of a string. All characters beginning after the preamble through the data length selection are used as the input.

Postamble Length – Defines the number of characters (before but not including the termination character) that will be stripped off the data string. All other data from the preamble length to the termination character minus the postamble length are used as the input string. When using an input that is always the same fixed length, this field remains blank.

Termination Character –+ Used to signal the end of the string input. The termination character can be any ASCII control character. If None is selected, the three-second timeout feature terminates the entry. In addition to None, selections available from the selection box include:

SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS
HT	LF	VT	FF	CR	SO	SI	DLE
DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN
EM	SUB	ESC	FS	GS	RS	US	

- Refer to Appendix G for ASCII control character definitions and functions.

Assignment – Determines how the input data should be used. Choices are:

ID1	Input populates the ID1 Shared Data variable.
Keypad	Used in conjunction with ID Mode – data that would normally be entered using the numeric keypad or on-screen alpha keys may be scanned in during an ID Mode sequence.
Tare	Enters data as a preset tare value
Tare ID	Uses value as an ID lookup in the tare table
Target ID	Uses value as an ID lookup in the target table
Target Weigh-in	Uses value as an ID lookup in the target table and assigns it as the Active Weigh-in target (Fill-560 feature only)
Target Weigh-out	Uses value as an ID lookup in the target table and assigns it as the Active Weigh-out target (Fill-560 feature only)

There is also a three-second timeout feature that tracks the amount of time between characters. If this three-second time is exceeded, the string is considered terminated.

3.8.1.2. Output

The Output Template setup screen enables configuration of the output data formats and a header or footer for the Repeat Print function.

To add the "DUPLICATE" designation to a repeat print of an output template, select either Header or Footer from the Repeat Print Field dropdown menu highlighted in Figure 3-18.

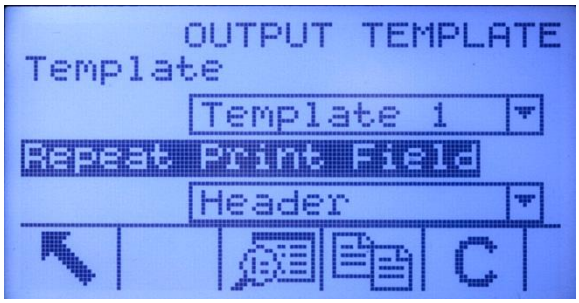


Figure 3-18: Repeat Print Field Setup

To view elements in a template or create a new template, select the desired template from the Template selection box. Five templates are available (Template 1–Template 5).

Press the VIEW TABLE softkey to access the selected template's view screen, which lists each element configured for the template.

Press the COPY softkey to open the copy screen, which enables the elements from one template to be copied to another template.

Press the CLEAR softkey C to clear all elements from the selected template. A warning screen displays as a precaution.

Press the EXIT softkey to return to the menu tree.

Each element is defined by the data type, actual data, justification and length. Elements may be edited, added (inserted), or deleted individually. A leading zero fill function is available for certain fields.

3.8.1.2.1. Editing

1. Press the UP and DOWN navigation keys to select a record to edit.
2. Press the EDIT softkey to open the setup screen for the record where edits can be made. The element number cannot be edited.
3. Select the element type from the Type selection box. Four element types are available:

CR/LF – A combination carriage return and line feed.

SDName – The name of a Shared Data variable from the terminal.

Special Character – Control characters from a standard ASCII chart. Refer to Appendix G, **ASCII Standard and Control Characters**.

String – A string of characters to print.

Press ENTER to confirm the element type selection. Depending on which type is selected, additional configuration options will appear.

4. Press the OK softkey OK to return to the template setup screen when editing of the element is complete.
5. Press the ESCAPE softkey Esc to return to the template setup screen without saving the element edits.

Template Editing Options

Table 3-3 lists the editable fields that appear for each Element Type and Format selection. Fields that are not available are indicated with a dash (–).

Table 3-3: Template Element Editing Options

Element Type	Data	Repeat Count	Format	Length	Leading Zero Fill
CR/LF	–	Blank**	–	–	–
SDNAME	Blank* (Refer to Table 3-4)	–	Default	–	–
			Centered, Left	Blank**	–
			Right	Blank**	Enabled/Disabled
Special Character	ASCII character list	–	–	–	–
String	Blank*	Blank**	Default	–	–
			Center, Left, Right	Blank**	–

* Alphanumeric entry field

** Numeric entry field

Repeat Count

A numeric value that sets the number of times the Data will repeat. For example, if the string data entered is an asterisk (*), a repeat count value of 20 would produce a row of 20 asterisks: **********.

Format & Length

The Format & Length options are Default, Centered, Left, and Right. These describe the justification of the data within the length of the field.

The Default value is fixed, and Length cannot be defined here.

For SD name and String data, the Centered, Left and Right formats are accompanied by a Length field. After choosing the format, focus moves to the Length entry box. This value determines how

long the element will be – the data will be positioned within a string of the length entered. Refer to the **Notes on Format & Length**, below.

Leading Zero Fill

In the case of Right-formatted SDName data, Leading Zero fill may be enabled or disabled. Normally, Leading Zero Fill will be disabled, which means spaces will be used to fill in leading non-significant data. If enabled, Leading Zero Fill will fill in any leading spaces of the data with zeroes. The following examples of 4 characters in output data defined as 8 characters long show the use of Leading Zero Fill:

Leading Zero Fill **disabled**:					.	1	2	3
Leading Zero Fill **enabled**:	0	0	0	0	.	1	2	3

Notes on Format & Length

If data for an element includes more characters than the value entered for Length, the output data will be cut off. For example, if the number of characters entered under format on the Output Template Edit Screen is six, and data for a string that contains eight characters is entered, only six of the characters from the data string will print. If data for a string that contains four characters is entered, all of the characters from the data string will print.

The characters and alignment of the printed data are defined by the selected format:

Example 8-character string of ABCDEFGH in a 6-character element:

Center:

B	C	D	E	F	G

Prints the middle six characters from an eight-character string – drops first and last characters.

Left:

A	B	C	D	E	F

Prints the first six characters from an eight-character string – drops the last two characters.

Right:

C	D	E	F	G	H

Prints the last six characters from an eight-character string – drops the first two characters.

Example 4-character string of ABCD in a 6-character element:

	A	B	C	D	

Space Space

Prints all four characters from a four-character string in a centered position, leaving a space at the beginning and a space at the end.

A	B	C	D		

Spaces

Prints all four characters from a four-character string in a left-justified position, leaving two spaces at the end.

		A	B	C	D

Spaces

Prints all four characters from a four-character string in a right-justified position, leaving two spaces at the beginning.

In Table 3-4, where dashes appear in the SDName (e.g. sd--08), this means that there are more than one instance of the share data variable. The instance number appears in place of the dashes (e.g. sd0308, for the third comparator's target comparison operator). For a full list of Shared Data fields, please refer to the IND560 Terminal Shared Data Reference (document # 64058660) found on the documentation CD.

Table 3-4: Example Shared Data Names for Use in Templates

IND560x Data Field	SDName	Length (A/N = alphanumeric)
Terminal		
Scale ID	cs0103	20 A/N
Base Serial Number	ce0138	13 A/N
Terminal Serial Number	xs0105	13 A/N
Terminal ID#1	xs0106	20 A/N
Terminal ID#2	xs0107	20 A/N
Terminal ID#3	xs0108	160 A/N
Current Date	xd0103	11 A/N
Current Time	xd0104	11 A/N
Transaction Counter Value	xp0101	9 A/N
Grand Total Value	tz0101	12 A/N
Grand Total Count	tz0102	9 A/N
Subtotal Value	tz0103	12 A/N
Subtotal Count	tz0104	9 A/N
ID Mode Prompts 1-20	pr0131-pr0150	20 A/N
ID Mode Prompt Responses 1-20	pa0101-pa0120	51 A/N
Message 01, 02, etc.	aw0101, aw0102..	100 A/N
Templates 1 - 5*	pt0101– pt0105	As programmed
Template Strings 1–20	pt0111 – pt0130	51 A/N
Targets		
Target Description	sp0101	20 A/N
Target Value	sp0105	12 A/N
Target Units	sp0120	3 A/N
Fine Feed	sp0110	12 A/N
Spill Value	sp0109	12 A/N
+ Tolerance Value (weight)	sp0111	12 A/N
– Tolerance Value (weight)	sp0112	12 A/N
+ Tolerance Value (%)	sp0114	12 A/N
– Tolerance Value (%)	sp0115	12 A/N
Comparator names 1-5	sd--01	21 A/N

IND560x Data Field	SDName	Length (A/N = alphanumeric)
Comparator target coincidence values 1 - 5	sd--05	12 A/N
Comparator target comparison operators 1-5	sd--08	5 A/N
Comparator second weight range values 1-5	sd--09	12 A/N
Comparator second weight range comparison operators 1-5	sd--10	5 A/N
Weights		
Scale Mode (Gross/Net)	ws0101	1 A/N (G or N)
Tare Source Description	ws0109	2 A/N "T<space>", or "PT"
Displayed Tare Wt.	ws0110	12 A/N
Displayed Gross Wt.	wt0101	12 A/N
Displayed Net Wt.	wt0102	12 A/N
Displayed Wt. Units	wt0103	3 A/N
3rd Weight Unit Gross Weight	wt0104	13 A/N
3rd Weight Unit Net Weight	wt0105	13 A/N
3rd Units	wt0106	3 A/N
Displayed Rate	wt0108	13 A/N
Rate Time Units	cs0107	1 A/N
Rate Weight Units	cs0108	1 A/N
Custom Unit Name	cs0112	12 A/N
Custom Unit Conversion Factor	cs0113	12 A/N

* Using a template field code within another template will insert the entire template into the new template.

Printing Multiple Weight Units

Note that if a third weight unit is defined, it can be named in a template so that it appears in the output data together with the displayed unit. However, if the third unit is currently displayed on the terminal, it will appear twice in the data output. Therefore, if the output is to include both primary and 3rd weight units, ensure that the primary unit data is displayed when the data output is initiated.

- Secondary Units are not available for multiple unit printing.

Inserting

Press the UP and DOWN navigation keys to select a location in the list of elements to insert a new element. Press the INSERT softkey to open the setup screen to create a new record. Configure the parameters as described under Editing. All following elements are moved down one position.

Deleting

Press the UP and DOWN navigation keys to select an element to delete. Press the DELETE softkey to delete the element.

Test Printing

Press the TEST PRINT softkey to perform a test print of the template being configured.

3.8.1.3. Strings

The Template Strings setup screen defines strings of characters that are frequently used in template messages. Template strings can be viewed, edited, inserted, deleted, or printed.

To view template strings:

1. Use the Search Field selection box to select ID or String and enter information in the Data field to limit the search, or do not enter any search limits to view all template strings.
2. Press the START SEARCH softkey. The String Search View screen displays the search results. Only records with non-null values display. Records are ordered by ID, with the lowest ID number shown first.
3. Press the UP and DOWN navigation keys to scroll up and down the screen in order to view all strings listed.

Editing

- Note that not all keyboard characters are available when entering information using the IND560x keypad. However, characters such as ~ and | can be included in a template created using the InSite software. They will be recognized by the IND560x when the template is downloaded, will display correctly, and will be included in the template when it is printed.
- The [,] and {, } characters have been added to the list of characters available from the terminal softkeys. These characters can be found in firmware versions 3.02 and higher.

1. Press the UP and DOWN navigation keys to select (highlight) the string record to be edited.
2. Press the EDIT softkey to open the record for editing. The edit screen will be shown with focus on the "Text" label. This is the only editable field on the screen. The ID number cannot be changed.
3. Press ENTER to access the text field. The alpha keys will display.
4. Use the alpha keys and the numeric keypad to edit the string. A string can be a maximum of 50 characters.
5. Press ENTER when complete.
6. Press the OK softkey to accept the edited record and return to the String Search View screen.
7. Press the ESC softkey (Esc) to return to the String Search View screen without accepting the changes to the string.

Inserting

1. Press the INSERT softkey to create a new record. An edit screen will be shown with "ID" and "Text" labels.
2. Press the UP and DOWN navigation keys to select the field to enter.
3. Press ENTER to access the field. When entering the ID field, the value shown is the first unused ID.
4. Use the numeric keypad to enter an ID number from 1 to 20.
5. Press ENTER when complete. If the ID entered already exists, an error display will be shown. The error must be acknowledged and a new ID entered.
6. If the TEXT field is entered, the alpha keys will display. Use the alpha keys and the numeric keypad to edit the text string.
7. Press ENTER when complete.
8. Press the OK softkey to accept the new record and return to the String Search View screen.
9. Press the ESC softkey (Esc) to return to the String Search View screen without accepting the new record.

Deleting

Press the DELETE softkey to delete a template string from the list.

Printing

1. Press the PRINT softkey to print the list.
2. Press the EXIT softkey to return to the String Search Screen.
3. Press the EXIT softkey again to return to the menu tree.

3.8.2. Reports

The reports setup screens enable configuration of the structure of tare and target table reports that are generated by the IND560x terminal. The reports setup screens include:

- Format
- Tare Table
- Target Table

3.8.2.1. Format

Use the selection box for the Format field to select the width of the reports

- Narrow (40) – 40 character-wide reports
- Wide (80) – 80 character-wide reports

3.8.2.1.1. Header

The Header field specifies the number of blank lines (CR/LF) to be placed at the start of each report.

3.8.2.1.2. Title

The Title selection box enables a default title line to be printed at the top of the report. Time and date will print in the format selected at Terminal > Region > Format Time & Date.

3.8.2.1.3. Record Separator

A repeated character may be selected as a separator between printed records in the report. This step selects the character to be used. The character choices in the selection box are:

None (no separator between records) = (equal symbols)

* (asterisks) CR/LF (blank line)

- (dashes)

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

****

3.8.2.1.4. Footer

The Footer field specifies the number of blank lines (CR/LF) to be placed at the end of each report.

3.8.2.2. Tare Table

Use this setup screen to select which fields in the Tare Table will print when a Tare Table Report is printed. More details are provided in the Reports section of Appendix D, **Communications**. The ID field is always printed; it cannot be disabled. Fields that can be enabled or disabled include:

- Tare
- Description
- n (number of transactions)
- Total (accumulated total tare weights)

3.8.2.3. Target Table

Use this setup screen to select which fields in the Target Table will print when a Target Table Report is printed. More details are provided in the Reports section of Appendix D, **Communications**. The ID field is always printed; it cannot be disabled. Fields that display and that can be enabled or disabled vary depending on how the Target Table is configured (as described in the Application branch under Memory setup).

Fields available include:

- Description
- Target
- +/- Tolerances
- Spill
- Fine Feed
- +/- Limits

If the Target mode is disabled, this branch cannot be expanded.

3.8.3. Connections

The IND560x comes standard with a single, intrinsically safe serial port (COM1). Additional ports are available by:

- Installing the current loop or fiber optic interface and using COM4 and/or COM5 to communicate with an ACM500 safe area communication module. When using the ACM500

module with the Ethernet/COM2/COM3 option installed, serial ports COM2 and COM3 and Ethernet connections Ethernet1, Ethernet2, Ethernet3 and EPrint become available.

- NOTE: Always power up the ACM500 before turning on the power to the IND560x. This will ensure that the IND560x will communicate correctly with the ACM500 and recognize all installed options.

- Installing the intrinsically safe current loop interface option into the IND560x and using COM4 and/or COM5 directly. In this application, the COM4 and COM5 ports can be used to communicate with the ACM200 safe area communication module or with an IND226x used as remote display.

- Installing the fiber optic interface option into the IND560x and using COM4 and/or COM5 directly. In this application, the COM4 and COM5 ports can be used to communicate with the legacy dual channel fiber optic converter, A100, 8624, or directly to another IND560x or Puma terminal used as a remote display.

3.8.3.1. COM4 and COM5

As explained above, the COM4 and COM5 communication ports can be used as standard serial ports directly or can be dedicated to communicate with the ACM500 module. The first decision to make regarding connections to the IND560x is determining how these two ports will be used. The Connections screen (Figure 3-19) shows the connection options for COM4 and COM5.

- NOTE: The COM4/COM5 Connection page is visible in setup even if NO interface board has been installed into the IND560x. If NO interface board is installed, the assignments for COM4 and COM5 must be "Disabled".

Figure 3-19: COM4 and COM5 Setup

3.8.3.1.1. To edit the COM4 or COM5 connection

1. Press the UP and DOWN navigation keys to select (highlight) the appropriate port, COM4 or COM5.
2. Press the ENTER key to edit the desired port.
3. Use the UP and DOWN keys to choose a connection type from the selection box.
4. Press the ENTER key to accept and save the connection parameter.

Table 3-5: Available COM4/COM5 Port Connections

Port	Connection	Function
COM4	Disabled	Port will not be used
	Standard	Port will be used directly with ACM200, Fiber Optic converter or IND226x
	ACM500	Port will be used to communicate with ACM500 for COM2, COM3 or PLC connectivity
COM5	Disabled	Port will not be used
	Standard	Port will be used directly with ACM200, Fiber Optic converter or a remote IND226x
	ACM500	Port will be used to communicate with ACM500 for Ethernet TCP/IP connectivity

The correct selection depends on what the IND560x will be communicating with over COM4 and/or COM5. Table 3-6 provides an overview of what the COM4 and COM5 settings should be for the various peripheral communication devices that work with the IND560x.

Table 3-6: COM4/COM5 Setup for Various Communication Modules

Peripheral Communication Device	Correct COM Connection	Application Notes
None	Disabled	No communication intended over COM4/COM5
ACM200 Module (Communication available over current loop interface only)	COM4 = Standard and/or COM5 = Standard	The ACM200 provides a single RS-232 port in the safe area. Two ACM200 modules can be supported simultaneously, one each on COM4 and COM5.
Legacy Fiber Optic Converter 0964-0043 0964-0052 0964-0058 0964-0059 0964-0060	COM4 = Standard and/or COM5 = Standard *1 or 2 communication channels may be required. Dependant on legacy setup.	The FO converter supports one or two channels of RS-232 or 20mA communication in the safe area. This selection would be used when replacing a Puma, ID3sTx, 8141 or 8525 terminal that is communicating to a fiber optic converter.
IND226x (Communication available over current loop interface only)	COM4 = Standard and/or COM5 = Standard	The IND226x with Interface-Remote installed can be used as a remote display inside the hazardous area. Only one of the two available ports is required for this functionality.
ACM500	COM4 = ACM500 and/or COM5 = ACM500 *Only 1 channel required in some cases.	The ACM500 can provide PLC and COM2/COM3/Ethernet communications in the safe area. Refer to Appendix A for details of which port is required for which option.

After the appropriate COM4 and/or COM5 connection has been made, proceed to the Connections View setup screen for further port assignments by pressing the VIEW TABLE softkey  .

If the port connection type has changed for COM4 or COM5, the IND560x will force a power cycle so that the IND560x will correctly communicate with any safe area communication devices. The IND560x will display a popup message indicating that a power cycle is about to take place (Figure 3-20). At this point, the operation cannot be cancelled. Setup must be entered again to view the port assignments.

Figure 3-20: COM4/COM5 Power Cycle Message

Proceed in setup to Communications>Connections and again press the VIEW TABLE softkey to enter the Connections View area where ports can be assigned.

3.8.3.2. Reconnect Mode

The communication protocol between the IND560x and the ACM500 requires that the ACM500 be powered up first. If the ACM500 experiences a power cycle, the message shown in Figure 3-21 will display. In the past when this occurred, users were required to acknowledge this pop-up message by pressing the ENTER key. Users were then further required to manually power cycle the IND560x to re-establish communication between the terminal and the ACM500.

Figure 3-21: ACM500 COM Error Message

A new setting in v3.04 firmware and higher provides the user with two options to re-establish communication automatically in the event of an ACM500 power loss. In setup, **Communication > Connections** includes a new setting called **Reconnect Mode**. Available settings include **Manual** and **Automatic**.

Manual When **Manual** is selected, the operator will be presented with two options when the ACM500 communication error (Figure 3-21) is shown on-screen. Pressing ESC will acknowledge and clear the error message, but no further action will be taken by the IND560x terminal. If OK is pressed, the error message is acknowledged and the IND560x will complete a power cycle in order to re-establish communication with the ACM500.

Automatic If **Automatic** is selected, the ACM500 communication error pop-up message will not display on-screen and the user will not be given a choice of when the IND560x will go through a power cycle. Instead, once the IND560x detects that the ACM500 is

back on line, the IND560x will automatically power cycle itself.

3.8.3.3. Communication Port Assignment

The Connections View setup screen (Figure 3-22) defines what type of communication will occur over each port. If no connections are programmed, nothing will be available on the COM ports or Ethernet ports.

Figure 3-22: Connections View Screen

Ports available for assignment can include the standard serial port COM1, optional COM2, COM3, COM4 and COM5 serial ports, the optional Ethernet ports, and the optional E-print port. The availability of all optional ports depends on the selections for COM4/COM5 on the Connections page as well as optional interfaces installed in the ACM500.

Various COM4/COM5 setup combinations exist. Table 3-7 shows the available ports available for additional assignment based on the initial setup selections for COM4 and COM5.

Table 3-7: Ports Available for Various COM4/COM5 Combinations

COM4 = Standard / COM5 = Standard	
Available Port	COM1, COM4, COM5
Ports Not Available	COM2, COM3, Ethernet 1,2,3, Eprint
COM4 = Standard / COM5 = ACM500	
Available Port	COM1, COM4, Ethernet 1,2,3, Eprint
Ports Not Available	COM2, COM3, COM5
COM4 = ACM500 / COM5 = Standard	
Available Port	COM1, COM2, COM3, COM5
Ports Not Available	Ethernet 1,2,3
COM4 = ACM500 / COM5 = ACM500	
Available Port	COM1, COM2, COM3, Ethernet 1,2,3, Eprint
Ports Not Available	COM4, COM5

The following functions are available via softkeys on the Connections View screen:

- Editing
- Inserting

- Deleting
- Clearing

To edit or insert connection assignments:

1. Press the UP and DOWN navigation keys to select (highlight) a connection assignment in the list.
2. Press the EDIT softkey to open the setup screen for editing a specific connection assignment or press the INSERT softkey to create a new connection assignment.
3. Parameters configured in the connections screen include the port and the type of input or output assignment. Depending upon these selections the remaining fields will vary but could include the trigger, the template to be sent, and if checksum will be sent or not.
4. Press the UP and DOWN navigation keys to move the focus to the field to be edited or added.
5. Press the ENTER key to select a field to edit or add.
6. Use the selection boxes for each field to select the port, associated assignment, and desired settings for the connection. Available selections are indicated in Table 3-8, organized by Port and Assignment. Specific details of the different assignments can be found in Appendix D, **Communications**.

Table 3-8: Available Parameters, by Port and Assignment

Port	Assignment	Trigger	Template	Checksum	# of Nodes
COM1 COM2 COM3 COM4 COM5	ASCII Input, CTPZ Input, Reports, SICS, Shared Data Server*, Remote Display				
	Continuous Output			Disabled, Enabled	
	Continuous Template		Template 1…5		
	Demand Output, Totals Report	Scale, Trigger 1…3	Template 1…5		
	Remote Discrete I/O				0, 1, 2, 3
Ethernet 1	Continuous Output			Disabled, Enabled	
	Continuous Template		Template 1…5		
	Demand Output, Totals Report	Scale, Trigger 1…3	Template 1…5		
	Reports				
Ethernet 2 Ethernet 3	Demand Output	Scale, Trigger 1…3	Template 1…5		
EPrint	Continuous Output			Disabled, Enabled	
	Continuous Template		Template 1…5		
	CTPZ Input				
	Demand Output	Scale, Trigger 1…3	Template 1…5		
Print Client	Continuous Output			Disabled, Enabled	
	Continuous Template		Template 1…5		
	Demand Output	Scale, Trigger 1…3	Template 1…5		

Connection options notes:

- Not all choices are available for all connection assignments. Only valid choices are shown in the selection boxes on the IND560x terminal.

- The Shared Data Server assignment is only available on COM1. Serial connection to the Shared Data Server is only possible on COM1. This assignment allows a user to connect to the Shared Data Server over COM1 without turning SW2-1 to the "on" position.
- IMPORTANT: Appropriate signal barrier is required when connecting an non-intrinsically safe device, such as a PC, to the intrinsically safe COM1 on the IND560x. Entity parameters must be confirmed to ensure the appropriate barrier has been selected.
- The Trigger field displays only when the assignment selection is Demand Output. The Trigger 1, 2, and 3 selections for Trigger enable connection of a discrete input or a PLC command to trigger the output of the selected template. The discrete selection must be programmed separately (as described in the Application branch under Discrete I/O).
- The Template field displays only when the assignment selection is Demand Output, Continuous Template, or Totals Report. Only one template can be assigned to each connection.
- The default template for the Totals Report is Template 5.
- The Checksum field is available for continuous outputs only.
- The SICS selection provides some Level 0 and Level 1 interface commands. Refer to Appendix D, **Communications** for details on the SICS protocol.
- If usage conflicts occur, a pop-up message will display and the IND560x terminal will not allow the conflicted assignment to be saved.
- EPrint offers a method to access the demand or continuous output data directly through the Ethernet port. Shared Data Server login and commands are not required to register for the data. The data output string does not include any Shared Data Server response messages, and reflects only the configured demand template data or the continuous output string. The EPrint port is accessible only through the Ethernet interface's secondary port, which can be configured in setup at Communication > Network > Port.
- The # of Nodes refers to the number of ARM100 Remote I/O modules that will be connected in series to the IND560x.

7. Press the OK softkey OK to accept the connection parameters and return to the Connections setup screen when editing or adding the connection assignment is complete.
8. Press the ESCAPE softkey Esc to discard the connection parameters and return to the Connections setup screen without saving the connection assignment edits or additions.

   Press the DELETE softkey to delete a connection assignment from the Connections list.

   To clear all connection assignments in the Connections list, press the CLEAR softkey C then press OK OK to confirm the action.

   Press the EXIT softkey to return to the menu tree.

3.8.4. Serial

Serial communication setup screens provide access to the communication parameters for the serial ports COM1, COM2, COM3, COM4 and COM5.

- NOTE: The COM2 and COM3 ports are only shown if the Ethernet/Serial option board has been installed in the ACM500.

- NOTE: The COM4 and COM5 ports can only be changed if their connection setup selection is "Standard".
- If "Remote Discrete I/O" is selected as the port assignment at **Communication > Connections**, the port parameters are automatically preset and cannot be changed.

3.8.4.1. COM1, COM2, COM3, COM4 and COM5

Use the COM1, COM2, COM3, COM4 and COM5 setup screens to configure the parameters for serial ports.

3.8.4.1.1. Baud

Use the Baud selection box to set the baud rate for the serial port. Options are:

300	1200	4800	19200	57600
600	2400	9600	38400	115200

3.8.4.1.2. Data Bits

Use the Data Bits selection box to set the data bits to either 7 or 8 for the serial port.

3.8.4.1.3. Parity

Use the Parity selection box to set the parity to None, Odd, or Even for the serial port.

3.8.4.1.4. Flow Control

Use the Flow Control selection box to set the flow control to either None or XON-XOFF (software handshaking).

- After an XOFF command is received on a serial port configured for XON/XOFF handshaking, data remaining in the port's buffer will still be sent. Port buffers contain the following amounts of data:
  - COM1: 16 bytes
  - COM2: 64 bytes
  - COM3: 64 bytes
  - COM4: 64 bytes (when set as "Standard", not "ACM500")
  - COM5: 64 bytes (when set as "Standard", not "ACM500")

3.8.4.1.5. Interface

Use the Interface selection box to select the serial port interface. Selections include:

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

- COM4 and COM5 are limited to RS-232 only.

3.8.5. Network

Network setup screens include Ethernet, Port, FTP and Email Alert.

3.8.5.1. Ethernet

Ethernet is available for TCP/IP transfer of data, shared data server access, connection via the EPrint port, email alerts, FTP and saving and restoring configurations with InSite™ SL. The Medium Access Control (MAC) Address cannot be edited; it is shown for information only. Setup for Ethernet allows static Internet Protocol (IP) addressing or DHCP (Dynamic Host Configuration Protocol). If the (Dynamic Host Configuration Protocol) DHCP Client setting is enabled, the IP Address, Subnet Mask, and Gateway Address fields are assigned automatically by the network and become read-only in the setup screens.

Use the UP and DOWN navigation keys to select the field to be edited. Press the ENTER key to edit the field or selection choice. The Ethernet branch includes the following fields:

3.8.5.1.1. DHCP Client

The DHCP client can be enabled or disabled. If disabled, the IP address must manually be assigned in the following fields. If enabled, the terminal will be assigned an IP address by the network server. The IP address can then be viewed in the following fields.

3.8.5.1.2. IP Address

Enter the IP address (or view if DHCP Client is enabled) for the IND560x terminal. After each group of digits has been entered, press ENTER to proceed to the next group. The default value for the IP is 192.68.0.1.

3.8.5.1.3. Subnet Mask

Enter the subnet mask (or view if DHCP Client is enabled) for the IND560x terminal. After each group of digits has been entered, press ENTER to proceed to the next group. The default value for the subnet mask is 255.255.255.0.

3.8.5.1.4. Gateway Address

Enter the gateway address (or view if DHCP Client is enabled) for the IND560x terminal. After each group of digits has been entered, press ENTER to proceed to the next group. The default value for the gateway is blank.

After entry is complete, press the EXIT softkey ↖ to return to the menu tree

3.8.5.2. Port

The Port setup screen displays the primary Ethernet port number and also allows a secondary port number to be configured for the same Ethernet interface. The primary port is reserved for the Shared Data Server access, which is described in Appendix D. The secondary port allows for either Shared Data Server access or EPrint connections, if configured. The primary and secondary ports can be used concurrently.

3.8.5.2.1. Primary Port #

The Primary Port number for the Ethernet TCP/IP interface is fixed at 1701, and is displayed as a read-only field in the Port setup screen (Figure 3-23). The Primary Port number can be modified

through a Shared Data write. Refer to the IND560 Shared Data Reference Manual found of the Documentation CD for details.

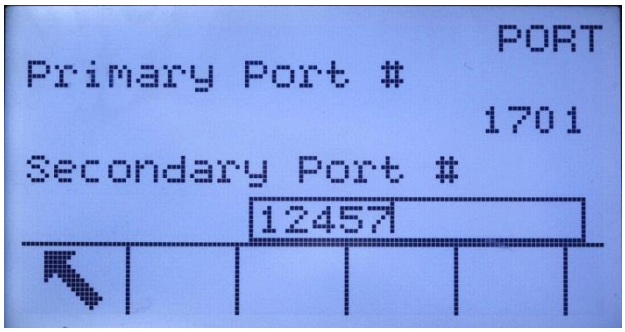


Figure 3-23: Secondary Port Setup

3.8.5.2.2. Secondary Port #

If a valid, user-defined Secondary Port number is entered, the Shared Data Server will also be accessible on a second TCP/IP port. However, if an EPrint connection is configured in setup at **Communication > Connections**, Shared Data Server access is no longer be available on this port, which will be used entirely for the EPrint demand or continuous types of output. A change to the Secondary Port number may require a manual power cycle of the terminal before the change becomes active.

3.8.5.3. FTP

The setup screen for FTP displays usernames and access levels for file download. Access levels for all parameters are shown in Appendix B, **Default Settings**. Usernames can be edited, inserted, or deleted.

3.8.5.3.1. To edit or insert a username

1. Press the UP and DOWN navigation keys to select (highlight) a username in the table.
2. Press the EDIT softkey to open the setup screen for editing a username or press the INSERT softkey to open the setup screen to create a new username.
3. Press the ENTER key to select the Username field. The alpha keys display.

- The Username field is accessible only when entering a new FTP user.

4. Use the alpha keys to edit or enter the desired username.
5. Use the Access selection box to assign the appropriate access level to the user. The following access levels are available:
    - Operator
    - Supervisor
    - Maintenance
    - Administrator
6. Press the DOWN navigation key to view the second screen, which displays the Password and Confirm Password fields.
7. Enter the desired password in the Password and Confirm Password fields.

8. Press the OK softkey OK to accept the username and password as entered.
9. Press the ESCAPE softkey Esc to exit without saving the username and password.

Press the DELETE softkey to delete a username from the table on the Users screen.

To clear all usernames from the list and leave only the default username "admin", press the CLEAR softkey C then OK OK to confirm the action.

3.8.5.4. Print Client

The Print Client connection allows the IND560 to send data to a specific IP address on the same network as the IND560. To set up Print Client:

1. At **Communication >Network > Print Client** – enter the Server IP Address and Server TCP Port number. The Server IP Address is the IP address of the device where the IND560 is sending the print information. The Server TCP Port is the port number of the device on the network.
2. At Connections, press the INSERT softkey to define a new connection.
3. Under Port, scroll to Print Client and press ENTER.
4. Under the Assignment and Checksum fields, make desired selection.
5. Press the OK OK softkey to save the settings.

3.8.5.5. Email Alert

The IND560x can be configured to send email alerts when it encounters a calibration change or calibration failure that might indicate a hardware problem, or when calibration expires. Note that the Ethernet connection used to send email alerts is separate from those configured at **Communication > Connections**.

3.8.5.5.1. Parameters

This screen permits four parameters to be set:

SMTP Server IP

This value is set using four groups of numbers, representing the IP address of the mail server the IND560x will use to send alerts. Default is 0.0.0.0.

Sender Email Address

This is an alphanumeric entry field permitting the IND560x's email address to be set. Default is blank.

Sender Name

This is an alphanumeric entry field, used to give the IND560x a unique name that will appear in the "From" field of alert emails. Default is "IND560x."

Subject Line

This alphanumeric entry field defines the Subject field of the email to be set. Default is "Scale Cal Alert."

3.8.5.5.2. Recipients

This screen is used to define recipients of email alerts, together with the condition under which they will receive an email. The following actions are available on the Email Recipients screen:

Softkey	Function	
	EXIT	Returns to the setup menu tree.
	EDIT	Opens the Email Recipients Edit screen, permitting parameters for the selected recipient to be edited.
	NEW	Opens the New Email Recipient screen, allowing a new recipient to be defined.
	DELETE	Deletes the selected recipient.
	TEST	Sends an email alert message, titled "Email Alert Test Message," to the recipient currently selected.

The NEW and EDIT screens offer the same options:

Email Address

This alphanumeric entry field is used to enter the recipient's email address. Default is blank. Up to 6 recipients can be configured.

- **Note** – use the decimal key  on the IND560x front panel to enter the period in each email address.

Alert On

Available options are None, All, Failures. The default is None. Table 3-9 lists all the events that trigger an email alert. Messages sent when Alert On is set to Failures are indicated by an asterisk.

Table 3-9: Calibration Alerts

Event	Email Message Subject
Completion of CalFree calibration	CalFree complete
After each step in step calibration	Calibration complete
Calibration expired	Calibration expired*
Failing a calibration test	Cal. test failed*
Passing a calibration test	Cal. test passed
Completion of a zero capture from the Calibration page	Zero captured
Completion of a span capture from the Calibration page	Calibration completed

3.8.6. PLC

The PLC parameters are only available when a PLC option is installed in the ACM500. PLC setup screens include:

- Analog Output
- A-B RIO
- DeviceNet
- PROFIBUS
- EtherNet/IP
- Modbus TCP
- Data Format

3.8.6.1. Analog Output

The analog output of the IND560x terminal provides either 4 - 20 mA or 0 - 10 volt DC outputs depending on how the connection is wired. The output can be configured to represent either the displayed weight or the gross weight.

To configure analog output:

1. Choose the appropriate source from the Source field selection box. Selections are:
   - None
   - Application (Source as defined by a Task Expert application)
   - ABS - Displayed Wt.
   - ABS – Rate*
   - Displayed Weight
   - Gross Weight
   - Rate*

     *Available only when Rate is enabled
2. Select either None or Scale from the Channel selection box. A selection of None disables the output.
3. On the second screen of this setup branch, the zero and span values for the analog output can be adjusted. These values can be for weight or rate, depending on the selected source. In the Zero Value field, enter the value at which the "zero" output of the analog signal should occur.
4. If these preprogrammed values do not provide the exact outputs required, they may be trimmed by using the ZERO and SPAN softkeys located at the bottom of the screen as follows:
5. Press the ZERO softkey to initiate the zero fine-tuning process or the SPAN softkey to initiate the span fine-tuning process. In either case, a warning screen offers two options – OK to continue with the operation, or EXIT to return to the Analog Output screen without making any adjustment.
6. The analog output signal value will change during this procedure – ensure that the PLC or other control equipment is disconnected. A warning message displays asking for verification to continue.

7. Once the OK softkey has been pressed, the zero fine-tuning or span fine-tuning operation begins. A message screen appears, showing the current value of the analog output signal. Use the softkeys that display to adjust the signal if necessary as follows:

Bump Down (faster adjustment down)		Nudge Down (slower adjustment down)	
Bump Up (faster adjustment up)		Nudge Up (slower adjustment up)	

8. Press the EXIT softkey to return to the previous screen.

3.8.6.2. A-B RIO

The Allen-Bradley Remote I/O (A-B RIO) network is an Allen-Bradley proprietary network protocol that permits certain PLCs to communicate to additional racks of input and output devices or to other peripheral devices that implement the RIO interface.

Additional interface information and programming examples can be found in the **IND560 Terminal PLC Interface Manual**, which is included on the documentation CD.

The A-B RIO setup screen is used to configure A-B RIO as a PLC interface option.

3.8.6.2.1. Node Address

Each IND560x Terminal connected to the network represents one physical node; however, the addressing of the node is defined as a logical rack address. This address is determined by the system designer, then configured in the IND560x Terminal by selecting the Node Address text box and using the numeric keypad to enter the appropriate node address (0–62).

Prior to the Node Address text box is a selection field allowing the user to enter the node address in either:

- Decimal
- Octal

Figure 3-24 shows the new A-B RIO setup screen for Node Address.

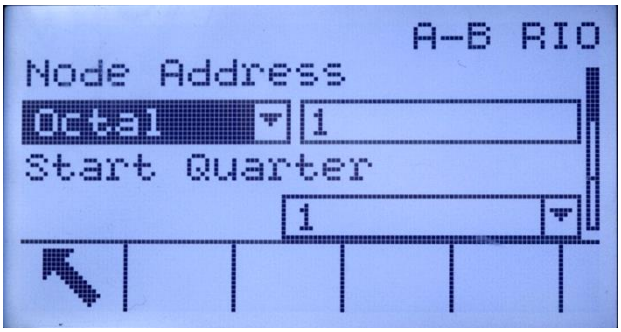


Figure 3-24: A-B RIO Node Address Setup Screen

3.8.6.2.2. Start Quarter (Group)

Each scale occupies a quarter rack (single group) in the RIO address space and the quarter (group) may be defined as the first (0), second (2), third (4), or fourth (6) quarter (group) of a

rack. Designate the location of the PLC that is the highest quarter used in a logical rack by using the selection box to select the appropriate start quarter address 1–4 (group 0–6).

3.8.6.2.3. Last Rack

The IND560x configuration selections enable designation of the last rack. Use the selection box to select Disabled or Enabled for last rack designation.

3.8.6.2.4. Data Rate

Use the selection box to select the desired data rate. Selections available are:

- 57.6 Kb
- 115.2 Kb
- 230.4 Kb

3.8.6.2.5. Block Transfer

Use the Block Transfer selection box to either Disable or Enable the block transfer mode of operation.

3.8.6.3. DeviceNet

The DeviceNet Interface can be configured to run up to 500Kbits per second depending on cabling and distances. Messages are limited to 8 un-fragmented bytes. The network can include up to 64 nodes including the master, commonly called the scanner. The DeviceNet setup screen is used to configure DeviceNet as a PLC interface option.

Additional interface information and programming examples can be found in the **IND560 Terminal PLC Interface Manual**, which is included on the documentation CD.

3.8.6.3.1. Node Address

Each IND560x Terminal connected to the network represents one physical node. This address is determined by the system designer, then configured in the IND560x Terminal by selecting the Node Address text box and using the numeric keypad to enter the appropriate node address (0–63). The default address is 63.

3.8.6.3.2. Data Rate

Use the selection box to select the desired data rate. Selections available are:

- 125 Kb
- 250 Kb
- 500 Kb

125 kB is the default value.

3.8.6.4. PROFIBUS DP

The PROFIBUS DP Interface supports discrete data transfer that enables bi-directional communication of discrete bit-encoded information or 16-bit binary word (signed integer) numerical values.

Additional interface information and programming examples can be found in the **IND560 Terminal PLC Interface Manual**, which is included on the documentation CD.

The PROFIBUS setup screen is used to configure PROFIBUS as a PLC interface option.

3.8.6.4.1. Node Address

Each IND560x Terminal connected to the network represents one physical node. This address is determined by the system designer, then configured in the IND560x Terminal by selecting the Node Address text box and using the numeric keypad to enter the appropriate node address (0–125).

3.8.6.4.2. Shared Data

The Shared Data parameter enables or disables an extended message length that includes shared data access. This data is added to the end of the standard scale slot information and extends the message length.

Use the Shared Data selection box to select Disabled or Enabled for shared data message communication.

3.8.6.5. EtherNet/IP

EtherNet/IP, short for "EtherNet Industrial Protocol," is an open industrial networking standard that takes advantage of commercial, off-the-shelf EtherNet communication chips and physical media. This networking standard supports both implicit messaging (real-time I/O messaging) and explicit messaging (message exchange). The interface enables the IND560x terminal to communicate with EtherNet/IP Programmable Logic Controllers (PLCs) through direct connection to the EtherNet/IP network at either 10 or 100 MBPS speed.

EtherNet / IP interface has the following features:

- User-programmable IP addressing.
- Capability for bi-directional discrete mode communications (Class 1 Messaging) of weight or display increments, status, and control data between the PLC and the IND560x.

Additional interface information and programming examples can be found in the **IND560 Terminal PLC Interface Manual**, which is included on the documentation CD.

3.8.6.5.1. MAC Address

The Terminal's MAC address in the Ethernet / IP network is assigned automatically.

3.8.6.5.2. IP, Subnet Mask and Gateway Address

The Terminal's IP Address, Subnet Mask and Gateway Address are chosen by the system designer. Default values are as follows:

IP Address: 192.168.0.1

Subnet Mask: 255.255.255.0

Gateway Address: 0.0.0.0

3.8.6.6. Modbus TCP

Additional interface information and programming examples can be found in the **IND560 Terminal PLC Interface Manual**, which is included on the documentation CD. The Modbus TCP setup screen is used to configure this PLC interface option.

3.8.6.6.1. MAC Address

The Terminal's MAC address in the Modbus TCP network is assigned automatically.

3.8.6.6.2. DHCP Client

The DHCP Client is enabled by default. If disabled, the IP address must be assigned manually. If enabled, the terminal will be assigned an IP address by the network server.

3.8.6.6.3. IP, Subnet Mask and Gateway Address

The Terminal's IP Address, Subnet Mask and Gateway Address are configured as described in Ethernet setup, above.

3.8.6.7. Data Format

Use the Data Format setup screen to configure the PLC data format.

3.8.6.7.1. Format

Select the desired PLC format from the Format field selection box. Selections include:

- Divisions - PLC format that provides scale increment data transfer.
- Floating Point - PLC format that provides 32-bit floating point data transfer in 16-bit integer format.
- Integer - PLC format that provides 16-bit integer data transfer.

3.8.6.7.2. Byte Order

Select the desired byte order field selection box. Selections are:

- Word Swap - Default value. Takes the single-precision floating point format and swaps the two words in the 32-bit double word. This format is compatible with RSLogix 5000 processors.
- Byte Swap - Makes the floating point format compatible with S7 Profibus.
- Historic - Makes the floating point format compatible with PLC 5 (selection only available with A-B RIO interface)
- Double Word Swap - Makes the data format compatible with the Modicon Quantum PLC for Modbus TCP networks (this selection is only available with EtherNet/IP and Modbus TCP interfaces.

Table 3-10: Available Selections, by PLC Interface

	A-B RIO	PROFIBUS	DeviceNet	Ethernet / IP Modbus TCP
Standard		x	x	x
Word swap	X	x	x	x
Byte swap	X	x	x	x
Historic	X			
Double Word Swap		x	x	x

Table 3-11: Byte Order

		Word Swap	Byte Swap	Double Word Swap	Standard / Historic
Weight value, terminal		1355			
PLC		15 Bit # 0	15 Bit # 0	15 Bit # 0	15 Bit # 0
Number, Integer/Division	Weight value Word	0x054B Hex	0x4B05 Hex	0x4B05 Hex	0x054B Hex
Floating point	First weight value Word	0x6000 Hex	0xA944 Hex	0x0060 Hex	0x44A9 Hex
	Second weight value Word	0x44A9 Hex	0x0060 Hex	0xA944 Hex	0x6000 Hex

3.8.6.7.3. Message Slots

This parameter refers to the number of slots of data that will be transferred. Typically only one slot is used in a single scale application, but sometimes an application requires multiple fields of data in a cyclic data transfer. In order to accomplish this, two, three, or even four message slots can be assigned for the output. As the number of message slots is increased, so is the length of the message, because each slot requires enough memory to transmit a complete set of data. More detailed information can be found in the IND560x Terminal PLC Interface Manual, which is included on the documentation CD.

Choose the number of message slots from the selection box. Press ENTER when done.

3.8.7. Reset

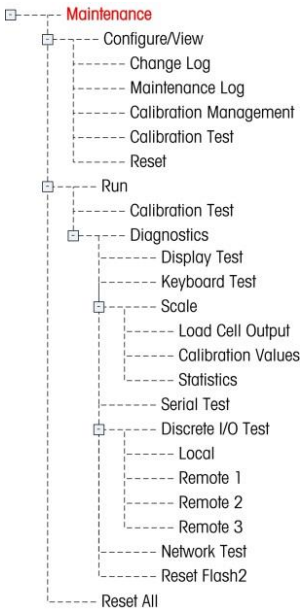
The Reset setup screen restores Communication branch setup values to their factory default settings.

3.8.7.1.1. Communication Reset

To initiate a reset, press the OK softkey OK. If the reset was successful, a verification message that reads "Reset Successful" displays If the reset was not successful, an error message that reads "Reset Failure" displays. If the reset fails, try to initiate the reset again. If the reset continues to fail, contact a local METTLER TOLEDO representative for assistance.

Press the ESCAPE softkey Esc to exit without resetting.

3.9. Maintenance



The maintenance setup branch includes:

Configure/View of the log files and calibration test

Running diagnostics or the calibration test

3.9.1. Configure/View

The Configure/View setup branch includes the following screens:

- Change Log
- Maintenance Log
- Calibration Management
- Calibration Test
- Reset

3.9.1.1. Change Log

The change log file tracks all changes to setup and shared data. The Change Log is approximately 150k bytes in size. Each record could vary in length, but an average of about 2,500 records can be saved. More details regarding the Change Log can be found in Appendix C, **Table and Log File Structure**.

Use the selection box on this setup screen to select Disabled or Enabled for the change log.

To reset all records in the change log file:

1. Press the RESET softkey . A warning message displays asking for verification that all configuration change records are to be reset.
2. Press the OK softkey . The configuration change records history is reset.
3. If the reset was successful, a verification message that reads "Reset Successful" displays. If the reset was not successful, an error message that reads "Reset Failure" displays. If the reset fails, try to initiate the reset again. If the reset continues to fail, contact a local METTLER TOLEDO representative for assistance.
4. Press the ESCAPE softkey Esc to return to the Change Log screen.

To view change log records:

5. Press the VIEW TABLE softkey . The Change Log Search screen displays.
6. Use the Search Field 1 and Search Field 2 selection boxes and associated data fields to enter specific search information to limit the search by date, shared data (SDName), Time, or Username, or enter * (the "find all" character) to view all Change Log information.
7. Press the START SEARCH softkey . The Log Search View screen displays with the search results sorted in chronological order (The most recent change record displays at the end of the file with focus. Older records may be viewed by pressing the UP navigation key.).

   Information displayed in the Change Log View includes:

   - Time Stamp

- Username
- Shared Data Field Name
- New Value

8. Press the PRINT softkey to print the list to all Report connections.
9. Press the EXIT softkey to return to the Change Log Search Screen.

3.9.1.2. Maintenance Log

The maintenance log is a record of routine maintenance or activities such as capture span and capture zero. Use the selection box on this setup screen to select Disabled or Enabled for the maintenance log.

The Maintenance Log is approximately 150k bytes in size. Each record can vary in size, but an average of about 2,500 records can be saved. More details regarding the Maintenance Log can be found in Appendix C, Table and Log File Structure.

Reset all records or view records in the Maintenance Log by following the same steps described for Change Log.

Information that displays on the Maintenance Log Search View screen includes:

- Time Stamp
- Username
- Event
- Status

3.9.1.2.1. New Maintenance Log Entry

The NEW softkey on the Maintenance Log screen opens an ADD MAINTENANCE RECORD screen, intended to record the upgrade or repair of equipment. From this screen, an Event may be added, removed or replaced, and its status recorded in an 8-character alphanumeric entry field. Press OK to confirm the change, or ESC Esc to exit the screen without changing the Maintenance Log.

3.9.1.3. Calibration Management

Calibration management includes a test interval to program how much time elapses or how many weighments should be completed between calibration checks. When this time or number of weighments is exceeded, an expiration action is initiated. The type of expiration action is also programmable. This feature is disabled by entering zeroes into both the number of days and number of weighments entry boxes.

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

3.9.1.3.1. Test Interval

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

The expiration action will be triggered when the first of either of these values is reached. For example, if 30 days and 3,000 weighments were programmed, as soon as 30 days or 3,000 weighments were exceeded (whichever were first), the expiration action would occur.

3.9.1.3.2. On Expiration

Use the On Expiration selection box to configure the activity to occur upon expiration of the calibration after the next test date or number of weighments occurs. Settings include:

a. No Action

b. Alarm Only (displays an expiration message)

c. Alarm & Disable (displays expiration message and disables the scale)

Note that, regardless of how the On Expiration option is configured, a pop-up message will appear over the home screen when calibration expires.

3.9.1.3.3. Last Date Tested, Next Test Date, and # of Weighments Left

The Last Date Tested and Next Test Date (if days is specified for intervals), or the number of weighments left until the next service (if weighments is specified for intervals), automatically calculate and display.

To reset the Last Date Tested to the current date:

1. Press the RESET softkey .
2. A warning message displays asking for verification that calibration management values are to be reset.
3. Press the OK softkey . A status screen displays that shows the reset process status. The Last Date Tested is reset to the current date. This reset also generates a recalculation of the Next Test Date and/or # of Weighments Left parameters if test intervals have been entered for these fields.
4. If the reset was successful, a verification message that reads "Values Reset OK" displays. If the reset was not successful, an error message that reads "Reset Failed" displays.
5. Press the ESCAPE softkey Esc to return to the Calibration Management screen.

3.9.1.4. Calibration Test

The calibration test provides a prompting, scale test sequence to help lead the person performing the test through a test sequence. A test load with +/– tolerance is programmable for each step along with two lines of prompting directions to guide the test person through each step. Up to 25 steps can be programmed for the sequence.

Use the Test Load Units selection box to select calibration test load units. Only weight units available for primary units are available for selection.

The entire calibration test sequence can be cleared by pressing the CLEAR softkey , then pressing OK to confirm the action. When the calibration test sequence is cleared (empty), it still shows the –End– step. The –End– record will always display as the last step of the calibration test sequence. This field cannot be deleted and cannot be edited.

Press the VIEW TABLE softkey to access the current calibration test sequence setup. The Calibration Test View screen displays.

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

Editing Inserting Deleting

To edit a calibration step:

1. When the Calibration Test setup screen opens, the first step in the list will have focus. Use the UP and DOWN navigation keys to select a step to edit.
2. Press the EDIT softkey to open the setup screen for the step where edits can be made.
3. The step's test load and tolerance data displays first. Information for Prompt Field 1 and Prompt Field 2 (up to 20 characters per field that display as separate lines during the calibration test) display on the next screen. Edit the test step's test load, tolerance, and prompts as desired.
4. Press the OK softkey to accept the calibration step parameters as entered.
5. Press the ESCAPE softkey Esc to return to the Calibration Test View screen without saving the changes to the calibration step parameters.

To insert a calibration step:

6. Use the UP and DOWN navigation keys to select the step in the calibration test procedure where the new step is to be inserted.
7. Press the NEW softkey to open the setup screen to create a new calibration test step.
8. Enter the step's test load and tolerance data and information for Prompt Field 1 and Prompt Field 2.
9. Press the OK softkey. The current screen data is stored at the indicated step number, and any existing steps move down one record to make room for the new step.
10. Press the ESCAPE softkey Esc to return to the Calibration Test View screen without saving the calibration step.

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

    Press the PRINT softkey to print the calibration test steps.

    Press the EXIT softkey to return to the Calibration Test screen.

3.9.1.5. Reset

The Reset setup screen resets setup values to factory default settings for the Maintenance Configure/View setup.

3.9.1.5.1. Maintenance Reset

To initiate a reset, press the OK softkey. If the reset was successful, a verification message that reads "Reset Successful" displays. If the reset was not successful, an error message that reads

"Reset Failure" displays. If the reset fails, try to initiate the reset again. If the reset continues to fail, contact a local METTLER TOLEDO representative for assistance.

Press the ESCAPE softkey Esc to exit without resetting.

3.9.2. Run

The Run screens enable the operator to:

- Run the calibration test
- View and run diagnostic tests

3.9.2.1. Calibration Test

The name of the person who previously ran the calibration test displays on the Run Calibration Test screen. Press the ENTER key to change the name. Use the alpha keys to enter a new name. Press ENTER.

To view and modify test weight information:

1. Press the TEST WEIGHT INFORMATION softkey to access the Test Weight View screen where test weight information such as weight values and serial numbers can be edited, inserted, or deleted.
2. Press the EDIT softkey to change a weight value or ID for a test weight, or press the NEW softkey to insert a weight value and ID for a new test weight.
3. Press the OK softkey to save the changes or the new test weight record.
4. Press the ESCAPE softkey Esc to exit without saving.
5. Press the DELETE softkey to delete a test weight from the list.
6. To clear all test weight records from the list, press the CLEAR softkey C, then OK to confirm the action.
7. Press the EXIT softkey to return to the Run Calibration Test screen.

To run the calibration test:

8. Press the START softkey to initiate the calibration test. The currently displayed weight unit is compared to the programmed calibration test procedure weight unit.

- If the units do not match, the IND560x terminal will automatically check other programmed units and switch to the corresponding weight unit. If the unit selected for calibration does not match the primary, second, or third units, an error message will display and the test cannot be run. If this occurs, reprogram the unit selection or the calibration test unit to ensure that they match.

9. Live scale weight (active weight) displays on the first line (under the system line).
10. The calibration test step (for example, 1/5, which indicates step 1 of 5) displays under the active weight display.
11. The next line displays the test load value and +/– tolerance values for the step.
12. Prompt 1 displays on the line under the test load.

13. Prompt 2 displays on the next line.
14. Follow the prompts on the display and add the required test weights.
15. Press the OK softkey OK to proceed to the next calibration test step.
16. If a tolerance fails at any step, a Calibration Test Tolerance Failure message displays. Press ENTER to acknowledge the error. There are now three possible steps:
    a. If the wrong test weights were added to the scale, adjust the weights and press the OK softkey OK to repeat the steps.
    b. If the test weights were correct and the scale needs to be recalibrated, press the ESCAPE softkey Esc to abort the calibration test.
    c. Press the SKIP softkey ■■■ (a new softkey that displays when a Calibration Test Tolerance Failure occurs), to accept the calibration test error and continue to the next step. This step of the test will still report as a failure, but the test can be run to completion if desired.
17. After progressing through all of the steps in the calibration test procedure, a Test Complete message displays along with a Status message of either Pass or Fail. Press the PRINT softkey to print the calibration test report to connections with a Report assignment.
18. Press the ESCAPE softkey Esc during any step to abort the calibration test and return to the Run Calibration Test screen.

3.9.2.2. Diagnostics

Diagnostic test setup screens include:

- Display Test
- Keyboard Test
- Scale
  - Load Cell Output
  - Calibration Values
  - Statistics
- Serial Test
- Discrete I/O Test
  - Local
  - Remote I/O 1
  - Remote I/O 2
  - Remote I/O 3
- Network Test
- Reset Flash 2

3.9.2.2.1. Display Test

The Display Test screen displays an alternate off/on dot block pattern when first accessed. After the alternate off/on cycle, any additional test data about the display such as memory or program information displays.

Press the EXIT softkey to return to the menu tree.

3.9.2.2.2. Keyboard Test

The Keyboard Test screen enables testing of the terminal keys, including:

- Softkeys
- Scale function keys

- Navigation keys
- Numeric keys

Press any key. The screen will display the key last pressed.

Press the EXIT softkey ↖ to return to the menu tree.

3.9.2.2.3. Scale

Scale diagnostics setup screens include:

- Load Cell Output
- Statistics
- Calibration Values

Load Cell Output

The Cell Output screen displays the current number of counts (active value) for the scale. This display is only available for analog load cells.

Press the EXIT softkey ↖ to return to the menu tree.

Calibration Values

The Calibration Values screen displays the current calibration values configured for the scale. The number of test loads that display calibration values is determined by the Linearity Adjustment setting configured for the scale (see the Scale branch, Calibration setup; this display is not available for IDNet and SICSpro scale types).

These calibration values can be recorded and then manually entered into a new replacement board should a failure ever occur, which eliminates having to recalibrate the scale with test weights. While this method is quick, it is not as accurate as placing test weights on the scale.

Use the UP and DOWN navigation keys to select a calibration value to be modified. Use the numeric keypad to enter new values.

Press the EXIT softkey ↖ to return to the menu tree.

Statistics

The Scale Statistics screen displays statistical information for the scale such as weighments (increments each time a transaction is triggered), overloads (increments when the applied load for a single load cell exceeds its overload capacity), peak weight (the maximum weight recorded by the scale), and zero commands (increments each time a zero command is received from an operator or remotely).

Use the UP, DOWN, LEFT, and RIGHT navigation keys to view all information and records.

Press the EXIT softkey ↖ to return to the menu tree.

3.9.2.2.4. Serial Test

The Serial Test screen enables testing of the sending and receiving hardware on the serial ports COM1, OOM2, and COM3.

Com Port

Use the Com Port selection box to select the COM1, COM2 or COM3 serial port for testing .

NOTE: COM4 and COM5 cannot be tested in this manner.

Press the START softkey to initiate transmission of the test string. After pushing the START softkey, it changes to a STOP softkey. Press this key to end transmission of the test string.

In the serial test mode, the terminal will transmit a string "Testing COMX nn" out the selected serial port where the "X" is the selected com port number (1, 2, or 3) and "nn" is a sequential two-digit number (00–99). If a jumper is placed between the transmit and receive terminals on that port, the same data displays in the receiving field.

If another device is connected to the receiving port, any ASCII data received displays in the receiving field.

The serial test continues until the STOP softkey is pressed, which returns the user to the main Serial Test screen.

Press the EXIT softkey to return to the menu tree.

3.9.2.2.5. Discrete I/O Test

Discrete I/O Test setup screens include:

- Local
- Remote I/O 1
- Remote I/O 2
- Remote I/O 3

Select the internal (local) or external (Remote I/O) to be tested from the menu tree. Press ENTER.

- **VERY IMPORTANT!**: When any of the Discrete I/O Test screens are first accessed, a warning message displays with instructions to remove output control power before proceeding with the test. The Discrete I/O Test screens enable manual setting of any of the outputs to on or off for testing, so it is necessary to remove output control power before proceeding.

Press the ESCAPE softkey Esc to abort and not perform the test.

To continue the test:

1. Press the OK softkey. A real-time display shows the status of each of the inputs and enables each of the outputs to be turned on and off. An input or output that displays ○ is turned off. An input or an output that displays ● is turned on.
2. Use the LEFT and RIGHT navigation keys to select an output to turn on or off.
3. Press the DISCRETE OFF softkey ○ to turn the output off, and press the DISCRETE ON softkey ● to turn the output on.
4. Press the EXIT softkey to return to the menu tree. The outputs return to their previous on/off configuration before the tests were initiated.

5. If three remote I/O modules are set up in the terminal, the IND560x disables the ability to run diagnostics on a local I/O board that may be installed.

3.9.2.2.6. Network Test

The Network Test screen enables Ethernet network testing and assists in determining the availability of network options. The status of each line associated with the network setup displays during and after testing, showing a status of either Testing, Pass, Fail, or Timeout.

Press the EXIT softkey to return to the menu tree.

3.9.2.2.7. Reset Flash 2

The reset Flash 2 function clears the Flash 2 memory of all TaskExpert program files, custom tables and bitmap files specific to TaskExpert custom programs that have been downloaded to the terminal. Only the A1.csv (Tare Table csv file), A2.csv (Target Table csv file) and A3.csv (Container Tare Table csv file present in the Fill-560 only) will remain in place and intact during a reset of the Flash 2 drive.

Press the START softkey to initiate a reset of the Flash 2 memory. The terminal will NOT prompt the user for confirmation and the reset will begin immediately. A "Reset successful" pop-up will appear when the reset is complete. Press ENTER to acknowledge. At this time, the terminal will complete a power cycle.

Press the EXIT softkey to abort and not perform the reset.

3.9.2.3. Reset All Factory Default Settings

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

- The Reset All step resets all parameters in the terminal, except metrologically significant settings such as Scale type, capacity, etc.

When the Reset All screen is first accessed, a message displays that asks for verification to reset all setup parameters to factory default settings. To continue with the Reset All, press the OK softkey . If the reset was successful, a verification message that reads "Reset Successful" displays If the reset was not successful, an error message that reads "Reset Failure" displays. If the reset fails, try to initiate the reset again. If the reset continues to fail, contact a local METTLER TOLEDO representative for assistance.

Press the ESCAPE softkey Esc to exit without resetting.

3.9.2.4. Install Base Upgrade

When a SICSpro type of platform is connected, this step will allow upgrading of the firmware in the load cell. Refer to Chapter 4, **Service and Maintenance**, for the procedure to follow when upgrading base software.

3.10. Restoring Factory Default Settings

Factory default settings can be restored individually for branches such as scale, application, and terminal, or globally with the Reset All screen under the Maintenance branch. The Reset screen is the last branch in each major branch of the menu tree (except for Maintenance). To restore factory default settings for Terminal, for example:

1. Press the SETUP softkey . The setup menu tree displays (see Figure 3-25).

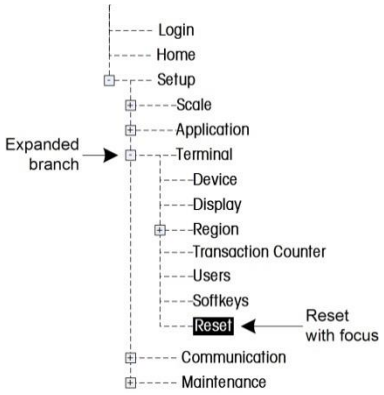


Figure 3-25: Setup Menu Tree – Reset

2. Use the DOWN navigation key to move the focus to Terminal.
3. Press the RIGHT navigation key to expand the Terminal branch.
4. Use the DOWN navigation key to move the focus to Reset.
5. Press the ENTER key to open the Terminal Reset screen.
6. Press the OK softkey to reset the Terminal setup values to factory default settings.
7. A status message appears that verifies a successful reset.
8. Press the EXIT softkey to return to the setup menu tree display.
9. Repeat steps 2–8 to reset factory default settings for any major branch in setup.

- Select Reset All under Maintenance to restore all setup settings to factory defaults. Note that neither this, nor Scale Reset, includes the reset of Type, Capacity, Increment, or Calibration data. Reset this data by setting SW2-1 to its ON position, and then performing a master reset by turning SW1-1 and SW1-2 ON and then cycling power to the terminal.

4 Service and Maintenance

This chapter covers
- Cleaning and Maintenance
- Service
- Upgrading Firmware
- Changing the Screensaver Graphic
- Display Messages
- Setting a Custom Language
- Troubleshooting
- External Diagnostics (Web Server)

The IND560x terminal is designed to provide years of dependable operation. However, METTLER TOLEDO recommends that – as with any industrial measurement equipment – the IND560x terminal and the connected scale system be serviced periodically. Timely, factory specified maintenance and calibration by a METTLER TOLEDO service technician will ensure and document accurate and dependable performance to specifications.

If unexpected problems do occur, METTLER TOLEDO recommends that service be done 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.

4.1. Terminal Cleaning and Maintenance

To clean the IND560x terminal's keypad and cover:

- Gently wipe the IND560x terminal's keypad and cover with a clean, damp, soft cloth.
- Use water or mild, non-abrasive cleaning agents.
- Do not use any type of acids, alkalis or strong industrial solvents such as toluene or isopropanol (IPA) that could damage the terminal's finish.
- Do not spray cleaner directly on the terminal.
- Do not clean the terminal using high-pressure or high-temperature water.
- Build-up of dust layers must be avoided.
- Remove light dust deposits using a damp cloth with a gentle wiping motion.
- Do not use compressed air or vacuum to remove dust layers.
- Follow good housekeeping practices to keep the terminal clean.

Regular maintenance inspections and calibration by a qualified service technician are recommended.

⚠ WARNING

IF THE IND560x KEYBOARD, DISPLAY LENS OR ENCLOSURE IS DAMAGED, THE DEFECTIVE COMPONENT MUST BE REPAIRED IMMEDIATELY. REMOVE POWER IMMEDIATELY AND DO NOT REAPPLY 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.

4.1.1. Overlay and Gasket

The IND560x is a rugged stainless steel enclosed instrument; however, the font panel is a polyester 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.

The overlay should be inspected during maintenance, and replaced if it is damaged. Should the front panel overlay become punctured, the IND560x should be taken out of service until the overlay can be replaced.

- To maintain IND560x terminal's gasket seal on Harsh and Panel enclosures:

  Inspect gasket for tearing, deterioration and damage each time the Harsh enclosure is opened.

  Replace gasket when removing the panel version terminal from panel.

4.2. Service

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

In general, once the IND560x is installed, programmed, and calibrated for a given application, only routine calibration 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.

4.2.1. General Safety Guidelines for Service

When performing on-site service or maintenance, only carry out this work on the weighing terminal in the hazardous area if the following conditions are fulfilled:

- The certification papers (conformity certificates, control drawing, manufacturer certifications, etc.) are present and can be used to confirm the correctness and safety of the installation
- The intrinsically safe entity parameters and area approval of the individual components are in accord with one another,
- The customer has issued a permit ("spark permit" or "fire permit")

- The area has been rendered safe and the owner's safety coordinator has confirmed that there is no danger
- The necessary tools and any required protective clothing are provided (danger of the build-up of static electricity)

4.3. Upgrading Firmware

The InSite™ CSL configuration tool program is used to flash new terminal firmware to the IND560x. The firmware update and the InSite SL configuration tool program must be saved on a PC that will be connected to the terminal for firmware flashing. Hyperterminal, a standard Windows program, is also an option for flashing firmware to the IND560x.

It is possible to upgrade the firmware of the IND560x in the following ways:

- Via the intrinsically safe COM1 serial port on the main board of the IND560x. An appropriate barrier is required to connect a PC directly to COM1.
- Via COM3 located on the Ethernet/COM2/COM3 option board installed in the ACM500.
- Via COM4 of the intrinsically safe current loop interface of the IND560x and the ACM200.

4.3.1. Performing the Upgrade with InSite™ CSL

NOTE: InSite™ CSL is only available to certified Mettler Toledo service providers. Another version of InSite™, InSite™ SL is available to users and can be used to save and restore terminal configurations. InSite™ SL cannot be used to upgrade firmware or carry out terminal configuration.

Implement the following steps to prepare the terminal for firmware flashing using the InSite CSL configuration tool:

Access the InSite CSL tool by double-clicking on its icon –  .

The new firmware will generate a checksum error on restart, which can be cleared by pressing ENTER on the terminal's keypad. This performs a Master Reset. Therefore, it is important to use InSite CSL to back up the current configuration and table data **before** performing the upgrade.

1. Remove power from the terminal.
2. Open the terminal enclosure as specified in Appendix A, **Installation**, Opening the Enclosure.
3. Set the SW1-1 switch to OFF (if not already in the OFF position) and the SW1-2 switch to ON. (See Appendix A, **Installation**, for switch locations.)
4. Apply power to the terminal. The Serial port download screen displays, which will list parameters for the serial port download (these parameters cannot be changed). The serial port on the PC must be programmed to match these parameters. This is done automatically in the InSite CSL program. Parameters listed include:

   Baud Rate: 115200
   Data Bits: 8
   Parity Bit: None

Stop Bits: 1

Flow Control: None

5. Connect the serial port cable from the PC that contains the firmware update and the InSite CSL configuration tool program to the barrier and then the barrier communication cable to the IND560x terminal. (See Appendix A, **Installation** for connection locations.) The terminal is now ready for firmware flashing.
6. Refer to the instructions/help provided with the InSite CSL configuration tool program for procedures required to complete firmware flashing.
7. When the firmware download process is complete, disconnect the serial cables, return switch SW1-1 to its original position (if it was changed) and turn the SW1-2 switch to OFF.
8. Close the terminal enclosure.

- To eliminate potential memory errors, it is recommended that a Master Reset be performed after flashing new firmware if one does not occur automatically. This procedure is described later in this chapter.

- IND560x SICSpro terminals have firmware v5.xx installed at the factory. Refer to notes on page 5-1 and 5-2 for firmware and boot code matching for Analog, IDNet and SICSpro main board hardware.

4.4. Changing Screen Saver Graphic

The graphic used by the IND560x as a screen saver can be changed by downloading a replacement file to the terminal.

4.4.1. Screen Saver Graphic Specification

The screen saver graphic is a bitmap file that should measure no more than 35 pixels wide and 35 pixels high. The file must be named saver.bmp.

4.4.2. Installing New Graphic

The screen saver graphic can be installed on the IND560x by making an ftp connection to the terminal via EtherNet, logging on as an administrator (with write privileges), and copying the file to ram:\saver.bmp. Refer to the ftp section of Appendix D, Communications, for further details.

4.5. Display Messages

4.5.1. Application Key Error

If, on power-up, the terminal finds that the hardware application key status has changed, a fault message (Figure 4-1) will display. For instance, if the Fill-560 hardware key was added to a standard IND560x, the fault would be displayed at power up.

Figure 4-1: Application Key Fault Message

Even though the ENTER graphic is shown, the ENTER key does not function. Two responses to this error are possible:

- If the hardware key status was **not** changed on purpose, turn power off and determine what caused the status to change. Fix the problem and apply power again. The terminal will retest the hardware key status.
- If the hardware key status **was** changed on purpose by adding or removing a key, perform a manual Master Reset – refer to Master Reset under Troubleshooting, below.

NOTE: Back up the terminal's current setup parameters before the hardware key status is changed. The original setup can then be downloaded to the terminal after the Master Reset has been performed.

4.5.2. COM4 Error / COM5 Error

A "COM4 Error" and/or "COM5 Error" message will display in the system line of the IND560x (Figure 4-2) if:

- The setting at **Communication > Connections > COM4** or **COM5** is ACM500, and the IND560x does not register communication from the ACM500 when it is powered up, or
- Communication is lost between the IND560x and ACM500.

For troubleshooting assistance, refer to the Internal Diagnostic Testing section later in this chapter.

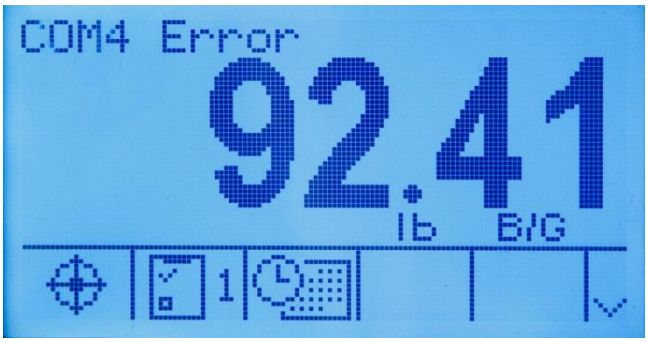


Figure 4-2: COM4 and COM5 Communication Errors

4.5.3. Invalid Parameters

The IND560x might display an "Invalid Parameters" message in the system line when exiting the setup menu (Figure 4-3). This will happen when the weighing mode has been set to "Over/Under" at **Application > Memory > Target Table > Mode** and there is no active Target value established. As long as a Target is setup up by recalling a record from the Target Table or manually setting up a value with the Target softkey, the "Invalid Parameters" message will no longer appear.

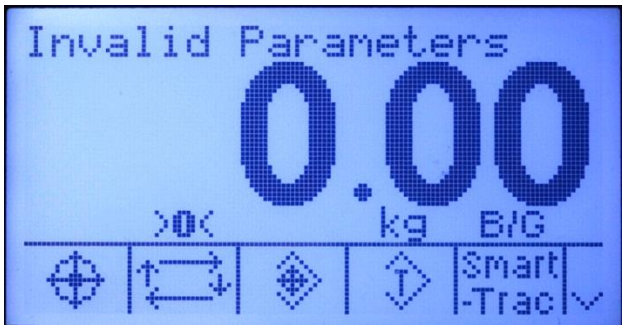


Figure 4-3: Invalid Parameter Message

4.5.4. Battery Alarm

When the battery voltage falls to its shut-off level, a message will appear on screen – "ALARM – Low Battery! Power off is in process!" This message will display for ten seconds, after which the terminal will power off automatically.

4.6. Setting a Custom Language

The IND560 terminal allows custom languages to be selected for display messages. The IND560x can store up to two custom language files at any one time. Any 2-lanugage combination can be stored in the IND560x providing that one language file is named **cust.txt** and the second language file is named **cust2.txt**. The following list contains all of the languages currently available for the IND560x:

- Polish
- Portuguese
- Russian

- Slovenian
- Croatian

Contact your METTLER TOLEDO technical support provider to obtain custom files for download to the terminal.

The procedure below assumes that a properly-configured text file, named either **cust.txt** or **cust2.txt** contains a complete set of display messages in the custom language. To set the custom language:

1. Make an ftp connection to the terminal.
2. Copy the **cust.txt** or **cust2.txt** file to the root directory of the IND560 (Flash2).
3. On the terminal, access **Setup > Terminal > Region > Languages**.
4. In the Display Messages field dropdown list, select Custom or Custom2 as appropriate.
5. Exit setup. Messages on the terminal's display will now appear in the custom language.

4.7. Troubleshooting

Troubleshooting activities for the IND560x include:

- Power Test
- Load Cell and IDNet Power Testing
- Battery test
- Internal Diagnostic Testing
- RS-232 Serial Output Voltage Testing
- Master Reset

4.7.1. Power Test

If the display is blank or if intermittent problems are occurring, the condition of the power source should be checked.

Begin by checking the AC power at the APS768x or PSUx source. If no AC power is present at the APS768x or PSUx input, have a qualified electrician at the site restore power at the source. After power is restored, test the IND560x for correct operation.

If there is AC voltage present at the source (APS768x or PSUx input), begin the process of checking the output of the APS768x or PSUx and input of the IND560x.

When measuring the input voltages of the IND560x, please be sure that the IND560x is ON and the scale is connected. Refer to Figure 4-4 and Table 4-1 for pin testing positions and expected voltages.

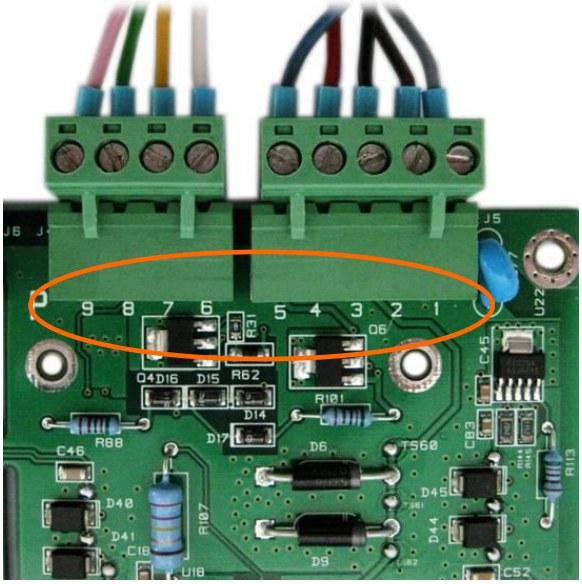


Figure 4-4: Pin Locations on IND560x Power Supply Connection Terminal

Table 4-1: Input Voltages IND560x from APS768x / PSUx

Measuring Point	Setpoint [V DC]		Remarks
	Min	Max	
P1 – P2	5.5	10.5	
P3 - P2	3.5	5.9	
P5 – P2	9	12.6	Depends on connected load
P6 – P7	7.8	8.7	
P8 – P7	10.3	12.6	If T-brick is connected
P9 – P7	5.3	7.15	

If these values are not in range, ensure that the internal wiring of the APS768x or PSUx is correct as shown in Table 4-1. If wiring is correct, disconnect the PSUx and measure the voltages of the APS768x or PSUx. Refer to Table 4-2 for pin testing positions and expected voltages. Refer to PSU/PSUx/APS768x Service Manual (22006570) for further information.

Table 4-2: Output Voltages APS768x / PSUx

Measuring Point	Setpoint [V DC]	
	Min	Max
U1 – GND	7.8	8.7
U2 – GND	11.4	12.6
U3 – GND	6.6	7.15
U4 – GND	9.5	10.5
U5 – GND	4.8	5.9
U6 – GND	11.4	12.6

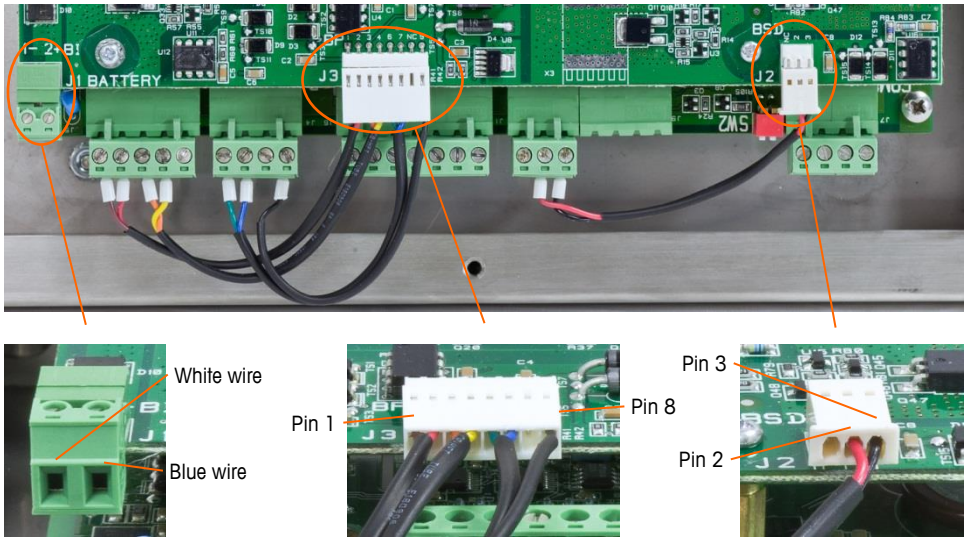


Figure 4-5: Pin Locations on IND560x-PAB Input Voltage

Table 4-3: Input Voltages IND560x-PAB from NiMH Battery Pack

Measuring Point	Setpoint [V DC]		Remarks
	Min	Max	
Blue to White wires	9.0	12.0	No load. Not attached to B1 port on IND560x-PAB

Table 4-4: IND560x-PAB Output Voltages When Connected to NiMH Battery Pack

Measuring Point	Setpoint [V DC]		Remarks
	Min	Max	
BP1-BP2	5.8	7.1	No load cell connected to main board
BP3-BP4	3.2	5.8	
BP6-BP7	6.7	8.6	No load cell connected to main board
BP9-BP7	5.4	7.1	

Table 4-5: Input Voltages IND560x-PAB (BSD) When Connected to NiMH Battery Pack

Measuring Point	Setpoint [V DC]		Remarks
	Min	Max	
BSD2-BSD3	6.7	8.6	No load cell connected to main board.

4.7.2. Load Cell and IDNet Power

When measuring the output voltages of a connected analog load cell system or IDNet base, be sure that the IND560x is ON and the scale is correctly connected. Refer to Figure 4-6 and Table 4-6 for

pin testing positions and expected voltages of the analog load cell connection. Refer to Figure 4-7 and Table 4-7 for pin testing positions and expected voltages for the IDNet connection.

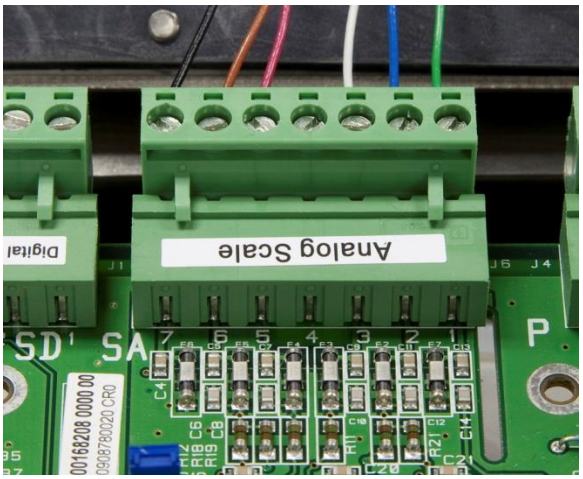


Figure 4-6: Analog Load Cell Connection Terminal

Table 4-6: Output Voltages Analog

Measuring Point	Setpoint [V DC]	
	Min	Max
SA1 – SA7	4.6	5.1

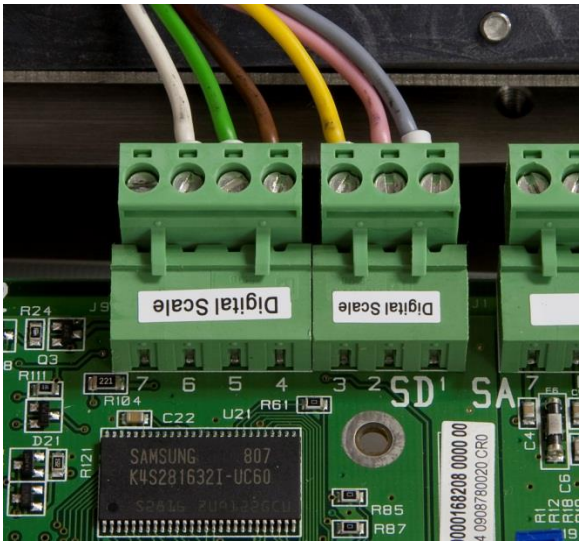


Figure 4-7: IDNet and SICSpro Base Connection Terminal

Table 4-7: Output Voltages, IDNet and SICSpro

Measuring Point	Setpoint [V DC]	
	Min	Max
SD1 – SD3	10.3	12.6
SD2 – SD3	7.8	8.7

Measuring Point	Setpoint [V DC]	
	Min	Max
SD7 – SD3	9	12.6

4.7.3. Battery Tests

If setup parameters change uncontrollably or programming is lost, check the BRAM battery voltage. Battery voltage is tested at the battery assembly on the Main PCB. The battery and power connector are shown in Figure 4-8.

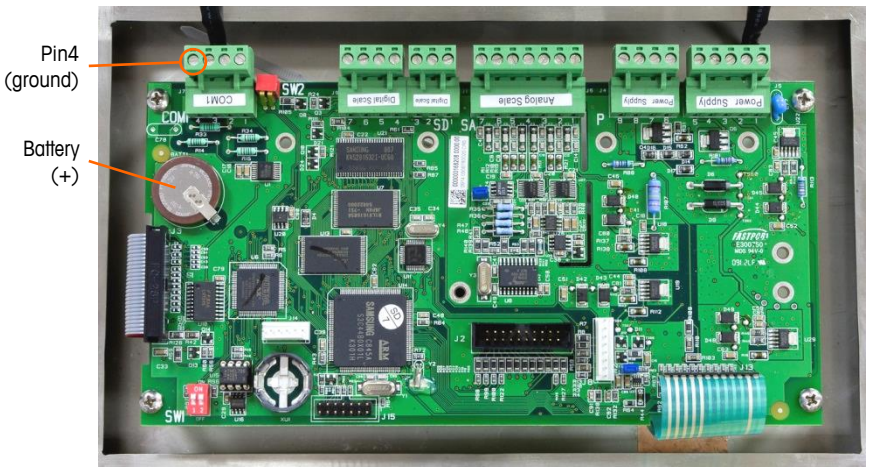


Figure 4-8: Battery Test

With the power disconnected, use a Volt-Ohm meter to measure voltage between the top of the battery (+) and COM1 pin 4 (ground). This measurement should be approximately 3.0 to 3.4 VDC. Replace the Main PCB if the measured voltage is below 2.5 VDC.

4.7.4. Internal Diagnostic Testing

The IND560x provides several internal diagnostic tests that are accessible in setup mode. Press the SETUP softkey to view the setup menu tree. Use the DOWN navigation key to scroll down the menu tree to Maintenance. Press the RIGHT navigation key to expand the menu tree selections for Maintenance. Scroll down and expand Run. Scroll down and expand Diagnostics. Available diagnostic setup screens include the following.

4.7.4.1. Display Test

Displays an alternate off/on dot block pattern when accessed. After the alternate off/on cycle, the display will return to the menu tree.

4.7.4.2. Keyboard Test

Enables testing of the keyboard. Each key that is pressed will be shown on the display. When testing is complete, press the EXIT softkey to return to the menu tree.

4.7.4.3. Scale

4.7.4.3.1. Load Cell Output

Displays the current load cell output (active weight) for the scale. This is useful to determine exactly how many counts the analog section is outputting and is not available with IDNet and SICSpro bases.

4.7.4.3.2. Calibration Values

Displays the current calibration values for the scale. If these values are recorded after a scale calibration, and the Main PCB is replaced in the future, the calibration values can be manually entered here to "transfer" the previous calibration to the new Main PCB. This is not available with IDNet and SICSpro bases.

4.7.4.3.3. Statistics

Displays statistical information for the scale such as the total number of weighments, the number of scale overloads, the peak weight weighed on the scale, total number of zero commands and failed zero commands. These are very helpful when diagnosing scale problems.

4.7.4.4. Serial Test

Enables testing of the transmit and receive functions on serial ports COM1, COM2 and COM3 (if installed in ACM500). COM4 and COM5 on the fiber optic and current loop interfaces of the IND560x can also be tested in this manner with special conditions.

1. Place a jumper wire between the transmit and the receive terminals of the COM port to be tested as shown in Figure 4-9.
2. Select the COM port (COM1, COM2, COM3) to be tested using the selection box for COM Port. Only the ports installed are available for testing.
3. Press the START softkey ⓘ and a data string is output repeatedly approximately once every three seconds. The data is: [Testing COMx: nn] where "x" is the COM port and "nn" is an incrementing value beginning at 00 and continuing to 99. Each transmission increments this number by one.
4. The same data string that is transmitted displays as the receiving field. If another device is connected to the receiving port, any ASCII data received displays in the receiving field.
5. To stop the serial port test, press the STOP softkey ⓥ.

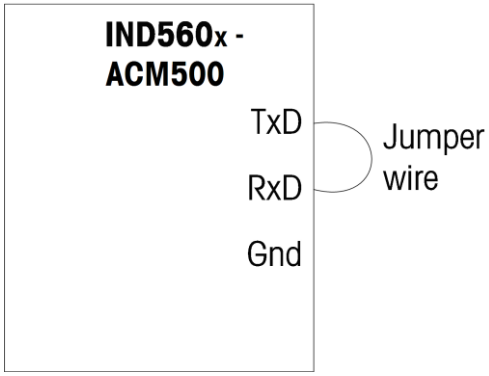


Figure 4-9: Jumper Wire Between Transmit and Receive Terminals on COM1

4.7.4.5. Special Conditions for Fiber Optic Loopback Test (COM4/COM5)

In order for COM4 and/or COM5 of the fiber optic interface to be available for testing, the settings at Communication/Connections/COM4-COM5 must be "Standard". This setting will make COM4 and COM5 function as a typical serial port.

1. Place a jumper fiber optic cable between the transmit and the receive terminals of the fiber optic interface on the port being tested as shown in Figure 4-10.
2. Select the COM port (COM4 or COM5) to be tested using the selection box for COM Port. Only the ports installed are available for testing.
3. Press the START softkey ⓘ and a data string is output repeatedly approximately once every three seconds. The data is: [Testing COMx: nn] where "x" is the COM port and "nn" is an incrementing value beginning at 00 and continuing to 99. Each transmission increments this number by one.
4. The same data string that is transmitted displays as the receiving field. If another device is connected to the receiving port, any ASCII data received displays in the receiving field.
5. To stop the serial port test, press the STOP softkey ⓥ.

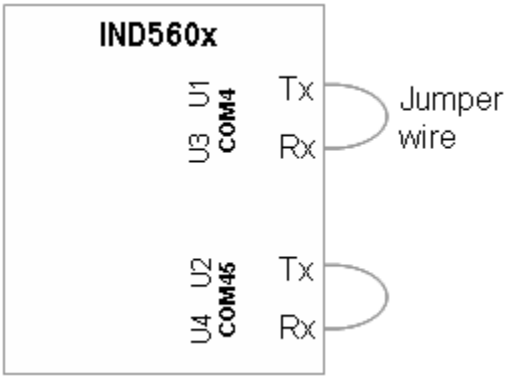


Figure 4-10: Jumper Wire Between Transmit and Receive Terminals on COM4 and COM5 of Fiber Optic Interface

4.7.4.6. Special Conditions for Current Loop Loopback Test (COM4/COM5)

In order for COM4 and/or COM5 of the current loop interface to be available for testing, the settings at Communication/Connections/COM4-COM5 must be "Standard". This setting will make COM4 and COM5 function as a typical serial port.

It is not possible to do a single wire loopback test on COM4 and COM5 of the current loop interface. METTLER TOLEDO has created a special loop back test plug that can be used for this purpose. The part number for this loopback test kit can be found in Chapter 5.0, Parts and Accessories.

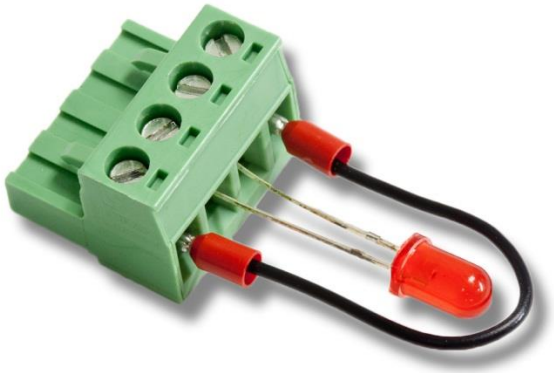


Figure 4-11: Loopback Test Fixture for IND560x I.S. Current Loop Interface

1. Place the current loop test plug (Figure 4-11) on the current loop port being tested as shown in Figure 4-10.
2. Select the COM port (COM4 or COM5) to be tested using the selection box for COM Port. Only the ports installed are available for testing.
3. Press the START softkey and a data string is output repeatedly approximately once every three seconds. The data is: [Testing COMx: nn] where "x" is the COM port and "nn" is an incrementing value beginning at 00 and continuing to 99. Each transmission increments this number by one.
4. The same data string that is transmitted displays as the receiving field.
5. To stop the serial port test, press the STOP softkey .

   The LED on the current loop COM4/COM5 test plug Figure 4-12indicates if voltage is present on the current loop interface board. If this LED is not lit, there is no voltage present at COM4 or COM5 of the current loop interface board and the board should be replaced.

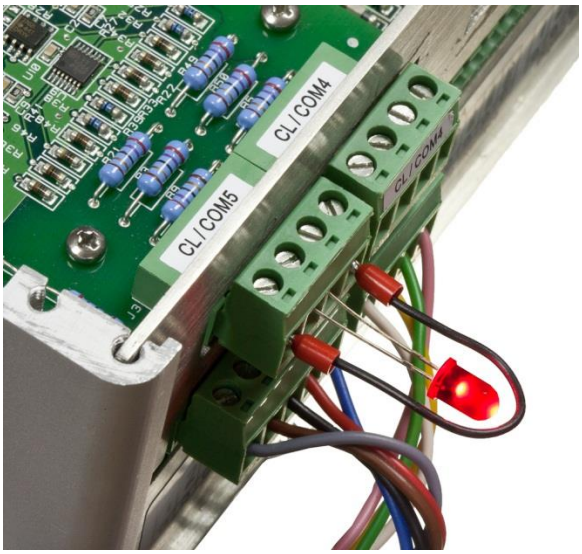


Figure 4-12: Current Loop COM4/COM5 Test Fixture Installed in IND560x

4.7.4.7. Special Conditions for IND560x Main Board Loopback Test

If loopback or voltage testing fails on COM4 or COM5 of the fiber optic or current loop interface board, an additional loopback test can be carried out on the IND560x main board port (J8) that supports these communication interface boards. A loopback test on the communication interface port on the main board will help further determine if the failure in on the main board on in the optional communication interface board.

An additional test plug has been created to carry out a loopback test on the main board on the IND560x (Figure 4-13). The part number for this current loop test kit can be found in Chapter 5.0, Parts and Accessories.

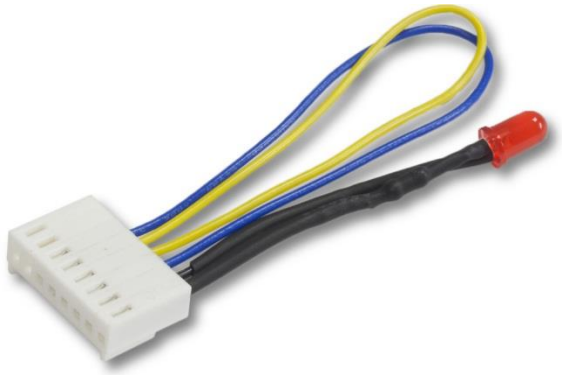


Figure 4-13: IND560x Communication Interface Test Plug

In order for the main board communication interface to be available for testing, the settings at Communication/Connections/COM4-COM5 must be "Disabled".

1. Place the test plug on port J8 of the IND560x main board.
2. Select the COM port (COM4 or COM5) to be tested using the selection box for COM Port. Either port will test the function of the J8 port.
3. Press the START softkey ⓘ and a data string is output repeatedly approximately once every three seconds. The data is: [Testing COMx: nn] where "x" is the COM port and "nn" is an incrementing value beginning at 00 and continuing to 99. Each transmission increments this number by one.
4. The same data string that is transmitted displays as the receiving field.
5. To stop the serial port test, press the STOP softkey ⓥ.

The LED on the main board loopback test plug indicates if voltage is present at the communication interface on the main board (Figure 4-14). If this LED is not lit, there is no voltage present at the interface and the main board of the IND560x should be replaced.

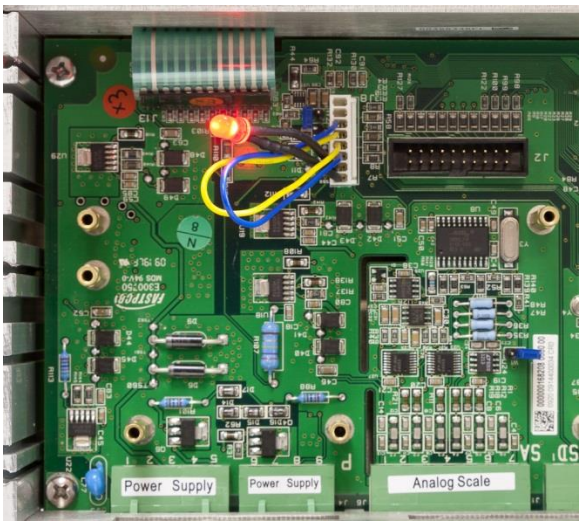


Figure 4-14: IND560x Communication Interface Test Plug Installed

4.7.4.8. Discrete I/O Test

Provides a view of the status of the discrete inputs and allows enabling or disabling of the discrete outputs for diagnostic purposes. Expand the Discrete I/O branch by pressing the RIGHT navigation key. Choose if the test will be performed on the local (internal) discrete I/O option or one of the remote ARM100 modules. Press ENTER when that branch is highlighted.

Next, a warning will display to remind the tester that the outputs can be turned on manually during this test, so any control power to the discrete outputs should be removed.

	⚠ WARNING
	THE DISCRETE OUTPUTS OF THE IND560x TERMINAL WILL BE MANUALLY ENABLED DURING THIS TEST. REMOVE OUTPUT CONTROL POWER SO EXTERNAL EQUIPMENT WILL NOT BE ENERGIZED BY MISTAKE. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

When viewing the test screen, the input status will be shown at the top of the display and the output status will be shown at the bottom of the display Figure 4-15). Focus is shown on Output #1 first.

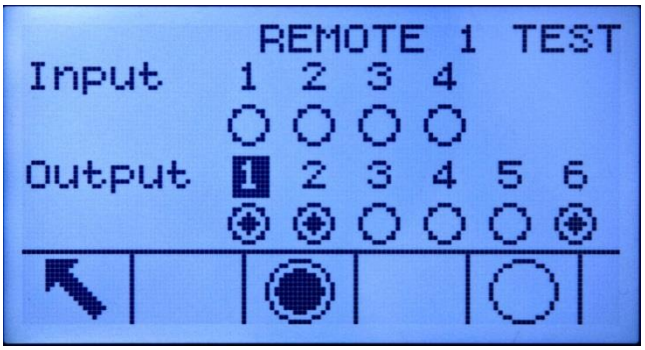


Figure 4-15: Discrete I/O Test Screen

Focus can be moved to any of the other outputs by using the RIGHT and LEFT navigation keys. The two softkeys at the bottom of the page will either enable ● or disable ○ the highlighted output.

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

4.7.4.9. Network Test

Enables testing of the Ethernet programming/hardware/firmware in the terminal. The following tests are run during this diagnostic process:

- TCP/IP Stack
- This IP Address
- Gateway address

Each step will indicate "Testing" during the test then indicate a Pass or Timeout status. If the status is shown as Timeout, it indicates that the IP address or gateway address has not been programmed in the terminal (refer to **Communication I Network** in Chapter 3, **Configuration** for information on entering the IP and gateway addresses).

4.7.5. RS-232 Serial Output Voltage Test

If tests of the sending and receiving functions on the COM1,COM2 or COM3 serial ports fails, use the following procedure to determine whether the RS-232 serial port is operational:

1. Remove power from the IND560x terminal and the printer.
2. Disconnect the data cable from the printer.
3. Set the voltmeter to read 20 VDC.
4. Connect the red lead to the transmit terminal of the COM port and connect the black lead to the ground terminal of the COM port.
5. Apply power to the IND560x. The meter should read as follows:
   - **Demand mode**—The meter should read a stable value (without fluctuation) between –4.55 and –5.36 VDC.
   - **Continuous mode**—The meter should fluctuate continuously within the range –5.36 to +5.36 VDC. The actual values and degree of fluctuation observed will depend on the type and sensitivity of the meter used. The constant fluctuation on the meter display indicates that the scale/terminal is transmitting information.

To test Demand baud rates, press the PRINT key ⎙. The display should fluctuate as for continuous mode for the duration of the transmission, then become stable again. This fluctuation indicates the terminal has transmitted data.

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

4.7.6. Master Reset

A hardware master reset is provided that sets all IND560x terminal settings to the factory default settings (refer to Appendix B, Default Settings).

The master reset typically is performed under these circumstances:

- When a software configuration problem arises that cannot be resolved without starting from the factory default settings.
- When security is enabled to protect setup, and the password is lost.
- After a firmware upgrade is performed.
- After a hardware key is installed or removed.

4.7.6.1. To initiate a master reset, perform the following steps

1. Remove power from the IND560x.
2. Note the position of switches SW1-1 and SW1-2.
3. Place both switches SW1-1 and SW1-2 in the ON position, as shown in Figure 4-16.

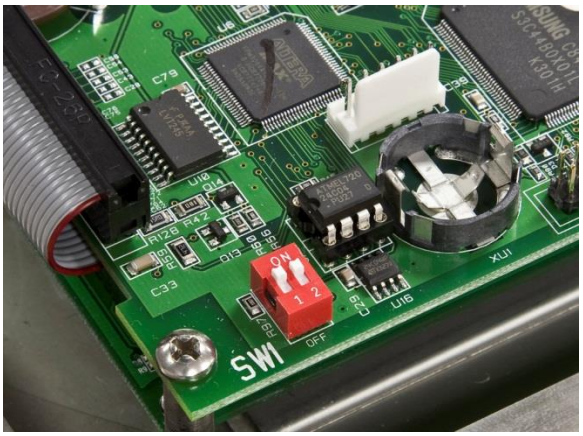


Figure 4-16: Switches SW1-1 and SW1-2

- The position of SW2-1 (indicated in Figure 4-17) determines whether metrologically significant EEPROM (scale) data is reset when a master reset is performed. SW2-1 must be set to ON to reset EEPROM data. If SW2-1 is set to OFF, EEPROM data will not be affected by the master reset.

Figure 4-17: Location of Switch SW2-1

4. Apply power to the IND560x. A warning message displays asking if all values should be reset to factory defaults.
5. Press ENTER to perform a master reset.
6. Remove power from the IND560x.
7. Return SW1-1 and SW1-2 (and, if they were changed, SW2-1 and SW2-2) to their original positions, noted in step 2.
8. Reapply power to the IND560x.

Or, if a master reset is not desired:

1. Do not press ENTER when the warning message displays asking if all values should be reset to factory defaults.
2. Remove power from the IND560x.
3. Reset switches SW1-1 and SW1-2 (and, if they were changed, SW2-1 and SW2-2) to their original positions.
4. Reapply power to the IND560x. The terminal will power up in the normal run state and a master reset will have been avoided.

4.8. External Diagnostics

4.8.1. Web Server

The IND560x includes a built-in web server utility that provides valuable tools for examining the operation of the terminal, its installed options and software. Information available in the Web Server includes:

- System hardware and software configuration
- Resource utilization
- Scale statistics and data

Web server help can also be used for the following functions:

- Reading shared data variables, viewed either statically or dynamically
- Writing shared data values
- Remote terminal reset

The Web Server in the IND560x is accessed with a web browser via the Ethernet connection installed in the ACM500. Access to the Terminal is provided by using its IP address. An IP address can be manually assigned, or assigned automatically by the network, depending on how DHCP is configured in setup at **Communication > Network > Ethernet**. If DHCP client is enabled, once the terminal is connected to the Ethernet its IP address will appear in the Ethernet configuration screen.

After an IP address for the IND560x has been entered or automatically assigned using DHCP, record the address and enter it as the URL in the browser.

If the connection was successful, the Web Server home page (Figure 4-18) is displayed.

4.8.1.1. Home Page

When the Web Server is first accessed, the Home page shown in Figure 4-18 appears in the browser window.

Figure 4-18: Web Server Home Screen

Click the links on this page to visit the respective views, each of which is detailed in the following sections.

At the bottom of each page accessed, a HOME button is shown which returns the view to the Home page seen in Figure 4-18 when pressed.

4.8.1.2. View Pages

4.8.1.2.1. Help File

A help file, accessible from each page via the help button ? explains the full range of the utility's features. Refer to this file for a full explanation of each of the items visible in each page.

Figure 4-19 shows a portion of the help file.

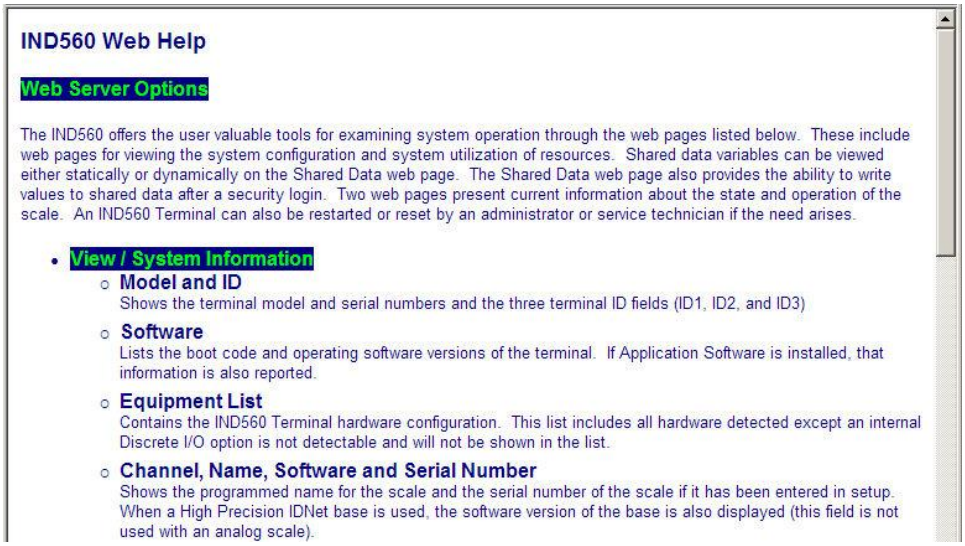


Figure 4-19: Help File

At the bottom of the Help page, a CLOSE WINDOW button allows the user to close this browser window without exiting the Web Server utility.

4.8.1.2.2. System Information

The system information page (Figure 4-20) provides information about asset information, installed component part numbers, software versions and serial numbers, and installed application software. The Channel Software column is not filled unless the terminal is using an IDNet or SICSpro scale base.

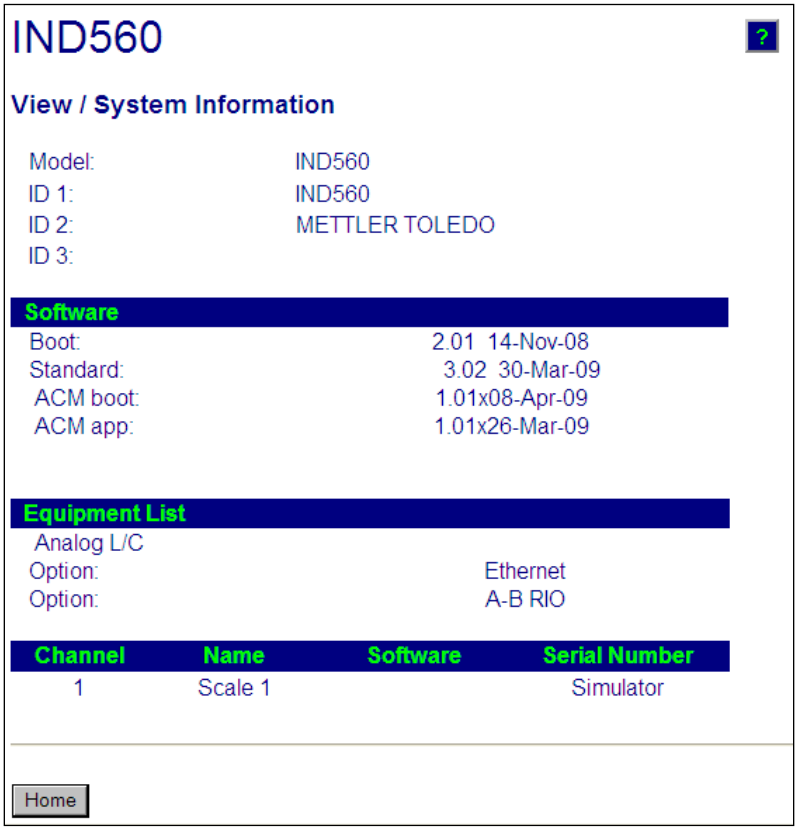


Figure 4-20: System Information Page

4.8.1.2.3. Resource Utilization

The resource utilization page (Figure 4-21) gives a snapshot of the current status of the terminal, including power on time and information about the various types of memory used by the IND560x.

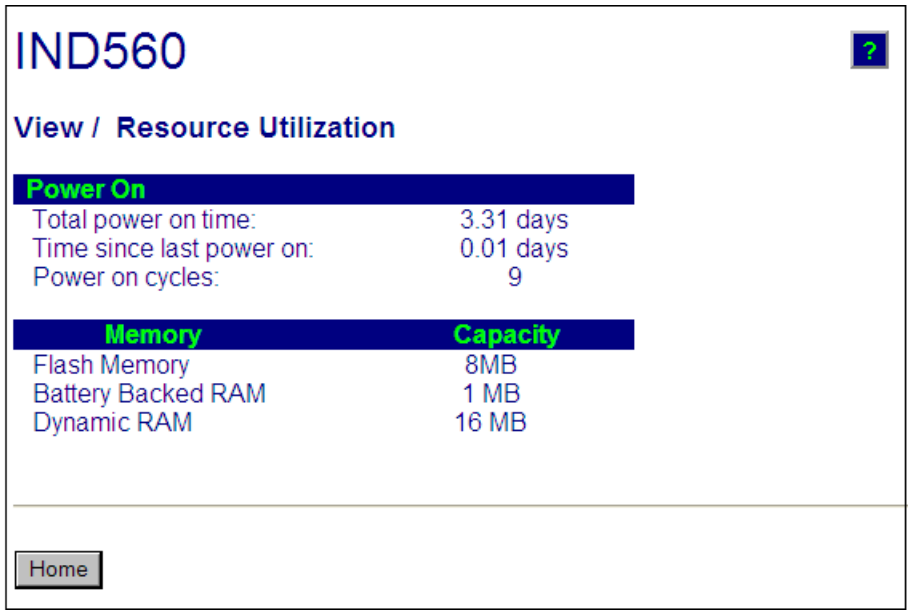


Figure 4-21: Resource Utilization Page

4.8.1.2.4. Scale Statistics

The scale statistics page (Figure 4-22) shows a variety of data for the scale.

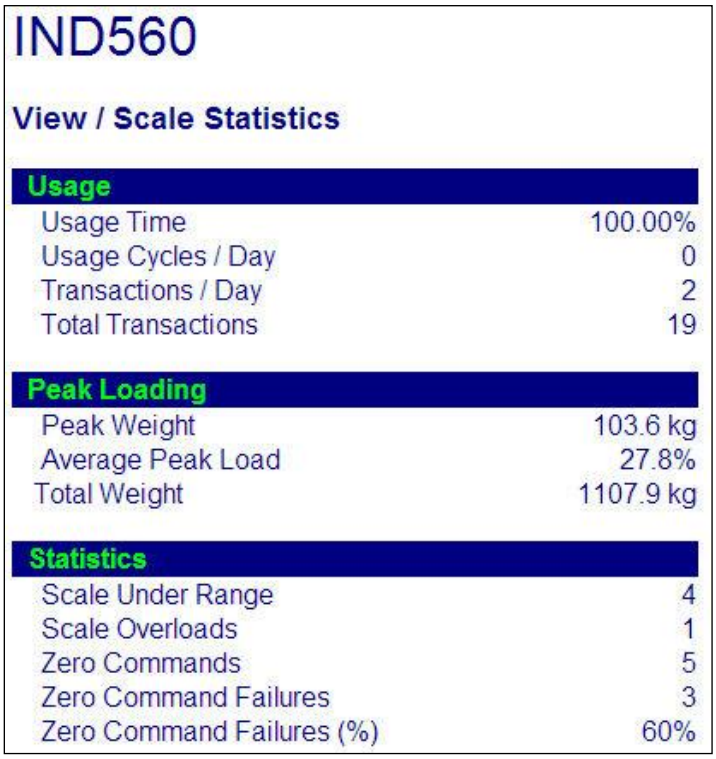


Figure 4-22: Scale Statistics Page

4.8.1.2.5. Scale Data

The scale data page (Figure 4-23) shows information, including current configuration and calibration values, for the scale. The signal quality display permits troubleshooting of the connection between the IND560x and load cells. When quality is poor, a red bar is displayed. A yellow bar indicates adequate quality, and green bar means the quality is good, as in the example below.

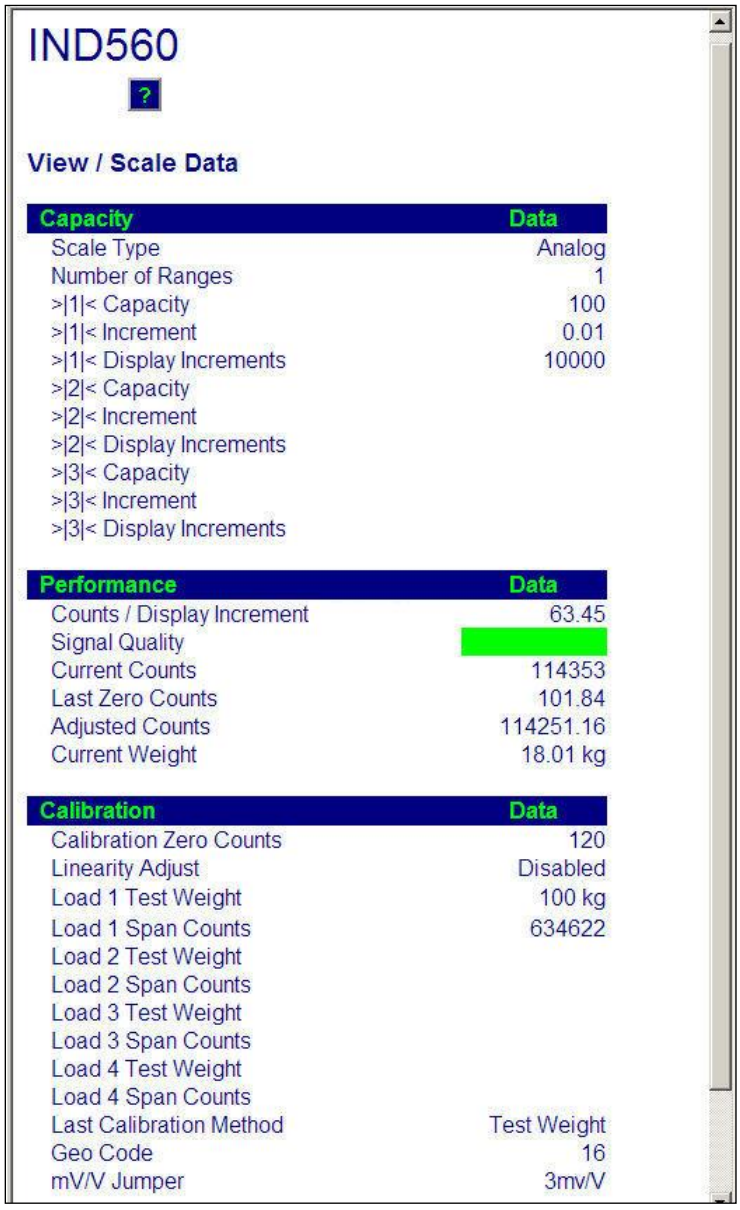


Figure 4-23: Scale Data Page

4.8.1.3. Diagnostics & Maintenance Pages

4.8.1.3.1. Shared Data

The shared data page (Figure 4-24) allows the user to request a display of current values for up to ten shared data variables at a time. Values are accessed by entering the shared data name in one

of the fields at left. When the Save Changes button at bottom is clicked, the Name fields are saved and the Values refreshed. The button is in focus when a new entry has been made in a Name field.

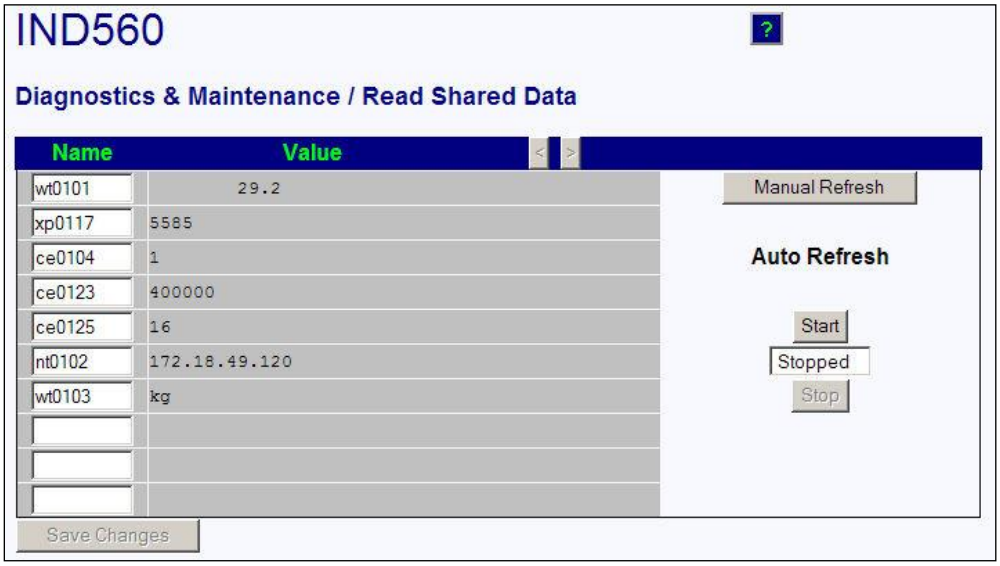


Figure 4-24: Shared Data Page

To refresh the displayed values without changing any variable names, click on the Manual Refresh button.

Values may also be refreshed automatically, at one second intervals, by clicking on the Start button. Once Start is selected, the Stop button is in focus and can be clicked. The current status of dynamic display (Stopped or Running) is shown in a field between the two buttons. Note that, as indicated on the page, Auto Refresh must be stopped before new shared data names can be entered.

For a complete list of available shared data names, refer to the IND560x Shared Data Manual. In the example shown in Figure 4-24, the shared data information displayed is as follows:

Table 4-4: Shared Data Information

Name	Data Displayed	Interpretation
wt0101	29.2	Current gross weight value
xp0117	5585	Cumulative power on time, in minutes
ce0104	1	Number of ranges defined for the scale
ce0123	400000	Encoder counts at the middle calibration value for the scale
ce0125	16	GEO code set in the Scale 2 calibration page
nt0102	172.18.49.120	Ethernet IP Address
wt0103	kg	Primary units set in the scale calibration page

When a string is longer than the data display width of 40 characters, the left/right scroll buttons < > may be used to move through the string to view all of it.

4.8.1.3.2. Write Shared Data

To access the Write Shared Data page, login at the administrator level is required. When prompted, enter the administrator's user name and password. The screen shown in Figure 4-25 will appear.

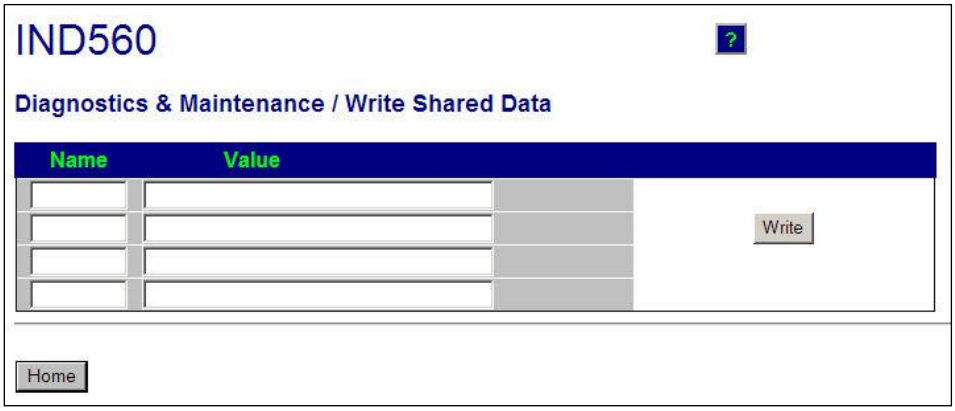


Figure 4-25: Write Shared Data Page

Enter the Shared Data name in the Name column at left, and the value to be written to it in the Value column, then click on the Write button. Four Shared Data variables can be modified at a time.

4.8.1.3.3. Reset Terminal

To access the Reset Terminal page, login at the administrator level is required. When prompted, enter the administrator's user name and password. The screen shown in Figure 4-26 will appear.

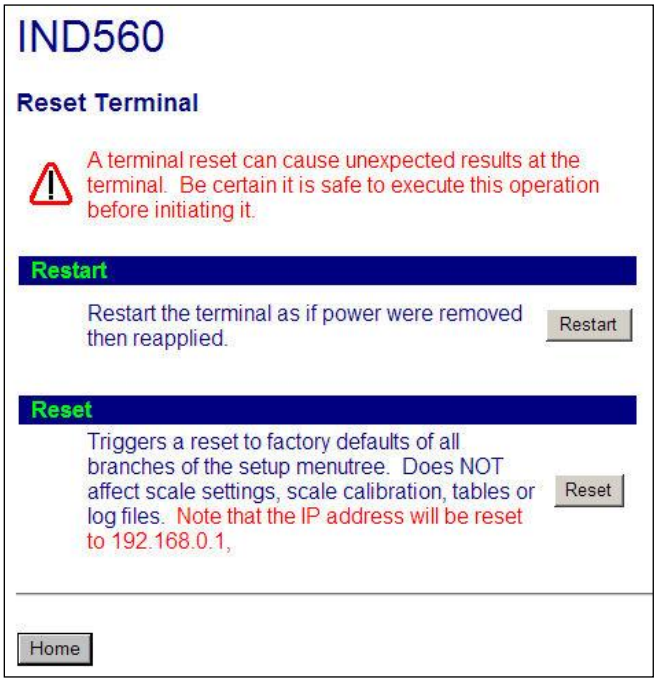


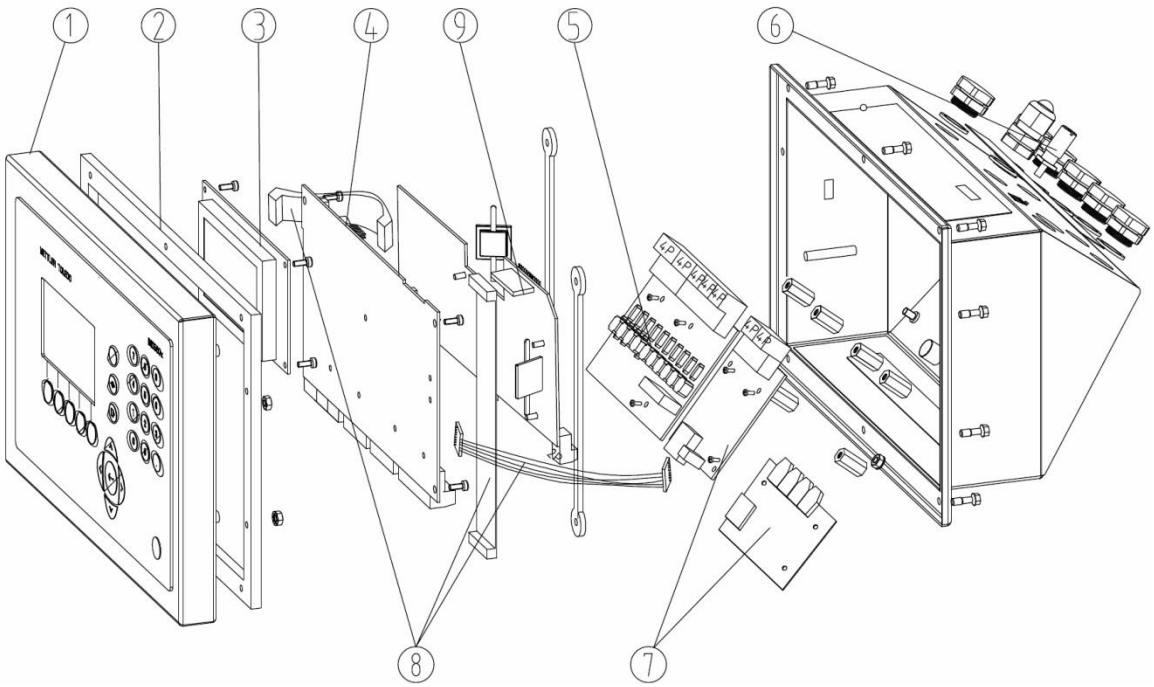
Figure 4-26: Reset Terminal Page

From this screen, the terminal can be restarted (equivalent to cycling power) or reset to factory defaults (except for calibration settings, tables and log files), with results as detailed on-screen.

- When a Master Reset is performed, the Terminal's IP address will default to factory settings.

5 Parts and Accessories

5.1. IND560x Terminal Harsh Enclosure

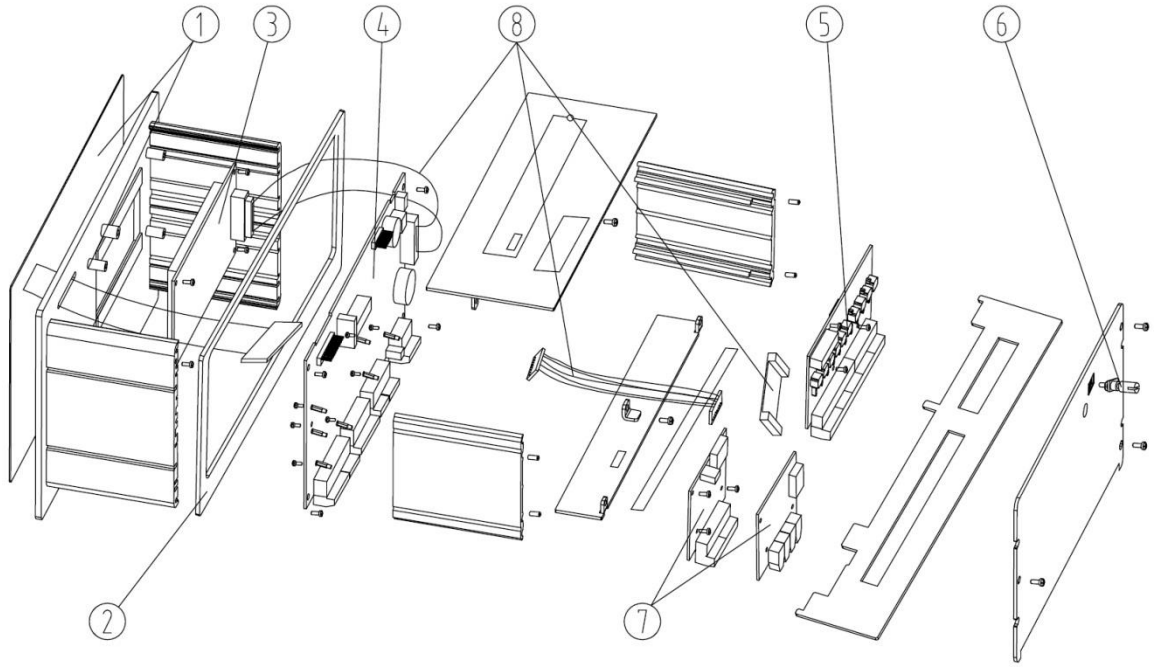


Part Description			Quantity	Part Numbers
1	Top cover- Keypad and front cover assembly		1	72237626
2	Sealing gasket		1	72237628
3	LCD display kit		1	72237629
4	Mainboard – analog[1]	Reminder: When installing a new PCB into a terminal equipped with an Application Pac other than Fill-560, the application software files must be downloaded again.	1	72237630
	Mainboard – IDNet[1]		1	72237631
	Mainboard – SICSpro[2]		1	30411412
5	Discrete I/O Option (Active/Active, Active/Passive or Passive/Passive)		1	Refer to page 5-4 for part numbers
6	Equipotential bonding kit		1	22005326
7	Communication Interface Options (Fiber Optic or I.S. Current Loop)		1	Refer to page 5-4 for part numbers

Part Description		Quantity	Part Numbers
8	Cable set kit	1	72237637
9	IND560x-PAB	1	72256018
N.S.	Connector kit	1	72203385
	ATEX gland kit	1	30411434

1. Analog and IDNet main boards with markings "168219R" or "1682195S" on the bottom side indicate hardware can only support firmware version 4.xx or earlier and matching boot code version 2.xx. These main boards cannot support firmware version 5.xx with matching boot code version 3.xx. Analog main boards with markings "168219T" can support firmware version 4.xx with matching boot code version 2.xx and firmware version 5.xx with matching boot code 3.xx. On Analog main boards with markings "168219T" firmware version 5.xx must match with boot code version 3.xx and firmware version 4.xx must match with boot code version 2.xx.
2. SICSpro main boards bear marking "168219T" on the bottom side. These main boards have firmware version 5.xx with matching boot code 3.xx. The SICSpro main boards cannot support firmware version 4.xx with matching boot code version 2.xx.

5.2. IND560x Terminal Panel-Mount Enclosure



Part Description		Quantity	Part Numbers
1	Top cover- Keypad and front cover assembly	1	72237627
2	Sealing gasket	1	71209390
3	LCD display kit	1	72237629

Part Description			Quantity	Part Numbers
4	Mainboard – analog[1]	Reminder: When installing a new PCB into a terminal equipped with an Application Pac other than Fill-560, the application software files must be downloaded again.	1	72237630
	Mainboard – IDNet[1]		1	72237631
	Mainboard – SICSpro[2]		1	30411412
5	Discrete I/O Option (Active/Active, Active/Passive or Passive/Passive)		1	Refer to page 5-4 for part numbers
6	Equipotential bonding kit		1	22005326
7	Communication Interface Options (Fiber Optic or I.S. Current Loop)		1	Refer to page 5-4 for part numbers
8	Cable set kit		1	72237637
N.S.	Connector kit		1	72203385

1. Analog and IDNet main boards with markings "168219R" or "1682195S" on the bottom side indicate hardware can only support firmware version 4.xx or earlier and matching boot code version 2.xx. These main boards cannot support firmware version 5.xx with matching boot code version 3.xx. Analog main boards with markings "168219T" can support firmware version 4.xx with matching boot code version 2.xx and firmware version 5.xx with matching boot code 3.xx. On Analog main boards with markings "168219T" firmware version 5.xx must match with boot code version 3.xx and firmware version 4.xx must match with boot code version 2.xx.
2. SICSpro main boards bear marking "168219T" on the bottom side. These main boards have firmware version 5.xx with matching boot code 3.xx. The SICSpro main boards cannot support firmware version 4.xx with matching boot code version 2.xx.

5.3. Options and Accessories

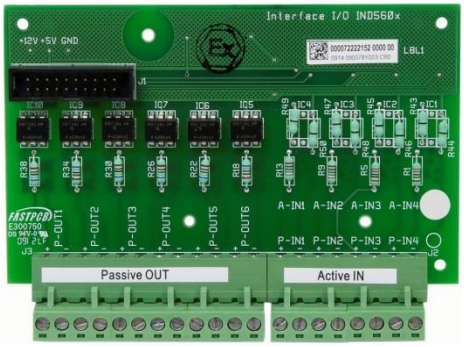
5.3.1. Wall-Mounting Brackets (Harsh Enclosure)

Part Description	Part numbers		
	USA	EU	AP
Wall-mounting Kit	71209353	22015569	71209353

5.3.2. Positionable Bracket

Part Description	Part Number		
	USA	EU	AP
Positionable bracket, includes mounting hardware	22015188		

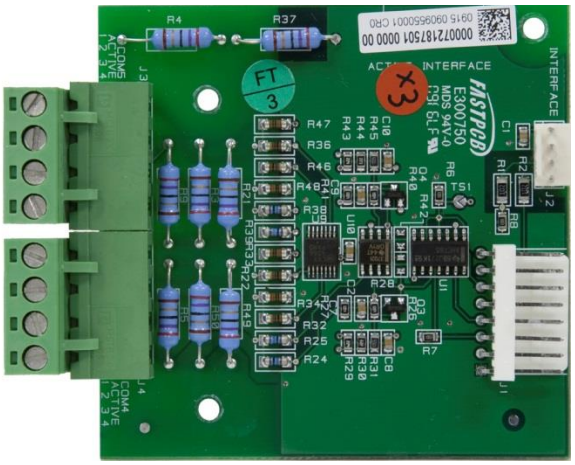
5.3.3. Discrete I/O Options



Part Description	Part Numbers		
	USA	EU	AP
For panel-mount terminal			
4 Active Inputs / 6 Active Outputs	72237412	72237636	72237412

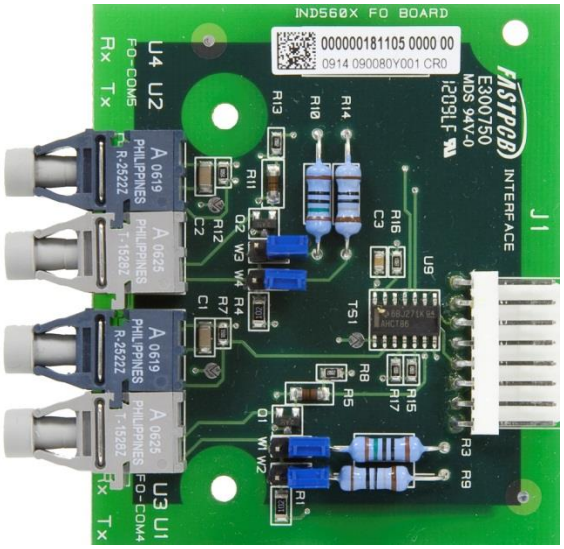
Part Description	Part Numbers		
	USA	EU	AP
4 Active Inputs / 6 Passive Outputs	72237413	72237635	72237413
4 Passive Inputs / 6 Passive Outputs	72237414	72237634	72237414
For harsh environment terminal			
4 Active Inputs / 6 Active Outputs	72237417	72237636	72237417
4 Active Inputs / 6 Passive Outputs	72237418	72237635	72237418
4 Passive Inputs / 6 Passive Outputs	72237419	72237634	72237419

5.3.4. Current Loop Communication Interface



Part Description	Part Numbers		
	USA	EU	AP
Active Current Loop interface kit, harsh	72237415	22020586	72237415
Active Current Loop interface kit, panel	72237410	22020586	72237410

5.3.5. Fiber Optic Communication Interface



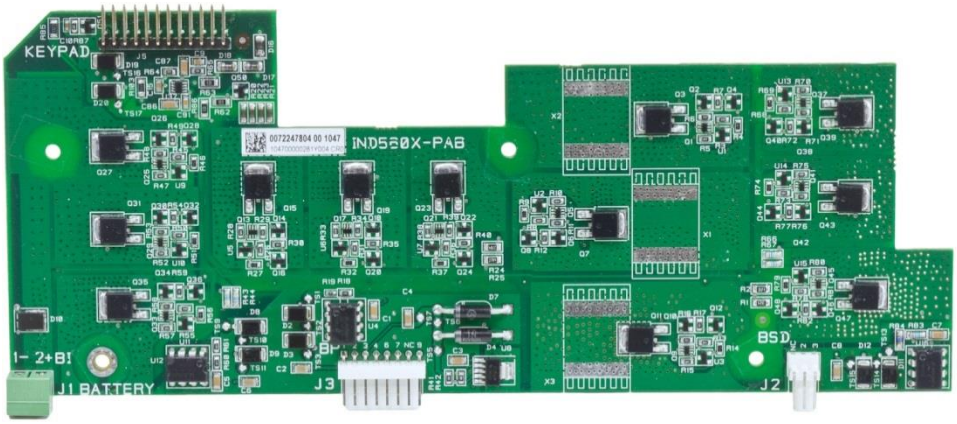
	Part Numbers		
Part Description	**USA**	**EU**	**AP**
Fiber Optic interface kit, harsh	72237416	22020587	72237416
Fiber Optic interface kit, panel	72237411	22020587	72237411

5.3.6. APS768x Power Supply

APS768x 230 VAC model shown

Part Description	Part Number, Legacy	Part Number, Current
APS768x Power Supply, 120 VAC	22021261	22026723
APS768x Power Supply, 230 VAC	22021262	22026727

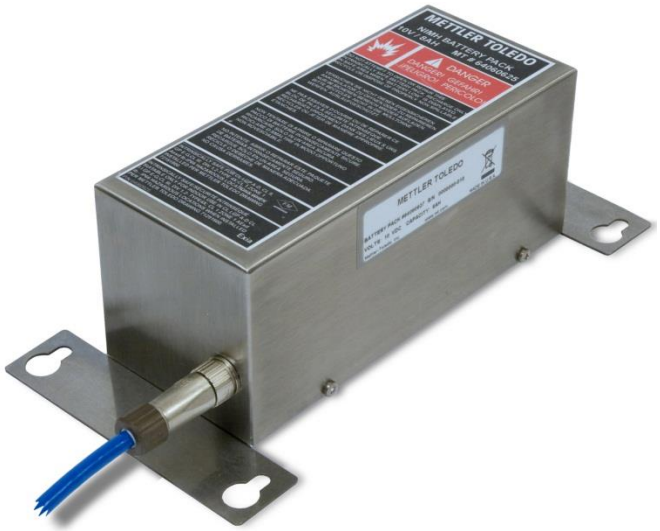
5.3.7. IND560x-PAB*



* This option is only compatible with the IND560x harsh/analog terminal

Part Description	Part Number
IND560x-PAB (Power Adapter Board) for use with external NiMH battery pack.	72256018

5.3.8. NiMH Battery Pack



Part Description	Part Number
NiMH Battery Pack kit	64085447
NiMH Battery Pack	64060625

5.3.9. NiMH Battery Charger

Part Description	Part Number	
	US	Export
NiMH Battery Charger	64060217	64060490

5.4. Application Software Options and Modules

5.4.1. TaskExpert Custom Programming Module

Part Description	Part Numbers		
	USA	EU	AP
TaskExpert Custom Program Software	64061204	22020597	64061204

5.4.2. Fill-560 Application Software

Part Description	Part Numbers		
	USA	EU	AP
Fill-560 Application Software	64055811	22020591	64055811

5.4.3. FillPlus-560 Application Software

Part Description	Part Number
FillPlus-560 Application Software (USA/EU/AP)	64088226
FillPlus-560 Application Software with TaskExpert™ (USA/EU/AP)	64088227

5.4.4. COM-560 Module

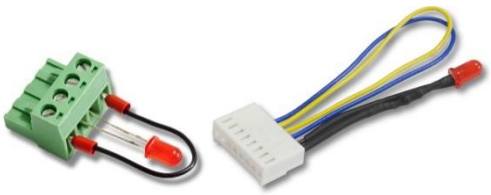
Part Description	Part Numbers		
	USA	EU	AP
COM-560 Module	64062647	22020592	64062647

5.4.5. Drive-560 Application Software

Part Description	Part Numbers		
	USA	EU	AP
Drive-560 Application Software	64062793	22020595	64062793

5.5. Service Tools

5.5.1. Loopback Test Kit



Part Description	Part Number
Loopback test kit for IND560x and ACM500 I.S. Current Loop and Fiber Optic Communication Interfaces	64085453

A Installation

This appendix covers

- Opening the Enclosures
- Mounting the Terminal
- Installing Cables and Connectors
- Wiring connections for internal options
- Wiring connections for ACM500 options
- Bonding and grounding
- PCB Switch Settings
- PCB Jumper Positions
- Closing the Enclosure
- Capacity Label Instructions
- Sealing the Enclosure
- Control Drawing

This appendix provides installation instructions for the IND560x terminal panel-mount and harsh enclosures. Please read this appendix thoroughly before beginning installation.

A typical IND560x installation, including an ACM500 communication module, is shown in Figure A-1.

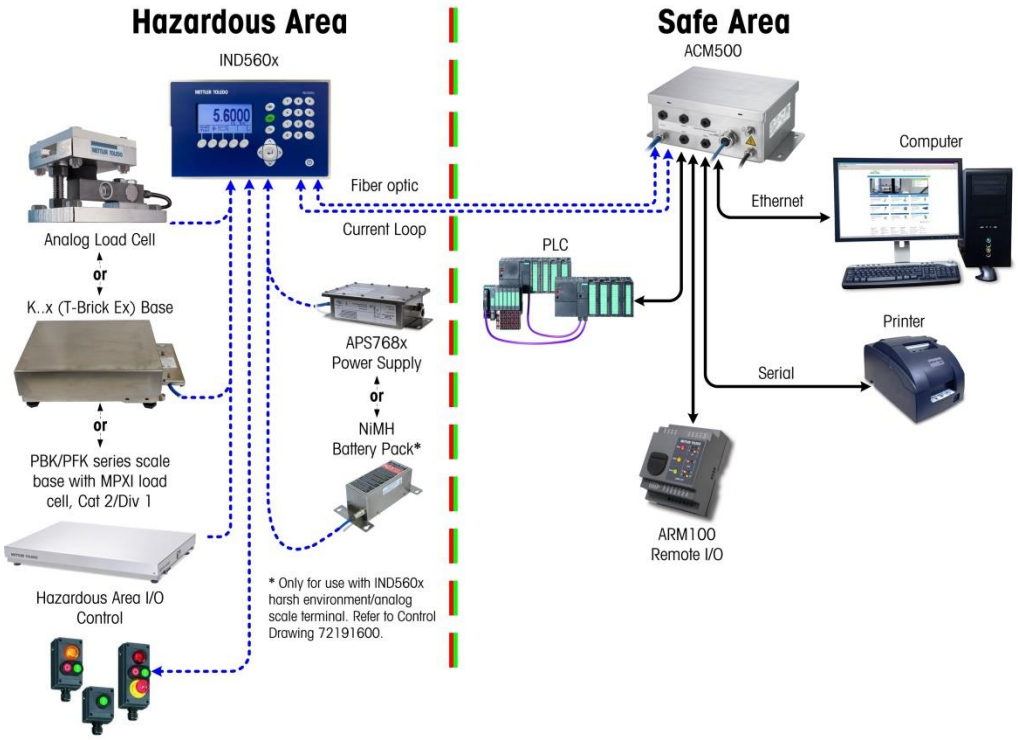


Figure A-1: Typical IND560x Installation

A.1. Opening the Enclosures

⚠ WARNING

DO NOT INSTALL OR PERFORM ANY SERVICE ON THIS EQUIPMENT BEFORE THE AREA IN WHICH THE IND560x IS LOCATED HAS BEEN SECURED AS NON-HAZARDOUS BY PERSONNEL AUTHORIZED TO DO SO BY THE RESPONSIBLE PERSON AT THE CUSTOMER'S SITE.

⚠ WARNING

TO PREVENT IGNITION OF HAZARDOUS ATMOSPHERES, DISCONNECT THE IND560x FROM ITS POWER SOURCE BEFORE OPENING THE ENCLOSURE. KEEP COVER TIGHTLY CLOSED WHILE THE CIRCUIT IS ENERGIZED. DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

Procedures for opening the IND560x terminal panel-mount and harsh enclosures differ and are described in the following sections.

A.1.1. Panel-Mount Enclosure

The panel-mount version of the IND560x is opened by removing the three Phillips-head screws on the back panel, indicated in Figure A-2. The rear panel can then be removed to gain access to the internal workings of the terminal.

Figure A-2: Opening the Panel-Mount Enclosure

A.1.2. Harsh Enclosure

The front panel of the harsh enclosure IND560x terminal is secured in place with ten (10) screws. To gain access to the terminal's PCB for internal wiring and setting switches, separate the front panel from the enclosure as follows:

1. Place the terminal face-down on a flat, non-abrasive surface.
2. Locate the ten screws securing the cover as shown in Figure A-3. Carefully remove each screw by turning counter-clockwise.

Figure A-3: Front Panel Screws

3. Set the screws aside for reassembly later.
4. Hold the front cover and the enclosure together as you flip the enclosure back over to its normal position.
5. Remove the cover. The cover will swing down, hinged by two wire cables at the bottom.

A.2. Mounting the Terminal

The panel-mount enclosure is designed to mount into a cutout of a flat surface such as an instrument panel or industrial enclosure. The harsh enclosure is designed to be placed on a desktop or can be mounted to a vertical surface or column using various optional mounting brackets. Mount the terminal where viewing is optimal and the terminal keypad is easily accessible. Observe location and environment considerations as described in Chapter 1, **Introduction**.

A.2.1. Panel-Mount Enclosure

The panel-mount enclosure includes aluminum clamping brackets at the side of the extrusion. Two Allen-head set screws are used to tighten each bracket against the panel surface. The enclosure will mount and seal properly on panel thicknesses from 16 GA to 11 GA. A panel-stiffener bracket is available as an option for applications where extra support is required.

Install the panel-mount enclosure by following these steps:

1. Loosen and remove the four Allen-head screws that secure the clamping brackets to the side of the housing (see Figure A-4). Use the 2mm Allen wrench included with the terminal.

Figure A-4: Clamping Bracket Components

2. Remove the two clamping brackets from the housing by sliding them toward the back of the enclosure (Figure A-5).

Figure A-5: Removing Clamping Bracket

3. Locate the front panel mounting gasket included with the terminal (typically inserted between pages of the Installation Manual) and remove the protective paper to expose its adhesive. Adhere the gasket to the rear of the front panel of the terminal as shown in Figure A-6, ensuring that the gasket is flat and spaced evenly on all sides.

   - IMPORTANT: Use only the gasket which is specified and supplied by Mettler-Toledo, LLC. When the panel version terminal is unmounted from a panel, the gasket must be replaced.

Figure A-6: Front Panel Gasket Installed

4. The opening (or cut-out) in the control panel or industrial enclosure should be sized per the panel cutout dimensions shown in Figure A-7. Dimensions are provided in inches and [millimeters].

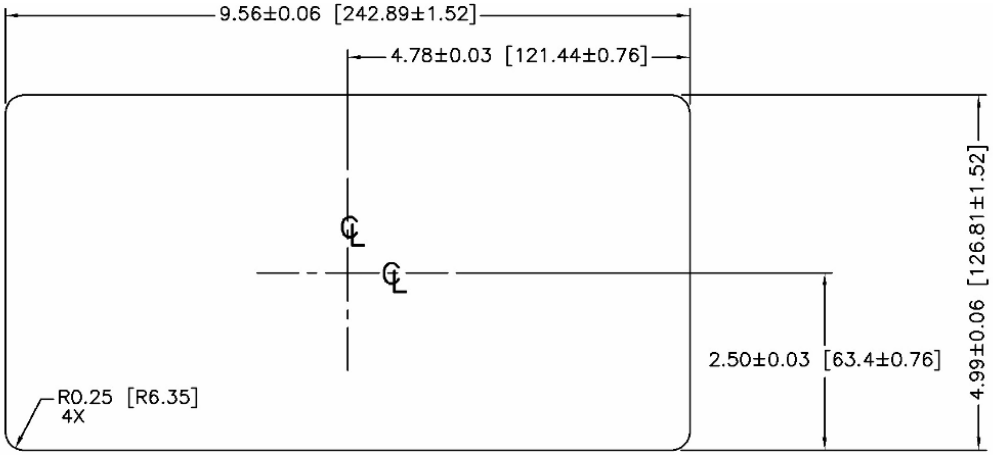


Figure A-7: Panel Cutout Dimensions

5. Place the IND560x terminal through the cut-out/opening in the control panel or enclosure door. It may be necessary to remove all terminal strip connectors to fit the IND560x through the cutout/opening.
6. If the optional panel stiffener bracket is to be used (#64005775), install it over the rear of the enclosure at this time.
7. Secure the terminal to the panel by inserting the clamping brackets into the channels on the side of the IND560x enclosure and installing the four Allen-head screws as shown in Figure A-8. All four set screws should be tightened to 0.55 Nm (5 in-lbs).

NOTE: Before tightening, make sure the IND560x terminal is installed level in the opening.

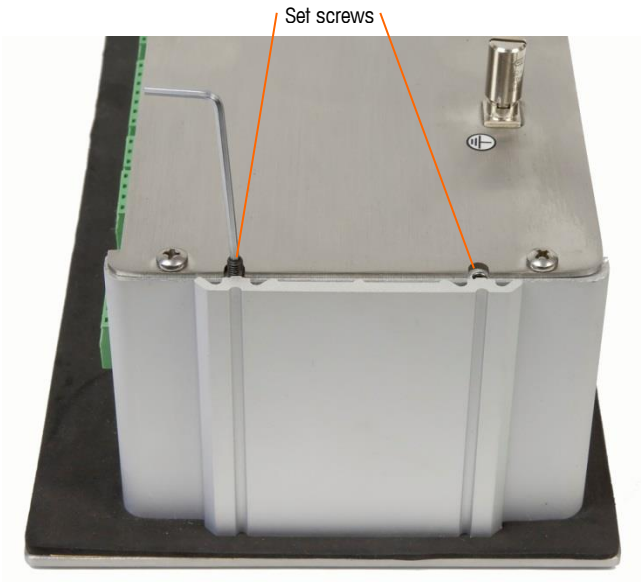


Figure A-8: Clamping Bracket Installed

- By design, the rear cover plate can produce outward force on the (extended) retaining brackets, increasing the overall stiffness of the enclosure structure and providing additional assurance that the panel mount unit will remain securely in place. Because of this, after the Allen-head screws have been tightened, and the unit secured into place, the rear cover plate of the IND560x panel-mount unit may be difficult to remove and replace during servicing. If this occurs, a slight loosening of the Allen-head screws should allow for easier removal and replacement of the rear cover. Remember to retighten the set screws after replacing the rear cover.

A.2.2. Harsh Enclosure

The harsh enclosure is made of stainless steel with a front panel angle of approximately 38 degrees. The harsh enclosure is designed to rest on a flat surface such as a table or desk top, or it can be mounted to a vertical surface with optional mounting brackets.

A.2.2.1. Desktop Mounting

When the IND560x terminal will be placed on a flat surface, the four rubber feet included with the terminal should be adhered to the bottom of the enclosure to prevent sliding. Locate the four rubber feet from a kit of parts supplied with the IND560x, remove them from their protective paper, and press one foot onto each corner of the bottom of the enclosure, as shown in Figure A-9.

- Inspect the gasket for tearing, deterioration and damage each time the Harsh enclosure is opened. Replace the gasket if it is brittle or damaged.

Figure A-9: Rubber Feet, Installed

A.2.2.2. Wall Mounting

An optional wall mounting bracket kit is available, permitting the IND560x harsh enclosure to be mounted to a vertical surface. Mount the wall brackets and terminal securely, to prevent the terminal from falling.

To wall mount the enclosure, follow these steps:

1. Bolt the two brackets to the bottom of the enclosure using the four M5 screws included with the brackets. The brackets should be attached as shown in Figure A-10.

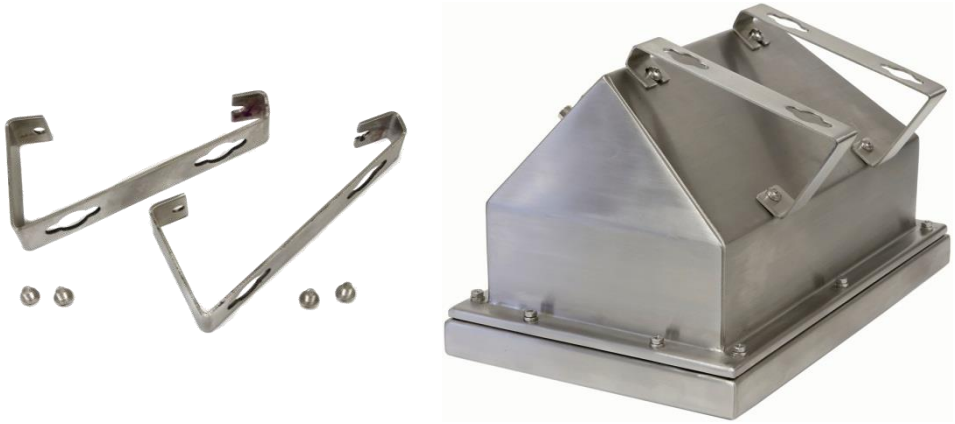


Figure A-10: Wall-Mounting Brackets (left), Attached to Enclosure (right)

2. If the enclosure will be mounted above eye level, skip step 3 and proceed to step 4.
3. If the enclosure will be mounted at or below eye level, it will be necessary to reverse the front cover 180 degrees. To reverse the front cover, perform the following steps:
   A. Open the enclosure per the instructions provided in the Opening the Enclosures section.

B. Loosen and remove the two nuts securing the two grounding straps (that also operate as hinges for the front cover) to the rear housing (Figure A-11).

Figure A-11: Loosening the Ground Straps

C. Carefully rotate the front cover 180 degrees and reattach the two grounding straps to the two studs on the opposite side of the housing shown in Figure A-12, near the grip bushings using the two nuts removed in the previous step. Tighten the two nuts.

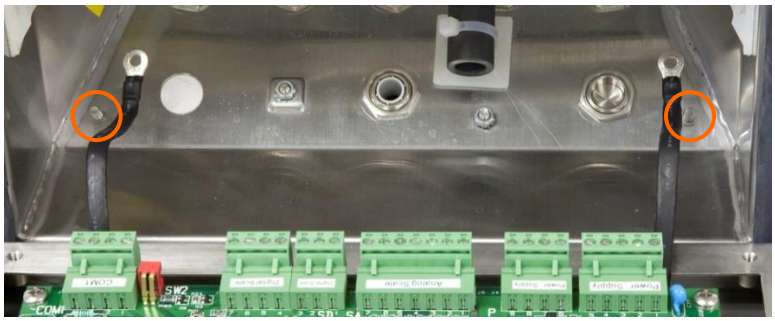


Figure A-12: Additional Studs for Alternative Attachment of Cover

4. Mark the position of the mounting holes on the vertical surface per the dimensions shown in Figure A-13 or by holding the terminal up to the surface and marking through the bracket holes. Dimensions are provided in inches and [mm].

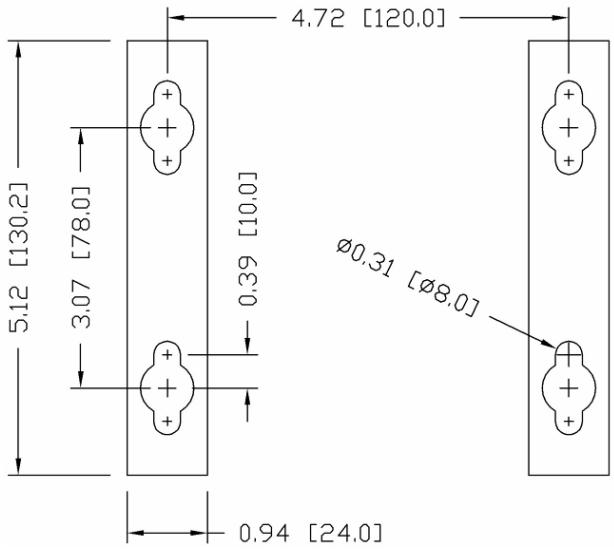


Figure A-13: Wall Bracket Mounting Hole Pattern

5. The hardware to mount the terminal to the vertical surface is not included with the terminal – it must be supplied locally. Ensure that the mounting hardware is capable of supporting the weight of the terminal, which is approximately 3.5 kg (8 lb). Using the locally supplied hardware, mount the terminal to the vertical surface.

   NOTE: Additional hardware is available for column mounting the IND560x terminal

A.3. Installing Cables and Connectors

Information for installing cables and connections to the IND560x terminal is provided in this section, including:

- Ferrite installation
- Harsh Enclosure Cable Glands
- Main Board Wiring Connections
- Wiring Connections for Options

A.3.1. Ferrite

In order to meet certain electrical noise emission limits and to protect the IND560x from external influences, it is necessary to install a ferrite core **on the analog, IDNet and SICSpro load cell cable** of the harsh and panel enclosures. The ferrite core is included with the terminal.

To install the ferrite, after routing the load cell cable through the gland on the rear housing, insert the cable through the center of the core and then take one wrap around the outside of the core and route the cable through again. Either the complete cable or the individual wires can be wrapped through the ferrite. This should be done as close to the enclosure as possible and on the inside of the harsh enclosure. See Figure A-14.

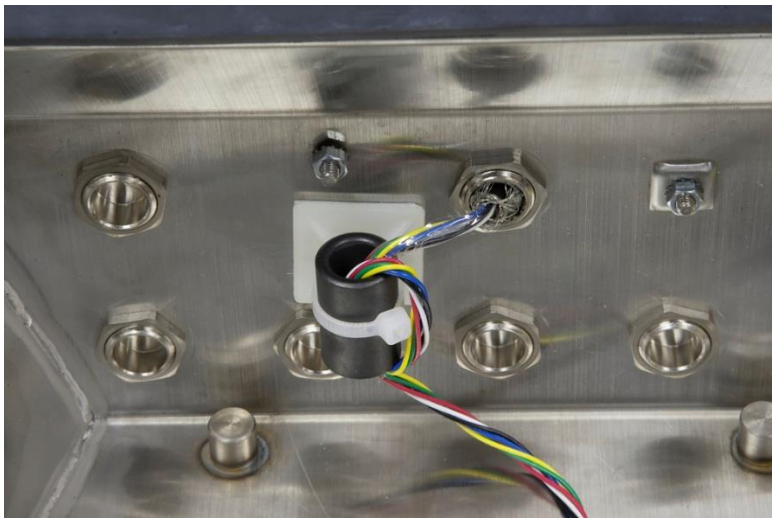


Figure A-14: A Ferrite Core, Installed

A.3.1.1. Ferrites for SICSpro Panel Mount Version

For the IND560x SICSpro terminal Panel version, ferrite cores are required to be installed on the cable wires for COM1 serial communication, discrete I/O, current loop interface and power supply cable. A single wrap around the outside of the core is only required for the SICSpro scale interface. Wires for the remaining interfaces can be routed through the core to the connector without the single wrap around the outside of the ferrite core.

Ferrite cores for the COM1 serial interface (SICSpro panel version only), power supply cable (SICSpro panel version only), scale interface (all versions in panel and Harsh) and other factory-configured options are included with the terminal accessory package.

Fiber optic interface cables do not require Ferrite cores.

Figure A-15 shows the additional ferrites required for the COM1 serial port, discrete I/O, current loop and power supply in the SICSpro panel version of the IND570 terminal:

Figure A-15: Ferrites Required for SICSpro Panel Installation

Table A-1: Ferrites Required for SICSpro Panel Installation

Cable	Quantity
COM1 Serial Port	1
Discrete I/O	2
Current Loop	1
SICSpro Scale	1
Power Supply	1

A.3.2. Harsh Enclosure Cable Glands

⚠ WARNING

ONLY THE COMPONENTS SPECIFIED IN THIS MANUAL CAN BE USED IN THIS DEVICE. ALL EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS DETAILED IN THIS MANUAL. INCORRECT OR SUBSTITUTE COMPONENTS AND/OR DEVIATION FROM THESE INSTRUCTIONS CAN IMPAIR THE INTRINSIC SAFETY OF THE TERMINAL AND COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

The IND560x harsh environment terminal is designed to withstand severe washdown and dusty environments. However, care must be taken when installing cables and/or connectors that enter the

terminal enclosure. Each cable that enters the enclosure has been assigned a specific location. The location of each of the glands and plugs is shown in Figure A-16.

Figure A-16: Cable Gland and Plug Assignments

To ensure a watertight and dust tight seal:

1. Pass the appropriately sized cable through the correct gland before connecting the wires. Depending upon the gland size, a specific size diameter cable must be used. The required cable sizes are shown in Table A-2.

Table A-2: Cable Diameters for Glands

Gland	Cable Diameter
Analog load cell, IDNet and SICSpro	6–10 mm (0.24–0.39 in.)
COM1	6–10 mm (0.24–0.39 in.)
Discrete input	6–10 mm (0.24–0.39 in.)
Discrete output	6–10 mm (0.24–0.39 in.)
CL interface	6–10 mm (0.24–0.39 in.)
FO Interface	2.2 mm (0.09 in) Special grommet included with interface
External Battery Pack	4-8 mm (0.16–0.3 in)

- **NOTE**: When installing the fiber optic interface option, a special split grommet is provided to seal around the fiber optic cables.
- **IMPORTANT**: Use only ATEX certified glands and blanks with the IND560x harsh terminal

1. When making cable terminations inside the harsh enclosure, ensure that the cable length from the terminal strip/connector to the terminal housing is sufficient so that no strain is placed on the connector assembly when the housing is in the fully open position.
2. Cables that include shields should have the shield terminated at the gland as shown in Figure A-17. Spread the shield wires out and make sure enough shield wire is present to make good contact with the metal part of the gland.

- NOTE: The shield of the cable from the IND560x to the ACM500 must **not be** terminated at the ACM500 end. The shield must be left open at the ACM500 end of the cable.

Figure A-17: Shield Termination at Gland

3. After making the wiring connections as described in the next section, ensure the nut on the cable gland is tightened properly to seal around the cable.

A.3.3. Main Board Wiring Connections

Once the IND560x terminal harsh enclosure is open, connections can be made to the terminal strips on the main board as shown in Figure A-18.

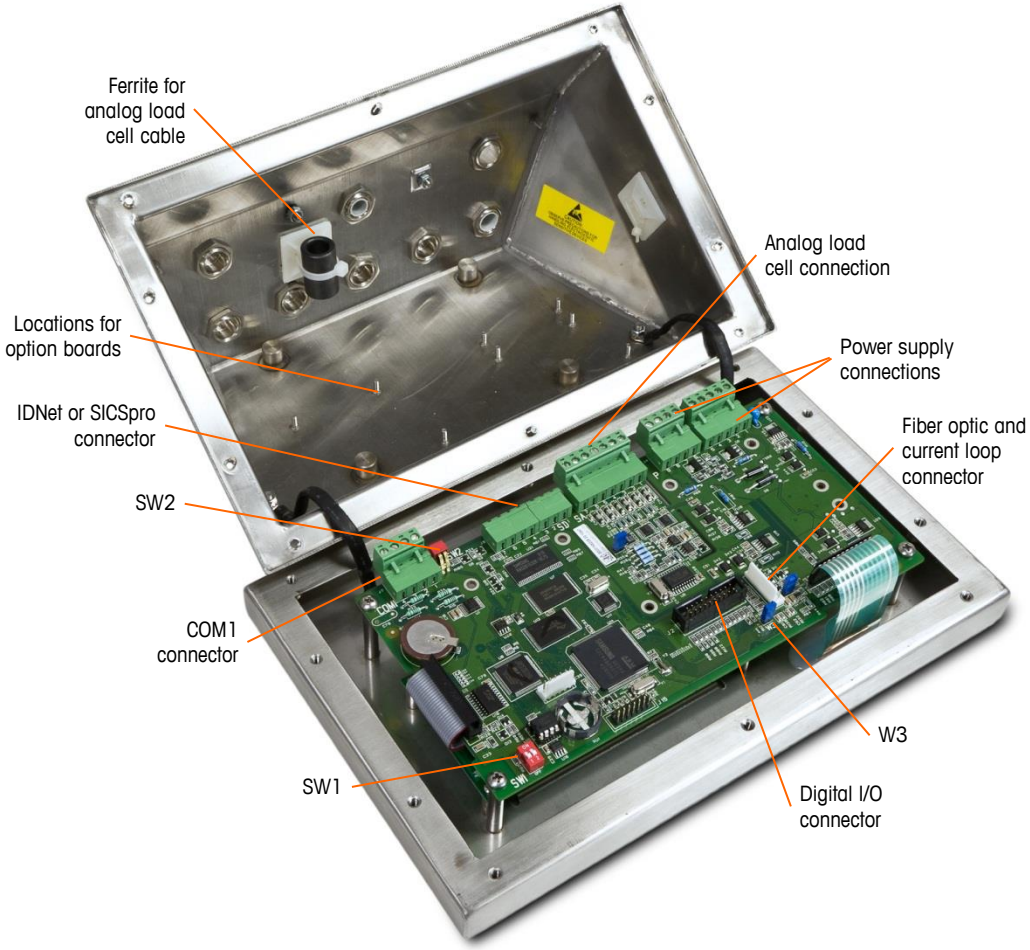


Figure A-18: Harsh Enclosure Connector Locations

As can be seen in Figure A-19, it is not necessary to open the panel-mount enclosure to make these connections.

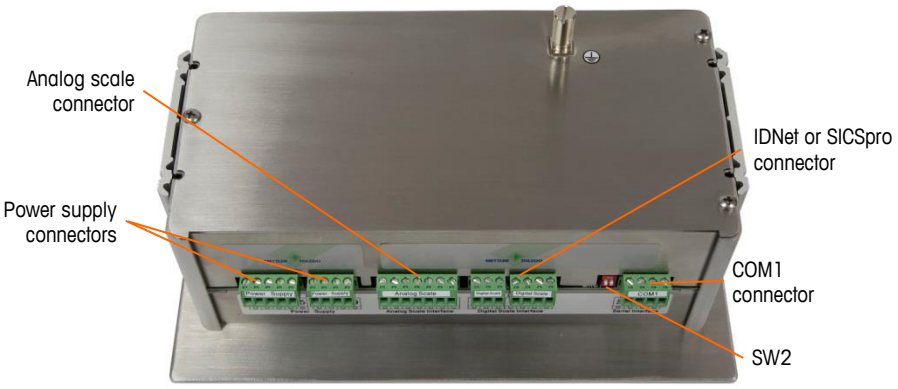


Figure A-19: Panel-Mount Enclosure Connector Locations

A.3.3.1. Power Connection

A.3.3.1.1. External Power Supply

One PSUx power supply, APS768x power supply or an external NiMH battery (P/N 64060625) is required to operate the IND560x terminal. The PSUx and APS768x power supplies include a 5m (16 ft.) long integral cable that must be terminated at the IND560x terminal. This cable also includes the required gland for the IND560x.

If the 5m (16 ft.) integral cable is not long enough for the application, it can be replaced with a longer cable. This procedure is described in the APS768x or PSUx power supply installation manual.

Before beginning to terminate the cable, install the gland on the end of the APS768x or PSUx cable into the empty hole identified in Figure A-16.

The wires from the APS768x or PSUx terminate at the nine terminals of J4 and J5 ports on the main board of the IND560x (also identified as the "P" connection blocks). as shown in Figure A-20.

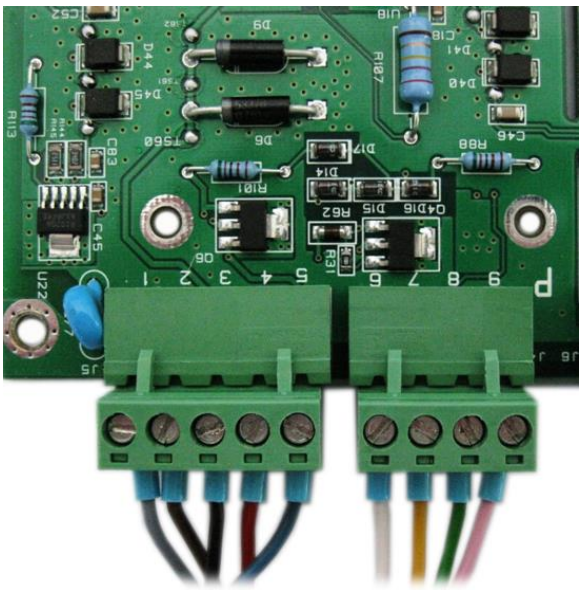


Figure A-20: Power Termination

The wire color for each of these connections is listed in Table A-3. The pin numbers are shown in Figure A-20.

Table A-3: APS768x / PSUx Cable Color Code

Terminal	Wire Color
P1	Gray
P2	Brown
P3	Black
P4	Red
P5	Blue
P6	White
P7	Yellow
P8	Green
P9	Pink

The APS768x and PSUx power supplies work with multiple METTER TOLEDO products. The internal wiring of the APS768x and PSUx must be adjusted for the product to which it will be connected. Table A-4 lists the APS768x or PSUx wiring setup for use with the IND560x terminal. This information can also be found on the control drawing for the IND560x.

Table A-4: APS768x / PSUx Internal Wiring Guide for Use with IND560x

Terminal	Wire Color
U1	White
GND	Yellow

Terminal	Wire Color
U2	Green
GND	Brown
U3	Pink
GND	--
U4	Gray
GND	--
U5	Black
GND	Red
U6	Blue
NC	--

A.3.3.1.2. External NiMH Battery Pack

Details on the installation and wiring of the IND560x-PAB can be found later in this chapter in the **Wiring Connections for Internal Options** section. The IND560x-PAB (Power Adapter Board) is an internally installed option that enables the IND560x to be powered by an external NiMH battery pack.

A.3.3.2. Analog Load Cell Connection

- NOTE: The entity values for the load cell **cable** must be considered as a safety factor in the installation.

When using an analog load cell version of the IND560x, load cell connections are made to the connector located on the main board as shown in Figure A-18 and Figure A-19.

The IND560x terminal is designed to power up to four 350-ohm load cells (or a minimum resistance of approximately 87 ohms). To confirm that the load cell load for this installation is within limits, the total scale resistance (TSR) must be calculated.

To calculate TSR:

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

Ensure that the TSR of the load cell network to be connected to the IND560x has a resistance greater than 87 ohms before connecting the load cells. If the resistance is less than 87 ohms, the IND560x will not operate properly.

In addition, the maximum cable distance must be reviewed. Table A-5 provides recommended maximum cable lengths based on cable gauge and correct operation of the terminal. Note that the entity values for the load cell cable must be considered as a safety factor in the installation.

Table A-5: Recommended Maximum Cable Lengths

TSR (Ohms)	24 Gauge (meters/feet)	20 Gauge (meters/feet)	16 Gauge (meters/feet)
One to four-350 Ω cells	60/200	182/600	304/1000

A jumper is provided on the main board that adjusts the gain of the analog section for 2 mV/V or 3 mV/V load cells. The factory default position of this jumper is 3 mV/V. Normally this position will work well for both 2 mV/V and 3 mV/V load cells. If 2 mV/V load cells are used, the jumper can be changed to the 2 mV/V position. Refer to Figure A-48 for the jumper position.

- **IMPORTANT:** When the IND560x-PAB option board is installed, the mV/V jumper (W1) is inaccessible. Set the mV/V jumper correctly for the analog load cell system **before** installing the IND560x-PAB.

Figure A-21 shows the terminal definitions on the analog load cell terminal connector J6 (also identified as the "SA" connection block). Refer to the manual of the load cell being collected to determine its color code. Color codes of some common platforms are shown in Table A-6.

Table A-6: Color Codes for Analog Load Cell Cabling

Assignment	RWMx PUA579x	PTA459x PFA575x PFA579x	DB...sTx DCS...sTx	PBA430x
Exc+	Grey	Grey	Blue	Green
Sen+	Yellow	Yellow	Green	Blue
Sig+	White	White	White	White
Sig-	Brown	Brown	Red	Red
Sen-	Green	Green	Grey	Brown
Exc-	Pink	Pink	Black	Black

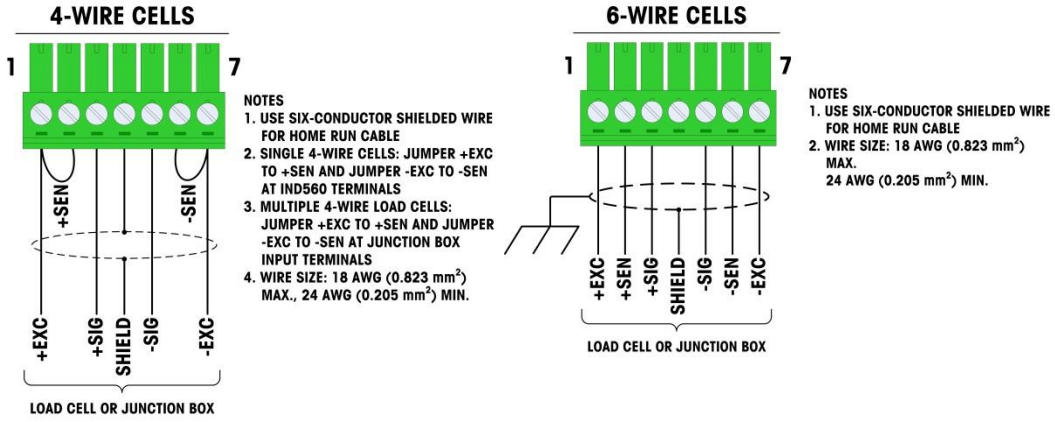


Figure A-21: Load Cell Termination

- NOTE: When using four-wire load cells, jumpers must be placed between the +Excitation and +Sense terminals and between the –Excitation and –Sense terminals.
- Note for load cell wiring: If an increase in load results in a decrease in weight display, reverse the signal wires (+SIG and –SIG).

A.3.3.3. High Precision IDNet Connection

The IND560x terminal IDNet connection supports the new T-Brick Ex T4 type cell used in the K..x bases and the Point Ex cell. The older types of intrinsically safe modules (known as PIK Ex) which were also used in the K..x bases, are not compatible with the IND560x terminal.

When using an IDNet version of the IND560x terminal, the cable connection from the base is made to the J1 and J9 connectors (also identified as the "SD" connection blocks) on the main board as shown in Figure A-18, Figure A-19 **and** Figure A-22.

The intrinsically safe version of the IDNet base is supplied with an open ended cable for termination. Table A-7 shows the wiring color code for the IDNet terminal strip.

Figure A-22: IDNet and SICSpro Cable Termination

Table A-7: IDNet and SICSpro Cable Color Code

Terminal	Wire Color For TBrick Ex and MPXI (SICSpro)	Wire Color for Point Ex
SD-1	Gray	No Connection
SD -2	Pink	Pink
SD -3	Yellow	Yellow
SD -4	Brown	Brown
SD -5	Green	Green
SD -6	White	White
SD -7	No Connection	Gray

A.3.3.4. SICSpro Connection

The IND560x terminal supplies Intrinsic Safe Power (6 wires, with two power, two IS-CL and two Ground lines) for SICSpro platform.

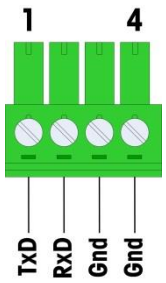
In the SICSpro version of the IND560x terminal, the cable connection from the platform is made to the main board Digital Scale Terminal (Figure A-22).

The SICSpro platforms are supplied with a discrete length of open-end cable, which connects to the Digital Scale Terminal on the IND560x terminal's main board.

- The SICSpro platforms are available with load cell cable lengths 0.125m, 1.5m, 5m, 10m, and 20m. The SICSpro platform cables cannot be modified in the field.

A.3.3.5. COM1 Serial Port Connection

The COM1 port includes connections for an intrinsically safe serial device. Figure A-23 indicates which terminal is which signal on the COM1 port. The cable length of this connection is limited to 10m (33 ft.).



Terminal	Signal
J7-1	TxD - Transmit data
J7-2	RxD - Receive data
J7-3	GND - Logic Ground
J7-4	GND - Logic Ground

Figure A-23: COM1 Port Signals

An example of connecting to an RS-232 device in the safe area through a Zener diode barrier is shown in Figure A-24. Refer to the entity approval values of COM1 when selecting a barrier. Note that seals and other protective devices will also be required to meet hazardous area wiring codes.

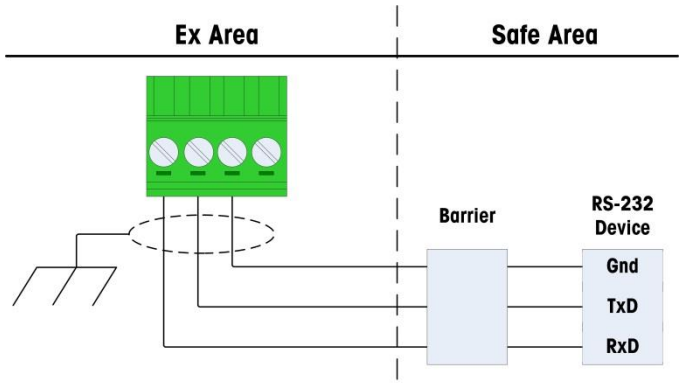


Figure A-24: Sample RS-232 Connection

A barrier that has been tested for correct operation with the IND560x, and can be connected directly to COM1, is:

- MTL7761Pac (FM and ATEX approvals)

A.4. Wiring Connections for Internal Options

Options that install internally to the IND560x terminal and require external wiring include the following:

- IND560x-PAB (Power Adapter Board)
- Discrete I/O
- Intrinsically safe Current Loop interface
- Fiber Optic interface

A.4.1. IND560x-PAB

- **IMPORTANT:** The IND560x-PAB option will only work with the harsh, analog version of the IND560x terminal. The IND560x-PAB physically **cannot** be installed into panel mount terminals, and **will not** satisfy the power needs of the IDNet interface.
- **IMPORTANT:** The IND560x-PAB option will only work with a specific revision of the IND560x analog main board. The correct version of analog main board can be identified by the presence of the W3 jumper, located as shown in Figure A-18, and indicated in Figure A-25. If the W3 jumper is not present on the main board, then that main board is **not** compatible with the IND560x-PAB.

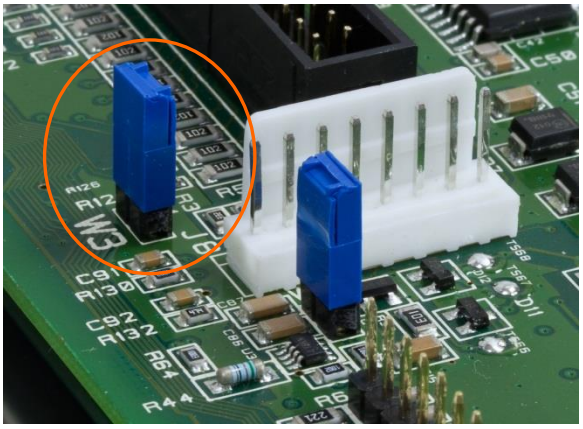


Figure A-25: W3 Jumper on IND560x Analog Main Board

The IND560x-PAB is an optional PCB installed onto the main board of an IND560x harsh/analog terminal. It enables this model of the IND560x to be powered by the METTLER TOLEDO external NiMH battery pack (P/N 64060625). The external NiMH battery (P/N 64060625) is the only battery pack approved for use with the IND560x.

This battery pack is available as a kit (P/N 64060627), which includes the NiMH battery assembly and a 3m (9.8 ft.) connection cable. The cable is constructed with a twist lock on one end, two

wires on the other end that must be terminated at the IND560x terminal, and the required gland for entry into the IND560x harsh housing. EMC performance requires that the shield of the connection cable be connected to the cable gland during installation. An example of shield termination at a gland is shown in Figure A-17.

- KOP 64060627 was modified in March 2011. Changes to the shielding were made to make the connection cable suitable for use with the IND560x. Calbe shielding was changed from a chassis connection to a direct connection to the cable gland. KOP 64060627 is also still suitable for use with the IND226x terminal.
- If an early version of the NiMH battery connection cable is switched over from an IND226x installation to an IND560x, steps must be taken to connect the shield of the connection cable to the cable gland before installation into the IND560x terminal (Figure A-17).

A.4.1.1. Field Modification of NiMH Battery Cable

The following instructions describe how to connect the shield of the NiMH battery pack connection cable to the cable gland that will be installed onto the rear of the IND560x terminal housing, in the event it is necessary to modify the NiMH battery cable in the field.

1. Disconnect the twist lock connector from the NiMH battery pack.
2. If it is present, remove the heat shrink from the battery connection cable. Cut off the green/yellow ground wire behind the solder point.
3. When making cable terminations inside the harsh enclosure, ensure that the cable length from the terminal strip/connector to the terminal housing is sufficient so that no strain is placed on the connector assembly when the housing is in the fully open position.
4. Strip back the blue cover of the battery connection cable until the shield and wires are exposed. Approximate lengths should be 9in (230mm) for the blue and white wires, and 0.75in (19mm) for the internal shield. Trim back the filler string.
5. Spread the shield wires out and make sure enough shield wire is present to make good contact with the metal part of the gland.
6. Fold the shield wires over the plastic component of the cable gland (Figure A-26). Then press this assembly into the threaded metal body of the gland.

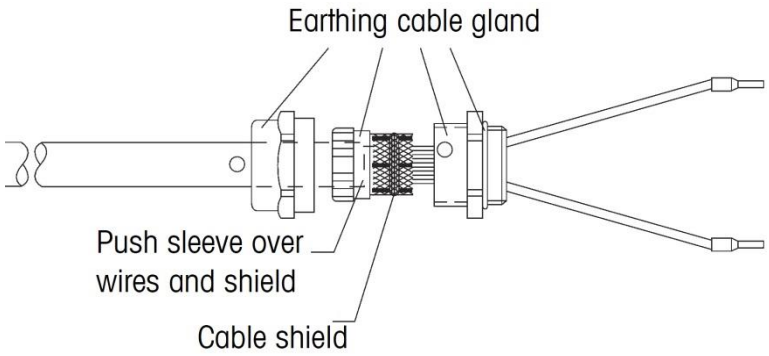


Figure A-26: Battery Pack Cable Preparation

7. Ensure the nut on the cable gland is properly tightened to secure the shield and seal around the cable.

8. Install this cable assembly into the appropriate enclosure opening as indicated in Figure A-16. The blue and white wires will connect to the IND560x-PAB in the procedure described in the next section.

A.4.1.2. PAB Installation

The IND560x-PAB option installs on top of the main board of the IND560x harsh/analog terminal as shown in Figure A-28. The following steps describe the process for installing the IND560x-PAB in the harsh/analog version of the IND560x terminal.

1. Disconnect all existing connections to the IND560x main board. Remove the fastening screws at the 4 corners and set aside for later use. Remove the main board from the front cover of the terminal.
2. Install the four brass standoffs provided with the IND560x-PAB kit into the locations indicated in Figure A-27. The standoffs should be secured to the main board with four screws provided in the IND560x-PAB installation kit.

Figure A-27: Location of IND560x-PAB Brass Standoffs

Figure A-28: PAB Installed on IND560x Main Board

3. Close jumpers W2 and W3 by placing the blue jumper pins across both pins of each jumper. This sets each jumper to its ON position. Refer to the **PCB Jumper Positions** section later in this document for confirmation on the appropriate jumper settings.

   - **IMPORTANT:** When the IND560x-PAB option board is installed, the mV/V jumper (W1) will become inaccessible. Set the mV/V jumper correctly for the analog load cell system **before** installing the IND560x-PAB.

4. Align the IND560x-PAB to the installed standoffs and secure with four additional screws provided in the IND560x-PAB kit.
5. Re-install the main board into the terminal front cover. Secure with original screws.
6. Reconnect the display cable to the main board.

7. Connect the keypad cable to new connection point on IND560x-PAB. This new connection point is indicated with "KEYPAD" (Figure A-29).

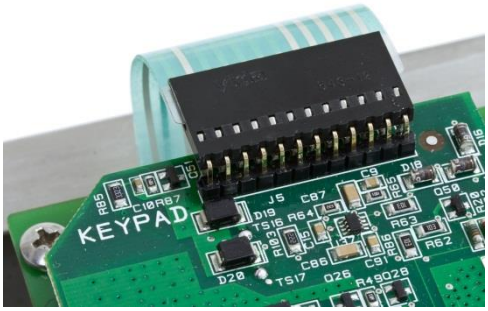


Figure A-29: Keyboard Connection on IND560x-PAB

8. Additional connections must be made between the J3 terminal of the IND560x-PAB and the J4 & J5 terminals of the IND560x main board (Figure A-30). Table A-8 indicates color codes for wiring the connection. Install the connector included with the IND560x-PAB kit according to these wiring codes.

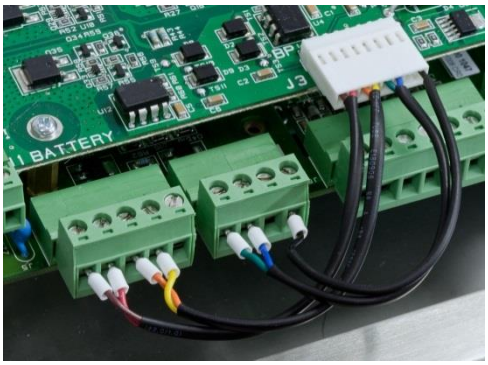


Figure A-30: IND560x-PAB (J3) to IND560x (J4/J5) Connection

Table A-8: IND560x-PAB (J3) to IND560x (J4/J5) Wiring Color Code

IND560x-PAB	IND560x Main Board	Wire Color
J3-1	J5-1	Brown
J3-2	J5-2	Red
J3-3	J5-3	Orange
J3-4	J5-4	Yellow
J3-6	J4-6	Green
J3-7	J4-7	Blue
J3-9	J4-9	Black

The IND560x-PAB functions as a voltage splitter for the IND560x terminal. A single source voltage comes into the IND560x-PAB from the NiMH battery pack. The IND560x-PAB splits this single source voltage into the various voltages required by the IND560x terminal for its

functions. For proper function of the IND560x, it is critical that the connections between the IND560x-PAB and the IND560x main board are correct.

9. One further connection is required, between J2 of the IND560x-PAB and J1 of the IND560x main board. A connector is included in the IND560x-PAB installation kit. Install this connector according to the wire color code listed in Table A-9 and as shown in Figure A-31.

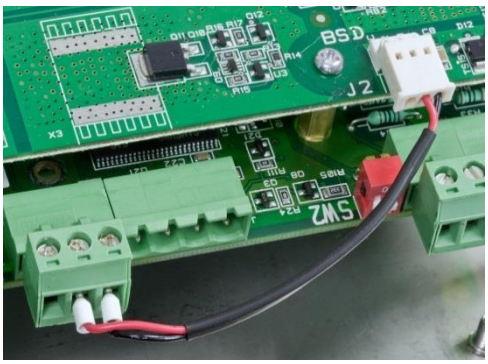


Figure A-31: IND560x-PAB (J2) to IND560x (J1) Connection

Table A-9: IND560x-PAB (J2) to IND560x (J1) Wiring Color Code

IND560x-PAB Terminal	IND560x Main Board Terminal	Wire Color
J2-2	J1-2	Red
J2-3	J1-3	Black

10. Finally, the two wires from the NiMH battery connection cable terminate at the two terminals of the J1-BATTERY port on the IND560x-PAB (Figure A-32). The wire color for each of these connections is listed in Table A-10. Secure any loose battery pack wires to the housing of the IND560x as shown in Figure A-32.

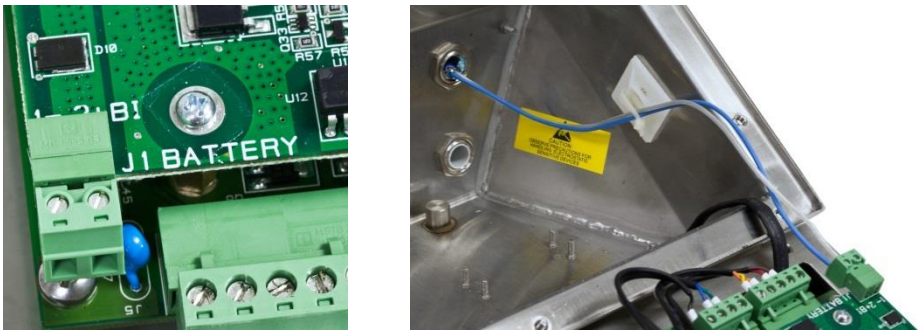


Figure A-32: PAB Battery Pack Connector (left) and Battery Cable Installation

Table A-10: IND560x-PAB (J1) Wiring Color Code

Terminal	Wire Color
J1-BATTERY 1-	White
J1-BATTERY 2+	Blue

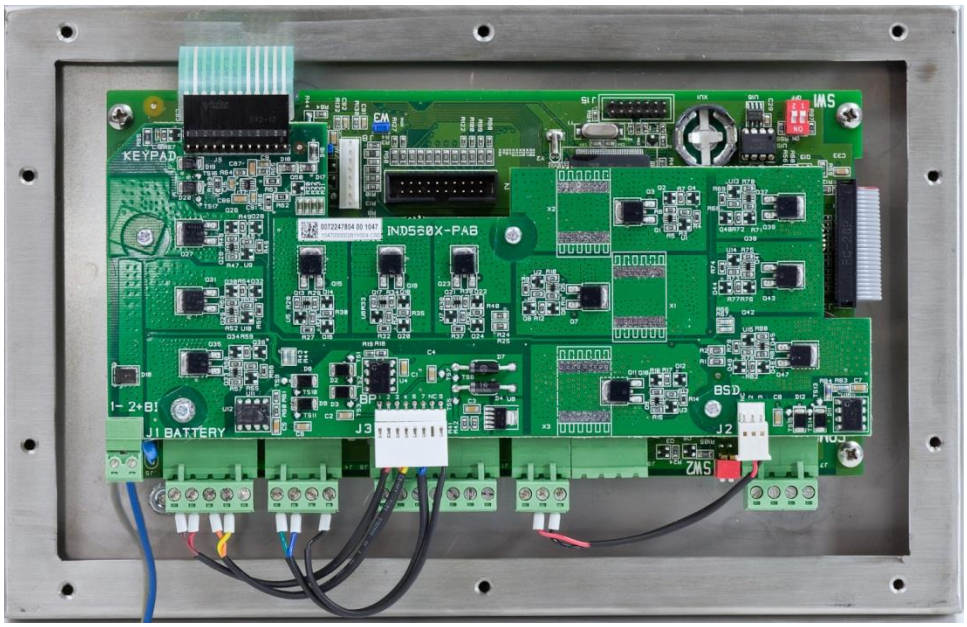


Figure A-33: Completed IND560x-PAB Installation in IND560x Harsh/Analog Terminal

A.4.2. Discrete I/O

The internal solid state Discrete Input/Output options provide four inputs and six outputs. A harness connects the main board of the IND560x to the Discrete I/O option board. The Discrete I/O option is available in three different versions with different active/passive combinations:

- Active inputs and active outputs
- Active inputs and passive outputs
- Passive inputs and passive outputs

The installation of the I/O option board is the same for all versions and is shown in detail in the installation instructions included with the option kit.

In the harsh enclosure, the Discrete I/O option installs into the rear of the enclosure. Three plastic standoffs are installed onto three fixed studs. The I/O board is then secured with screws onto the standoffs as shown in Figure A-34.

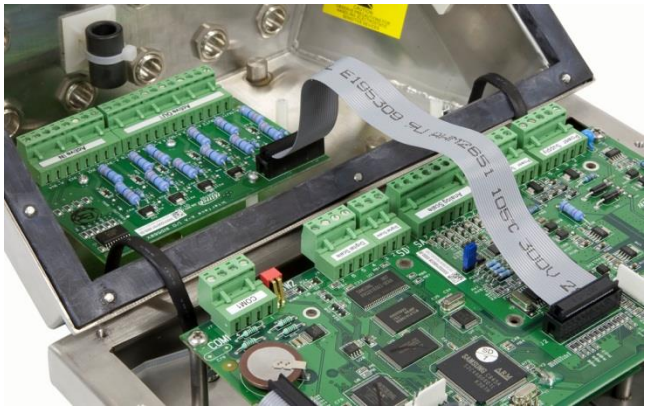


Figure A-34: Harsh Enclosure Discrete I/O Installation

In the panel-mount enclosure, the Discrete I/O option installs above the main board onto three fixed, pre-installed brass standoffs secured with screws as shown in Figure A-36 and Figure A-36.

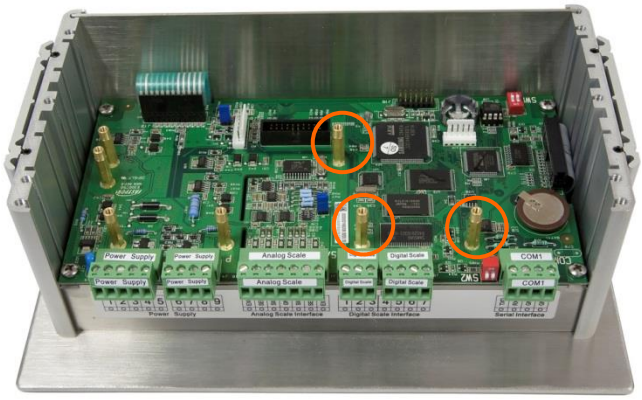


Figure A-35: Panel-mount Enclosure Discrete I/O Installation

Figure A-36: Panel-mount Enclosure Discrete I/O Installation

There are two removable 4-position terminal strips on this option board that provide connections to the inputs and three removable 4-position terminal strips which provide connections to the outputs. These connections are described next. Note that only the wiring connections are shown and not all sealing or other protective methods required for safe operation. All installations must be correct per the local wiring code and must follow the entity approval concept.

A.4.2.1. Active Inputs

Using the Discrete I/O option with active inputs enables connection of switches or other simple devices to trigger an input. The terminal provides the intrinsically safe voltage internally making the input active and no voltage is supplied by the external simple device.

Because the voltage supplied by the IND560x for the active inputs is intrinsically safe, the external simple device/switch does not need to be certified for use in intrinsically safe circuits located in hazardous gas environments.

- ATEX Guideline for Connection to Active Input: As a simple equipment, according the §5.7 EN/IEC 60079-11 the external simple device does not need to be certified for use in Intrinsically Safe circuits installed inside hazardous gas environments.

In hazardous dust applications, the Table 1 of EN/IEC 61241-11 has to be taken into account, e.g. for the certified Po = 2,94mW the relevant regulation is to apply and II2D approved input devices should be used.

- FM guideline for connection to the active input: Using simple apparatus as defined by section 504.2 of the National Electric Code (NFPA 70) is "An electrical component or combination of components of simple construction with well-defined electrical parameters that does not generate more than 1.5 volts, 100 milliamps, and 25 milliwatts and is compatible with intrinsic safety of the circuit in which it is used."

  The Section 504.4 exception in the NEC states that "Simple apparatus, as described on the control drawing, shall not be required to be listed."

An example of how to wire to the active inputs is shown in Figure A-37.

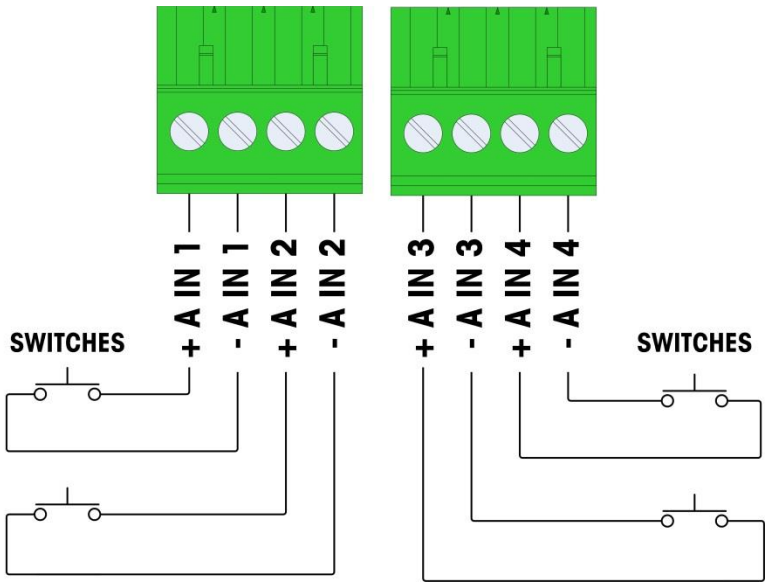


Figure A-37: Active Input Connections

A.4.2.2. Active Outputs

Using the Discrete I/O option with active outputs enables direct connection of low-power intrinsically safe solenoids or piezo fluid control valves. The terminal provides the intrinsically safe voltage internally making the output active and no external voltage is required by the external simple device. The source power is approximately12 VDC at a 50mA total current. All outputs operate from this single power source.

The IND560x Active Output option uses internal series resistors to limit the power to I.S. levels. These internal resistors have the following effects on the Active / Active I/O option:

- Increasing the current draw has an inverse effect on the voltage available to the control device.
- The voltage will drop depending on the current required to operate the solenoid.

Estimates on available voltage based on current draw are shown in Table A-11.

Table A-11: Approximate Available Active Output Voltages

Current Draw	Available Voltage on Active Output
0 mA	12.3 VDC
10 mA	11.4 VDC
20 mA	10.7 VDC
30 mA	10.0 VDC
40 mA	9.3 VDC
50 mA	8.6 VDC

Any resulting lower voltages must be considered when selecting a control device. Devices from two manufacturers that have been tested for correct operation with the IND560x and can be connected directly to the outputs as shown are:

- ASCO – Provide complete ASCO part # PIA8314A300 6-30V when sourcing (FM and ATEX approvals)
- Hoerbiger S-9: PS13950646A-00 and S29: PS13850646A-00 (ATEX approval only)

An example of how to wire to the active outputs is shown in Figure A-38.

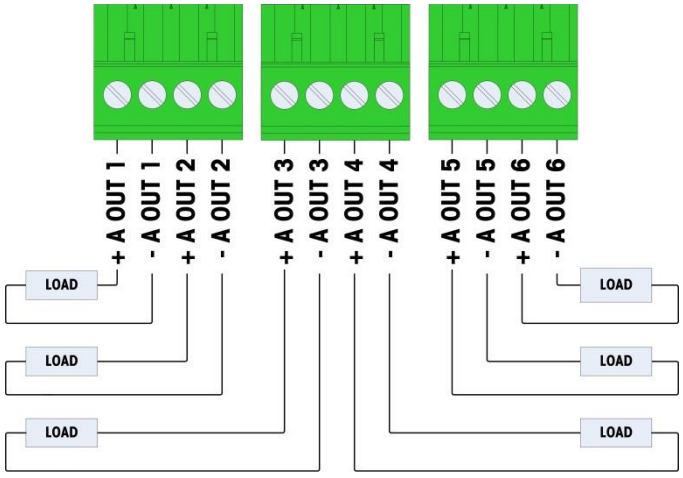


Figure A-38: Active Output Connections

A.4.2.3. Passive Inputs

Using the Discrete I/O option with passive inputs allows connection of an external intrinsically safe voltage supply (or a standard power supply with barriers) to power switches or other simple devices to trigger an input. The external power source must meet the requirements of the hazardous areas approval and entity values must be compared.

Barriers from two manufacturers that have been tested for correct operation with the IND560x and can be connected directly to the inputs as shown are:

- Pepperl & Fuchs #778

- Bartec 17-584L-0001/0000

One example of how to wire to the passive inputs is shown in Figure A-39.

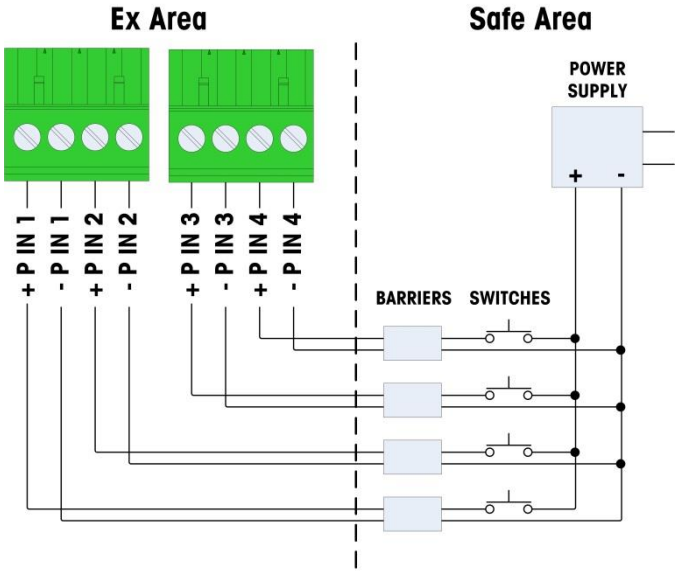


Figure A-39: Passive Input Connections

A.4.2.4. Passive Outputs

Using the Discrete I/O option with passive outputs provides the ability to control high voltage solenoids or other feeding equipment in the safe area through protective devices such as an intrinsically safe switch amplifier. The external switch amplifier isolates the lines back to the IND560x terminal so they remain intrinsically safe while providing switching of a higher AC or DC voltage. Entity values of the amplifiers must be compared to the IND560x output entity parameters. Cable capacitance and inductance must also be included.

Devices from two manufacturers that have been tested for correct operation with the IND560x and can be connected directly to the outputs as shown are:

- Bartec
  - 17-584D-200D/0000 (2 Channel, 24 V)
  - 17-584D-110D/0000 (1 Channel, 24 V)
  - 17-584D-120D/0000 (1 Channel, 120 V)
- Pepperl & Fuchs
  - KFA6-SR2-Ex2.W (230 VAC)
  - KFA5-SR2-Ex2.W (115 VAC)
  - KFD2-SR2-Ex2.W (24 VDC)

One example of how to wire to the passive outputs using intrinsically safe switch amplifiers is shown in Figure A-40.

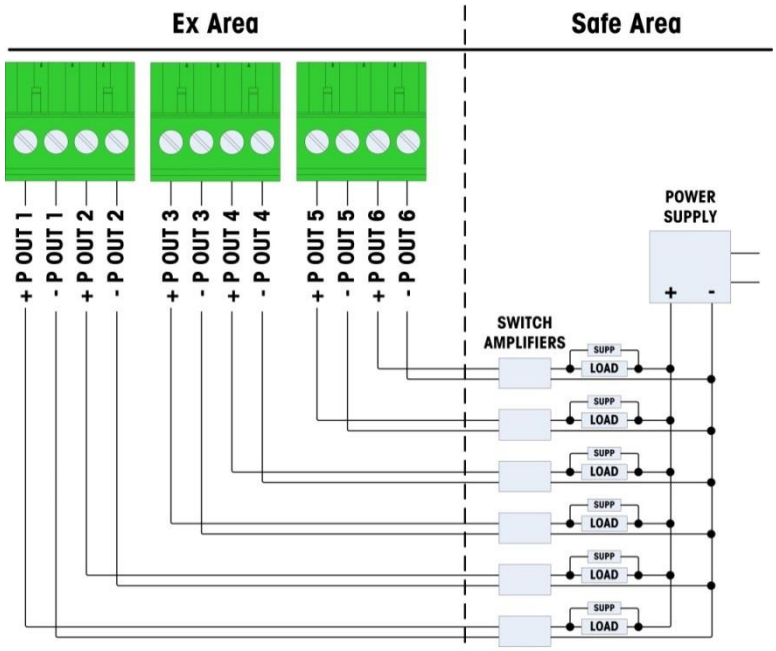


Figure A-40: Passive Output Connections

A.4.3. I.S. Current Loop Interface

There is an optional intrinsically safe current loop interface board that provides communication to an ACM200 or ACM500 in a safe area or an IND226x terminal as a remote display inside the hazardous area. This option can be ordered already installed into the IND560x at the factory or is available as a kit that can be installed in the field. Instructions are included with the kit showing the installation procedure of the option into the IND560x terminal as shown in Figure A-41.

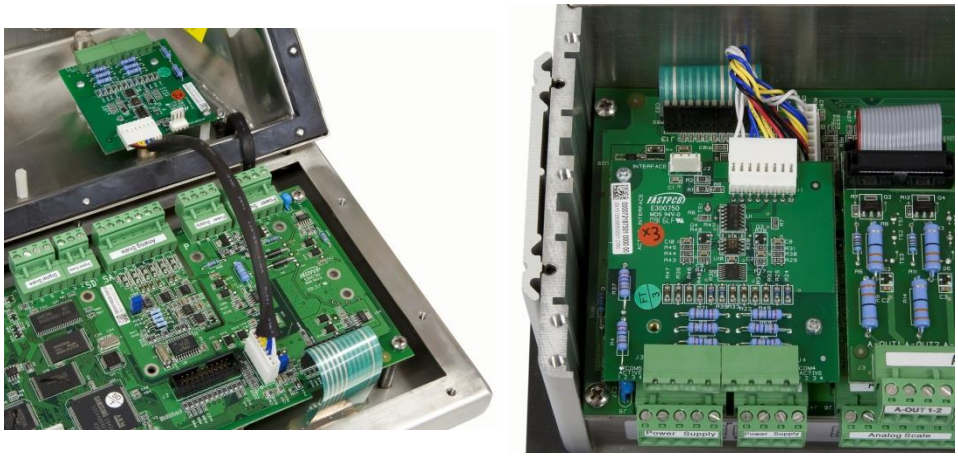


Figure A-41: I.S. CL Interface Board – Harsh (left) and Panel (right) installations

The interface board provides two circuits for communication to the ACM500 or a single channel to the ACM200 or IND226x terminal. If connecting to an ACM500, depending upon the options used in the ACM500, it may not be necessary to provide connections to both circuits. Refer to Table A-12 to determine if both the COM4 and the COM5 circuit must be connected.

Table A-12: IND560x Interface Port Wiring

Option Used in ACM500	COM4 Required	COM5 Required
COM2 Port	✓	--
COM3 Port	✓	--
Ethernet TCP/IP	--	✓
PLC Option	✓	--

Each I.S. CL interface cable used must contain two twisted pair conductors, and each conductor must be a minimum of 0.5mm2 (20 GA or 0.032 AWG) in size. A separate cable is required for each COM port used. CL connection cables are available in various sizes from Mettler-Toledo. Please see the appropriate price pages and catalogs for available sizes and part numbers.

These instructions describe how to connect the IND560x terminal end of the intrinsically safe interface cable. Refer to the installation manual of the other device used for details on connecting the opposite end of the cable. Depending upon the country of installation, special cable protection such as conduit seals may be required. Refer to the control drawing, the approval certificates and local regulations to determine what is required.

1. Make certain that power is removed from the IND560x terminal and the device at the other end of the cable.
2. On the harsh enclosure, feed the cables through the correct cable gland (identified in Figure A-16) until the wires reach the I.S. serial interface board (approximately 90 mm – 3.5 in.). The COM5 cable should enter through the cable gland closest to the corner of the enclosure and the COM4 cable should enter through the cable gland beside the COM5 gland.

   On both enclosures, keep the internal wires as short as practical and make sure they do not contact any other wiring. Some typical wiring schemes are listed in Table A-13, Table A-14, and Table A-15.

Table A-13: Wiring to ACM500 Accessory

IND560x COM4 (J4) Terminal #		ACM500 COM4 (J4) Terminal #	and / or	IND560x COM5 (J3) Terminal #		ACM500 COM5 (J3) Terminal #
1	◄►	1		1	◄►	1
2	◄►	2		2	◄►	2
3	◄►	3		3	◄►	3
4	◄►	4		4	◄►	4

Table A-14: Wiring to ACM200 Accessory

IND560x COM5 (J3) Terminal #		ACM200 COM (J3) Terminal #
1	◄►	1
2	◄►	2

IND560x COM5 (J3) Terminal #		ACM200 COM (J3) Terminal #
3	◄►	3
4	◄►	4

Table A-15: Wiring to IND226x as a Remote Display

IND560x COM4 (J4) Terminal #		IND226x Interface-Remote PCB COM4 (J4) Terminal #
1	◄►	1
2	◄►	2
3	◄►	3
4	◄►	4

3. On the harsh enclosure terminal, after all the cables have been connected, tighten the compression nuts on the cable glands to secure the cables.

A.4.4. Fiber Optic Interface

An optional fiber optic interface board provides communication to an ACM500, a legacy dual channel fiber optic converter located in a safe area, or to an IND560x used as a remote display inside the hazardous area or the safe area. The fiber optic interface option can be ordered already installed into the IND560x at the factory or is available as a kit that can be installed in the field. Instructions are included with the kit showing the installation procedure of the option into the IND560x terminal as shown in Figure A-42.

Figure A-42: Fiber Optic Interface Board

The interface board provides two dedicated circuits for communication to the ACM500 or the two circuits can be used to communicate with the dual channel fiber optic converter as two independent ports. A single channel can be used to talk to an IND560x remote display.

When the scale type of the IND560 is "Remote" (refer to Chapter 3, Configuration), a single Fiber Optic channel can also be used to receive communication from a Puma or ID3sTx terminal, making the IND560x a remote terminal for a Puma or ID3stx.

- Note: When using the IND560x as a remote terminal for a Puma or ID3sTx, the J2 jumper on the Puma/ID3sTx FO option pcb must be adjusted to send a more intense signal. This is because the IND560x requires a stronger FO signal to correctly work as a remote display for the Puma/ID3sTx. To send a stronger signal from the Puma/ID3sTx, position the jumper on the J2 pins (Figure A-43) to close the connection between the A, B or C pins until the signal transmitted by the Puma/ID3sTx is strong enough to be seen by the IND560x remote.

Figure A-43: J2 Pin Location on Puma/ID3sTx FO Option PCB

When connecting to an ACM500, the number of communication channels required depends on the options that will be used in the ACM500. It may not always be necessary to provide connections for both circuits. Refer to Table A-16 to determine if both the COM4 and the COM5 circuit must be connected. Two fiber optic cables are required for bidirectional communication on each port. If both COM4 and COM5 are to be used bidirectionally, four lengths of cable must be installed.

Table A-16: IND560x Interface Port Wiring

Option Used in ACM500	COM4 Required	COM5 Required
COM2 Port	✓	--
COM3 Port	✓	--
Ethernet	--	✓
PLC Option	✓	--

The IND560x terminal does not automatically include any fiber optic cables when the Fiber Optic interface is installed at the factory. Hard clad silica and plastic core fiber optic cables are available from METTLER TOLEDO.

- When using fiber optic cable, care must be taken not to bend the cable sharply or it could be permanently damaged.

A.4.4.1. Plastic Core Fiber Optic Cable

For very short distances up to 40m (130 ft), a plastic core fiber optic cable is available. This cable is available with connectors already installed on each end or is available in bulk and a termination kit can be used for connection in the field. Please refer to the appropriate price pages and catalogs for available lengths and part numbers.

A.4.4.2. Glass Core Fiber Optic Cable

Cable lengths longer than 40m (130 ft.) require use of a hard clad silica (glass) core cable. This cable requires special tools to properly install connectors so field termination of the cable is not recommended.

If necessary, cables can be coupled using a special optic coupler, but the coupler signal loss is equivalent to 150 m (500 ft.) of cable. When one coupler is used the useable distance is reduced to 150 m (500 ft.)

A.4.4.3. Fiber Optic Interface Connections

The following instructions describe fiber optic cable connections to the IND560x terminal. Refer to the technical manual of the other connected device for details on connecting the other ends of the cables.

1. Make certain that power is removed from the IND560x terminal.
2. For the harsh enclosure, feed the ends of the fiber optic cables through the split bushing of the correct cable gland (identified in Figure A-16) until the cable reaches the fiber optic interface board - approximately 90 mm (3.5 in.). The COM5 cables should enter through cable gland closest to the corner of the enclosure and the COM4 cables should enter through the cable gland beside the COM5 gland. For the panel-mount enclosure, it is not necessary to open the enclosure to access the fiber option board.

Figure A-44: Split Grommet for Fiber Optic Cables

3. Be sure the fiber optic cable is not bent to less than a 13 mm (1/2 inch) radius. Any sharp kinks in the fiber optic cable will damage it and then the cable must be replaced. Coil any excess cable neatly in large loops close to the IND560x or other device and secure it so it does not get damaged.

4. When installing a fiber optic cable, the connectors on the end of the cable will snap into the transmitter or receiver on the interface board. Grasp the connector only (not the cable) when inserting or removing. Only gentle pressure is required.

   Some typical wiring schemes are listed in Table A-17, Table A-18, and Table A-19. Note that the "U" number listed in the tables below is the transmitter or receiver on the fiber optic interface option. The transmitter is gray in color and the receiver is blue in color.

Table A-17: FO Cables to ACM500 Accessory

IND560x COM4	ACM500 COM4	and / or	IND560x COM5	ACM500 COM5
Tx (U1) ↔	Rx (U3)		Tx (U2) ↔	Rx (U4)
Rx (U3) ↔	Tx (U1)		Rx (U4) ↔	Tx (U2)

Table A-18: FO Cables to Dual Channel FO Converter Accessory

IND560x COM4	Dual Channel FO Converter Channel 1	-or-	IND560x COM5	Dual Channel FO Converter Channel 2
Tx (U1) ↔	Rx (J4)		Tx (U2) ↔	Rx (J6)
Rx (U3) ↔	Tx (J3)		Rx (U4) ↔	Tx (J5)

Table A-19: FO Cables to IND560x Remote Display

IND560x COM4	IND560x Remote COM4	-or-	IND560x COM5	IND560x Remote COM5
Tx (U1) ↔	Rx (U3)		Tx (U2) ↔	Rx (U4)
Rx (U3) ↔	Tx (U1)		Rx (U4) ↔	Tx (U2)

5. On the harsh enclosure terminal, after all fiber optic cables have been connected, tighten the compression nuts on the outside of the harsh enclosure cable glands to secure the fiber optic cables.

A.5. Wiring Connections for ACM500 Options

Options available for the IND560x terminal that are installed inside the ACM500 module in the safe area and require external connections include the following:

- Fiber Optic Interface
- I.S. Current Loop Interface
- Ethernet/COM2/COM3
- Analog Output
- Allen-Bradley RIO
- DeviceNet
- Ethernet/IP
- Modbus TCP
- PROFIBUS DP

The connections for each of these options are described in the ACM500 Installation and Technical manuals. These manuals can be found on the Documentation CD that shipped with the IND560x. Refer to these manuals for details on connecting the options.

A.6. Bonding and Grounding

All grounding and equal potential bonding connections must be made according to local regulations based upon the country of installation. Refer to local codes and the control drawings in the Appendix section of this manual for more specific information regarding grounding.

It is typical that local regulations will require that all connected pieces of equipment in the system be bonded together and grounded to a single point. A special external ground screw designed for equal potential bonding is provided on the IND560x terminal (Figure A-45).

Figure A-45: IND560x Terminal Grounding Screw: Harsh (left), Panel (right)

A.7. Equipotential Bonding (EB)

Equipotential bonding must be installed by an electrician authorized by the owner. METTLER TOLEDO Service performs only a monitoring and consulting function for this procedure.

Connect equipotential bonding of all devices (power supply unit, weighing terminal, interface converter and weighing platform) in accordance with the terminal diagram and all country-specific regulations and standards. In the process, it must ensured that:

- All device housings are connected to the same potential via the EB terminals.
- No circulating current flows via the cable shielding for intrinsically safe circuits.
- The neutral point for equipotential bonding is as close to the weighing system as possible.

A.7.1. 13BWarnings

A.7.1.1. 20BCENELEC

A.7.1.1.1. Connection of EB per Country-Specific Regulations

It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.

A.7.1.2. 21BcFMus

A.7.1.2.1. Connection of EB per ANSI/NFPA 70, Article 504, and ANSI/IA RP 12.06.01 or Canadian Electric Code C22.2

It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.

A.8. PCB Switch Settings

PCB switch settings for the IND560x Main board are described in this section.

A.8.1. Main PCB Switches

Four switches are located on the main PCB. as shown in Figure A-46. Functions of the switches are listed in Table A-20.

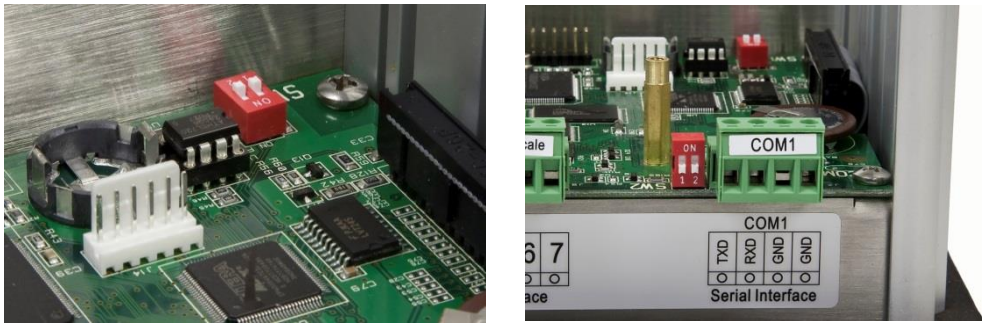


Figure A-46: SW1 (left) and SW2 (right) Locations

Table A-20: Main PCB Switches Functions

Switch	Functions	
SW1-1	Metrology Security Switch (legal for trade) When in the ON position, this switch prohibits changes to metrologically significant areas in the menu tree	When both SW1-1 and SW1-2 are set to ON and power is cycled, a Master Reset is performed. Metrologically significant data is **not** reset unless SW2-1 is also set to ON.
SW1-2	Flash Software Set in the ON position during software download Set in the OFF position during normal operation	
SW2-1	Factory test Set in the OFF position at all times for normal weighing. This switch must be ON when connecting to the InSite™ CSL program using the COM1 serial port of the IND560x terminal.	When a Master Reset is performed, set SW2-1 to ON to reset metrologically significant data, such as scale calibration, GEO code, etc.
SW2-2	Factory test Set in the OFF position at all times	

- When both SW1-1 and SW1-2 are positioned ON and AC power is applied to the terminal, a Master Reset function will be initiated. This procedure will erase all programming in the terminal and return all settings back to factory default values. Metrologically significant data (calibration) is **not** reset unless SW2-1 is also set to ON during this process. This process is further described in the IND560x Technical Manual, Chapter 4, **Service and Maintenance**.

A.9. PCB Jumper Positions

A.9.1. On/Off Key Disable

There is a jumper, W2, close to the keypad connection that determines if the On/Off key operates or if the key function is disabled and the IND560x terminal always power up in the "On" condition. In applications where an operator is not normally present, it is suggested that the jumper be removed from the two pins so the terminal will return to operation after a power outage. Figure A-47indicates the jumper's location and positions.

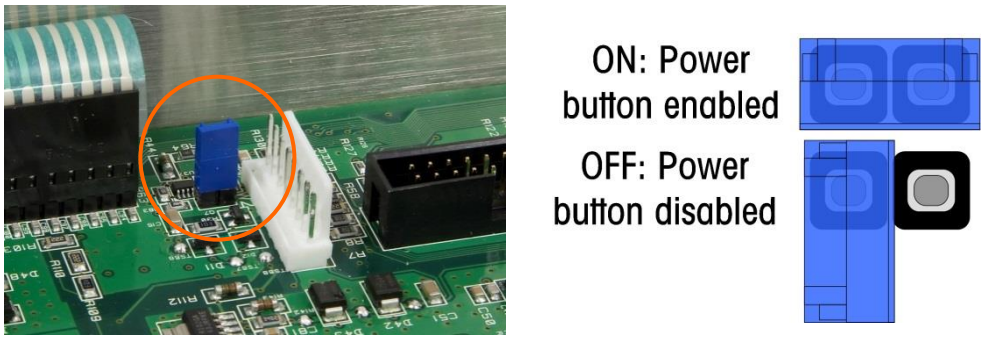


Figure A-47: On/Off Key Disable Jumper

- When removing the W2 jumper for disabling the On/Off key, reposition it on just one of the pins as shown at lower right in Figure A-47. The On/Off jumper settings are described in Table A-21.

Table A-21: W2 Power On/Off Key Jumper Description

Position	Description
On (Closed)	Enables the Power On/Off button on the terminal keypad
Off (Open)	Disables the Power On/Off button on the terminal keypad. Terminal will always power up automatically after a power outage

A.9.2. 2mV/V 3mV/V Jumper

The IND560x Main board has a jumper, W1, which selects either 2 mV/V or 3 mV/V operation of the analog circuitry when the Analog load cell connection is activated on the main board. This jumper is not used when the IDNet or SICSpro connection is activated on the IND560x main board. Figure A-48 indicates the jumper's location and positions.

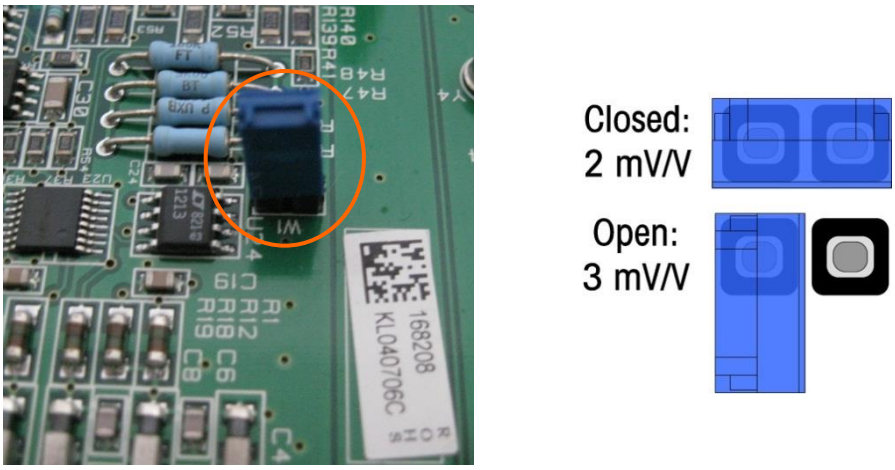


Figure A-48: Millivolt Jumper Location (left) and Positions (right)

- When removing the W1 jumper for 3mV/V operation, reposition it on just one of the pins as shown at lower right in Figure A-48.

The 2 mV/3 mV jumper settings are described in Table A-22.

Table A-22: W1 Millivolt Jumper Description

Position	Description
Closed	Sets the connected scale's load cell setting to 2 mV/V.
Open	Sets the connected scale's load cell setting to 3 mV/V

A.9.3. IND560x-PAB Jumper

The IND560x main board has a jumper, W3, which is specific to use of the IND560x-PAB. Both W3 and W2 must be set, in order to use the IND560x-PAB. Figure A-49 shows the position of these jumpers, near the Fiber Optic and Current Loop connector.

- When the IND560x-PAB is installed, both the W3 jumper and the W2 jumper must be set to ON (closed).
- When the either the PSUx or APS768x power supply is used with the IND560x, both W3 and W2 should be set to OFF (open). In this case, the W2 jumper will return to its function, controlling the operation of the keypad On/Off button.

Table A-23 describes W3 and W2 jumper settings as they apply to the IND560x-PAB.

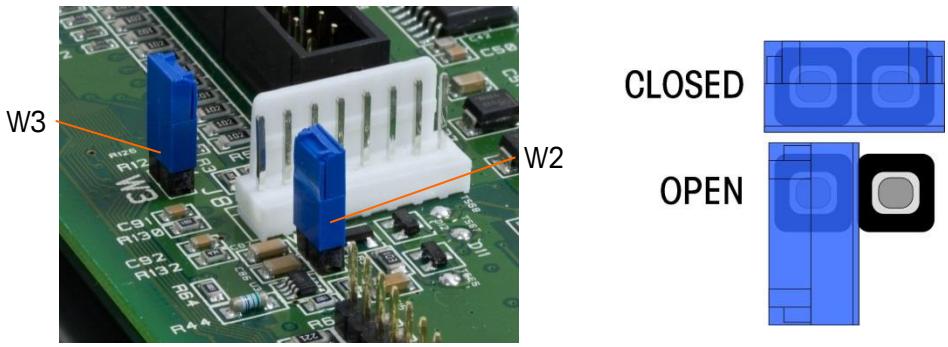


Figure A-49: IND560x (W3) and Power On/Off (W2) Jumper Locations (left) and Positions (right)

Table A-23: IND560x-PAB Related W3 and W2 Jumper Descriptions

Jumper	Position	Description
W3	Closed	Enables function of IND560x with external battery pack.
	Open	Enables function of the IND560x with PSUx or APS768x.
W2	Closed	Enables function of IND560x with external battery pack and enables keyboard On/Off button.
	Open	Disables the Power On/Off button on the terminal keypad. Terminal will always power up automatically after a power outage.

A.10. Closing the Enclosure

When the IND560x is used in non-metrologically approved applications, after all connections have been made, close the enclosures as explained next.

A.10.1. Panel-Mount Enclosure

If no approved sealing is required, simply place the rear cover on the back of the panel-mount enclosure so the holes line up correctly. Secure with the three Phillips-head screws that were removed originally.

- IMPORTANT: Ensure that the IND560 panel mount unit has been installed using only the gasket that is specified and supplied by Mettler-Toledo

A.10.2. Harsh Enclosure

To secure the front cover of the harsh enclosure:

1. Place the terminal with the front cover face-down on a soft, flat surface.
1. Ensure the gasket is in the correct position.
2. Align the holes in the rear housing with the threaded holes in the front cover.
3. Locate the ten screws originally securing the cover and reinstall them by turning clockwise.
4. Torque the screws to 1.5 Nm.

A.11. Capacity Label Instructions

The regulations in some locations require that the scale capacity and increment be shown on the front of the terminal, near the display. To satisfy this requirement, a blue capacity label is included with the terminal that must be completed and adhered to the front overlay.

The capacity label (shown in Figure A-50) provides space for the Max, min, and e information for each range or interval for which the scale is programmed. If only one or two ranges are used, the unused portion of the label may be cut off with scissors. Written information must be legible and a minimum of 2mm or 0.08 in. in height. A permanent marker should be used for this information.

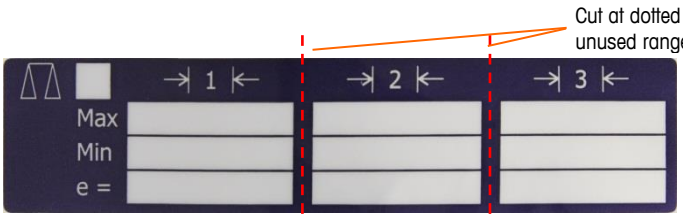


Figure A-50: Preparing the Capacity Label

Clean any oil or other contaminants from the area of the overlay shown in Figure A-51 where the capacity label will be added. Peel the backing from the label and adhere it to the overlay in the location shown in Figure A-51, or another location acceptable to the local regulations.

Figure A-51: Capacity Label Installed

A.12. Sealing the Enclosure

When the IND560x terminal is used in a metrologically "approved" application, it must be protected from tampering by use of seals. Optional sealing kits that contain all the required hardware are available from METTLER TOLEDO. The method used for sealing may vary depending upon the local requirements.

A.12.1. Sealing the Panel-Mount Enclosure

The panel-mount enclosure supports both two- and three-screw external sealing for the United States and Canada. An additional sealing plate, which covers the terminal strips is available for approved installations in Europe.

A.12.1.1. United States and Canadian Sealing

To seal the panel-mount enclosure, follow these steps:

1. Ensure that the appropriate approval region has been selected in setup under **Scale > Type > Approval** and that the Metrology security switch SW1-1 is in the "ON" position.
2. Secure the back panel of the IND560x panel mount using the through-hole screws provided in the sealing kit. The U.S. requires use of only two of the screws; Canada requires use of all three.
3. Thread the wire cable and plastic seal through the hole in each new screw.
4. Thread the end of the wire cable through the plastic seal and snap the seal shut. Cut off any excess wire.

A.12.1.2. European Sealing

Sealing requirements per OIML standards require additional physical protections of the load cell connections. A unique kit is available for sealing the panel mount IND560x in approved installations.

To seal the panel-mount enclosure, follow these steps:

1. Ensure that the appropriate approval region has been selected in setup at **Scale > Type > Approval** and that the Metrology security switch SW1-1 is in the "ON" position.
2. Uninstall any I/O or interface option boards and disconnect their cables from the main board of the IND560x panel mount. No additional option boards can be installed at this time. The display cable can remain connected to the main board.
3. Remove the 4 Phillips-head screws that normally secure the main board to the permanent standoffs inside the chassis. Save these screws.
4. Install the 4 brass standoffs included with the sealing kit, onto the permanent standoffs in the chassis where the 4 Phillips-head screws were just removed.
5. Place the horizontal sealing plate on top of these newly installed standoffs. Take care to slide the front edge of the sealing plate into the correct channel on the panel mount chassis. Secure the sealing plate into place with the 4 Phillips-head screws that originally held the main board in place.

- In order to get the sealing plate to fit, it may be necessary to loosen the hex screws that hold the panel mount integrated brackets in place.

6. Install any I/O or interface option boards into the IND560x over the top of the horizontal sealing plate and reconnect the harnesses to the main board of the IND560x.
7. Remove the appropriate adhesive covers from the vertical cover plate, and slide the vertical cover plate into place.
8. Secure the back panel of the IND560x using three Phillips-head screws and the two screw sealing sleeves. Insert two of the Phillips-head screws through the sealing sleeves and tighten to the back of the terminal.
9. Place appropriate paper marks over these sealing sleeve/screw combinations.

A.12.2. Sealing the Harsh Enclosure

A.12.2.1. United States and Canadian Sealing

To seal the harsh enclosure follow these steps:

1. Ensure that the appropriate approval region has been selected in setup under **Scale > Type > Approval**, and that the Metrology security switch SW1-1 is in the "ON" position.
2. Place the terminal with the front cover face-down on a soft, flat surface.
3. Ensure the gasket is in the correct position.
4. Align the holes in the rear housing with the threaded holes in the front cover.
5. Install the through-hole screws provided in the sealing kit – they replace two or three of the screws used to attach the front panel to the harsh enclosure. The U.S. and Europe require 2-point external sealing. Canada requires 3-point external sealing.
6. Locate seven of the ten screws originally securing the cover and reinstall them by turning clockwise.
7. Torque all screws to 1.5 Nm.
8. Thread the wire cable and plastic seal through the hole in each new screw.
9. Remove any remaining slack in the wire cable.
10. Thread the end of the wire cable through the plastic seal and snap the seal shut. Cut off any excess wire.

A.12.2.2. European Sealing

To seal the harsh enclosure follow these steps:

1. Ensure that the appropriate approval region has been selected in setup at **Scale > Type > Approval**, and that the Metrology security switch SW1-1 is in the "ON" position.
2. Place the terminal with the front cover face-down on a soft, flat surface.
3. Ensure the gasket is in the correct position.
4. Align the holes in the rear housing with the threaded holes in the front cover.
5. Locate nine of the ten screws originally securing the cover and reinstall them by turning clockwise.
6. In the remaining 10^{th} spot, take the screw from the sealing kit and insert it through the sealing sleeve found in the sealing kit. Install the sealing sleeve/screw combination.
7. Torque all screws to 1.5 Nm.
8. Place an appropriate paper mark over the sealing sleeve/screw combination.

A.13. Cleaning After Installation

⚠ WARNING

AVOID ELECTROSTATIC CHARGING BY WEARING SUITABLE WORKING CLOTHES WHEN OPERATING IN HAZARDOUS AREAS.

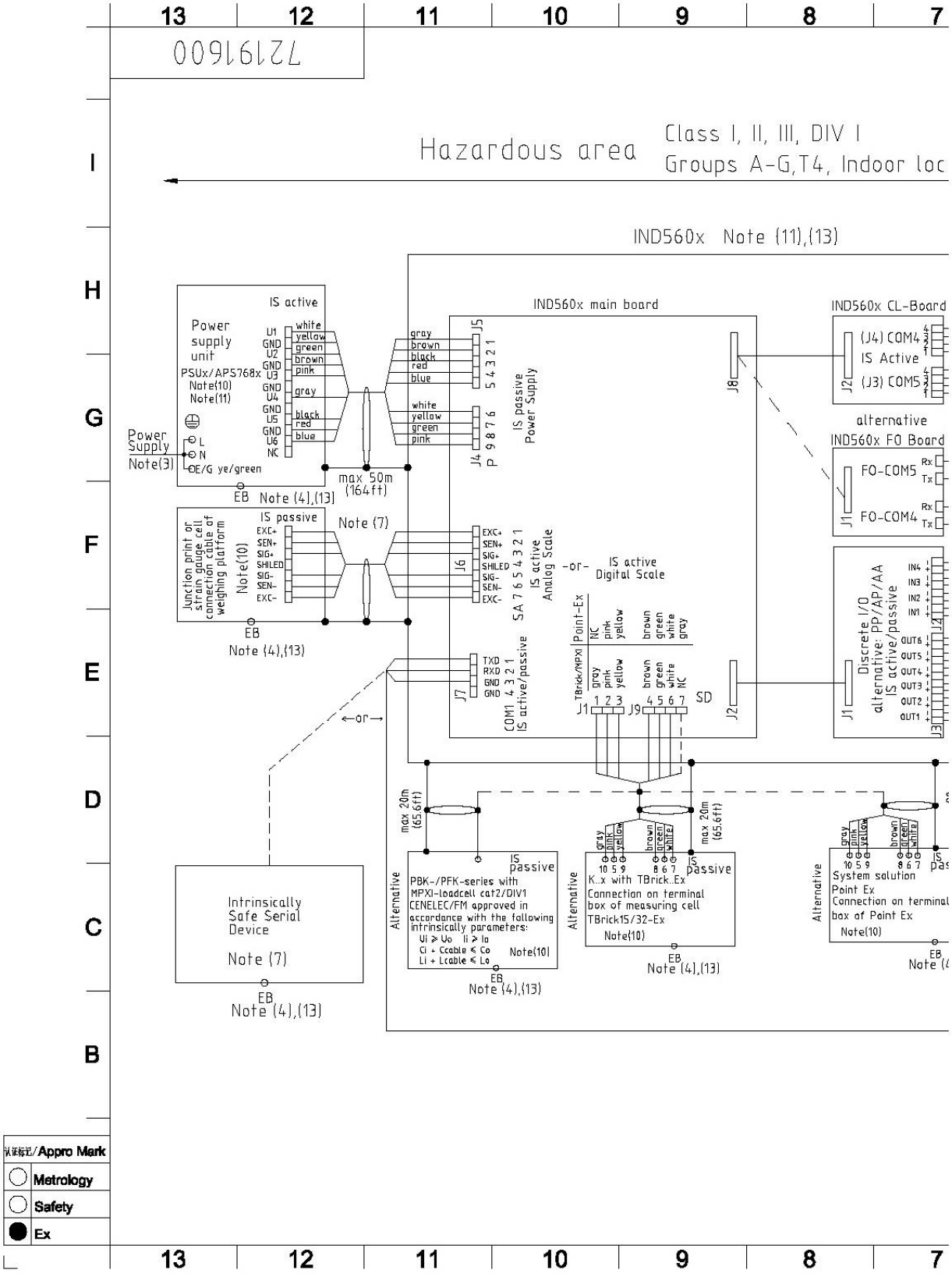
A.13.1. Notes on Cleaning

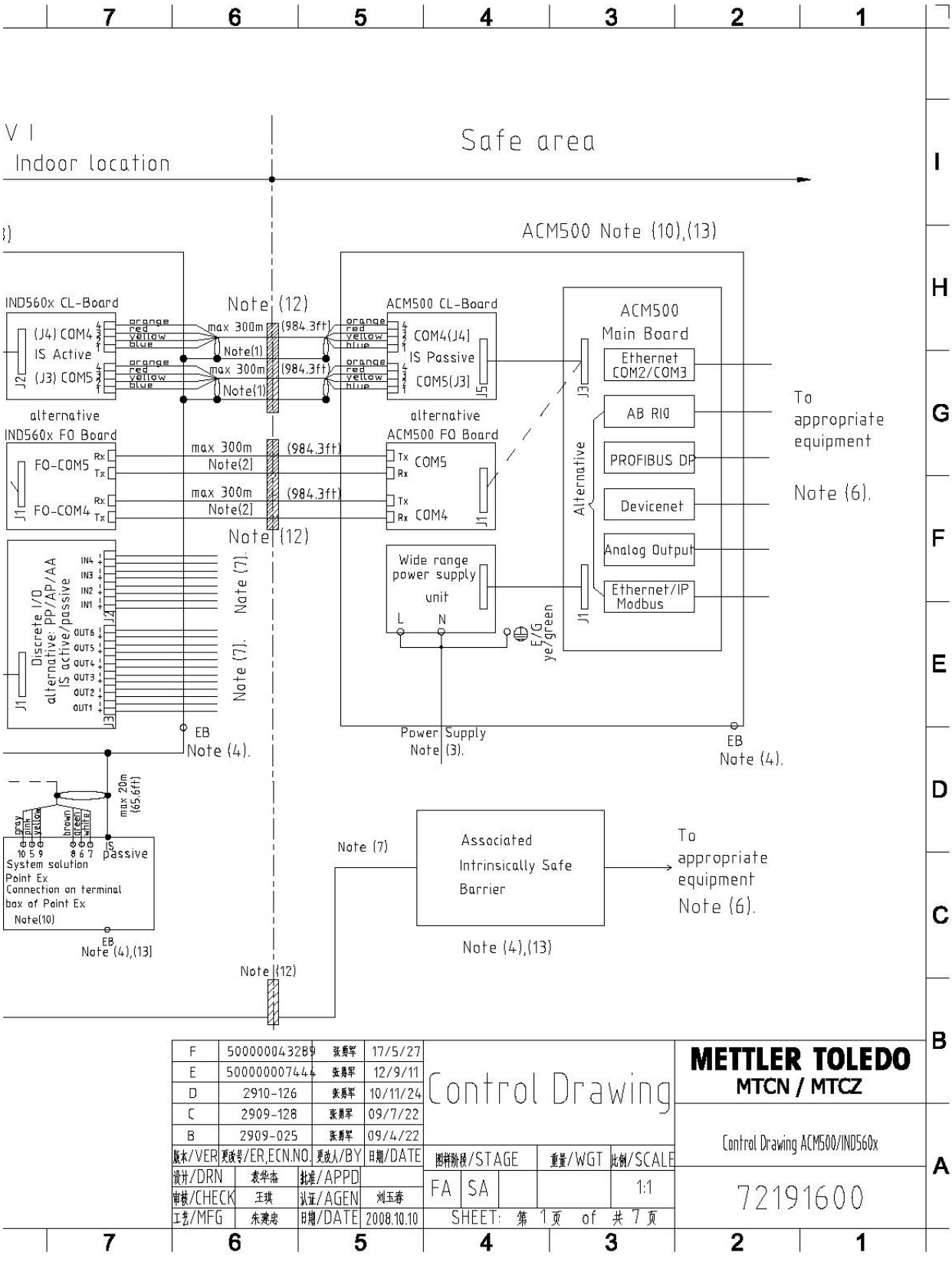
To clean the IND560x terminal's keypad and cover:

- Gently wipe the IND560x terminal's keypad and cover with a clean, damp, soft cloth.
- Use water or mild, non-abrasive cleaning agents.
- Do not use any type of acids, alkalis or strong industrial solvents such as toluene or isopropanol (IPA) that could damage the terminal's finish.
- Do not spray cleaner directly on the terminal.
- Do not clean the terminal using high-pressure or high-temperature water.
- Build-up of dust layers must be avoided.
- Remove light dust deposits using a damp cloth with a gentle wiping motion.
- Do not use compressed air or vacuum to remove dust layers.
- Follow good housekeeping practices to keep the terminal clean.

A.14. Control Drawing

The Control Drawing, 72191600, is included on the following pages and in Appendix H, Certificates and Drawings.


Hazardous area
Class I, II, III, DIV I
Groups A-G,T4, Indoor loc
IND560x Note (11),(13)
IND560x main board
IND560x CL-Board
IND560x FO Board
alternative
IS active
Power supply unit
PSUx/APS768x
Note(10)
Note(11)
Power Supply
Note(3)
max 50m (164ft)
EB Note (4),(13)
IS passive
Junction print or strain gauge cell connection cable of weighing platform
Note(10)
Note (7)
IS active Digital Scale
IS active Analog Scale
IS passive Power Supply
Point-Ex
TBrick/MPXI
COM1 IS active/passive
SD
Discrete I/O alternative: PP/AP/AA IS active/passive
(J4) COM4
IS Active
(J3) COM5
FO-COM5
FO-COM4
Intrinsically Safe Serial Device
Note (7)
max 20m (65.6ft)
PBK-/PFK-series with MPXI-loadcell cat2/DIV1 CENELEC/FM approved in accordance with the following intrinsically parameters:
Ui ≥ Uo Ii ≥ Io
Ci + Ccable ≤ Co
Li + Lcable ≤ Lo
Note(10)
K..x with TBrick..Ex
Connection on terminal box of measuring cell
TBrick15/32-Ex
Note(10)
System solution
Point Ex
Connection on terminal box of Paint Ex
Note(10)
Alternative
认证标记/Appro Mark
Metrology
Safety
Ex



F	500000043289	张勇军	17/5/27	
E	500000007444	张勇军	12/9/11	
D	2910-126	张勇军	10/11/24	
C	2909-128	张勇军	09/7/22	
B	2909-025	张勇军	09/4/22	
版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE	
设计/DRN	袁华磊	批准/APPD		
审核/CHECK	王琪	认证/AGEN	刘玉春	
工艺/MFG	朱建忠	日期/DATE	2008.10.10	

Control Drawing

图样阶段/STAGE		重量/WGT	比例/SCALE
FA	SA		1:1

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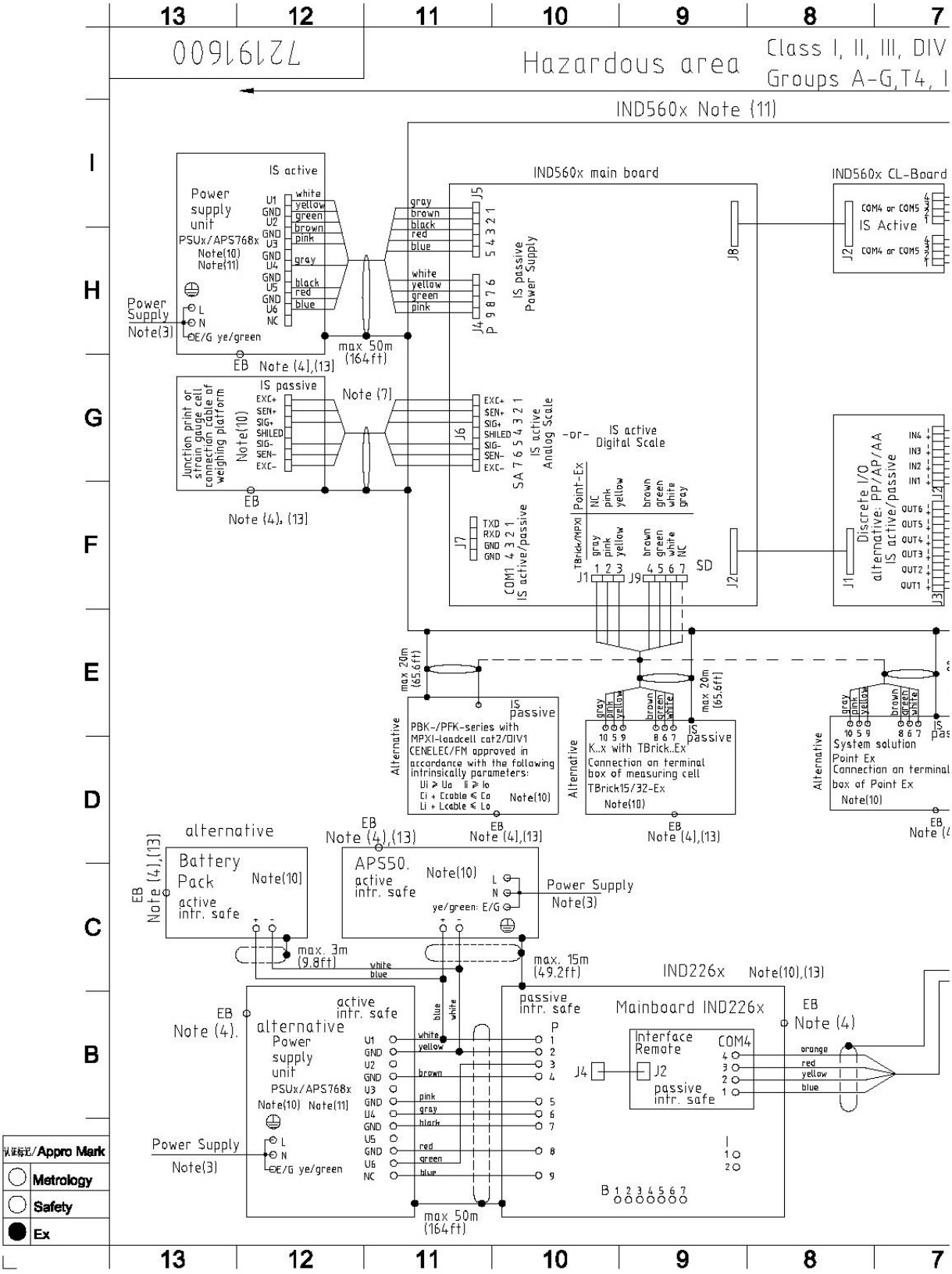
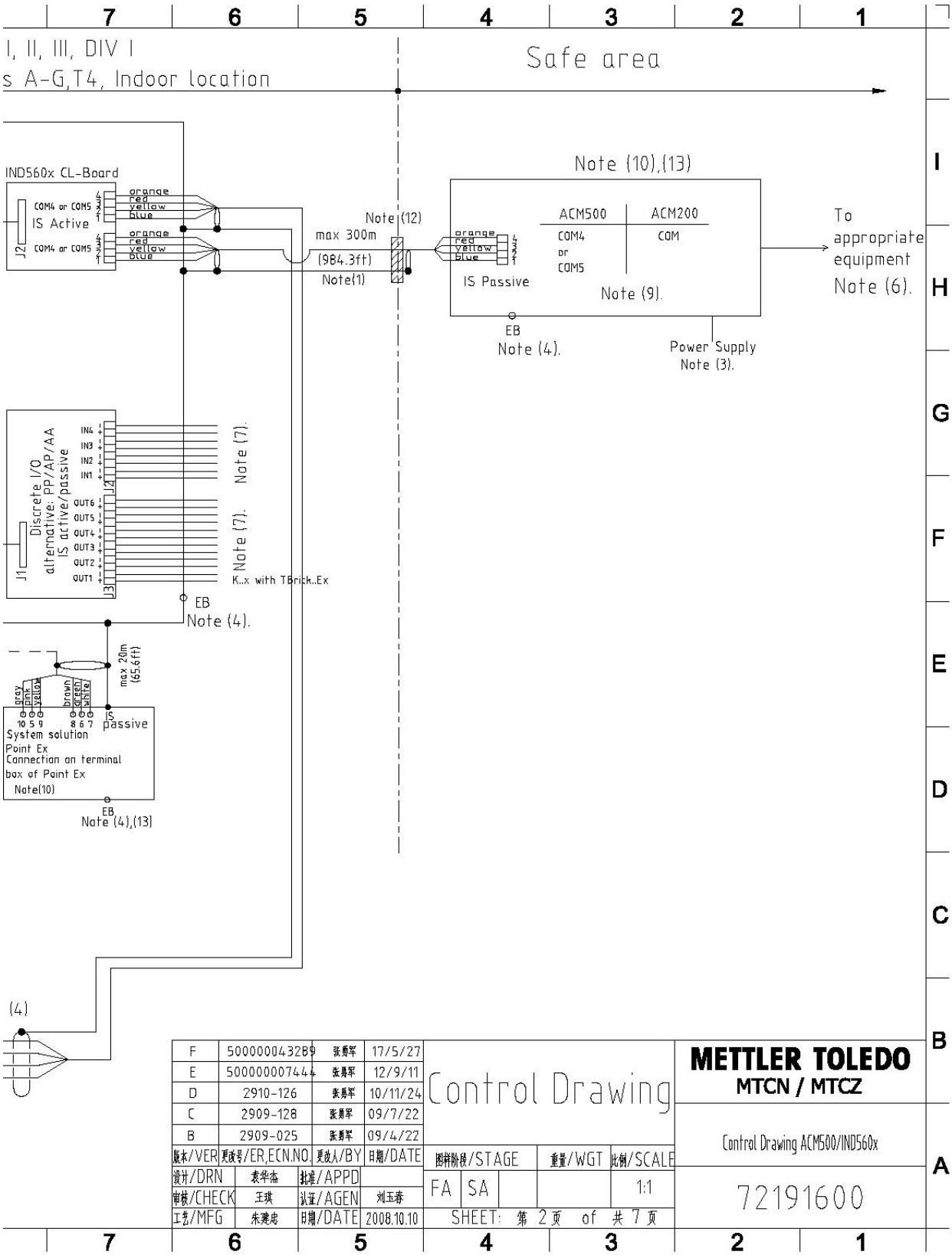
Control Drawing ACM500/IND560x

72191600


13
12
11
10
9
8
7
72191600
Hazardous area
Class I, II, III, DIV
Groups A-G,T4, I
IND560x Note (11)
IND560x main board
IND560x CL-Board
IS active
Power supply unit
PSUx/APS768x
Note(10)
Note(11)
Power Supply
Note(3)
L
N
E/G ye/green
EB Note (4),(13)
max 50m (164ft)
IS passive
Junction print or strain gauge cell connection cable of weighing platform
Note(10)
Note (7)
IS active Digital Scale
-or-
IS active Analog Scale
IS passive Power Supply
COM4 or COM5
IS Active
Discrete I/O
alternative: PP/AP/AA
IS active/passive
Point-Ex
TBrick/MPXI
SD
max 20m (65.6ft)
Alternative
PBK-/PFK-series with MPXI-loadcell cat2/DIV1 CENELEC/FM approved in accordance with the following intrinsically parameters:
Ui ≥ Ua Ii ≥ Io
Ci + Ccable ≤ Ca
Li + Lcable ≤ La
Note(10)
K..x with TBrick..Ex
Connection on terminal box of measuring cell
TBrick15/32-Ex
System solution
Point Ex
Connection on terminal box of Point Ex
alternative
Battery Pack
active intr. safe
APS50.
Power Supply
max. 3m (9.8ft)
max. 15m (49.2ft)
IND226x
Note(10),(13)
Mainboard IND226x
passive intr. safe
Interface Remote
COM4
Note (4).
max 50m (164ft)
Appro Mark
Metrology
Safety
Ex


I, II, III, DIV I
s A-G,T4, Indoor location
Safe area
IND560x CL-Board
COM4 or COM5
IS Active
J2
orange
red
yellow
blue
max 300m
(984.3ft)
Note(1)
Note (12)
Note (10),(13)
ACM500
ACM200
COM4
or
COM5
COM
IS Passive
Note (9).
To
appropriate
equipment
Note (6).
EB
Note (4).
Power Supply
Note (3).
Discrete I/O
alternative: PP/AP/AA
IS active/passive
J1
J2
J3
IN4
IN3
IN2
IN1
OUT6
OUT5
OUT4
OUT3
OUT2
OUT1
Note (7).
K..x with TBrick..Ex
EB
Note (4).
max 20m
(65.6ft)
grey
pink
yellow
brown
green
white
10 5 9
8 6 7
IS passive
System solution
Point Ex
Connection an terminal
box of Point Ex
Note(10)
EB
Note (4),(13)
(4)
F 500000043289 张勇军 17/5/27
E 500000007444 张勇军 12/9/11
D 2910-126 张勇军 10/11/24
C 2909-128 张勇军 09/7/22
B 2909-025 张勇军 09/4/22
版本/VER 更改号/ER,ECN.NO. 更改人/BY 日期/DATE
设计/DRN 袁华磊 批准/APPD
审核/CHECK 王琪 认证/AGEN 刘玉春
工艺/MFG 朱建忠 日期/DATE 2008.10.10
Control Drawing
图样阶段/STAGE 重量/WGT 比例/SCALE
FA SA 1:1
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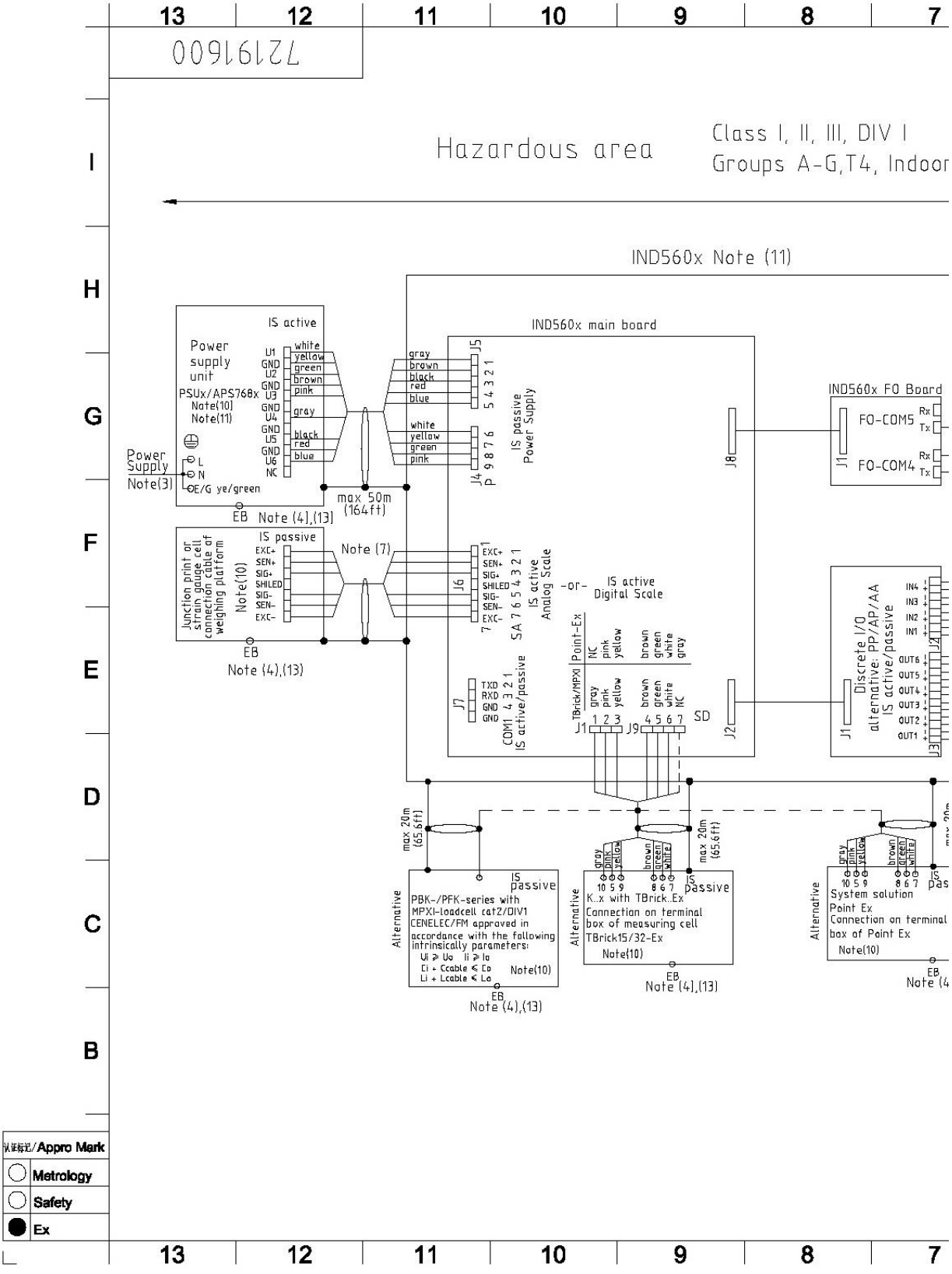
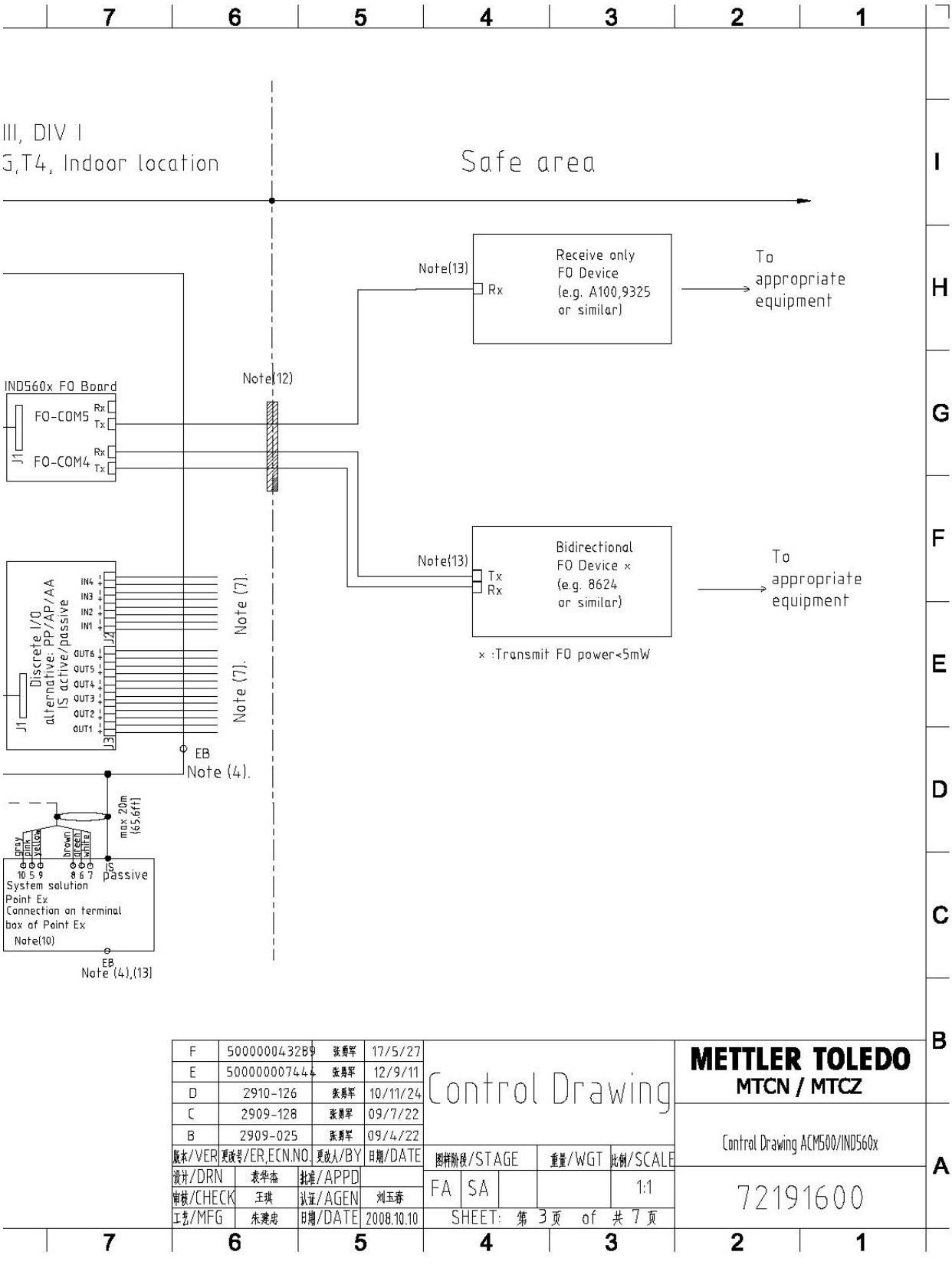
72191600


Hazardous area
Class I, II, III, DIV I
Groups A-G,T4, Indoor
IND560x Note (11)
IND560x main board
IND560x FO Board
IS active
Power supply unit
PSUx/APS768x
Note(10)
Note(11)
Power Supply
Note(3)
L
N
E/G ye/green
EB Note (4),(13)
max 50m (164ft)
IS passive
Junction print or strain gauge cell connection cable of weighing platform
Note(10)
Note (7)
IS passive Power Supply
IS active Analog Scale
-or- IS active Digital Scale
Point-Ex
TBrick/MPXI
COM1 IS active/passive
SD
FO-COM5
FO-COM4
Discrete I/O alternative: PP/AP/AA IS active/passive
max 20m (65.6ft)
Alternative
IS passive
PBK-/PFK-series with MPXI-loadcell catZ/DIV1 CENELEC/FM approved in accordance with the following intrinsically parameters:
Ui ≥ Uo Ii ≥ Io
Ci + Ccable ≤ Co
Li + Lcable ≤ Lo
Note(10)
K..x with TBrick..Ex
Connection on terminal box of measuring cell TBrick15/32-Ex
Note(10)
System solution Point Ex
Connection on terminal box of Point Ex
Note(10)
Wire/Appro Mark
Metrology
Safety
Ex



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E	500000007444	张勇军	12/9/11	
D	2910-126	张勇军	10/11/24	
C	2909-128	张勇军	09/7/22	
B	2909-025	张勇军	09/4/22	
版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE	
设计/DRN	袁华磊	批准/APPD		
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工艺/MFG	朱建忠	日期/DATE	2008.10.10	

Control Drawing

图样阶段/STAGE	重量/WGT	比例/SCALE
FA SA		1:1

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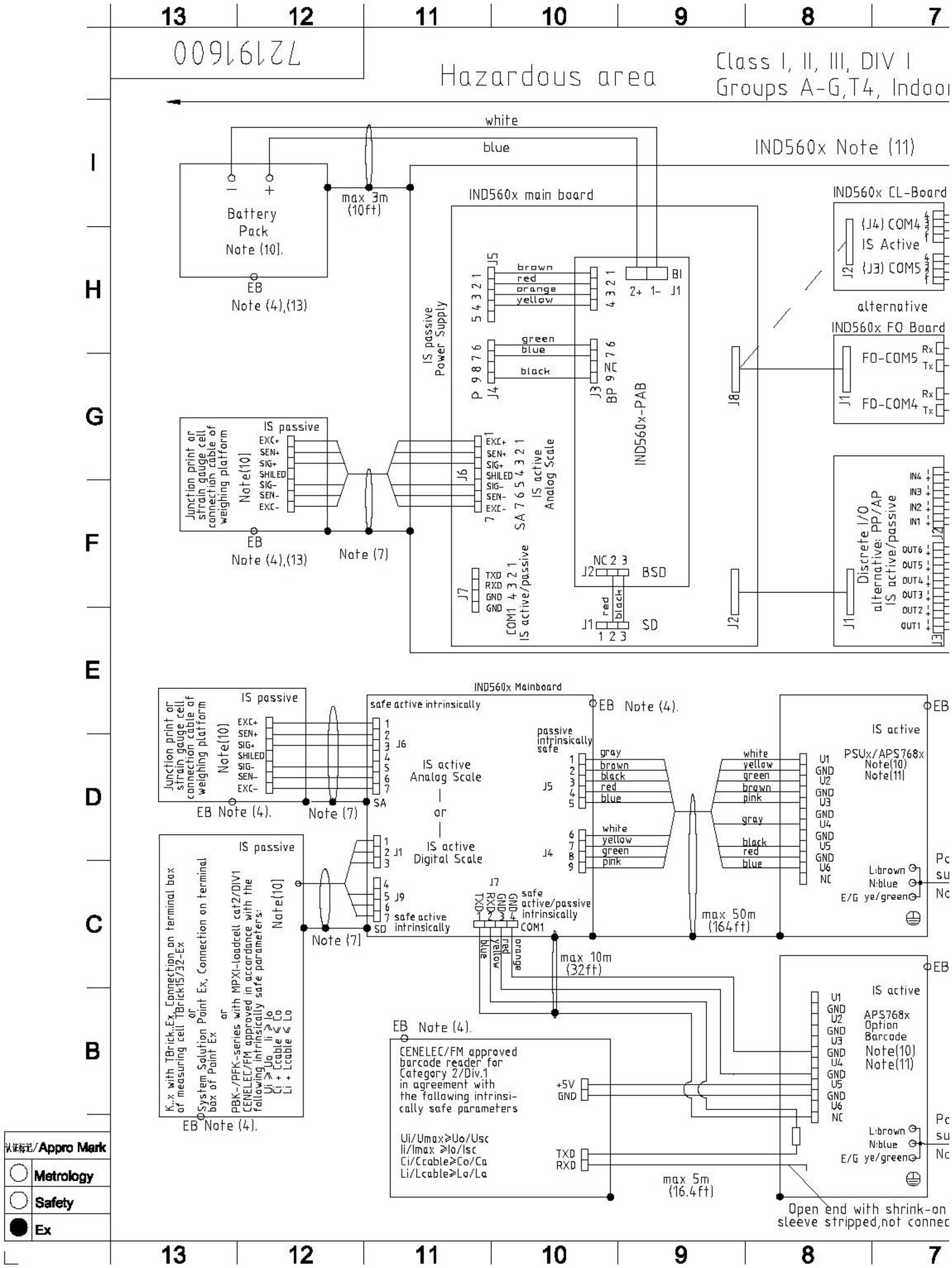
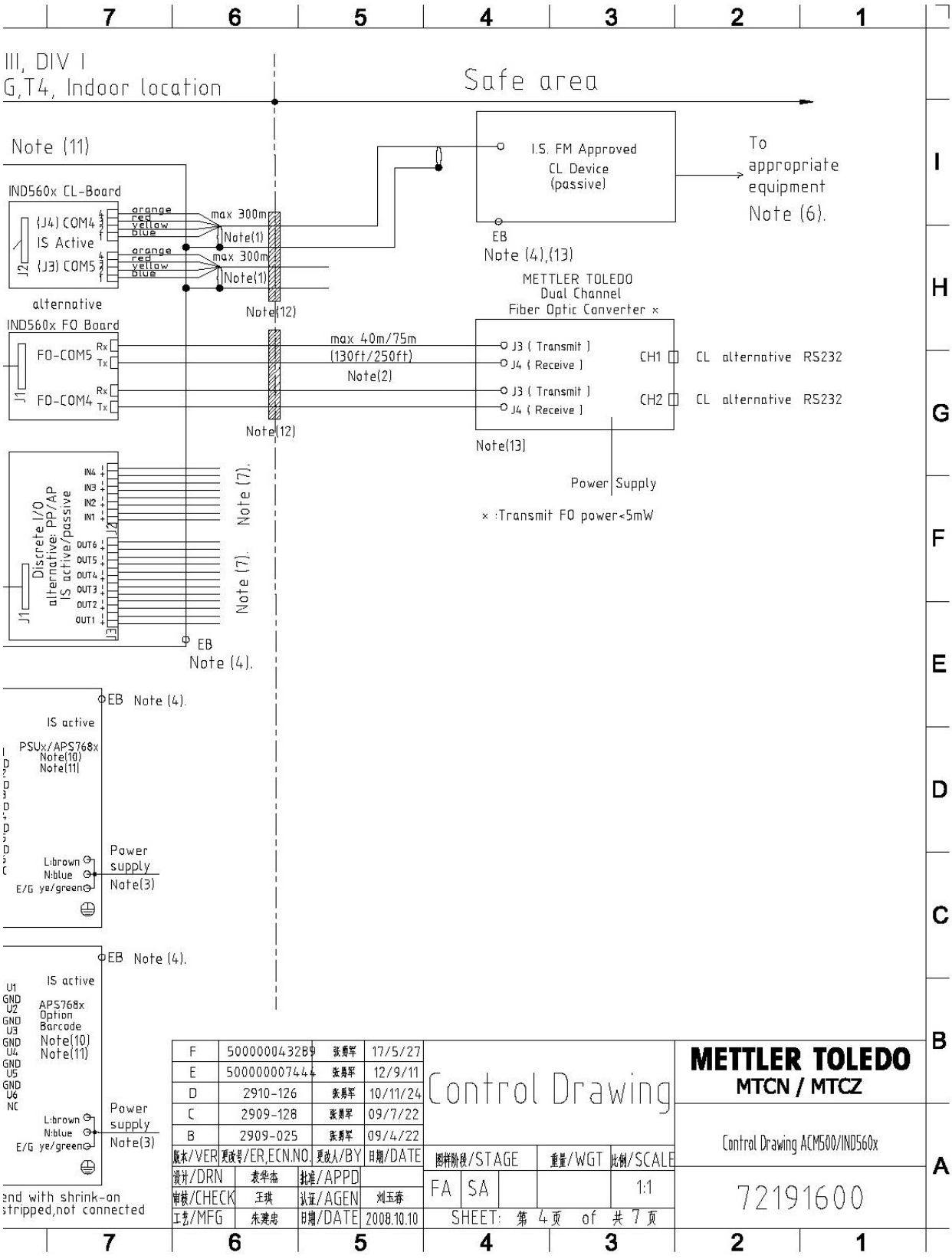

72191600
Hazardous area
Class I, II, III, DIV I
Groups A-G,T4, Indoor
white
blue
IND560x Note (11)
Battery Pack Note (10).
max 3m (10ft)
IND560x main board
IND560x CL-Board
IND560x FO Board
alternative
IS passive Power Supply
IND560x-PAB
EB Note (4),(13)
Junction print or strain gauge cell connection cable of weighing platform Note(10)
IS passive
IS active Analog Scale
Note (7)
BSD
SD
IS active/passive
Discrete I/O alternative: PP/AP IS active/passive
IND560x Mainboard
safe active intrinsically
passive intrinsically safe
IS active Analog Scale
or
IS active Digital Scale
EB Note (4).
IS active
PSUx/APS768x Note(10) Note(11)
max 50m (164ft)
max 10m (32ft)
safe active/passive intrinsically
safe active intrinsically
K..x with TBrick..Ex, Connection on terminal box of measuring cell TBrick15/32-Ex
or
System Solution Point Ex, Connection on terminal box of Point Ex
or
PBK-/PFK-series with MPXI-loadcell cat2/DIV1 CENELEC/FM approved in accordance with the following intrinsically safe parameters:
CENELEC/FM approved barcode reader for Category 2/Div.1 in agreement with the following intrinsically safe parameters
Ui/Umax≥Uo/Usc
Ii/Imax ≥Io/Isc
Ci/Ccable≥Co/Ca
Li/Lcable≥Lo/La
APS768x Option Barcode Note(10) Note(11)
max 5m (16.4ft)
Open end with shrink-on sleeve stripped,not connec
认证标记/Appro Mark
Metrology
Safety
Ex


III, DIV 1
G,T4, Indoor location
Safe area
Note (11)
IND560x CL-Board
(J4) COM4
IS Active
(J3) COM5
orange
red
yellow
blue
max 300m
Note(1)
I.S. FM Approved
CL Device
(passive)
To
appropriate
equipment
Note (6).
EB
Note (4),(13)
alternative
IND560x FO Board
FO-COM5
FO-COM4
Rx
Tx
Note(12)
max 40m/75m
(130ft/250ft)
Note(2)
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Dual Channel
Fiber Optic Converter ×
J3 (Transmit)
J4 (Receive)
CH1
CH2
CL alternative RS232
Note(13)
Power Supply
× :Transmit FO power<5mW
Discrete I/O
alternative: PP/AP
IS active/passive
IN4
IN3
IN2
IN1
OUT6
OUT5
OUT4
OUT3
OUT2
OUT1
Note (7).
Note (4).
IS active
PSUx/APS768x
Note(10)
Note(11)
L:brown
N:blue
E/G ye/green
Power
supply
Note(3)
APS768x
Option
Barcode
end with shrink-on
stripped,not connected
F 500000043289 张勇军 17/5/27
E 500000007444 张勇军 12/9/11
D 2910-126 张勇军 10/11/24
C 2909-128 张勇军 09/7/22
B 2909-025 张勇军 09/4/22
版本/VER 更改号/ER,ECN.NO. 更改人/BY 日期/DATE
设计/DRN 袁华磊 批准/APPD
审核/CHECK 王琪 认证/AGEN 刘玉春
工艺/MFG 朱建忠 日期/DATE 2008.10.10
Control Drawing
图样阶段/STAGE FA SA
重量/WGT
比例/SCALE 1:1
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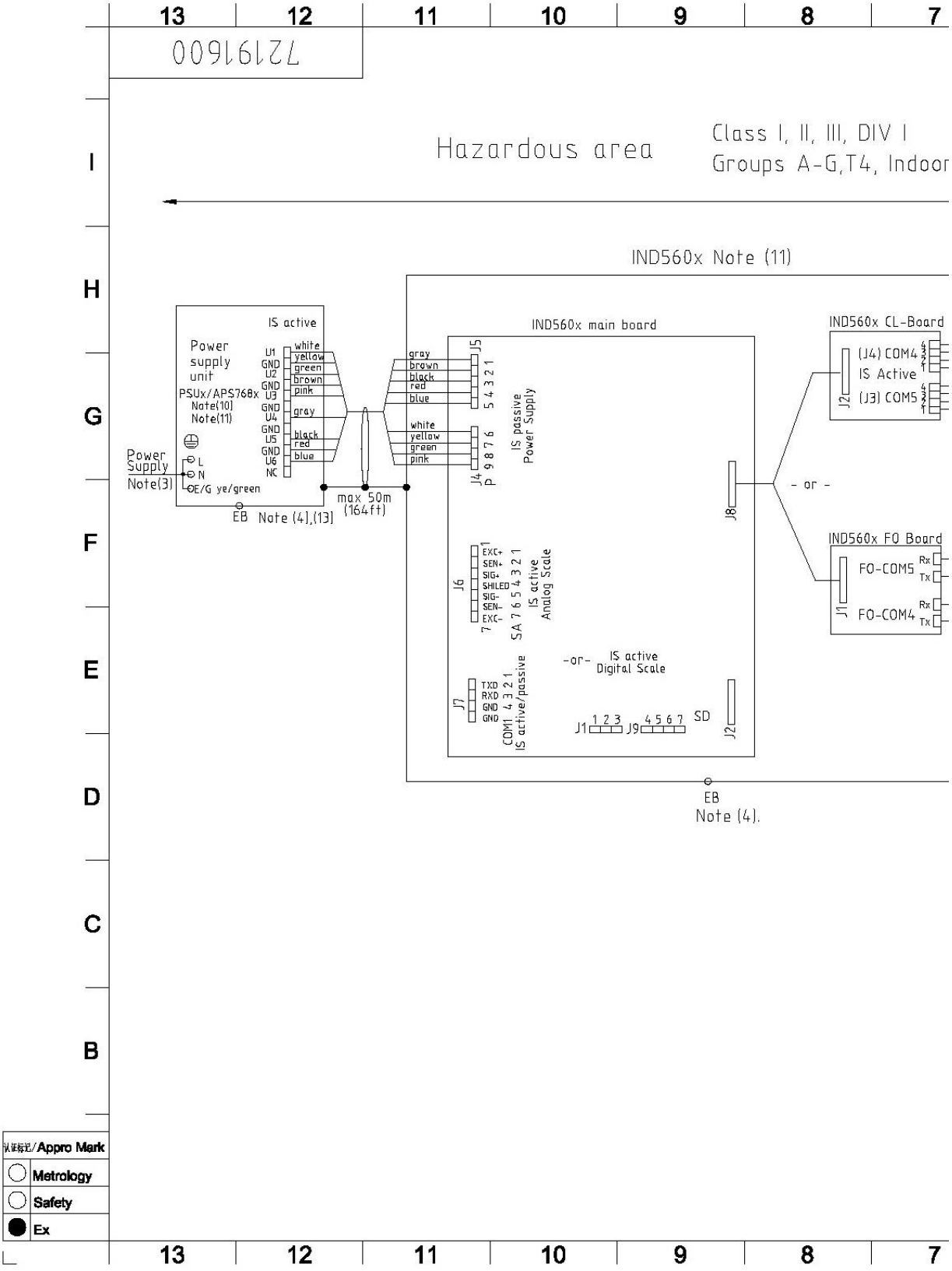
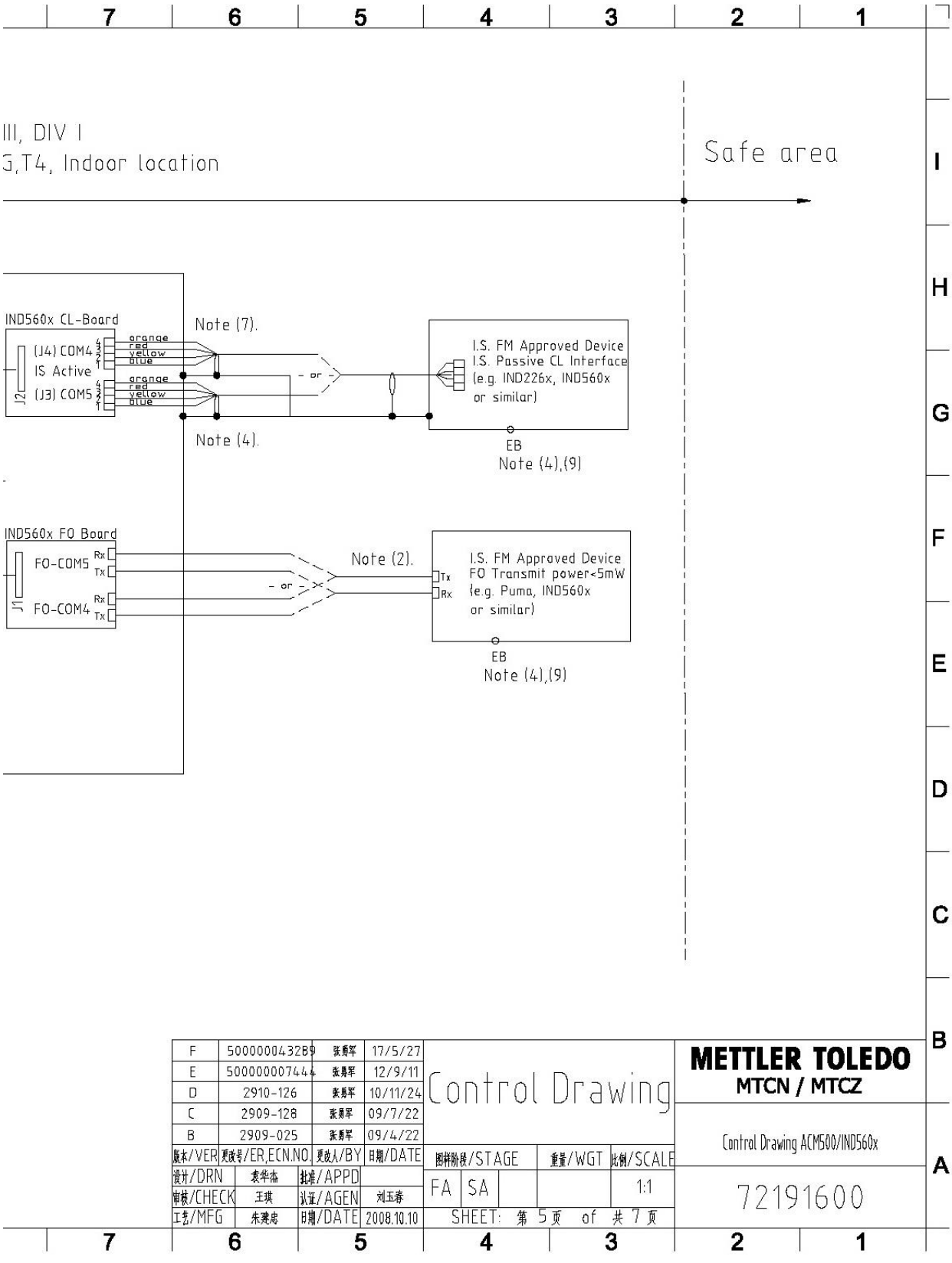
METTLER TOLEDO
MTCN / MTCZ
Control Drawing ACM500/IND560x
72191600


72191600
Hazardous area
Class I, II, III, DIV I
Groups A-G,T4, Indoor
IND560x Note (11)
IS active
Power supply unit
PSUx/APS768x
Note(10)
Note(11)
Power Supply
Note(3)
L
N
PE/G ye/green
EB Note (4),(13)
max 50m (164ft)
IND560x main board
IS passive Power Supply
IS active Analog Scale
-or- IS active Digital Scale
IND560x CL-Board
(J4) COM4
IS Active
(J3) COM5
IND560x FO Board
FO-COM5
FO-COM4
- or -
EB Note (4).
Appro Mark
Metrology
Safety
Ex


III, DIV I
G,T4, Indoor location
Safe area
IND560x CL-Board
(J4) COM4
IS Active
(J3) COM5
J2
orange
red
yellow
blue
Note (7).
- or -
Note (4).
I.S. FM Approved Device
I.S. Passive CL Interface
(e.g. IND226x, IND560x
or similar)
EB
Note (4),(9)
IND560x FO Board
FO-COM5
FO-COM4
J1
Rx
Tx
Note (2).
- or -
I.S. FM Approved Device
FO Transmit power<5mW
(e.g. Puma, IND560x
or similar)
EB
Note (4),(9)
F 500000043289 张勇军 17/5/27
E 500000007444 张勇军 12/9/11
D 2910-126 张勇军 10/11/24
C 2909-128 张勇军 09/7/22
B 2909-025 张勇军 09/4/22
版本/VER 更改号/ER,ECN.NO. 更改人/BY 日期/DATE
设计/DRN 袁华磊 批准/APPD
审核/CHECK 王琪 认证/AGEN 刘玉春
工艺/MFG 朱建忠 日期/DATE 2008.10.10
Control Drawing
图样阶段/STAGE 重量/WGT 比例/SCALE
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Control Drawing ACM500/IND560x
72191600

7219160O

IND560x Intrinsically saf

Power Supply

Passive	Ui/V	Ii/mA	Pi/W	Ci/uF	Li/mH
P1(J5.1)	10.5	74	0.78	0.24	-
P3(J5.3)	5.9	240	1.41	0.48	-
P5(J5.5)	12.6	92	1.16	0.36	-
P6(J4.1)	8.7	133	1.16	0.13	-
P8(J4.3)	12.6	42	0.53	-	-
P9(J4.4)	7.15	107	0.77	0.24	-

Analog Scale Interface

Active	Uo/V	Io/mA	Po/W	Co/uF	Lo/mH
SA1-7(J6)	5.88	133	0.8	0.2	0.3

Digital Scale Interface

Active	Uo/V	Io/mA	Po/W	Co/uF	Lo/mH
SD1(J1.1)	12.6	42	0.53	0.4	1.0
SD2(J1.2)	8.7	133	1.16	0.87	0.3
SD5(J9.2)	5.36	30	0.04	0.1	0.1
SD6(J9.3)	5.36	30	0.04	0.1	0.1
SD7(J9.4)	12.6	92	1.16	0.14	0.3

Serial interface COM1 (RS232)

Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM1.1/1.2 (J7.1/J7.2)	±5.36	±18.1	24.2	100	100
Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
COM1.1/1.2 (J7.1/J7.2)	±10	-	-	Negligible	Negligible

Ri min=297Ohm

Power Input PAB

	Ui/V	Ii/mA	Pi/W	Ci/uF	Li/mH
BI 1- (J1-1)	Ground				
BI 2+ (J1-2)	12.0	3030	6.83	0.49	-

Appro Mark
○ Metrology
○ Safety
● Ex

nsically safe entity parameters

Discrete I/O Board

Active/Active IO Borad

Li/mH	Outputs Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
-	A-OUT1+(J3.1)---A-OUT6+(J3.11)	12.6	92	627	100	400
-	Inputs Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
-	A-IN1+(J2.1)---A-IN4+(J2.7)	5.88	2	2.94	100	100
-						
-						
-						

Active/Passive IO Borad

Lo/mH	Outputs Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
0.3	P-OUT1+(J3.12)---P-OUT6+(J3.2)	15	40	150	10	10
	Inputs Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
	A-IN1+(J2.8)---A-IN4+(J2.2)	5.88	2	2.94	100	100

Passive/Passive IO Borad

Lo/mH	Outputs Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
1.0	P-OUT1+(J3.12)---P-OUT6+(J3.2)	15	40	150	10	10
0.3	Inputs Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
0.1	P-IN1+(J2.8)---P-IN4+(J2.2)	30	50	375	10	10
0.1						
0.3						

Serial CL data interface

Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM4/5	5.36	107	144	600	400

Lo/uH
100

Serial FO data interface

Li/uH
egligible

Peak light output power is Pout < 5mW at transmission data line per output FO-COM4 and FO-COM5.

Li/mH
-

F	500000043289	张勇军	17/5/27	
E	500000007444	张勇军	12/9/11	
D	2910-126	张勇军	10/11/24	Control Drawing
C	2909-128	张勇军	09/7/22	
B	2909-025	张勇军	09/4/22	
版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE	图样阶段/STAGE 重量/WGT 比例/SCALE
设计/DRN	袁华磊	批准/APPD		FA SA 1:1
审核/CHECK	王琪	认证/AGEN	刘玉春	
工艺/MFG	朱建忠	日期/DATE	2008.10.10	SHEET: 第 6 页 of 共 7 页

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7219160O

ACM500 Intrinsically safe entity parameters

ACM500 CL Board (passive) - Intrinsically Safe Entity Values

Passive interface	Ui	Ii	Pi	Ci	Li
COM4, Terminals 1-4	10 V	300 mA	500 mW	120 nF	0 mH
COM5, Terminals 1-4	10 V	300 mA	500 mW	120 nF	0 mH

Table 1

ACM500 FO board (active)

Fiber optic light output power (Pout) for COM4 and COM5 is limited to 5mW maximum per transmission data line.

Table 2

ACM200 Intrinsically safe entity parameters

Passive interface	Ui	Ii	Pi	Ci	Li
COM, Terminals 1-4	10 V	300 mA	500 mW	120 nF	0 mH

11. Also certified according NEC505: AEx ib IIC T4 Zone1 or AEx me [ib] IIC T4
12. Install cable seal between differently rated areas per country-specific regulations.
13. Various combinations of the options shown are possible based on physical hardware limits of the IND560x terminal.

WEEE/Appro Mark	
○	Metrology
○	Safety
●	Ex

CENELEC approval	cFMus approval
Cables conforming to EN50039 and EN60079-14 for intrinsically safe circuits	For installation please refer to ANSI/ISA RP 12.06.01, "Installation of intrinsically-safe devices in CLASS I hazardous areas" Canadian installation in accordance with Canadian Electrical Code C22.1 Cable as per country-specific regulations for intrinsically- safe circuits

1. Don't connect cable shield at ACM500 end. Maximum length 300m (1000 ft.).

2. HCS Fiber maximum length 300m (1000 ft.) or POF Fiber maximum length 40m (130ft) @115Kbd and 75m (250ft) @9600bd.

3. Mains connection in accordance with country-specific regulations; for supply voltage and frequency refer to rating plate.

4. Connection of equipotential bonding (EB) as per country-specific regulations. It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.	4. Connection of equipotential bonding (EB) as per ANSI/NFPA 70,Article 504 and ANSI/IA RP 12.06.01 or Canadian Electrical Code C22.2. It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.

5. Install cabling securely so that it is protected from damage and it does not move.

6. Maximum input voltage permitted: Um=250Vrms or DC.

7. Connection to an intrinsically safe approved apparatus in accordance with following conditions:

Ui ≥ Uo (Voc) Ci + Ccable < Co (Ca)

Ii ≥ Io (Isc) Li + Lcable < Lo (La)

Pi ≥ Po

Discrete I/O active input: connection to simple apparatus according NEC (NFPA 70), section 504.2 and 504.4

8. Ambient temperature range: -10℃ to +40℃

9. Installation as described ACM500 installation information 64061976 (multilingual).
Installation as described IND560x installation information 64061929 (multilingual).
Installation as described IND226x/ACM200 installation information 72203959 (German) 72210036 (US).
Installation as described Puma installation information D14724300A.

10.	FM project	FMc or CSA
IND560x	3035339	3035339C
IND226x	3028618,3030647	3028618C,3030647C
ACM200	3030961	3030961C
ACM500	3034372	3034372C
PSUx	300810,3024135	1360311(CSA)
APS768x	3040399	3040399C
Battery Pack	3031092	3031092C
TBrickEx	3017821	1647044(CSA)
PointEx	3020293	1620259(CSA)
APS500/501	3031533	3031533C
MPXI	pending	pending

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E	500000007444	张勇军	12/9/11
D	2910-126	张勇军	10/11/24
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B	2909-025	张勇军	09/4/22

设计/DRN	袁华磊	批准/APPD	
审核/CHECK	王琪	认证/AGEN	刘玉春
工艺/MFG	朱建忠	日期/DATE	2008.10.10

Control Drawing

图样阶段/STAGE	重量/WGT	比例/SCALE
FA SA		1:1

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72191600

B Default Settings

B.1. Setup Defaults

The following tables list the factory default settings and associated security levels for the IND560x terminal setup parameters.

- Items noted with an asterisk (*) are not shown for IDNet scales. Items noted with two asterisks (**) are shown only for IDNet scales. Items noted with three asterisks (***) are shown only for SICSpro scales.

Setup Feature	Default Value	Security Access
Scale – Type		
Name	Scale 1	Maintenance
Scale Type	Automatically determined to be Analog, IDNet or SICSpro- Remote is secondary option after load cell interface is determined	Administrator
*** Platform Serial Number	Display only	--
* Load Cells	1 x 350Ω	Administrator
* Approval	None [*** Display only]	Administrator
Scale – Advanced Setup Mode		
Advanced Setup Mode (ASM) is found only in the SICSpro type scales. Settings such as Capacity, Increment, Zero, Tare, Filtering and Calibration are found within ASM.		Administrator
Scale – Capacity & Increment		
Primary Units	kg	Administrator
* # of Ranges	1	Administrator
* >I1I<	50 x 0.01	Administrator
* Blank Over Capacity	5 d	Administrator
** x10 Always	Disabled	Administrator
Scale – Calibration		
* Geo Code	16	Administrator
Base Serial Number	[blank]	Administrator
* Calibration Units	kg	Administrator
* Linearity Adjust	Disabled	Administrator
* Analog Gain Jumper	3 mV/V	Administrator

Setup Feature	Default Value	Security Access
* Cell Capacity	50	Administrator
* Cell capacity Unit	kg	Administrator
* Rate Cell Output	3 mV/V	Administrator
* Estimated Preload	0	Administrator
* Estimated Preload Unit	kg	Administrator
Scale – Zero – AZM & Display		
* Auto Zero	Gross	Administrator
** Auto Zero	Enabled	Administrator
* Auto Zero Range	0.5 d	Administrator
* Under Zero Blanking	5 d	Administrator
Power up	Restart	Administrator
Scale – Zero – Ranges		
* Power Up Zero	Disabled	Administrator
* Power Up Range	+ 0 % – 0 %	Administrator
Pushbutton Zero	Enabled	Administrator
* Pushbutton Range	+ 2 % – 2 %	Administrator
Scale – Tare – Types		
Pushbutton Tare	Enabled	Maintenance
Keyboard Tare	Enabled	Maintenance
Net Sign Correction	Disabled	Maintenance
** Terminal Tare	Disabled	Maintenance
Scale – Tare – Auto Tare		
Auto Tare	Disabled	Maintenance
Tare Threshold Weight	0 kg	Maintenance
Reset Threshold Weight	0 kg	Maintenance
Motion Check	Enabled	Maintenance
Scale – Tare – Auto Clear		
Auto Clear Tare	Disabled	Maintenance
Clear Threshold Weight	0 kg	Maintenance
Motion Check	Enabled	Maintenance
Clear After Print	Disabled	Maintenance
Clear With Zero	Disabled	Maintenance
Power Up	Restart	Maintenance

Setup Feature	Default Value	Security Access
Scale – Units		
Second Unit	None	Administrator
Third Unit	None	Administrator
Power Up	Restart	Administrator
Custom Factor	1	Administrator
Custom Name	Cust	Administrator
Custom Increment	0.1	Administrator
Scale – Rate		
Weight Units	None	Maintenance
Time Units	Seconds	Maintenance
Measurement Period	1	Supervisor
Output Average	1	Supervisor
Scale – Filter		
* Low Pass Frequency	2.0 Hz	Maintenance
* Low Pass # of Poles	8	Maintenance
* Notch Filter Frequency	30 Hz	Maintenance
* Stability Filter	Disabled	Maintenance
** Vibration	Average Conditions	Maintenance
** Weighing Process	Universal Weighing	Maintenance
Scale – Stability		
* Motion Range	1 d	Administrator
* No-motion Interval	0.3 seconds	Administrator
** Stability	2	Administrator
Timeout	3	Maintenance
Scale – Log or Print		
Minimum Wt.	0 kg	Maintenance
Interlock	Disabled	Maintenance
Automatic	Disabled	Maintenance
Reset on	Return, 0 kg	Maintenance
Threshold Wt.	0 kg	Maintenance
Motion Check	Disabled	Maintenance
Scale – MinWeigh		
MinWeigh	Disabled	Supervisor
Uncertainty U_o	0 kg	Supervisor
Uncertainty c	0	Supervisor

Setup Feature	Default Value	Security Access
Tolerance	0.1	Supervisor
Safety Factor	1	Supervisor
MinWeigh Value	0 kg	Supervisor
Application – Memory – Alibi		
Alibi Memory	Disabled	Administrator
Application – Memory – Tare Table		
Description	Disabled	Maintenance
Totalization	None	Maintenance
Records 01–25	Empty	Supervisor
Application – Memory – Message Table		
Records 01–99	Blank table with no values listed	Supervisor
Application – Memory – Target Table		
Mode	None	Maintenance
Tolerance Type	Weight Deviation	Maintenance
Output Type	Concurrent	Maintenance
Records 01–25	Blank table with no values listed	Supervisor
Application – Operation – Target		
Source	Displayed Weight	Maintenance
Latching	Enabled	Maintenance
Motion Check	Disabled	Supervisor
Application – Operation – Comparators		
Source	None	Supervisor
Active	<	Supervisor
Description	[blank]	Supervisor
Limit	0	Supervisor
High Limit	0	Supervisor
Application – Operation – Totalization		
Mode	None	Maintenance
Clear GT on Print	Disabled	Maintenance
Subtotal	Disabled	Maintenance
Clear ST on Print	Disabled	Maintenance
Convert Weight	Enabled	Maintenance
Application – Operation – ID		
Mode	None	Maintenance
Threshold	0	Maintenance

Setup Feature	Default Value	Security Access
Reset	0	Maintenance
Looping	Disabled	Maintenance
Application – Discrete I/O – Inputs		
Discrete Inputs	Blank table with no values listed.	Maintenance
Application – Discrete I/O – Outputs		
Discrete Outputs	Blank table with no values listed.	Maintenance
Application – Task Expert - Start (Shown only if module is installed)		
Task File Name	Blank table	Administrator
Terminal – Device		
* Battery Operation	Disabled	Maintenance
ID 1	IND560x	Maintenance
ID 2	METTLER TOLEDO	Maintenance
ID 3	Blank	Maintenance
Serial Number	Blank	Maintenance
Terminal – Display		
Screensaver	0 Minutes	Maintenance
Backlight	Enabled	Maintenance
Backlight Timeout	1 Minute(s)	Maintenance
Auto Off Timer	Disabled	Maintenance
SmartTrac Size	None	Maintenance
Rate Display	Disabled	Maintenance
Terminal – Region – Format Time & Date		
Time Format	24:MM:SS	Maintenance
Date Format	DD MMM YYYY	Maintenance
Date Field Separator	/ (slash)	Maintenance
Terminal – Region – Set Time & Date		
Hour	No default values	Supervisor
Minute		
Day		
Month		
Year		
Terminal – Region – Language		
Display Messages	English	Maintenance
Keypad Selection	English	Maintenance

Setup Feature	Default Value	Security Access
Terminal – Transaction Counter		
Transaction Counter	Enabled	Maintenance
Counter Reset	Disabled	Maintenance
Next Transaction	0000000001	Maintenance
Terminal – Users		
Username #1	admin	Maintenance
Access #1	Administrator	Maintenance
Password #1	[blank]	Maintenance
Username #2	anonymous	Maintenance
Access #2	Operator	Maintenance
Password #2	[blank]	Maintenance
Terminal – Softkeys		
Softkey 3	Set Time and Date	Maintenance
Softkey 9	Recall Information	Maintenance
Softkey 10	Setup	Maintenance
All Others	[blank]	Maintenance
Communication – Templates – Input		
Preamble Length	0	Maintenance
Data Length	1	Maintenance
Postamble Length	0	Maintenance
Termination Character	CR	Maintenance
Assignment	Tare	Maintenance
Communication – Templates – Output		
Template 1	See Default Templates for format	Maintenance
Template 2	See Default Templates for format	Maintenance
Template 3	[blank]	Maintenance
Template 4	[blank]	Maintenance
Template 5	Refer to Default Templates for format	Maintenance
Repeat Print Field	Disabled	Supervisor
Communication – Templates – Strings		
Strings 01–20	Blank table with no values listed.	Maintenance
Communication – Reports Format		
Format	Narrow (40)	Maintenance
Header	2	Maintenance
Title	Enabled	Maintenance

Setup Feature	Default Value	Security Access
Record Separator	None	Maintenance
Footer	5	Maintenance
Communication – Reports – Tare Table		
Tare	Enabled	Maintenance
Description	Disabled	Maintenance
N	Disabled	Maintenance
Total	Disabled	Maintenance
Communication – Reports – Target Table		
Description	Disabled	Maintenance
Target	Enabled	Maintenance
+/- Tolerances	Disabled	Maintenance
Spill	Disabled	Maintenance
Fine Feed	Disabled	Maintenance
Communication - Connections		
COM4 Port	Disabled	Maintenance
COM5 Port	Disabled	Maintenance
Reconnect Mode (shown if ACM500 is set as COM4 or COM5)	Disabled	Maintenance
Communication – Connections View (one default connection preconfigured)		
Port	COM1	Maintenance
Assignment	Demand	Maintenance
Trigger	Scale	Maintenance
Template	Template 1	Maintenance
Communication – Serial – COM1		
Baud	9600	Maintenance
Data Bits	8	Maintenance
Parity	None	Maintenance
Flow Control	None	Maintenance
Interface	RS-232	Maintenance
Communication – Serial – COM2 (Shown only if Ethernet/COM2/COM3 option detected)		
Baud	9600	Maintenance
Data Bits	8	Maintenance
Parity	None	Maintenance
Flow Control	None	Maintenance
Interface	RS-232	Maintenance

Setup Feature	Default Value	Security Access
Communication – Serial – COM3 (Shown only if Ethernet/COM2/COM3 option detected)		
Baud	9600	Maintenance
Data Bits	8	Maintenance
Parity	None	Maintenance
Flow Control	None	Maintenance
Interface	RS-232	Maintenance
Communication – Network – Ethernet (Shown only if Ethernet/COM2/COM3 option detected)		
MAC Address	Unique value	Maintenance
DHCP Client	Disabled	Maintenance
IP Address	192.168.0.1	Maintenance
Subnet Mask	255.255.255.0	Maintenance
Gateway Address	0.0.0.0	Maintenance
Communication – Network - Port (Shown only if Ethernet option detected)		
Secondary Port #	0	Maintenance
Communication – Network – FTP (Shown only if Ethernet option detected.)		
Username #1	admin	Maintenance
Access #1	Administrator	Maintenance
Password #1	admin	Maintenance
Username #2 (not displayed)	anonymous	Maintenance
Access #2 (not displayed)	Operator	Maintenance
Password #2 (not displayed)	[blank]	Maintenance
Communication – Network – Email Alert–Parameters		
SMTP Server IP	0.0.0.0	Maintenance
Sender Email Address	[blank]	Maintenance
Sender Name	IND560x	Maintenance
Subject Line	Scale Cal. Alert	Maintenance
Communication – Network – Email Alert–Recipients		
Email Address	[blank]	Maintenance
Alert On	None	Maintenance
Communication – PLC – Analog Output (Shown only if Analog Output option detected)		
Source	Displayed Weight	Administrator
Channel	Scale	Administrator
Zero Value	0	Administrator
Full Scale Value	50	Administrator

Setup Feature	Default Value	Security Access
Communication – PLC – A-B RIO (Shown only if A-B RIO option detected)		
Node Address	Decimal, 1	Administrator
Start Quarter	1	Administrator
Last Rack	Disabled	Administrator
Data Rate	57600	Administrator
Block Transfer	Disabled	Administrator
Communication – PLC – DeviceNet (Shown only if DeviceNet option detected)		
Node Address	63	Administrator
Data Rate	125k	Administrator
Communication – PLC – PROFIBUS (Shown only if PROFIBUS option detected)		
Node Address	1	Administrator
Shared Data	Disabled	Administrator
Communication – PLC – EtherNet/IP-Modbus TCP (Shown only if EtherNet/IP - Modbus TCP option detected)		
Mac Address	Assigned automatically	Administrator
IP Address	192.168.0.1	Administrator
Subnet Mask	255.255.255.0	Administrator
Gateway Address	0.0.0.0	Administrator
Communication – PLC – Data Format (Shown only if PLC option detected)		
Format	Integer	Administrator
Byte Order	Word Swap	Administrator
Message Slots	1	Administrator
Maintenance – Configure / View – Change Log		
Change Log	Disabled	Administrator
Maintenance – Configure / View – Maintenance Log		
Maintenance Log	Disabled	Maintenance
Maintenance – Configure / View – Calibration Management		
Test Interval (Days)	0	Maintenance
Test Interval (Weighments)	0	Maintenance
On Expiration	No Action	Maintenance
Last Date Tested	Current Date	Maintenance
Next Test Date	Current Date	Maintenance
# of Weighments Left	0	Maintenance
Maintenance – Configure / View – Calibration Test		
Test Load Units	kg	Maintenance
Test Sequence	Empty	Maintenance

Setup Feature	Default Value	Security Access
Maintenance – Run – Diagnostics – Scale – Calibration Values		
Zero (Counts)	0	Administrator
Test Load #1 (Weight)	50	Administrator
Test Load #1 (Counts)	800,000	Administrator
Maintenance – Run – Diagnostics – Scale – Statistics		
Weighments	0	N/A
Overloads	0	N/A
Peak Weight	0 kg	N/A
Zero Commands	0	N/A
Zero Fail	0	N/A

B.2. Default Templates

Template 1		
Element	**Data**	**Format**
1	wt0101	[010]
2	<sp>	[001]
3	wt0103	[003]
4	CR/LF	1
5	ws0110	[010]
6	<sp>	[001]
7	wt0103	[003]
8	ws0109	[002]
9	CR/LF	1
10	wt0102	[010]
11	<sp>	[001]
12	wt0103	[003]
13	N	[001]
14	CR/LF	2
15	-End-	

Template 2		
Element	**Data**	**Format**
1	cs0103	[021]
2	CR/LF	1

Template 2		
Element	**Data**	**Format**
3	xd0104	[015]
4	CR/LF	1
5	xd0103	[015]
6	CR/LF	1
7	wt0101	[010]
8	<sp>	[001]
9	wt0103	[003]
10	CR/LF	1
11	ws0110	[010]
12	<sp>	[001]
13	wt0103	[003]
14	ws0109	[002]
15	CR/LF	1
16	wt0102	[010]
17	<sp>	[001]
18	wt0103	[003]
19	N	[001]
20	CR/LF	2
21	- End -	

Templates 3 and 4		
Element	**Data**	**Format**
1	- End -	

Template 5		
Element	**Data**	**Format**
1	Totals Report	[040]
2	CR/LF	1
3	xd0104	[020]
4	xd0103	[020]
5	CR/LF	1
6	Subtotal:	- -
7	CR/LF	1
8	n =	- -
9	tz0104	- -

Template 5		
Element	**Data**	**Format**
10	tz0103	[030]
11	ce0103	[004]
12	CR/LF	1
13	Grand Total:	- -
14	CR/LF	1
15	n =	- -
16	tz0102	- -
17	tz0101	[030]
18	ce0103	[004]
19	CR/LF	1
20	- End -	

C Table and Log File Structure

This appendix covers
- Alibi Memory
- Tare Table
- Target Table
- Change Log File
- Maintenance Log File
- Table Reports

The IND560x terminal includes an alibi memory file, a tare table, a target table, a change log file, and a maintenance log file. Descriptions of each of these are included in this chapter.

C.1. Alibi Memory

Alibi memory stores transaction information in a preset format that is not changeable. Alibi memory can be enabled or disabled in setup at **Application > Memory > Alibi**.

The alibi memory operates by storing up to 600 alibi records in a battery-backed file as they occur. After this file is full, all of these records are written to the "alibi.bin" file in flash and the 600-record file is cleared and begins to store the next 600 records. The flash file (alibi.bin) can store up to 60,000 transactions before it rolls over and begins to overwrite the oldest file. When the Alibi memory becomes 75% full, a warning message displays indicating the status. Another message displays when the file is 90% full. It will continue to store records until it is 100% full and then begin overwriting the oldest files. Additional Alibi memory records will be recorded over the older ones.

Each record in the Alibi Memory file includes:

- Date and time stamp fields
- A transaction counter value, which is a unique numeric field that identifies the transaction (the transaction counter must be enabled in terminal setup to activate the transaction counter value)
- Gross or net weight, tare weight, and weight unit

C.1.1. Viewing Alibi Memory Records

Alibi memory records can be viewed in setup at **Application > Memory > Alibi**, or they can be accessed by using either the REPORTS softkey or the Alibi softkey **Alibi** from the home screens.

C.1.1.1. To View Alibi Memory Records

1. Press the REPORTS softkey or the Alibi softkey **Alibi**.

2. If the REPORTS softkey was pressed, select Alibi Memory from the selection box shown.Press the VIEW TABLE softkey shown at the bottom of the screen. The Search Screen displays (Figure C-1). If the ALIBI softkey **Alibi** was pressed instead of the REPORTS softkey from the Home screen, the display will immediately show the Search Screen. Figure C-1 shows the first of two screens, the second containing Search Field 2 and its associated data fields. Note the scroll bar at right indicating the availability of a second screen.

Figure C-1: Alibi Search Screen

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

4. Press the SEARCH softkey . The Alibi Memory Search View screen displays with the search results sorted in chronological order. The file will have the most current record at the end of the file and focus will be on that record. Only the first two fields (date and time) will be shown on the display. The remainder of the fields in each record can be viewed by pressing the RIGHT navigation key to move the view to the right. Pressing the LEFT navigation key will return the view toward the left. Figure C-2 includes a series of screens to show the contents of further columns available in the view.

Figure C-2: Alibi Search Results Views

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

C.2. Tare Table

The IND560x terminal contains a tare table with 25 records for storing tare weights that can be recalled by the operator for use instead of manually entering them for each transaction. This recall function is especially useful when certain tare values are used repeatedly. 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 counter increments by one.

For gross weight accumulation, the tare table can be used with tare values of 0 in order to accumulate weight by tare ID.

The counter for the tare totals is seven digits long and has a maximum value of 1,500,000. When this value is exceeded, an overflow error displays and that value is not accumulated. The counter must be reset in order to continue totalizing. The total register is 11 digits in length including all positions to the right of the decimal point. The decimal position is determined by the display resolution for the unit entered as the tare unit. The maximum value for a scale with a display resolution of 0.01 kg would be 999999999.99 kg. When this value is exceeded, an overflow error displays and that value is not accumulated. The total must be reset in order to continue totalizing.

These tare weights can be recalled by either selecting from a list of all the values using the TARE TABLE softkey followed by the SEARCH softkey or can be "quick accessed" directly by pressing the Tare ID value followed by the TARE TABLE softkey. A printed report of the records in the Tare Table is available through the REPORTS softkey. This procedure is explained later in this chapter.

The structure of a tare record is shown in Table C-1.

Table C-1: Tare Records Stored in the Tare Table

Field	Length	Type	Description
ID	2	Numeric	Numeric string used for tare record lookup
Tare Weight	8	Numeric	Tare value. Stored in display resolution.
Tare Units	3	Alpha	Tare weighing units (dwt, g, kg, lb, oz, ozt, t, ton)
Description	20	Alphanumeric	Description of this tare value
Total Weight	8	Numeric	Total weight of transactions completed using this stored tare record
Total Count	8	Numeric	Total number of transactions using this stored tare record.

C.2.1. Selecting From a List

Before the tare table can be accessed, the TARE TABLE softkey must be added to the softkeys on one of the home screens (refer to Appendix E, Softkey Mapping).

C.2.1.1. To Access the Tare Table

1. Press the TARE TABLE softkey to display the search screen as shown in Figure C-3.

Figure C-3: Tare Table Search Screen

2. Use the Search Field selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" character, the asterisk (*) to view all records.
3. Press the SEARCH softkey . The Tare Table Search View screen displays with the search results sorted by ID. The file will have the lowest record ID at the top of the file and focus will be on that record. Only the first three fields (ID, Tare, and Units) will be shown on the display. The remainder of the fields in each record can be viewed by pressing the RIGHT navigation key to move the view to the right. Pressing the LEFT navigation key will return the view toward the left. Figure C-4 includes a series of screens to show the contents of further columns available in the view.

Figure C-4: Tare Table Search View Results

1. Use the UP and DOWN navigation keys to focus on a tare record.

4. Press the OK softkey to use that record for the tare. The stored tare value is recalled from the Tare Table and is used as the preset tare value. A value stored in the tare table is automatically converted when recalled if it does not match the display unit.

C.2.2. Quick Access

If the ID number for a specific tare record in the Tare Table is known, the record can be quickly recalled for use without going through the view and selection process.

Before the tare table can be accessed, the TARE MEMORY softkey must be added to the softkeys on one of the home screens (refer to Appendix E, **Softkey Mapping**).

C.2.2.1. To Quickly Access a Specific Tare Table Record

1. Use the numeric keypad to enter the one- or two-digit ID for the tare that is to be used. The data entry screen displays as shown in Figure C-5.

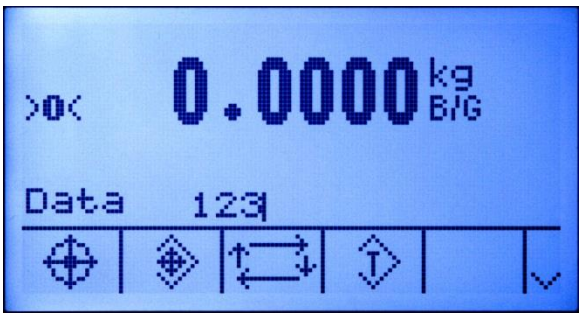


Figure C-5: Data Entry Field

2. Press the TARE TABLE softkey to quickly recall the ID record entered. The stored tare value is recalled from the Tare Table and is used as the preset tare value. A value stored in the tare table is automatically converted when recalled if it doesn't match the display unit.
3. If an invalid ID number is entered, an "ID not found" message displays.

C.2.3. Clearing Totals

All the records in the Tare Table can be cleared by pressing the CLEAR softkey C when viewing the first setup page for the table at **Application > Memory > Tare Table**.

The totals for all of the records in the Tare Table are cleared by pressing the REPORTS softkey, selecting Tare Table from the selection box, and pressing the CLEAR TOTALS softkey C*.

C.2.3.1. To Clear the Total Value of an Individual Record

1. Access the menu tree and move to **Application > Memory > Tare Table**.
2. Press the VIEW TABLE softkey. The Search screen (Figure C-3) displays.
3. Use the Search Field selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" character, the asterisk (*), to view all records.
4. Press the SEARCH softkey. The Tare Table Search View screen (Figure C-4) displays with the search results sorted by ID.

5. Use the UP and DOWN navigation keys to highlight the tare record for which the total is to be cleared and press the EDIT softkey. The Tare Edit screen displays.
6. Press the DOWN navigation key to highlight the "n" and "Total" label and press ENTER.
7. Clear the "n" and/or "Total" values by pressing the CLEAR key on the numeric keypad when focus is in that data entry box. When the value in the data entry box is clear, press ENTER.
8. Press the OK softkey to accept the changes.
9. Press the EXIT softkey four times to return to the home screen.

C.3. Target Table

The IND560x contains a 25-record Target Table that stores frequently used target-comparison values. The fields in the record will depend upon the operating mode of the Target Table and Tolerance Type as selected in setup at **Application > Memory > Target Table**. There are two choices for the mode – Material Transfer or Over/Under. There are either two or three choices for the tolerance type, depending upon the target mode selection.

A target table record can be recalled by picking from a list of all the values using the TARGET TABLE softkey followed by the SEARCH softkey. It may be also be "quick accessed" directly by entering the Target ID value followed by the TARGET TABLE softkey. These procedures are explained later in this section.

A printed report of the records in the Target Table is available through the REPORTS softkey. This procedure is explained later in this chapter.

The possible fields for a target record are shown in Table C-2. Not all fields will be used for all combinations of Operating Mode and Tolerance Type.

Table C-2: Target Records Stored in the Target Table

Field	Length	Type	Description
ID	2	Numeric	Numeric string used for target record lookup
Target weight	8	Numeric	Target value to be used for the comparison
Target units	3	Alpha	Target weighing units (dwt, g, kg, lb, oz, ozt, t, ton)
+ Tolerance or Over Limit	8	Numeric	Acceptable tolerance over the target weight or maximum acceptable weight
– Tolerance or Under Limit	8	Numeric	Acceptable tolerance under the target weight or minimum acceptable weight
Fine Feed	8	Numeric	Amount of material that will be fed in the slower rate of feed in a 2-speed feed system
Spill	8	Numeric	Amount of material in suspension that will add to the weight after all feeds are shut off
Description	20	Alphanumeric	Description of the target record

Regardless of the mode or tolerance type selected in setup, the recall of a target record is performed the same way.

C.3.1. Selecting From a List

Before the Target Table can be accessed, the TARGET MEMORY softkey must be added to the softkeys on one of the home screens (refer to **Appendix E, Softkey Mapping**).

C.3.1.1. To Select From a List

1. Press the TARGET MEMORY softkey to display the search screen as shown in Figure C-6.

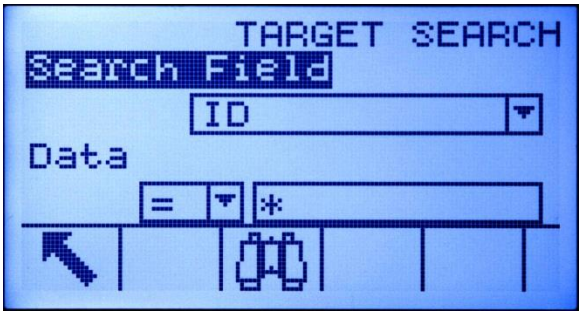


Figure C-6: Target Table Search Screen

2. Use the Search Field selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" character, the asterisk (*) to view all records.
3. Press the SEARCH softkey. The Target Table Search View screen displays with the search results sorted by ID. The file will have the lowest record ID at the top of the file and focus will be on that record. Only the first two fields [ID and Description (if enabled)] will be shown on the display. The remainder of the fields in each record can be viewed by pressing the RIGHT navigation key to move the view to the right. Pressing the LEFT navigation key will return the view toward the left. Figure C-7 includes a series of screens to show the contents of further columns available in the view.

Figure C-7: Target Search View Results

4. Use the UP and DOWN navigation keys to focus on a target record and press the OK softkey to use those values. The stored target record is recalled from the Target Table and placed in the active target record.
5. If a Report connection has been configured, the PRINT softkey can be used to print the current view.

C.3.2. Quick Access

If the ID number for a specific target record in the Target Table is known, the record can be quickly recalled for use without going through the view and selection process.

Before the target table can be accessed, the TARGET MEMORY softkey must be added to the softkeys on one of the home screens (refer to **Appendix E, Softkey Mapping**).

C.3.2.1. To Quickly Access a Specific Target Table Record

1. Enter the one- or two-digit ID for the tare that is to be used. The display will show the data entry screen as shown in Figure C-5.
2. Press the TARGET MEMORY softkey to quickly recall the ID record entered. The stored target value is recalled from the Target Table and is loaded into the active target record.
3. If an invalid ID number is entered, a message [ID not found] displays.

C.3.3. Target Record Units

If second and/or third units are established in the IND560x, target records that utilize either second or third units can be retrieved from the Target Table into Active Target status. The IND560x 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.

C.4. Change Log File

The Change Log in the IND560x terminal file tracks all changes to shared data. The Change Log can be enabled or disabled in setup at **Maintenance > Configure/View > Change Log**.

The Change Log file is a linear-type file that eventually becomes full if not reset. It will hold an estimated 2,500 records. When the file becomes 75% full, a warning message displays indicating the status. Another message displays when the file is 90% full. If the file is not reset, it will continue to store records until it is 100% full and a final 100% full message displays. Additional changes to shared data will not be recorded until the file is reset.

The Change Log file is available as a comma-delimited file (change.csv) that can be exported to the InSite program or any FTP client PC. The variable length Change Log record structure and an example are as follows:

Timestamp , Username , SDName , Value

2005/02/11 09:45 , System , ce0102 , "91"<CR><LF>

2005/02/11 09:46 , System , sp0105 , "25.85" <CR><LF>

C.4.1. Viewing Change Log File Records

The Change Log records can be viewed in setup at **Maintenance > Configure/View > Change Log**.

The setup mode access is described in this section and access via the REPORTS softkey is described at the end of this appendix.

C.4.1.1. To Access Change Log File Records

1. Access the menu tree and open the **Maintenance > Configure/View > Change Log** sub-branch.
2. Press the VIEW TABLE softkey. The Log Search screen displays (Figure C-8). Note the scroll bar, indicating that a second screen is available. Scroll down to see Search Field 2 and its associated data fields.

Figure C-8: Change Log Search Screen

3. Use the Search Field 1 and Search Field 2 selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" asterisk character (*) to view all records.
4. When the search criteria are set, press the SEARCH softkey. The Log Search View screen (Figure C-9) displays with the search results sorted in chronological order (the oldest record displays first). Additional columns of data (User name, Shared Data name, New Value) may be viewed by scrolling to the right.

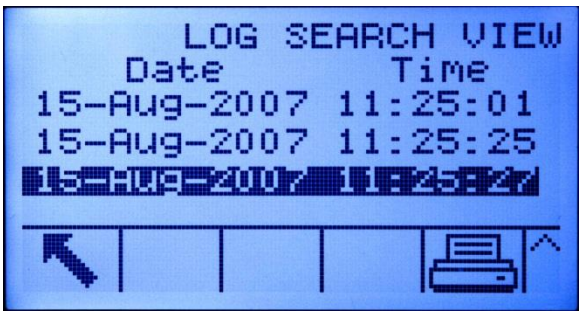


Figure C-9: Change Log Search View Screen

5. If a Report connection has been configured, the PRINT softkey can be used to print the current view.
6. Press the EXIT softkey to return to the Log Search Screen.

C.4.2. Resetting the Log File

The Change Log file is reset each time a Master Reset is done and can also be manually reset in setup.

C.4.2.1. To Reset the File Manually

1. Enter the menu tree and go to **Maintenance > Configure/View > Change Log**.
2. Press the RESET softkey to reset the log file. A screen displays that asks for verification. Press the OK softkey to continue. A status message displays verifying that the reset was successful.

C.5. Maintenance Log File

A Maintenance Log can be enabled or disabled in setup at **Maintenance > Configure/View > Maintenance Log**.

The Maintenance Log file is a ring-type file that overwrites the oldest record when it becomes full. It will hold an estimated 2,500 records. When the file becomes 75% full, a warning message displays indicating the status. Another message displays when the file is 90% full. If the file is not reset, it will continue to store records until it is 100% full and then begin overwriting the oldest files. Additional maintenance records will be recorded over the older ones.

The Maintenance Log tracks and logs service operations that are performed on the IND560x. The items logged include functions such as calibration and file export.

The Maintenance Log file is available as a comma-delimited file that can be exported to the InSite program or any FTP client PC. A Maintenance Log record structure and an example are as follows:

Timestamp , Username , Channel , Cell , Event Code , Status

2005/02/11 09:45 , System , 01 , ,02 , SUCCESS<CR><LF>

A complete list of the possible event codes for the IND560x terminal is listed in Table C-3.

Table C-3: Maintenance Log Event Codes and Status

Channel	Cell	Event	Description	Status Code(s)
<blank>	<blank>	1	Calibration test failed	1-n = failed at step n.
Scale #	<blank>	2	Zero calibration performed	failed, success, motion
Scale #	<blank>	3	Span calibration performed	failed, success, motion
Scale #	<blank>	4	CalFREE calibration performed	failed, success
<blank>	<blank>	8	Log file exported	Maintenance, Change, Alibi
<blank>	<blank>	9	Setup file exported	Success
<blank>	<blank>	10	Metrology switch / electronic seal broken	Success

Channel	Cell	Event	Description	Status Code(s)
Scale #	<blank>	11	Calibration Expired	1 = Days 2 = Weighments
Various	Various	15	Added option component	Text(8)
Various	Various	16	Removed option component	Text(8)
Various	Various	17	Replaced component	Text(8)
<blank>	<blank>	18	Maintenance Log initialized	Success
Scale #	<blank>	19	Calibration values manually edited	Success
<blank>	<blank>	21	Set date or time	Success
<blank>	<blank>	22	Table exported	A1, A2, A3, A4
Scale #	<blank>	23	Calibration Test Passed	Success

C.5.1. Viewing Maintenance Log File Records

The Maintenance Log records can be viewed in setup at Maintenance > Configure/View > Maintenance Log.

C.5.1.1. To Access the Maintenance Log File

1. Access the menu tree and open the **Maintenance > Configure/View > Maintenance Log** sub-branch.
2. Press the VIEW TABLE softkey. The Maintenance Log Search screen displays (Figure C-10).

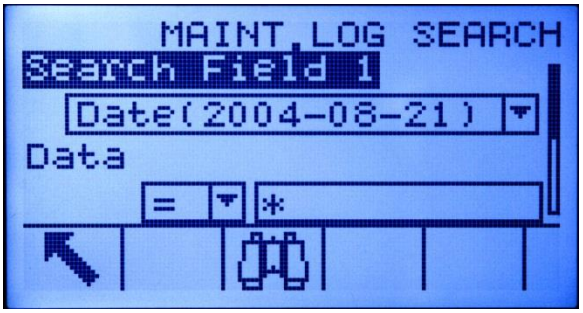


Figure C-10: Maintenance Log Search Screen

3. Use the Search Field 1 and Search Field 2 selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" asterisk character (*) to view all records.
4. When the search criteria are set, press the SEARCH softkey. A Log Search View screen like the one shown in Figure C-9 displays with the search results sorted in chronological order (oldest record displays first). Only the first two fields (Date and Time) will be shown on the display. The other two fields in each record (User name and Status) can be viewed by pressing the RIGHT navigation key to move the view to the right. Pressing the LEFT navigation key will return the view toward the left.

5. Use the UP and DOWN navigation keys to focus on any record.
6. If a Report connection has been configured, the PRINT softkey can be used to print the current view.
7. Press the EXIT softkey to return to the Maintenance Log Search Screen.

C.5.2. Resetting the Log File

The Maintenance Log file is reset each time a Master Reset is done and can also be manually reset in setup.

C.5.2.1. To Reset the File Manually

1. Enter the menu tree and go to the **Maintenance > Configure/View > Change Log** sub-branch.
2. Press the RESET softkey to reset the log file. A screen displays that asks for verification. Press the OK softkey to continue. A status message displays verifying that the reset was successful.

C.6. Table Reports

The Alibi Memory, Tare Table, and Target Table can be viewed by an operator by pressing the REPORTS softkey. Results of the table view for the Tare Table and Target Table can be printed directly from the Reports page; the Alibi memory file can be printed once its view is accessed. The table report structures are based on the fields defined in the table and report configuration. All fields are all available to be enabled or disabled in the table's configured fields for the report. The programming of the format for the report print is described in Chapter 3, **Configuration**, and sample report printouts are provided in Appendix D, **Communication** in the Reports section.

In order to access the report function, the REPORTS softkey must be added to the selection of softkeys on one of the home pages (refer to Appendix E, **Softkey Mapping**).

C.6.1. To View and Print a Table

1. Press the REPORTS softkey. The Reports Selection Screen displays (Figure C-11). Only tables that have been enabled in setup are shown. The Tare Table will always be shown.

Figure C-11: View Reports Screen

2. Select the table to view from the Type selection box, or press the PRINT softkey to print either the Tare or Target Table. Because the Alibi table is likely to be large, it cannot be printed directly from this screen; the table must be filtered and the results shown in the Alibi Search

View screen before a print can be initiated. A "Reports" connection must be configured to enable the report print. Note that the available softkeys will change based on the selection of the type of report.

3. After selecting the report, press the VIEW TABLE softkey .
4. The table search screen displays. These screens are shown in Figure C-1, Figure C-3, or Figure C-6, depending upon which table is being viewed.
5. Use the Search Field selection boxes and associated data fields to enter specific search information to limit the search, or use the default "find all" character, the asterisk (*) to view all records.
6. Press the Search softkey to view the results of the search. Each of the tables can be printed from its Search View screen.

C.7. Calibration Test Report

A Calibration Test Report can be printed at the completion of all of the steps in a successful or failed calibration test procedure. Details on how to setup and run a stored calibration test can be found in Chapter 3, **Configuration**.

After progressing through all of the steps in the calibration test procedure, a Test Complete message displays along with a Status message of either Pass or Fail. Press the PRINT softkey to print the calibration test report. A connection with a Report assignment is required at **Communication > Connections** to successfully print the Calibration Test Report. An example of the Calibration Test Report is show in Figure C-12. The Calibration Test Report is a fixed format and cannot be modified.

```
     Calibration Test Report

      16:18:51      20/Jul/2010

IND560
METTLER TOLEDO
IND560
Scale:
Technician: JOHNSON
Weight Units: kg

          ID              Weight
--------------------  --------

#       +/-      Target     Actual   OK
-- --------  --------  --------  --
 1       0.1         5         5   -
 2      0.15        25      25.1   -
 3         1        99     100.3   X
 4       1.1       150     149.9   -

Test Status:  Failed
```

Figure C-12: Sample Calibration Test Report

D Communications

This appendix covers
- Serial Interface Parameters
- Demand Output Mode
- Continuous Output Mode
- CTPZ
- SICS Protocol
- Remote Discrete I/O
- ASCII Input
- Reports
- Shared Data Access
- Ethernet
- FTP
- Terminal Updates

⚠ WARNING

THE INFORMATION IN THIS SECTION OF THE IND560x TECHNICAL MANUAL IS INTENDED TO ACT AS A REFERENCE CONCERNING ONLY THE STRUCTURE AND SETUP OF COMMUNICATION PROTOCOLS SUPPORTED BY THE IND560x TERMINAL. INSTALLATION OF COMMUNICATION OPTIONS ARE SHOWN IN THE INSTALLATION SECTION OF THIS MANUAL, APPENDIX A.

NOTICE

BE CERTAIN THAT THE COMMUNICATION CIRCUITS ARE WIRED EXACTLY AS SHOWN IN THE INSTALLATION SECTION OF THIS MANUAL. IF THE WIRES ARE NOT CONNECTED CORRECTLY, THE IND560x TERMINAL OR INTERFACE BOARD MAY BE DAMAGED.

D.1. Serial Interface Parameters

One standard and four optional serial ports are supported with the IND560x terminal. COM1 is the standard port, and can be found on the Main PCB of the IND560x. The optional COM2 and COM3 can be found on the Ethernet/COM2/COM3 interface that is installed in the ACM500 safe area communication module. The optional COM4 and COM5 are found on the fiber optic or intrinsically safe current loop interface boards that can be installed in the IND560x terminal.

COM1 provides an RS-232 interface. This is a three-wire (TDX, RXD, and GND) interface with XON/XOFF flow-control capabilities (handshaking). This port can also be used for loading new IND560x firmware and to access the shared data server.

Optional COM2 provides only RS-232. This interface is a three-wire connection with XON/XOFF handshaking capabilities.

Optional COM3 provides RS-232, RS-422, and RS-485 interfaces. The RS-232 interface is a three-wire (TDX, RXD, and GND) with XON/XOFF flow-control capabilities (handshaking). The RS-422 is a four-wire interface designed for single point-to-point communication. The RS-485 connection is a two-wire interface but does not provide multi-drop communication with addressing. All interfaces can be output simultaneously; however, only one input can be used.

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

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

- 1 stop bit

The baud rate can be configured from 300 to 115.2K baud and a checksum character can also be configured for the standard continuous output string.

The IND560x terminal uses software handshaking to control data flow commonly referred to as XON/XOFF handshaking. When a receiving device is getting information from an IND560x terminal and cannot receive any more in its buffer, it sends an ASCII XOFF (13h) telling the IND560x terminal to temporarily stop sending data until its buffer clears.

When the device can receive more data, it sends an ASCII XON (11h) telling the IND560x terminal to begin sending data again. This process can occur as often as required by a receiving device.

The XON/XOFF method is the only type of handshaking that is supported by the IND560x terminal.

The IND560x terminal supports two different modes of data output – demand and continuous.

D.2. Demand Output Mode

The demand output mode transmits data only when the IND560x terminal receives a print request. Print requests are sent to the IND560x terminal when:

- The operator presses the PRINT button
- A discrete input selected as print is triggered
- An ASCII "P" is sent through a command input port
- Auto print is enabled and all conditions for auto print are met
- A PLC command to print is received
- The "Print" command shared data is triggered

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

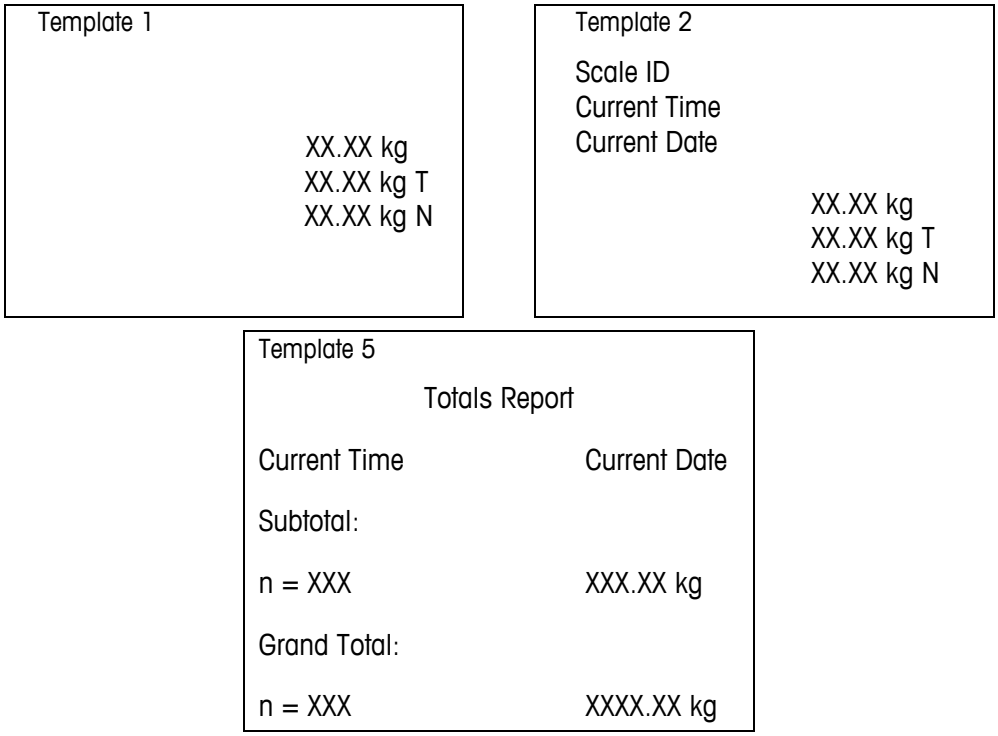
D.3. Custom Triggers

There are three programmable custom triggers in the Connections section of setup that can be used to "trigger" a specific demand output. This could be used to provide a separate "Print" key (using a discrete input) that prints a specific template to a particular serial port or Ethernet. Using the custom triggers enables printing of different information to the same port or a different port based on which custom trigger is initiated. While not normally used, these custom triggers provide great flexibility in configuring demand outputs.

A connection using a custom trigger is configured like a standard demand output except that Trigger 1, Trigger 2, or Trigger 3 is selected as the trigger instead of Scale. After making the connection, a custom trigger can be assigned to one of the discrete inputs to initiate the demand output. A custom trigger can also be initiated directly by a PLC command (refer to the IND560x Terminal **PLC Interface Manual**); by toggling one of the cp0101, cp0102, or cp0103 shared data variables (refer to the IND560x **Shared Data Reference**); or by assigning the trigger to one of the trigger softkeys (refer to Appendix E, **Softkey Mapping**, and to the Connections section of Chapter 3, **Configuration**).

D.4. Output Templates

The IND560x provides five fully customizable templates to define a custom string of data to be transmitted. A template can be used with a demand mode connection, a custom trigger connection or with a continuous template connection. In the setup of the terminal, a template is tied to an output connection so that when that connection is triggered, the selected template will be transmitted. The three default templates in the terminal from the factory are as follows:



Each template can store up to 1,000 bytes of data. Table D-1 defines how the 1,000 bytes are calculated. There is no warning if a template overflows this limit until the template is saved. At this time, any information over the 1,000-byte limit will be lost. The InSite program does track the size of the template as it is being built and provides an appropriate warning if the limit is exceeded.

Table D-1: Calculation of Template Data Bytes

Print Field	Space Used
IND560x Data Field	8 characters
Special Character	4 characters + code (2 or 3 characters depending on the character)
String Field	String length + quantity (1 or 2)
Justify a Field	2 characters + justify letter (L, R, C) + space limit (1, 2, or 3 characters)
Zero Fill a Field	2 characters + Z + space limit (1, 2 or 3 characters)
Repeat Character	5 characters + number (1, 2 or 3 digits for number of times repeated)
Line end <CR><LF>	7 characters

D.4.2. Template Example

The following example shows a customer ticket that has three template strings centered in a 40-character wide field, with an asterisk underline.

```
J.W. CAREY COMMUNICATIONS
URBANA, ILLINOIS
DAILY WEIGHT TOTALS
****************************************
```

Use the information in Table D-2 to calculate how much of the template remains for field data.

Table D-2: Space Required for the Example Ticket Heading Information

Character Description	Character Total
IND560x Field (String 1)	8 (IND560x shared data field)
Centered (Justify in 40-character field)	2 + 1 (letter C) + 2 (two digits for quantity 40)
CR (ASCII Carriage Return character	2 + 1 (one digit for quantity 1)
LF (ASCII Line Feed character	2 + 1 (one digit for quantity 1)
Total formatting characters required	19
Total space required (characters on each line)	25 + 19 + 19 = 63
ASCII (*) character	1 (ASCII character)
Repeat (*) 40 times	5 (repeat) + 2 (number of repeats)
CR	2 + 1 (one digit for quantity 1)
LF (ASCII Line Feed character)	2 + 1 (one digit for quantity 1)
Total space for line of asterisks	14
Grand total of characters (19 + 63 + 14)	96
Total characters remaining in this template (1,000 – 96)	904

- For template space calculation:
  - Regardless of the number of characters in an IND560x terminal data field, a template uses only eight characters (the field code).
  - Justification uses four to six characters that are not used if the field remains unjustified.

D.5. Continuous Output Mode

The continuous output mode of the IND560x can be used to continuously send weight data and scale status information to a remote device such as a PC or a remote display.

D.5.1. Standard Continuous Output

Continuous mode can be assigned to COM1, COM2, COM3, COM4, COM5, Ethernet 1 or Eprint. Checksum can be enabled or disabled on any of these ports with continuous output. A data string will be output approximately 20 times per second for baud rates above 4800 baud. If a baud rate below 4800 is selected, the output rate will be slower. At 300 baud, the output rate is only approximately 2 per second. A specific output rate can be set through a Shared Data write to field cs0121 (refer to the IND560 Shared Data Reference).

The format is fixed, except for baud rate, parity, data flow (XON/XOFF), and interface type. The data consists of 17 or 18 bytes as shown in Table D-3.

Non-significant weight data and tare data digits are transmitted as spaces. The continuous output mode provides compatibility with METTLER TOLEDO products that require real-time weight data. Table D-3 shows continuous format output.

Table D-3: Continuous Output Format

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

- Continuous Output Format Notes:

1. ASCII Start of Text character (02 hex), always transmitted.
2. Status words. Refer to Table D-4, Table D-5, and Table D-6 for details.
3. Displayed weight. Either gross or net weight. Six digits, no decimal point or sign. Insignificant leading zeroes are replaced with spaces.
4. Tare weight. Six digits of tare weight data. No decimal point in field.
5. ASCII Carriage Return <CR> character (0D hex).
6. Checksum, transmitted only if enabled in setup. Checksum is used to detect errors in the transmission of data. Checksum is defined as the 2's complement of the seven low order bits of the binary sum of all characters preceding the checksum character, including the <STX> and <CR> characters.

Table D-4, Table D-5, and Table D-6 detail the standard status bytes for standard continuous output.

Table D-4: Status Word A Bit Definitions

Bits 2, 1, and 0			
2	1	0	**Decimal Point Location**
0	0	0	XXXXX00
0	0	1	XXXXX0
0	1	0	XXXXXX
0	1	1	XXXXX.X

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

Table D-5: Status Word B Bit Definitions

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

Table D-6: Status Word C Bit Definitions

Bits 2, 1, and 0			Weight Description
2	**1**	**0**	
0	0	0	lb or kg, selected by Status Byte B, bit 4
0	0	1	grams (g)
0	1	0	metric tons (t)
0	1	1	ounces (oz)
1	0	0	troy ounces (ozt)
1	0	1	penny weight (dwt)
1	1	1	tons (ton)
1	1	1	custom units

Bit 3	Print Request = 1
Bit 4	Expand Data x 10 = 1, Normal = 0
Bit 5	Always = 1
Bit 6	Always = 0

D.5.2. Continuous Template Output

If continuous template is selected as the assignment for a connection, a custom string of data can be configured using one of the five available templates. When a continuous template output is selected, the output rate will depend on the size of the template and the baud rate selected. The rate will vary from approximately once per second up to approximately 20 times per second. Refer to Table D-7 for estimated output rates of a 160 byte template.

Table D-7: Continuous Template Output Rate

Baud Rate	Outputs/Second	Baud Rate	Outputs/Second
300	1	9600	10
600	2	19200	12
1200	4	38400	14
2400	6	57600	16
4800	8	115200	18

The template can include any combination of elements (IND560x Field Codes, ASCII characters, or print strings). Note that the output rate may be adversely affected by transmitting a large template or selecting a slow baud rate.

The template is configured as explained in Chapter 3, Configuration, and this template has the same size restrictions as described above in the Demand Output Mode, Output Templates section.

D.6. CTPZ

The CTPZ input mode provides a method for a remote serial device to trigger several basic functions when a control character is sent to the IND560x. Remote ASCII control characters and the IND560x terminal responses include:

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

All other characters are ignored.

- ASCII control characters can be sent in upper- or lower-case.

Example

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

D.7. Standard Interface Command Set (SICS) Protocol

The IND560x terminal supports the METTLER TOLEDO Standard Interface Command Set (MT-SICS), which is divided into four levels (0, 1, 2, 3), depending on the functionality of the device. The IND560x terminal supports parts of levels 0 and 1:

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

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

D.7.1. Data Interface Configuration

Setting of the interface such as baud rate, number of data bits, parity, handshake protocols and connector pin assignments are described in Chapter 3.0, Configuration.

D.7.2. Version Number of the MT-SICS

Each level of the MT-SICS has its own version number, which can be requested with the command I1 from level 0. The IND560x supports:

- MT-SICS level 0, version 2.2x (except the ZI command)
- MT-SICS level 1, version 2.2x (except the D, DW and K commands)

D.7.3. Command Formats

Each command received by the scale via the data interface is acknowledged by a response of the device to the transmitter. Commands and responses are data strings with a fixed format. Commands sent to the IND560x terminal comprise one or more characters of the ASCII character set. Enter commands only in uppercase.

- The parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec., in the examples shown in this section, a space is represented as _).
- Each command must be terminated by CR LF (ASCII 13 dec., 10 dec.)

The characters CR and LF, which can be inputted using the ENTER or RETURN key of most entry keypads, are not listed in this description. However, it is essential they be included for communication with the IND560x terminal.

Example

Command to tare the IND560x terminal:

"TA_20.00_lb" (The command terminator CR LF is not shown.)

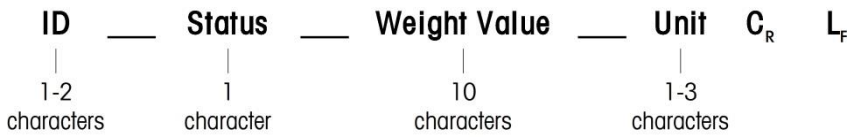
D.7.4. Response Formats

All responses sent by the IND560x terminal to the transmitter to acknowledge the received commands have one of the following formats:

- Response with weight value
- Response without weight value
- Error message

D.7.4.1. Format of the Response with Weight Value

A general description of the response with weight value as follows:



- ID – Response identification.
- __ – Space (ASCII 32 dec.)
- Status – Status of the IND560x terminal. See description of the commands and responses.
- Weight Value – Weighing result, which is shown as a number with 10 digits, including sign directly in front of the first digit. The weight value appears right justified. Preceding zeroes are suppressed with the exception of the zero to the left of the decimal point.
- Unit – Weight unit displayed.
- CR – Carriage Return (ASCII 13 dec.)
- LF – Line Feed (ASCII 10 dec.)

  Comment – CR LF will not be shown in this description.

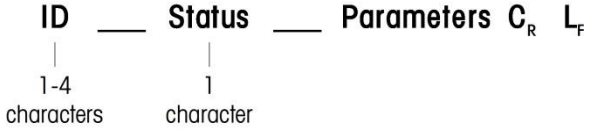
Example

Response with a stable weight value of 0.256 kg:

S _ S_ _ _ _ _ _ 0.256 _ kg

D.7.4.2. Format of the Response Without Weight Value

A general description of the response without weight value is as follows:



- ID – Response identification.

- _ – Space (ASCII 32 dec.)
- Status – Status of the IND560x terminal. See description of the commands and responses.
- Parameters – Command-dependent response code.
- CR – Carriage Return (ASCII 13 dec.)
- LF – Line Feed (ASCII 10 dec.)

  Comment – CR LF will not be shown in this description.

D.7.4.3. Format of Error Messages

ID C_R L_F

- ID – Error Identification
  There are four different error messages. The identification always comprises two characters:

  ES – Syntax error
  The IND560x terminal has not recognized the received command.

  ET – Transmission error
  The scale has received a "faulty" command, such as a parity error.

  EL – Logical error
  The command is understood, the parameter is wrong.

  EI – Internal Error
  The command is understood but cannot be executed at this time.

  CR – Carriage return (ASCII 13 dec.)

  LF – Line Feed (ASCII 10 dec.)

  Comment – CR LF will not be shown in this description.

D.7.5. Tips for the Programmer

Tips for programming the IND560x terminal SICS protocol include:

D.7.5.1. Command and Response

Improve the dependability of application software by having the program evaluate the response of the IND560x terminal to a command. The response is the acknowledgment that the IND560x terminal has received the command.

D.7.5.2. Reset

When establishing communication between the IND560x terminal and system, send a reset command to the IND560x terminal to enable a start from a determined state. When the IND560x terminal or system is switched on or off, faulty characters can be received or sent.

D.7.5.3. Quotation Marks (" ")

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

D.7.6. Commands & Responses MT-SICS Level 0

The IND560x terminal receives a command from the system computer and acknowledges the command with an appropriate response. The following sections contain a detailed description of the command set in alphabetical order with the associated responses. Commands and responses are closed with CR and LF. These termination characters are not shown in the following description, but they must always be entered with commands or sent with responses.

The commands of MT-SICS level 0 are available with even the simplest devices, which support the METTLER TOLEDO Standard Interface Command Set. These include:

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

The following are detailed descriptions of these Level 0 commands:

D.7.6.1. I0 – INQUIRY OF ALL IMPLEMENTED MT-SICS COMMANDS

Command: I0 – Inquiry of all implemented MT-SICS commands

Response:	I0 B 0 "I0"	Level 0 "I0" command implemented
	I0 B 0 "I1"	Level 0 "I1" command implemented
	I0 B 0 "I2"	Level 0 "I2" command implemented
	I0 B 0 "I3"	Level 0 "I3" command implemented
	I0 B 0 "I4"	Level 0 "I4" command implemented
	I0 B 0 "S"	Level 0 "S" command implemented
	I0 B 0 "SI"	Level 0 "SI" command implemented
	I0 B 0 "SIR"	Level 0 " SIR" command implemented
	I0 B 0 "Z"	Level 0 "Z" command implemented
	I0 B 0 "@"	Level 0 "@" command implemented
	I0 B 1 "SR"	Level 1 "SR" command implemented

I0 B 1 "T"	Level 1 "T" command implemented
I0 B 1 "TA"	Level 1 "TA" command implemented
I0 B 1 "TAC"	Level 1 "TAC" command implemented
I0 B 1 "TI"	Level 1 "TI" command implemented

Error Response I0 I - Cannot execute command at this time.

D.7.6.2. I1 – INQUIRY OF MT-SICS LEVEL AND MT-SICS VERSIONS

Command: I1 – Inquiry of MT-SICS level and MT-SICS versions

Response: I 1 _ A _ "" _ "2.2x" _ "2.2x" _ " " _ " "

- "" No Levels fully implemented
- 2.2x Level 0, version V2.2x
- 2.2x Level 1, version V2.2x
- "" No MT-SICS 2 commands
- "" No MT-SICS 3 commands
- Error Response I1 _ I – Command understood, not executable at present.

Comments

- In the case of the MT-SICS level, only fully implemented levels are listed. In this case, neither level 0 nor level 1 were fully implemented so the level is not specified.
- In the case of the MT-SICS version, all levels are specified even those only partially implemented.

D.7.6.3. I2 – INQUIRY OF DATA

Command: I2 – Inquiry of data.

Response: I 2 _ A _ "IND560x _ Standard _50.00 kg"

Response: I 2 _ A _ "IND560x _ 560Fill _50.00 kg"

- IND560x - Model number of terminal
- Standard - Basic model with no special application software
- 560Fill - Sent when an IND560-Fill is queried
- 50.00 kg - Capacity and primary unit of the base connected to the IND560x
- Error Response I2 _ I – Command understood, not executable at present.

Comments

- The number of characters of "text" depends on the application software and scale capacity.

D.7.6.4. I3 – INQUIRY OF SW VERSION AND TYPE DEFINITION NUMBER

Command I3: Inquiry of SW version number(s) and type definition number.

Response: I3 _ A _ "1.00"

- 1.00 – Firmware version of the IND560x
- Error Response I3 _ I – Command understood, not executable at present.

Comment

- The number of characters of "text" depends on the revision and device type.

D.7.6.5. I4 – INQUIRY OF SERIAL NUMBER

Command: I4 – Inquiry of serial number.

Response: I4 _ A _ "text"

- Serial number as "text" (content of shared data xs0105 in IND560x terminal)
- Error Response I4 _ I – Command understood, not executable at present.

Example

Command: I 4 – Inquiry of serial number

Response: I 4 _ A _ "123456-6GG"

Comments

- The serial number response is the content of the terminal serial number as entered in the setup.

D.7.6.6. S – SEND STABLE WEIGHT VALUE

Command: S – Send the current stable net weight.

Response:

- S _ S _ WeightValue _ Unit – Current stable weight value.
- S _ I – Weight value is in the current displayed units.
- S _ + – IND560x in overload range.
- S _ - – IND560x in underload range.

Example

Command: S – Send a stable weight value.

Response: S _ S _ _ _ _ _ 100.00 _ kg. – The current, stable weight value is 100.00 kg.

Comments

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

D.7.6.7. SI – SEND WEIGHT VALUE IMMEDIATELY

Command: SI – Send the current net weight value regardless of scale stability.

Response:

- S _ S _ WeightValue _ Unit – Stable weight value.
- S _ D _ WeightValue _ Unit – Non-stable (dynamic) weight value.
- S _ I – The command is understood, cannot execute the received command at this time (scale currently executing another command, such as tare).
- S _ + – IND560x in overload range.
- S _ - – IND560x in underload range.

Example

Command: SI – Send current weight value.

Response: S _ D _ _ _ _ _ 129.07 _ kg – The current weight value is unstable (dynamic) and is 129.07kg.

Comments

- The response to the command SI is the last internal weight value (stable or dynamic) before receipt of the command SI.
- Weight value is in the current displayed units.

D.7.6.8. SIR – SEND WEIGHT VALUE IMMEDIATELY AND REPEAT

Command: SIR – Send the net weight values repeatedly, regardless of scale stability.

Response:

- S _ S _ WeightValue _ Unit – Stable weight value.
- S _ D _ WeightValue _ Unit – Non-stable (dynamic) weight value.
- S _ I – The command is understood, cannot execute the received command at this time (IND560x terminal is executing another command, such as tare).
- S _ + – IND560x in overload range.
- S _ - – IND560x in underload range.

Example

Command: SIR – Send current weight values at intervals.

Response:

- S _ D _ _ _ _ _ 129.07 _ kg
- S _ D _ _ _ _ _ 129.08 _ kg
- S _ D _ _ _ _ _ 129.09 _ kg
- S _ D _ _ _ _ _ 129.09 _ kg

- S _ D _ _ _ _ _ 114.87 _ kg
- **. . .** – The scale sends stable or non-stable weight values at intervals.

Comments

- SIR is overwritten and cancelled by the commands S, SI, SR, and @.
- The number of weight values per second depends on the scale type and will vary from approximately 6 (older IDNet bases) to approximately 50 (SICSpro bases).
- Weight value is in the current displayed units.

D.7.6.9. Z – ZERO

Command: Z – Zero the scale.

Response:

- Z _ A – The following then holds:

  Scale is in gross mode

  Zero setting performed, (stability criterion and zero setting range complied with).
- Z _ I – The command is understood, cannot execute the received command at this time (IND560x terminal is currently executing another command, such as tare, or timeout as stability was not reached.)
- Z _ + – Upper limit of zero setting range exceeded.
- Z _ - – Lower limit of zero setting range exceeded.

Example

Command: Z – Zero.

Response: Z _ A – Zero setting performed.

Comments

- If enabled in setup a tare value will be cleared during zero setting.
- The zero point determined during switching on is not influenced by this command (the measurement ranges remain unchanged).
- The duration of the timeout is approximately one second.

D.7.6.10. @ – RESET

Command: @ – Reset the scale to the condition found after switching on, but without a zero setting being performed.

Response:

- I 4 _ A _ "text" – Serial number of the scale, the scale is ready for operation.

Example

Command: @

Response: I4 _ A _ "123456-6GG" – The IND560x terminal is reset and sends the serial number.

Comments

- All commands awaiting responses are canceled.
- The "reset" command is always executed.
- A reset command received by the IND560x terminal during the calibration and test procedure cannot be processed.

D.7.7. Commands & Responses MT-SICS Level 1

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

- SR – Send weight value on weight change (Send and Repeat)
- TA – Set tare value
- TAC – Clear tare value
- TI – Tare Immediately

D.7.7.1. SR – SEND WEIGHT VALUE ON WEIGHT CHANGE (SEND AND REPEAT)

Command: SR

- S R _ PresetValue _ Unit – Send the current stable weight value and then continuously after every weight change greater or equal to the preset value a non-stable (dynamic) value followed by the next stable value, range = 1d to maximum load.
- SR – If no preset value is entered, the weight change must be at least 12.5% of the last stable weight value, minimum = 30d.

Response:

- S _ S _ WeightValue _ Unit – Current, stable weight value. Weight change.
- S _ D _ WeightValue _ Unit – Non-stable weight value.
- S _ S _ WeightValue _ Unit – Next stable weight value.
- S _ I – The command is understood, the received command cannot be executed at this time (the IND560x terminal is currently executing another command, such as tare, or timeout as stability was not reached.)
- S _ L – Command understood, parameter wrong.
- S _ + – IND560x in overload range.
- S _ - – IND560x in underload range.

Example

Command: S R _ 0.50 _ kg – Send the current stable weight value followed by every load change $\geq$ 0.50 kg.

Response:

- S _ S _ _ _ _ _ 100.00 _ kg – Scale stable.
- S _ D _ _ _ _ _ 115.23 _ kg – More than 0.50 kg loaded.
- S _ S _ _ _ _ _ 200.00 _ kg – Scale again stable.

Comments

- SR is overwritten and cancelled by the commands S, SI, SIR, @ and hardware break.
- If, following a non-stable (dynamic) weight value, stability has not been reached within the timeout interval, the response "S _ I " is sent and then a non-stable weight value. Timeout then starts again form the beginning.
- The preset value must be entered in the first unit that is the weight unit displayed after the IND560x terminal has been switched on.

D.7.7.2. T – TARE

Command: T – Tare a stable weight value

Response:

T_S_WeightValue_Unit – Taring performed. Stability criterion and taring range comply with settings. Current Tare weight value in current units is returned.

T_ I – Taring not performed (scale is executing another command, zero setting, or stability timeout reached.)

T_+ – Upper limit of taring range exceeded.

T_- – Lower limit of taring range exceeded.

Example

Command: T

Response: T _S _ _ _ _ _100.00_kg – The IND560 has accepted a tare value of 100.00 kg.

Comments

The new tare weight value overwrites tare memory.

The duration of the timeout depends on the scale type and its settings. If motion does not settle within this time, the command is aborted.

Clearing tare value: See command TAC

D.7.7.3. TA – INQUIRE/ENTER TARE VALUE

Command: TA – Inquiry of tare weight value

TA _ Tare Preset Value _ Unit – Entry of a tare value.

Response:

- T A _ A _ TareWeightValue _ Unit – Current Tare weight value.
- T A _ I – The command is understood, the received command cannot be executed at this time (the IND560x terminal is currently executing another command, such as zero setting).
- T A _ L – Command understood, parameter wrong.

Example

Command: T A _ 10.00 _ kg – Load a preset tare of 10 kg.

Response: T A _ A _ _ _ _ _10.00_k g – The IND560x has accepted the 10.00 kg tare value.

Comments

- The existing tare will be overwritten by the preset tare weight value.
- The IND560x terminal will automatically round the inputted tare value to the current readability.
- The preset value must be entered in the current units.

D.7.7.4. TAC – CLEAR TARE VALUE

Command: TAC – Clear tare value.

Response:

- TAC _ A – Tare value cleared.
- TAC _ I – The command is understood, the received command cannot be executed at this time (the IND560x terminal is currently executing another command, such as zero setting, or timeout as stability was not reached).

D.7.7.5. TI – TARE IMMEDIATELY

Command: TI – Tare immediately, (store the current weight value, which can be stable or non-stable (dynamic), as tare weight value).

Response:

- T I _ S _ WeightValue _ Unit – Taring performed, stable tare value.
- T I _ D _ WeightValue _ Unit – Taring performed, non-stable (dynamic) tare value.
- T I _ I – The command is understood, the received command cannot be executed at this time (the IND560x terminal is currently executing another command, such as zero setting.)
- T I _ L – The command is understood, the parameter is wrong.
- T I _ + – Upper limit of taring range exceeded.
- T I _ - – Lower limit of taring range exceeded.

Example

Command: TI – Tare.

Response: T I _ D _ _ _ _ _117.57 _ kg – The tare memory holds a non-stable (dynamic) weight value.

Comments

- Any previous tare value will be overwritten by the new tare weight value.
- Even during a non-stable (dynamic) condition, a tare weight value can be determined. However, the tare value determined in this manner may not be accurate.

The stored tare weight value is sent in the current units.

D.8. Remote Discrete I/O (ARM100)

The IND560x provides the ability to expand the discrete input and output control to remote ARM100 devices. This ability is required when more than four inputs or six outputs are used (these are limits of the internal discrete I/O option) or it may be beneficial to have all of the I/O external to the IND560x based on the application. A total of three sets of I/O are supported in the IND560x. This could be configured as the internal discrete I/O option and two remotes or all three sets of I/O could be remotes.

The communication link from the IND560x terminal to the ARM100 remote discrete I/O module is an RTU-based RS-485 communication protocol. During power-up, if remote discrete I/O has been enabled, communication will be established between the IND560x terminal and the remote modules. Any communication errors will be shown on the system line of the IND560x.

Since the ARM100 uses the RS-485 communication link, either the ACM200 configured with the CL/RS-422/RS-485 option or the ACM500 with the optional COM3 option may be connected directly to the ARM100. For short runs of 50 feet or less, COM1 (intrinsically safe) may also be used to connect to ARM100 via a signal barrier and an RS-232 to RS-485 converter, both installed in the safe area. COM4 or COM5 (available in optional current loop and fiber optic interfaces) may also be used to connect to an ARM100 via an ACM200 module configured with the optional RS-485 interface or the dual channel fiber optic converter with an RS-232 to RS-485 converter.

This communication uses both the input and output portions of the port so it cannot be shared with any other connections. When "Remote Discrete I/O" is selected as the assignment for COM1, COM3, COM4 or COM5, the communication parameters are automatically preset by the terminal and cannot be changed from the front panel – they can only be viewed.

Note: COM2 does not support "Remote Discrete I/O" assignment.

The parameters are:

- Baud Rate: 57600
- Data bits: 8
- Parity: None
- Flow Control: None
- Interface: RS-485

After the ARM100 modules are wired per the details in the **ARM100 Installation Guide** and programming the assignment in the connections portion of setup, the remote modules should be operational. When assigning functions to remote discrete I/O locations, the remote modules are addressed by 1.0.x for module #1, 2.0.x for module #2, and 3.0.x for module #3. Each module provides four inputs and six dry-contact relay outputs.

Example

Tare assigned to discrete I/O input address 1.0.1.

This indicates that when input #1 is turned on in remote module #1, a tare will be taken.

D.9. ASCII Input

With the IND560x terminal, an intrinsically safe bar code scanner or other intrinsically safe ASCII device can be connected to a port and used as an input device to enter ASCII data. This is done with the ASCII Input connection type. When this input type is selected, the assignment for the data received must also be specified at Communication > Templates > Input. Available assignments include:

- ID1
- Keypad
- Tare
- Tare ID
- Target ID
- Target Weigh-in (Fill-560 feature only)
- Target Weigh-out (Fill-560 feature only)

As part of the programming for using the ASCII input, an input template must be configured. The template feature permits removal of a preamble (preceeding characters) and a postamble (trailing characters) that are not part of the desired data. Using these parameters in the setup of the input template, the number of characters to be ignored before and after the data are programmed. These must be the same for each data input string that the IND560x receives.

An input will be terminated after the receipt of the programmable "Termination Character" or a 1 second timeout of no new characters received. At this time, any input data that has been collected will be applied to the assignment that has been selected. This could be an actual value such as a preset tare value or a response for IDs, or it could initiate a look-up into the tare or target table by selecting Tare ID or Target ID.

The following notes apply to how the ASCII input is handled through the input template:

- The Preamble Length selects how many characters should be skipped at the beginning of an input string before the desired data.
- Data Length defines the maximum length of a string. All characters beginning after the Preamble through the Length selection will be used as the input.
- The Postamble length is the number of characters (before the Termination Character) that will be stripped off the data string. All other data from the Preamble Length to the Termination Character minus the Postamble Length will be used as the input string. When using an input that is always the same fixed length, this field would remain blank.
- The Termination Character is used to signal the end of the string input. It can be any ASCII control character. If "None" is selected, the timeout feature will terminate the entry.
- There is also a 1 second timeout feature that tracks the amount of time between characters. If this 1 second time is exceeded, the string will also be considered terminated.

Example

Preamble of 2, Data length of 5, Postamble of 0, Termination Character of <CR>, Input assignment of Tare.

Data received is: <STX>P001.5 kg<CR>

The preamble of 2 removes the <STX> and P characters. The next 5 characters of 001.5 are the actual data. The postamble is set to 0 because the data field has already been filled so no characters have to be removed. The <CR> terminates the input.

This string would input 1.5 as a preset tare to the IND560x.

This same data could be obtained by programming a Preamble of 2, Data length of 8, Postamble of 3, Termination Character of <CR>. The Postamble length of 3 would remove the <space>kg from the data field since they are the last 3 characters received in front of the <CR>.

D.10. Reports

In order to print reports of the tare table, target table, or message strings, a connection must be made for the "Reports" function. When a reports connection is made to a serial port, whenever a report is run and then printed, it will be routed to the assigned port.

The structure of the printed report is selectable in setup so that all reports have the same general format. Printable fields for the tare table and target table individual reports are also selected in the Reports sub-block of Communications.

A sample of each report in a 40 column wide and an 80 column wide print are shown in the following sections.

D.10.1. Alibi Table

The alibi table can be viewed or printed. Alibi memory is viewed in the same way as a search and view of any other table in the terminal. It is accessible from the dedicated ALIBI softkey **Alibi**, the REPORTS softkey, or through the menu tree at Application > Memory > Alibi.

D.10.2. Tare Table Report

In the following report examples, all fields were programmed to print. A (*) record separator was selected for these reports.

D.10.2.1. 40 Column Example

If the first field on a line were disabled, it would not be printed and the field to the right would be shifted left. If a field on the right of a line were disabled, it would not print and that space would be blank. If all fields on a specific line were disabled, the complete line would be removed from the report.

```
Tare Memory Report


ID:  1              T:  26.4 kg
Desc: Blue Box #4
n:     54        Total:    52954.3 kg
****************************************
ID:  5              T:   3.7 kg
Desc: Green Bag #29
n:      7        Total:    25593.4 kg
```

```
****************************************
ID:  6               T:  23.3 kg
Desc: B16 Pallet
n:      0        Total:          0 kg
****************************************
```

D.10.2.2. 80 Column Example

If any field were disabled, that data would not be printed and that complete column would be removed from the report.

```
Tare Memory Report

 ID        T            Description         n            Total
  1         26.4 kg Blue Box #4               54         52954.3 kg
********************************************************************************
  5          3.7 kg Green Bag #29              7         25593.4 kg
********************************************************************************
  6         23.3 kg B16 Pallet                 0               0 kg
********************************************************************************
```

D.10.3. Target Table Report

In the following examples, all fields were programmed to print. A (-) record separator was selected for these reports.

D.10.3.1. 40 Column Report Example

If the first field on a line were disabled, it would not be printed and the field to the right would be shifted left. If a field on the right of a line were disabled, it would not print and that space would be blank. If all fields on a specific line were disabled, the complete line would be removed from the report.

```
Target Memory Report

ID: 1              Target:   11.00 kg
Spill:    0.55       Fine:     0.4
+Tol:      0.1       -Tol:     0.1
Desc: White RT4 Gran
----------------------------------------
ID: 2              Target:   12.35 kg
Spill:    0.48       Fine:     0.6
+Tol:      0.2       -Tol:     0.2
Desc: Mixture #7728
----------------------------------------
ID: 3              Target:   23.85 kg
Spill:     0.3       Fine:     0.8
+Tol:      0.3       -Tol:     0.1
Desc: Yellow #40 Pel
----------------------------------------
```

D.10.3.2. 80 Column Report Example

If any field were disabled, that data would not be printed and that complete column would be removed from the report.

```
Target Memory Report

 ID     Target     Spill      Fine      +Tol      -Tol          Desc
  1    11.00  kg     0.55       0.4       0.1       0.1   White RT4 Gran
--------------------------------------------------------------------------------
  2    12.35  kg     0.48       0.6       0.2       0.2   Mixture #7728A
--------------------------------------------------------------------------------
  3    23.85  kg      0.3       0.8       0.3       0.1   Yellow #40 Pel
--------------------------------------------------------------------------------
```

D.10.4. Message Table Report

The message table contains text that can be used in print templates. There are 99 records and each record can be up to100 characters long. In the view of the message table, only the first 20 characters of the message string are shown. The message table report can only be printed from the Message Table sub-block of Application using the PRINT softkey  . An example of the 40 column wide printed report is shown next. The 80 column report will also wrap if the line exceeds the 80 character limit.

```
Message Report

 1  James Carey
----------------------------------------
 2  Communications
----------------------------------------
 3  101 East Main Street
----------------------------------------
 4  This is an example of what the view
of a string of more than forty characte
rs would look like in a report
----------------------------------------
```

D.10.5. Totals Report

The totals report will print only the fields that have been enabled for the totalizing function. If the subtotal feature has been disabled, then that field will not display or print. The example below includes both the subtotal and grand total fields. The report format is always in a 40 column width for the totals report.

```
             Totals report
14:25:39                    20/Jul/2007
Subtotal:
n = 6                        86.19 kg
Grand Total:
n = 27                      372.76 kg
```

D.11. Shared Data Access

All setup parameters, triggers and statuses in the IND560x are stored and routed through "Shared Data". This is a system of memory mapping that permits remote clients to send commands and receive data from the terminal. In order to access the shared data variables in the IND560x, a remote client must login to the Shared Data Server. Access is provided through either the COM1 serial port or through the optional Ethernet port. Regardless of the method used, the same access is provided and the login procedure is very similar. The IND560x is limited to 3 simultaneous Shared Data Server logins.

D.11.1. Shared Data Server Login

Shared data access is available from the COM1 serial port and the optional Ethernet port.

D.11.1.1. To login to the Shared Data Server via COM1

1. To enable communication with the Shared Data Server:

   Delete all connections to the COM1 port of the IND560x. In setup at **Communication > Serial**, ensure that port settings for COM1 are:

   - 115.2 K baud
   - 8 data bits
   - No parity
   - 1 stop bit

   or

   Move switch SW2-1 to its ON position. This permits communication with the Shared Data Server without deleting any connections that have been configured in setup. Setting SW2-1 to ON will cause the message "Test Mode" to appear in the system line until SW2-1 is turned OFF.

   - To restore access to configured COM1 connections, remember to return SW2-1 to its original, OFF, position once Shared Data Server communication is ended.

   or

   At **Communication > Connections**, set the assignment of COM1 as "Shared Data Server". This setting allows communication with the Shared Data Server over COM1 without setting SW 2-1 to the ON position. At **Communication > Serial**, ensure that port settings for COM1 are:

   - 115.2 K baud
   - 8 data bits
   - No parity
   - 1 stop bit

2. Program the serial port of the remote device for:

   - 115.2 K baud
   - 8 data bits
   - No parity

- 1 stop bit

3. Connect an RS-232 cable between the remote client PC and the IND560x COM1 port. Connection to the intrinsically safe COM1 port must be made via a signal barrier located in the safe area.
4. Open a program to communicate with the IND560x (such as HyperTerminal).
5. Type: user xxxxx where xxxxx is a valid username programmed in the **Terminal > User** branch of the setup menu tree. The access level assigned to this username will determine which shared data variables will be available.
6. If a password is required for the username entered in step 5, the terminal will display: 51 Enter password. If no password is required, skip to step 8.
7. Type: pass xxxxx where xxxxx is the valid password for the username entered in step 5.
8. Response from IND560x: 12 Access OK
9. The remote client is now logged onto the Shared Data Server.

- To restore access to configured COM1 connections, remember to return SW2-1 to its original, OFF, position once Shared Data Server communication is ended.

D.11.1.2. To login to the Shared Data Server via Ethernet

The shared data server is available via port 1701. For applications that have no access to port 1701, a second port can be enabled. To enable the second port, enter the desired port number in shared data variable xs0138. This variable cannot be accessed from the front panel of the IND560x – modify it via the shared data server (port 1701) to change the second port value.

1. Program appropriate IP and Gateway addresses into the IND560x in the Communication, Network branch of the menu tree.
2. Connect a crossover cable between the remote client PC and the IND560x.
3. Open a program in the client PC to communicate with the IND560x (such as HyperTerminal).
4. Create a TCP/IP connection to the IP address programmed in the IND560x at port 1701, or the alternative port assigned using shared data variable xs0138.
5. If the IP and Gateway addresses and the cable connection are correct, the IND560x will display: Ready for user
6. Type: user xxxxx where xxxxx is a valid username programmed in the **Terminal > Users** branch of the setup menu tree. The access level of the username used will determine which shared data variables can be accessed.
7. If a password is required for the username in the previous step, the terminal will display: 51 Enter password. If no password is required, skip to step 9.
8. Type: pass xxxxx where xxxxx is the valid password for the username entered in step 6.
9. Response from IND560x: 12 Access OK
10. The remote client PC is now logged onto the Shared Data Server.

D.11.2. Shared Data Server Commands

After connecting to the Shared Data Server in the IND560x, several commands are available for use by the client. All commands can be given in either upper- or lower-case letters. The quotation marks shown are for clarity only and should not be transmitted. The valid commands are described in the following sections.

- Response Format: "Read", "write", and "callback" message responses have a formatted header. The first two characters indicate the status. "00" is the success status. "99" is a failure status. The next character is the type of message, "R", "W", or "C". The next three characters are a sequence number, which cycles from 001 to 999, and then starts over again.

D.11.2.1. "user" Command

A client must login to the SDSV using the "user" command before accessing Shared Data. The server validates the username and sends a response message back to the user. The SDSV responds with [Access OK] if no password is required or [Enter password] if a password is required.

A client can use only the "user", "pass", "help" and "quit" commands before successfully logging on.

Format: user username

Response 1: 12 Access OK

Response 2: 51 Enter Password

D.11.2.2. "pass" Command

The user enters a password using the "pass" command. If the password is valid, the server displays the [Access OK] message. If not valid, the server displays the [No access] message.

Format: pass password

Response: 12 Access OK

D.11.2.3. "help" Command

The "help" command returns the list of the valid commands for the IND560x.

Format: help

Response: 02 USER PASS QUIT READ R WRITE W SYSTEM CALLBACK XCALLBACK
GROUP RGROUP XGROUP CTIMER LOAD SAVE HELP NOOP
CONTOUT XCOUNTOUT PRINTOUT XPRINTOUT

D.11.2.4. "quit" Command

The "quit" command terminates the TCP/IP connection.

Format: quit

Response: 52 Closing connection

D.11.2.5. "read" Command

The "read" command allows the client to read a list of one or more Shared Data fields. An individual field or an entire block can be read. If more than one field is requested, the fields should be separated by a space. If successful, the server responds with a separated list of values in ASCII format. The server separates individually requested fields with a "~"; and Shared Data separates items within a block with a "^". If an error is detected, the server responds with an error message. The maximum length of the reply message is 1,024 characters.

Format: read SDV#1 SDV#2

Example 1: read wt0101 wt0103

Response 1: 00R003~ 17.08~lb~

Example 2: read sp0100 (reads entire block)

Response 2:
00R012~XP/0163M^1^^78^20.500000^0^0^0^1.200000^3.500000^0.150000^0.050000^0^0.000000^0.000000^0^0^0^0^0^0^1^0.000000^0.000000^0.000000^0.000000^0.000000^~

- The 'read' command can be abbreviated to the letter "r" if desired.

D.11.2.6. "write" Command

The "write" command allows the client to write a list of one or more Shared Data fields. A single field or an entire block can be written. The maximum length of the write message is 1,024 characters. Items within a list of writes must be separated with a "~". You must separate items within a block with a "^".

Format: write SDVblock#1=value1^value2^ value3
write SDV#1=value1~SDV#2=value2~SDV#3=value3

Example1: write ak0100=abc^def^hij^lmn (writes fields into a block)

Response 2: 00W006~OK

Example 2: write aj0101=12.56~aj0150=987.653 (writes fields within a list)

Response 2: 00W007~OK

- The "write" command can be abbreviated to the letter "w" if desired.

D.11.2.7. "system" Command

The "system" command returns a description of the IND560x terminal. This is the same information that is shown on the Recall System Information screen of the IND560x.

Format: system

Response: 0S005~ SYSTEM INFO RECALL

Model: IND560x
S/N:
ID1: IND560x
ID2: METTLER_TOLEDO
ID3:
Software
Boot: L1.00 181348
Standard: L1.00 181349
Fill-560: L1.00
Hardware
Analog L/C
Opt: E-Net

D.11.2.8. "noop" Command

The "noop" command performs no task; it checks communication and returns an [OK] response message.

Format: noop

Response: 00OK

D.11.2.9. "callback" Command

The "callback" command allows the client to define one or more fields for which the Shared Data Server sends a message to the client when the value of the callback field changes. Only certain SDV may be included in a callback command. These SDV are noted by an "rc" or "rt" status in the column after the structure column in the Shared Data document. Mainly, these are triggers that are used in the terminal. SDV with a status of "na" are not real-time SDV and cannot be used in callbacks.

The callback message contains one or more changed field names and the new value for each field. A maximum of twelve callback fields can be specified. The "ctimer" command specifies the minimum time between repeated callback messages.

Format: callback SDV#1 SDV#2

Example: callback st0102 st0103 st0104

Response 1: 00B001~OK

Response 2: 00C005~st0102=0^st0103=1^st0104=1 (sent when all of the SDV change)

Response 3: 00C006~st0104=0 (sent when only st0104 changes)

D.11.2.10. "xcallback" Command

The "xcallback" command allows the client to remove one or more callback fields from the list of current SDV.

Format: xcallback SDV#1 SDV#2 or xcallback all (removes all callbacks)

Example: xcallback st0102 (removes st0102 SDV from callback)

Response: 00X008~OK

D.11.2.11. "group" Command

The "group" command allows the client to define a group of callback fields. The Shared Data Server sends a message to the client when the value of any field in the group changes. The group callback message contains the group number and the values of all fields in the group in the defined order. The "ctimer" command specifies the minimum time between repeated callback messages. The maximum number of groups is six, and the maximum number of fields in a group is twelve.

Format: group n SDV#1 SDV#2 SDV#3 (where n = the number of the group 1–6)

Example: group 5 st0103 st0104 st0107 (groups target feeding and tolerance SDV into one group)

Response 1: 00B019~OK

Response 2: 00C026~group5=0^1^0 (indicates status of all 3 SDV in group 5 whenever any one of them changes)

D.11.2.12. "rgroup" Command

The "rgroup" command allows the client to define a group of fields. The client can use the group number to read the entire group at once using the READ command. The maximum number of groups is six, and the maximum number of fields in a group is twelve.

Format: rgroup n SDV#1 SDV#2 (where n = the number of the group 1–6)

Example: rgroup 3 di0101 di0102 di0103 di0104 (groups all discrete inputs into one group that can be read with a single read command)

Response: 0G008~group=3, number fields=4

Read Example: r 3

Response: 00R009~1~0~1~0~

D.11.2.13. "xgroup" Command

The "xgroup" command allows the client to remove one or all groups.

Format: xgroup n (where n = the group number 1 - 6) or XGROUP all
(removes all groups, including "contout" and "printout")

Example: xgroup 5 (cancels group 5)

Response: 00X011~group=5

D.11.2.14. "contout" Command

The "contout" command allows the client to define the continuous output string as a callback field. The Console Print Server sends a message to the client at each continuous output. The continuous

output message is either in the Standard METTLER TOLEDO Continuous Output format or in a continuous template format. The "ctimer" command specifies the minimum time between repeated callback messages. The "xcontout" command removes the registration from the terminal and the communication will stop.

- Refer to the Ethernet Continuous Output section later in this chapter for examples of using the "contout" command.

Format: contout

Response: 00G008~number CONTOUT streams=1

When a continuous output occurs to the Ethernet port, the data will be sent to the client formatted as selected in setup.

Data: 00C004 14! 354 236
00C005 14! 354 236

D.11.2.15. "xcontout" Command

The "xcontout" command allows the client to remove the continuous output callback, thus ending the registration so no further continuous outputs will be available.

Format: xcontout

Response: 00X070~CONTOUT

- Also refer to the Ethernet Continuous Output section later in this chapter for details on the "xcontout" command.

D.11.2.16. "printout 1" Command

The "printout" command allows the client to define a Demand Print Stream as a callback field. The Demand Print Streams include demand print (triggered by the scale) and custom triggers (triggers 1, 2, and 3). The console print server sends a message to the client at each print output. Since print messages can span multiple message blocks (depending upon size), the start of the print message has a <dprint> tag and the end of the message has a </dprint > tag. After registering for the demand output, the client will receive the appropriate data stream. The "ctimer" command specifies the minimum time between repeated callback messages. The "xprintout" command removes the registration from the terminal and the communication will stop.

- Refer to the Ethernet Demand Output section later in this chapter for details on using the "printout" command.

Format: printout 1

Response: 00G008~number PRINTOUT streams=1

When a demand output occurs to the Ethernet port, the data will be sent to the client formatted by the selected template. There will be <dprint> and </dprint> delimiters for the string.

Data: 00P004 <dprint> 22.08 lb
17.06 lb T

5.02 lb N
</dprint>

D.11.2.17. "xprintout" Command

The "xprintout" command allows the client to remove the print output callback, thus ending the registration so no further demand outputs will be available.

Format: xprintout

Response: 00X070~PRINTOUT

- Refer to the Ethernet Demand Output section later in this chapter for details on the "xprintout" command.

D.11.2.18. "ctimer" Command

The "ctimer" command allows the client to set the minimum time between repeated callback messages in milliseconds. The minimum allowable setting is 50 milliseconds and the maximum is 60 seconds. The default value is 500 milliseconds.

Format: ctimer n (where n is the number of milliseconds)

Example: ctimer 1000 (set the callback timing to 1 second)

Response: 00T862~new timeout=1000

D.11.2.19. "csave" Command

The "csave" command saves the current callback and group settings into Shared Data for use later with the "cload" command.

Format: csave

Response: 00L004~OK

D.11.2.20. "cload" Command

The "cload" command loads the callback and group settings from Shared Data into the shared data server. The terminal will begin to service the loaded callback and group commands.

Format: cload

Response: 00L001~OK

D.11.3. Using Shared Data to Select Target Table and Tare Table Records

When the IND560x was released, there were only two ways that a user could select a Target record or a Tare record from a memory table – through a table search or by performing a quick recall using the numeric keypad and the softkeys. Beginning with version 3.0 firmware, Target and Tare records can be recalled from their respective memory tables using both Shared Data and PLC commands.

The following section outlines the sequence of steps that must followed to recall memory table records using Shared Data. Please reference the IND560 PLC Interface Guide (# 72184339, on the documentation CD) for information regarding the use of a PLC to recall memory table records.

To recall a Target Table record or Tare Table record from a memory table, the first step is to specify the Tare or Target record ID. Then a command is issued to recall this specified record ID from either the Tare Table or the Target Table.

- When the Shared Data Server is accessed via the intrinsically safe COM1, an appropriate barrier must be used.

D.11.3.1. Recalling a Target Table Record or Tare Table Record to Active Status

1. Log into Shared Data server as directed in previous sections of Appendix D.
2. Using Shared Data field qc0189, write the numeric ID of the record that you wish to recall from either the Target Table or the Tare Table. Numeric ID is a maximum two digit value (1-25).
3. Next, write either a 1 or a 6 to Shared Data field qc0189. Writing a "1" will recall the ID set in qc0190 from the Tare Table; writing a "6" will recall the ID set in qc0190 from the Target Table.

- NOTE: These shared data fields are only applicable for standard functionality Over/Under or Material Transfer modes of operation. They do not work for the Fill-560 Application Software. In the Fill-560, Targets must be specified as Weigh-in Targets or Weigh-out Targets. While Active Weigh-in and Weigh-out values can be accessed via Shared Data (see the AF block in the IND560 Shared Data Reference, found on the documentation CD), there is no mechanism to recall a full Target Table record and designate it as a Weigh-in or Weigh-out Target.

D.11.3.2. Table Records in Output Templates

Information regarding activated Target Table and Tare Table records, including Totalization information, is available for transmission in output (print) templates. This information can be found in the "TD" block of Shared Data. The TD shared data fields will report values only if the active Tare or Target record was retrieved directly from the Tare or Target Table. If manual changes are made to the active Tare or Target record, these shared data values will report empty fields. Records can be recalled by any available means: table search, quick recall or remotely via PLC or Shared Data.

D.12. Ethernet

The optional Ethernet port for the IND560x, which is installed in the ACM500, provides a 10 Base-T connection for connection to an Ethernet network. Up to 10 clients can connect to the IND560x at one time. The Ethernet port can be used for the following functions:

- Shared data access (described previously)
- Demand output
- Continuous output
- FTP
- Sending calibration alert emails
- Web Server access

- Flashing new IND560x firmware

The demand output, continuous output, FTP and flashing new firmware functions are described in the following sections.

D.12.1. Ethernet Connection to a PC

The optional Ethernet port for the IND560x provides a way to interface a PC to the IND560x to download and upload files and configuration information. In order to carry out these functions, the IND560x must be connected to the ACM500 with optional Ethernet board installed. The ACM500 is then connected to a PC with an Ethernet cable.

There are two types of Ethernet cables: Patch and Crossover. Patch cables are used to connect a PC to a network or a hub. The easiest way to connect a PC to the ACM500 via Ethernet is to use a crossover Ethernet cable (Figure D-1). A crossover cable connects directly from the PC Ethernet port to the ACM500 Ethernet port (no hubs or network needed). If a crossover cable is unavailable, it is possible to still connect with two patch cables and a hub (Figure D-2). Both types of Ethernet cables are readily available at stores that sell computer equipment.

Figure D-1: Connecting the IND560x to a PC with a Crossover Cable

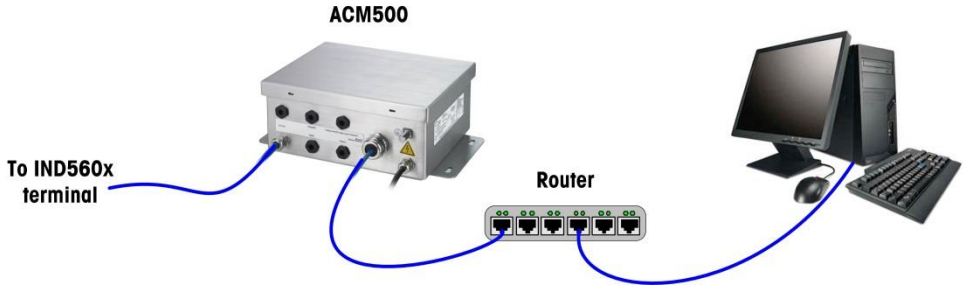


Figure D-2: Connecting the IND560x to a PC with Patch Cables

D.12.1.1. IP Address Setup

The IP addresses must be setup on both the IND560x and the PC as follows:

1. Check the IND560x IP address and subnet mask and note the numbers to configure the PC. (Refer to Chapter 3, **Configuration**, Communication, Network for information about network configuration.)
2. The PC and the IND560x should have the same subnet mask.
3. The PC and the IND560x must have unique IP addresses. The IP address numbers must be the same where the subnet mask is 255, but different where the subnet mask is 0. See the example in Table D-8 and Figure D-3, which follow.

Table D-8: IP Address Configuration Example (for Crossover or Hub Configuration)

IND560x IP Address	192	168	0	1
Subnet Mask	255	255	255	0
PC IP Address	192	168	0	2

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

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

4. Click on **Start > Settings > Network Connections** (Figure D-4). A window like the one shown in Figure D-5 will open.

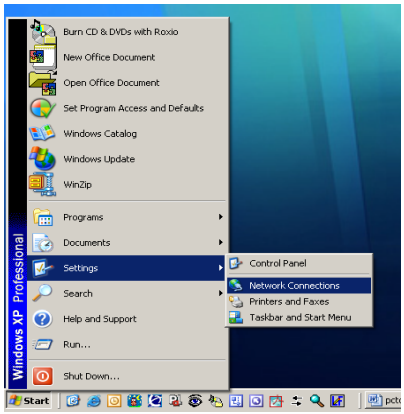


Figure D-4: Accessing the Network Connections Screen

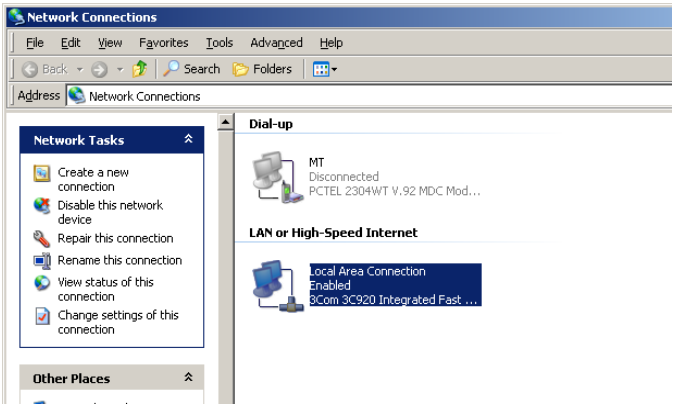


Figure D-5: Network Connections Screen

5. Select the local area internet connection.

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

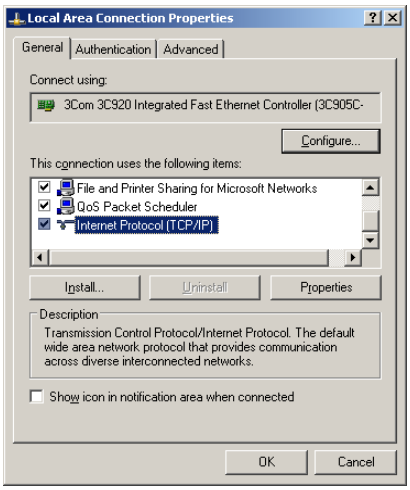


Figure D-6: Local Area Connection Properties Screen

7. Scroll down to Internet Protocol (TCP/IP) and select it.
8. Click on the Properties button. The Internet Protocol (TCP/IP) Properties Screen displays (Figure D-7).

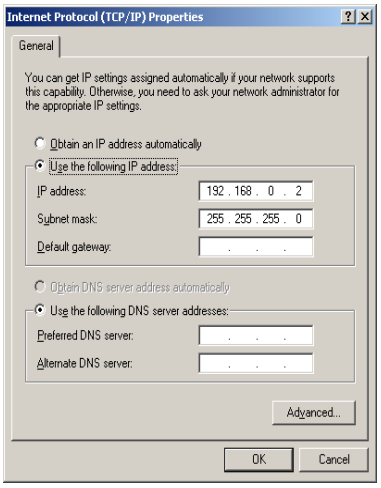


Figure D-7: Internet Protocol (TCP/IP) Properties Screen

9. Typically, "Obtain an IP address automatically" is checked. However, to connect to the IND560x, set the PC IP address and subnet mask by selecting "Use the following IP address".
10. Enter the IP address and subnet mask settings for the specific PC.
11. Click on the OK button.

- After disconnecting from the IND560x and before connecting back to the PC's normal network connection, remember to change the Internet Protocol (TCP/IP) Properties Screen setting back to "Obtain an IP address automatically" or to whatever setting was active when the screen was accessed.

D.12.2. Ethernet Demand Output

If a demand output connection to Ethernet is made in the connections section of setup, a remote device may "register" to receive the data through the Ethernet port. In order to do this, the remote device must login to the shared data server and send the command to register for the data. The login can be any valid username and password for the terminal.

- When a user logs into the shared data server, he or she acquires the level of access for the username and password used. All levels of users can receive a demand string.

If a demand output connection to EPrint is made in the Connections section of setup, a remote device is not required to "register" with the Shared Data Server to receive the data through the Ethernet port. The data string simply contains the assigned template's information. The EPrint connection is made via the secondary TCP/IP port at the user-defined port number (set up at Communication > Network > Port).

D.12.2.1. Registering for the Demand Output

The "printout" command allows the client to define a Demand Print Stream as a callback field. The Demand Print Streams include demand print (triggered by the scale) and custom triggers (triggers 1, 2, and 3). The console print server sends a message to the client at each print output. Since print messages can span multiple message blocks (depending upon size), the start of the print message has a <dprint> tag and the end of the message has a </dprint > tag. After registering for the demand output, the client will receive the appropriate data stream. The "ctimer" command specifies the minimum time between repeated callback messages. The "xprintout" command removes the registration from the terminal and the communication will stop.

- The "xgroup all" command will also terminate any demand output registrations.

D.12.2.2. Sequence Example 1

1. Enter the menu tree of setup.
2. In the Connections sub-block of the Communications block of setup, create a connection for Demand Output assignment to the Ethernet port triggered by Scale using Template 2.
3. Ensure that the IP and Gateway addresses are programmed properly.
4. Login to the shared data server from the client, (see "user" command in the Shared Data Server section).
5. Register to receive the demand data by entering the "printout 1" command.
6. The IND560x will acknowledge the registration with a message [00Gxxx~number PRINTOUT streams=1]. Now, whenever a demand print is generated, the Template 2 data will be sent to the client.

```
00P004 <dprint>Scale 1
01:33:10
06/Sep/2005
    17.08 lb
    17.08 lb T
     0.00 lb N
</dprint>
```

The "xprintout" command allows the client to remove the print output callback registration thus stopping the demand output.

D.12.2.3. Sequence Example 2

1. Enter the menu tree of setup.
2. In the Connections sub-block of the Communications block of setup, create a connection for Demand Output assignment to the Ethernet port triggered by Trigger 1 using Template 1.
3. Ensure that the IP and Gateway addresses are programmed properly.
4. Login to the shared data server from the client, (see "user" command in the Shared Data Server section).
5. Register to receive the demand data by entering the "printout 1" command.
6. The IND560x will acknowledge the registration with a message [00Gxxx~number PRINTOUT streams=1]. Now, whenever the custom trigger is initiated (by a programmed discrete input or PLC command), the Template 1 data will be sent to the client.

```
00P004 <dprint>     17.08 lb
     17.08 lb T
      0.00 lb N
</dprint>
```

The "xprintout" command allows the client to remove the print output callback registration thus stopping the demand output.

D.12.3. Ethernet Continuous Output

If a continuous output type of connection to Eprint is made in the connections section of setup, a remote device is not required "register" with the Shared Data server, to receive data through the Ethernet port. The data string simply contains the assigned continuous output or template information. The Eprint connection is made via the secondary TCP/IP port at the user-defined secondary port number (configured in setup at Communication > Network > Port).

If a continuous output or continuous template output connection to Ethernet is made in the connections section of setup, a remote device may "register" to receive the data through the Ethernet port. In order to do this, the remote device must login to the shared data server and send the command to "register" for the data. The login can be any valid username and password for the terminal.

- When a user logs onto the shared data server, they acquire the level of access for the username and password used. All levels of users can receive a continuous string.

D.12.3.1. Registering for the Continuous Output

The "contout" command allows the client to define the continuous output string as a callback field. The Console Print Server sends a message to the client at each continuous output. The continuous output message is either in the Standard METTLER TOLEDO Continuous Output format or in a continuous template format. The "ctimer" command specifies the minimum time between repeated callback messages. The "xcontout" command removes the registration from the terminal and the communication will stop.

- The "xgroup all" command will also terminate any continuous output registrations.

D.12.3.2. Sequence Example

1. Enter the menu tree of setup.
2. In the Connections sub-block of the Communications block of setup, create a connection for Continuous Output assignment to the Ethernet port triggered by Scale.
3. Ensure that the IP and Gateway addresses are programmed properly.
4. Login to the shared data server from the client, (see "user" command in the Shared Data Server section).
5. Register to receive the continuous data by entering the "contout" command.
6. The IND560x will acknowledge the registration with a message [00Gxxx~number CONTOUT streams=1]. Now, whenever a continuous output string is generated by the IND560x, the data will be sent to the client.

```
00C148 14!    354   236
>
00C149 14!    354   236
>
00C150 14!    354   236
>
00C151 14!    354   236
```

The "xcontout" command allows the client to remove the continuous output callback registration thus stopping the continuous output.

The output rate of a Continuous type output over Ethernet is 20Hz by default. This rate cannot be modified through the terminal setup menu. However, the output rate can me modified by a Shared Data write to a field in the "cs" block of Shared Data. Please refer to the **IND560 Shared Data Reference** on the documentation CD for specifics.

D.13. FTP

The IND560x provides the ability to transfer files using FTP (file transfer protocol). METTLER TOLEDO recommends the use of the InSIte PC program to assist in this transfer, but files can also be transferred through the Command prompt using an FTP client with the following commands.

- fget – all files can be read using this command
- fput – only certain files can be downloaded back to the IND560x terminal

In order to access any files from the IND560x, the client must login to the FTP server. Valid usernames and passwords are entered in the setup under Communications, Network, FTP and each username is assigned an access level. All access levels can read files but only maintenance and administrator levels can write new files to the terminal (see Chapter 3.0, Configuration for further information about configuring FTP usernames, passwords, and access levels).

The following list indicates the path for the available files that can be accessed using the "fget" and "fput" commands.

flash:\tare.bin

Binary file that contains all the tare table records. This file is in a binary format and is not directly editable. The InSite program provides the ability to edit the records and download back to the terminal.

- The Tare Table is also available as a .csv file. This file is stored in the flash2 directory as flash2:\A1.csv.

  The format of this comma-separated value file is: ID, Tare, Description, Unit, n, Total. Units are listed as defined in Shared Data variable td0125.

  The A1.csv file can be created or modified externally and downloaded to the terminal.

flash:\target.bin

Binary file that contains all the target table records. This file is in a binary format and is not directly editable. The InSite program provides the ability to edit the records and download back to the terminal.

- The Target Table is also available as a .csv file. This file is stored in the flash2 directory as flash2:\A2.csv.

  The format of this comma separated value file is: ID, Description, Target, Unit, Spill, + Tolerance, -Tolerance, Fine Feed. Units are listed as defined in Shared Data variable td0125.

  The A2.csv file can be created or modified externally and downloaded to the terminal.

flash:\cont.bin

Binary file that contains all the container tare table records from the Fill-560 application software. This file is in a binary format and is not directly editable. The InSite program provides the ability to edit the records and download back to the terminal.

- The Container Tare Table is also available as a .csv file. This file is stored in the flash2 directory as flash2:\cont.csv.

  The format of this comma separated value file is: ID, Unit, Tare, Minimum, Maximum, Description, n, Total. Units are listed as defined in Shared Data variable td0125.

  The cont.csv file can be created or modified externally and downloaded to the terminal.

ram:\caltest1.cfg

A text file that defines the calibration test procedure. Refer to Appendix C for the structure of this file.

ram:\caltw1.txt

A text file that lists the test weight values and identification string for the test weights used in the calibration test. Refer to Appendix C for structure of this file.

ram:\saver.bmp

A 35 x 35 pixel bitmap file used as a screen saver.

gen:\change.csv

A comma-delimited file of the change log in the IND560x terminal. This file can only be read from the terminal – it cannot be written back to the terminal.

gen:\maint.csv

A comma-delimited file of the maintenance log in the IND560x terminal. This file can only be read from the terminal – it cannot be written back to the terminal.

gen:\bkram.dmt gen:\flash.dmt gen:\E2prom1.dmt	These three files are the backup files for all of the setup parameters in the terminal. Retrieving and storing these files enables reloading of the terminal with the current parameters in case of a catastrophic failure.

- New Shared Data was added to v3.02 firmware to add ftp access control. The assignment of shared data field nf0101 now affects ftp access rights. Please refer to the Shared Data Reference manual on the documentation CD for full details.

D.13.1. FTP Example

The following procedure describes how one might upload the calibration test to a PC running Microsoft Windows, modify the file, and then download it again to the terminal. The complete sequence is shown in Figure D-8.

1. A valid username and password from the FTP server of the IND560x terminal is required. Refer to Chapter 3, **Configuration**, Communication, Network, FTP.
2. The client must also know the IP address of the IND560x and a valid network connection established between the client and the terminal is required before beginning. Refer to the Ethernet section, Ethernet Connection to a PC earlier in this chapter.
3. Open the command prompt window in the client PC and type: ftp
4. Press ENTER. The command line should now display: ftp>.
5. To open the FTP connection, type open xxx.xxx.xxx.xxx where the xxx.xxx.xxx.xxx represents the IP address of the IND560x terminal.
6. Press ENTER. The display should indicate that service is ready and prompt for the username.
7. Enter the username from the IND560x FTP user list.
8. Press ENTER. If the username is valid, the display will prompt for a password.
9. Enter the password for the username used.
10. Press ENTER. If the login procedure was successful, the prompt line will now display: ftp>
11. Enter the command: get ram:\caltest1.cfg
12. Press ENTER. This command will upload the calibration test procedure to the directory that was showing in the command prompt line before the FTP program was started. The client screen should indicate that the transfer was successful.
13. Modify the file as required. Refer to Appendix C for the file structure.
14. Download the modified file to the IND560x by typing:

    put caltest1.cfg ram:\caltest.cfg

    The client screen should indicate that the transfer was successful.
15. After the transfer is complete, type: quit
16. Press ENTER to exit the FTP process. An acknowledgment message: Bye displays.
17. Type: exit
18. Press ENTER to close the command line screen and return to Windows.

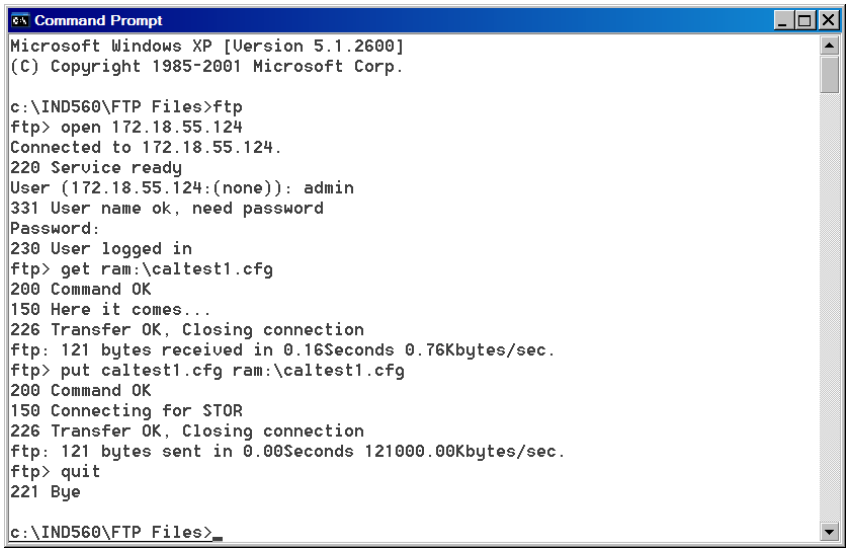


Figure D-8: Example FTP Sequence

D.14. Terminal Updates

D.14.1. Uploading New Firmware

A new version of firmware can be loaded into the IND560x using either the Ethernet or serial port. The METTLER TOLEDO software program InSite is required for the update. This procedure is defined in Chapter 4, Service and Maintenance, Upgrading Firmware.

D.14.2. Uploading Customized Softkey Graphics

Customized graphics for home screen softkeys may be uploaded to the IND560x terminal either using ftp through an Ethernet connection, or through a serial connection. The file names of each graphic must match the filename of the graphic it is to be replaced. Lists of these filenames are provided in Chapter 2, Operation and Appendix E, Softkey Mapping.

D.14.2.1. FTP Upload

Open a DOS window and navigate to the folder where the new Softkey bitmaps are available.

Once the command line is showing the path of the new bitmaps, open an ftp connection with the IND560x, as shown in Figure D-8.

At the ftp prompt, type "put filename.bmp flash:\filename.bmp". The filename of the new graphic must be the same as that of the bitmap it replaces. This process can be repeated to upload multiple bitmap files.

Once all the new softkey graphics are uploaded, quit the ftp session and close the DOS window. The new softkey graphic can now be used in the terminal, when selected in setup at Terminal > Softkeys.

D.14.2.2. Serial Upload

To upload graphics through a serial connection:

1. Use HyperTerminal (or equivalent) to make a serial connection (with Baud = 115200, Data Bits = 8, Parity Bit = None, Stop Bits = 1, Flow Control = 0) to the IND560x from the PC where the customized graphics reside.
2. Log in to the Shared Data server as **admin**. Enter a password if the terminal is configured to require one. To upload files, the login must be at the administrator level.
3. After receiving the "Access OK" prompt, type "fput flash:\filename.bmp", where filename.bmp is the name of the graphic to be uploaded.
4. The IND560x will begin to send C characters (visible in Figure D-9) to indicate that it is in serial communication with the PC.
5. Access the Transfer | Send File menu. In the dialog box that appears (Figure D-9), browse to the graphic file to be uploaded, and select it. In the Protocol selection box, choose 1K Xmodem.

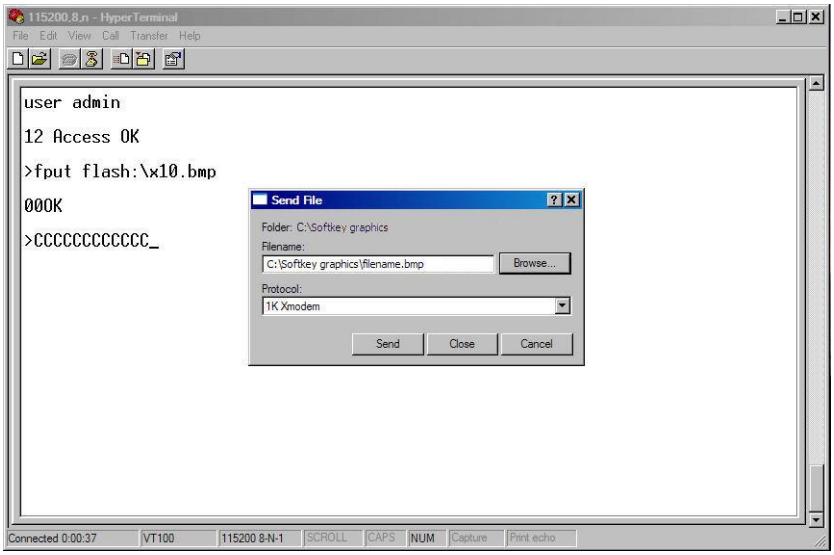


Figure D-9: Send File Dialog Box

6. Click OK. A progress bar will indicate that the file is being uploaded. Once upload is complete, the Cancel button changes to OK (Figure D-10). Close the dialog box.

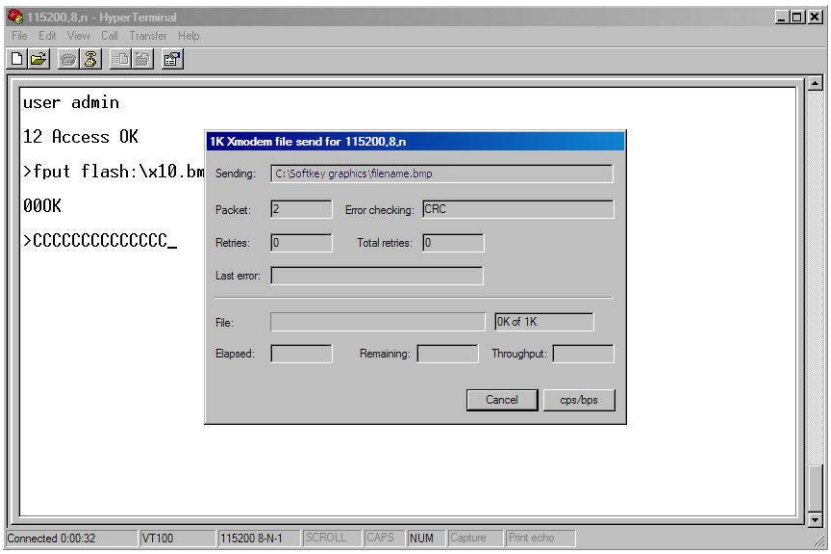


Figure D-10: File Transfer Dialog Box

7. When the "OK" prompt displays in HyperTerminal, if required repeat steps 3 to 6 to upload another customized graphic file.
8. Once all files have been uploaded, at the command prompt type "write qc0149 1". This command causes the IND560x to save the changes made during the upload session.
9. Finally, close the connection and quit HyperTerminal.

E Softkey Mapping

E.1. Introduction

This appendix covers
- Introduction
- Softkey Setup and Navigation
- Softkey Configuration
- Customizing Softkeys

Softkeys provide quick access to setup pages or application functions, and are located at the bottom of the display screens. Up to 15 softkeys can be defined. A maximum of five softkeys display at one time on any given screen. Follow the softkey configuration steps provided in this section to configure the IND560x softkeys to display in the most convenient manner for the application.

E.2. Softkey Setup and Navigation

Figure E-1 shows a weight display home screen with two softkeys:

Unit Switching Position defined as softkey number one

Reports Position defined as softkey number three

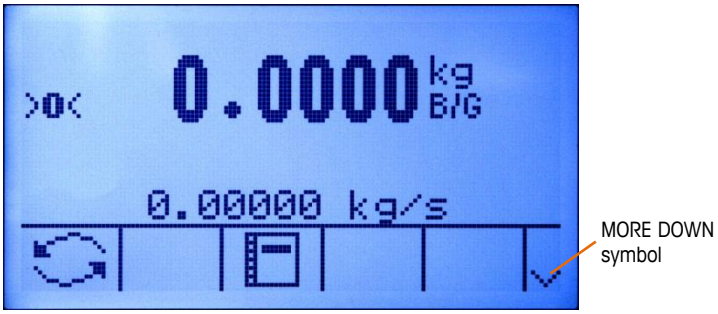


Figure E-1: Home Screen #1

When more than five softkeys are defined, a MORE DOWN symbol V displays to the right of the softkeys (Figure E-1). Press the DOWN navigation key on the keypad to advance to the second screen of softkeys. (If enough softkeys are defined, a third screen of softkeys is available and pressing the DOWN navigation key again would scroll to a third screen).

Figure E-2 shows a second home screen with two additional softkeys:

	**Recall**	Position defined as softkey number nine
	**Setup**	Position defined as softkey number ten

Figure E-2: Second Home Position Screen

On the last available screen of softkeys, a MORE UP symbol ^ displays to the right of the softkeys (Figure E-2). Press the UP navigation key to return to the previous screen of softkeys.

E.3. Softkey Configuration

Add or rearrange the display of softkeys on the main weighing screen by configuring parameters on the softkey setup screen, which is located in setup at Terminal > Softkeys.

When the softkeys setup screen opens, focus is on the softkey position number "1" located above the first icon (see Figure E-3).

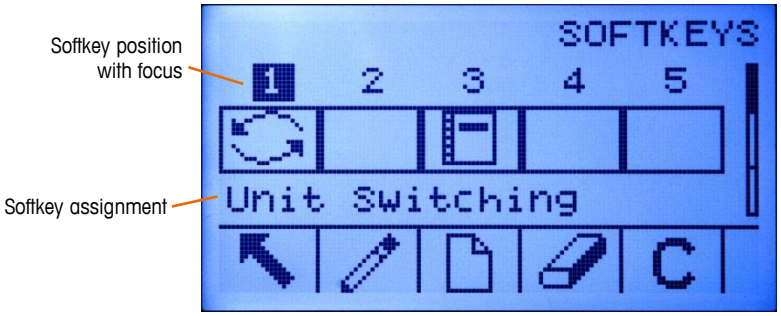


Figure E-3: Softkeys Setup Screen

The focus can be moved by pressing the UP, DOWN, LEFT, and RIGHT navigation keys. As a different softkey position gains the focus, its assignment is shown in text toward the bottom of the screen.

For example, in Figure E-3 focus in on softkey position number 1, which is assigned the UNIT SWITCHING softkey  . Press the RIGHT navigation key to move focus to softkey position 2. The assignment value changes to the x10 DISPLAY softkey  . Softkey positions that show no icon have an assignment value of None.

Two softkeys, INFORMATION RECALL and SETUP, must always be present. As a default, they are located together in positions 9 and 10. These keys can be moved by first creating a copy of the softkey in a new position and then deleting the softkey from the original position. The original position cannot be removed until the new position has been created.

- If an entire row of softkeys is blank, then that row will not be made available at the home screen. For example, if softkey positions 1–5 have softkeys programmed and positions 11–15 have softkeys programmed but softkey positions 6–10 are blank, the second row of softkeys will not be shown from the home screen.
- For a comprehensive list of all available softkey assignments, refer to Chapter 2 of this manual, Operation.

E.3.1. Editing Softkeys

The edit function allows replacement of one softkey assignment with a different softkey assignment. The edit function enables replacement of a blank assignment with another softkey assignment, without shifting any other softkey positions.

E.3.1.1. To Edit a Softkey

1. Use the navigation keys to move the focus to the position number of the softkey to be edited.
2. Press the EDIT softkey. The Softkey Edit screen (Figure E-4) displays. The softkey position number selected for editing is shown on the screen along with the current assignment.

Figure E-4: Softkey Edit Screen

3. Press the ENTER key to select the assignment selection box.
4. Use the UP or DOWN navigation keys to scroll through the selections until focus is on the desired assignment.
5. Press the ENTER key to select the assignment. If None is selected for the assignment, the softkey assignment is reserved as a blank space.
6. Press the EXIT softkey to return to the Softkeys Setup Screen.

- There is no limit on the number of positions that can have the same softkey assignment. For example, the SWITCH UNITS softkey will display on each softkey position if it is assigned in a 1–5 (first screen) position and a 6–10 (second screen) position.

E.3.2. Inserting Softkeys

E.3.2.1. To Insert Softkeys

1. Use the navigation keys to move the focus to the position number where the softkey is to be inserted.
2. Press the INSERT softkey. The Softkey Edit screen displays. The softkey position selected is shown on the screen along with Assignment selection box.
3. Press the ENTER key to select the assignment selection box.
4. Use the UP or DOWN navigation keys to scroll through the selections until focus is on the desired assignment.
5. Press the ENTER key to select the assignment. If None is selected for the assignment, the softkey assignment is reserved as a blank space.
6. Press the EXIT softkey to return to the Softkeys Setup Screen. The new softkey will display on the Softkey setup screen in the position where it was inserted and all following softkeys will be moved one position to the right.
   - If all 15 softkey positions are full and a new softkey is added, all positions after the inserted position will move one position to the right and the softkey in position 15 will be lost. The only exception to this is if the RECALL or SETUP softkeys are in that position, the softkey immediately before these special softkeys will be lost.

E.3.3. Deleting Softkeys

E.3.3.1. To Delete Softkeys

1. Use the navigation keys to move the focus to the position number of the softkey to be deleted.
2. Press the DELETE softkey. The softkey is removed from the Softkey setup screen and all following softkeys will be moved one position to the left.
   - Remember that there must always be one instance each of the RECALL and SETUP softkeys. The original softkey cannot be deleted until a new position has been created.

E.3.4. Clearing All Softkeys

To clear all softkey assignments except INFORMATION RECALL and SETUP, press the CLEAR softkey C. A screen displays that asks for verification to clear all softkeys. Press the OK softkey to continue or the ESCAPE softkey Esc to return to the Softkeys setup screen.

E.4. Customizing Softkeys

All the softkeys available for assignment to the home screen can be replaced with customized bitmap images.

The bitmaps must measure no more than 23 pixels wide by 15 pixels high. Each graphic must have a white border at least one pixel wide at left, right and top – see Figure E-5.

- NOTE: Bitmap file types must be black and white in order to display correctly on the terminal screen.

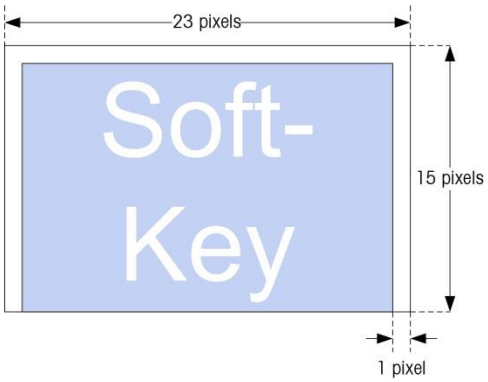


Figure E-5: Softkey Graphic Dimensions

Graphics may be uploaded to the IND560x terminal using an ftp connection via Ethernet, or through a serial port. Refer to Appendix D, **Communications**, for details on these procedures.

New bitmap graphics must have the same filename as the graphic they replace. Table E-1 lists the softkey graphics that can be replaced with customized images.

Table E-1: Bitmap Graphic Filenames

Softkey	Default Image	Graphic File Name
Alibi	Alibi	alibi.bmp
Calibration Test		cal_test.bmp
Comparators		comprtr.bmp
ID	ID	Id.bmp
MinWeigh	Min-Weigh	minweigh.bmp
Recall Info		recall.bmp
Reports		reports.bmp
Setup		setup.bmp
SmartTrac	Smart-Trac	sm_trac.bmp
Tare Table		tare_mem.bmp
Target		target.bmp
Target Control		control.bmp
Target Start		start.bmp
Target Table		targ_mem.bmp
Trigger 1	1	trigger1.bmp

Softkey	Default Image	Graphic File Name
Trigger 2		trigger2.bmp
Trigger 3		trigger3.bmp
Time & Date		timedate.bmp
Unit Switching		select.bmp
x10 Display		x10.bmp

F GEO Codes

The GEO code feature provided in the IND560x terminal permits calibration readjustment due to changes in elevation or latitude without reapplying test weights. This adjustment assumes a previously accurate calibration was done with the GEO code set properly for that original location and that the GEO code for the new location can be accurately determined. The procedure for using this feature is as follows.

F.1. Original Site Calibration

1. Use the GEO code chart (Table F-1) on the following pages to determine the GEO code for the current altitude and location at which the scale will be calibrated.
2. Enter that GEO value into the GEO code parameter in setup at **Scale > Calibration**.
3. Immediately after entering the GEO code, perform a zero and span adjustment using accurate test weights.
4. Exit the setup menu tree.
5. The scale can now be used in its new location.

F.2. New Site GEO Code Adjustment

When a terminal is to be reinstalled at a different geographic location, gravitational and altitude changes can be accounted for by following these steps. Note that this procedure is not necessary if an on-site recalibration is performed.

1. Use the GEO code chart (Table F-1) on the following pages to determine the GEO code for the new altitude and location at which the scale will be used.
2. Enter that GEO value into the GEO code parameter in Setup at **Scale > Calibration**.
3. Immediately after entering the GEO code, exit the setup menu tree. DO NOT perform a normal calibration.

The calibration has now been adjusted for the differences in gravity from the original site of calibration to the new site of use.

Using the GEO code value for calibration adjustment is not as accurate as re-applying certified test weights and re-calibrating the scale in a new location.

Table F-1: GEO Adjustment Values

Latitude North or South, in Degrees and Minutes	Height Above Sea Level, in Meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Height Above Sea Level, in Feet										
	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730
0° 0'–5° 46'	5	4	4	3	3	2	2	1	1	0	0
5° 46'–9° 52'	5	5	4	4	3	3	2	2	1	1	0
9° 52'–12° 44'	6	5	5	4	4	3	3	2	2	1	1
12° 44'–15° 6'	6	6	5	5	4	4	3	3	2	2	1
15° 6'–17° 0'	7	6	6	5	5	4	4	3	3	2	2
17° 10'–19° 2'	7	7	6	6	5	5	4	4	3	3	2
19° 2'–20° 45'	8	7	7	6	6	5	5	4	4	3	3
20° 45'–22° 22'	8	8	7	7	6	6	5	5	4	4	3
22° 22'–23° 54'	9	8	8	7	7	6	6	5	5	4	4
23° 54'–25° 21'	9	9	8	8	7	7	6	6	5	5	4
25° 21'–26° 45'	10	9	9	8	8	7	7	6	6	5	5
26° 45'–28° 6'	10	10	9	9	8	8	7	7	6	6	5
28° 6'–29° 25'	11	10	10	9	9	8	8	7	7	6	6
29° 25'–30° 41'	11	11	10	10	9	9	8	8	7	7	6
30° 41'–31° 56'	12	11	11	10	10	9	9	8	8	7	7
31° 56'–33° 9'	12	12	11	11	10	10	9	9	8	8	7
33° 9'–34° 21'	13	12	12	11	11	10	10	9	9	8	8
34° 21'–35° 31'	13	13	12	12	11	11	10	10	9	9	8
35° 31'–36° 41'	14	13	13	12	12	11	11	10	10	9	9
36° 41′–37° 50′	14	14	13	13	12	12	11	11	10	10	9
37° 50′–38° 58′	15	14	14	13	13	12	12	11	11	10	10
38° 58′–40° 5′	15	15	14	14	13	13	12	12	11	11	10
40° 5′–41° 12′	16	15	15	14	14	13	13	12	12	11	11
41° 12′–42° 19′	16	16	15	15	14	14	13	13	12	12	11
42° 19′–43° 26′	17	16	16	15	15	14	14	13	13	12	12
43° 26′–44° 32′	17	17	16	16	15	15	14	14	13	13	12
44° 32′–45° 38′	18	17	17	16	16	15	15	14	14	13	13

Latitude North or South, in Degrees and Minutes	Height Above Sea Level, in Meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Height Above Sea Level, in Feet										
	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730
45° 38′–46° 45′	18	18	17	17	16	16	15	15	14	14	13
46° 45′–47° 51′	19	18	18	17	17	16	16	15	15	14	14
47° 51′–48° 58′	19	19	18	18	17	17	16	16	15	15	14
48° 58′–50° 6′	20	19	19	18	18	17	17	16	16	15	15
50° 6′–51° 13′	20	20	19	19	18	18	17	17	16	16	15
51° 13′–52° 22′	21	20	20	19	19	18	18	17	17	16	16
52° 22′–53° 31′	21	21	20	20	19	19	18	18	17	17	16
53° 31′–54° 41′	22	21	21	20	20	19	19	18	18	17	17
54° 41′–55° 52′	22	22	21	21	20	20	19	19	18	18	17
55° 52′–57° 4′	23	22	22	21	21	20	20	19	19	18	18
57° 4′–58° 17′	23	23	22	22	21	21	20	20	19	I9	18
58° 17'–59° 32'	24	23	23	22	2\2	21	21	20	20	19	19
59° 32'–60° 49'	24	24	23	23	22	22	21	21	20	20	19
60° 49'–62° 9'	25	24	24	23	23	22	22	21	21	20	20
62° 9'–63° 30'	25	25	24	24	23	23	22	22	21	21	20
63° 30'–64° 55'	26	25	25	24	24	23	23	22	22	21	21
64° 55'–66° 24'	26	26	25	25	24	24	23	23	22	22	21
66° 24'–67° 57'	27	26	26	25	25	24	24	23	23	22	22
67° 57'–69° 35'	27	27	26	26	25	25	24	24	23	23	22
69° 5'–71° 21'	28	27	27	26	26	25	25	24	24	23	23
71° 21'–73° 16'	28	28	27	27	26	26	25	25	24	24	23
73° 16'–75° 24'	29	28	28	27	27	26	26	25	25	24	24
75° 24'–77° 52'	29	29	28	28	27	27	26	26	25	25	24
77° 52'–80° 56'	30	29	29	28	28	27	27	26	26	25	25
80° 56'–85° 45'	30	30	29	29	28	28	27	27	26	26	25
85° 45'–90° 00'	31	30	30	29	29	28	28	27	27	26	26

G ASCII Standard and Control Characters

G.1. ASCII Standard Characters

Char.	Dec.	Hex.
NUL	0	00
SOH	1	01
STX	2	02
ETX	3	03
EOT	4	04
ENQ	5	05
ACK	6	06
BEL	7	07
BS	8	08
HT	9	09
LF	10	0A
VT	11	0B
FF	12	0C
CR	13	0D
SO	14	0E
SI	15	0F
DLE	16	10
DC1	17	11
DC2	18	12
DC3	19	13
DC4	20	14
NAK	21	15
SYN	22	16
ETB	23	17
CAN	24	18
EM	25	19
SUB	26	1A
ESC	27	1B

Char.	Dec.	Hex.
FS	28	1C
GS	29	1D
RS	30	1E
US	31	1F
SP	32	20
!	33	21
″	34	22
#	35	23
$	36	24
%	37	25
&	38	26
′	39	27
(	40	28
)	41	29
*	42	2A
+	43	2B
,	44	2C
-	45	2D
.	46	2E
/	47	2F
0	48	30
1	49	31
2	50	32
3	51	33
4	52	34
5	53	35
6	54	36
7	55	37

Char.	Dec.	Hex.
8	56	38
9	57	39
:	58	3A
;	59	3B
<	60	3C
=	61	3D
>	62	3E
?	63	3F
@	64	40
A	65	41
B	66	42
C	67	43
D	68	44
E	69	45
F	70	46
G	71	47
H	72	48
I	73	49
J	74	4A
K	75	4B
L	76	4C
M	77	4D
N	78	4E
O	79	4F
P	80	50
Q	81	51
R	82	52
S	83	53

Char.	Dec.	Hex.
T	84	54
U	85	55
V	86	56
W	87	57
X	88	58
Y	89	59
Z	90	5A
[	91	5B
\	92	5C
]	93	5D
^	94	5E
_	95	5F
`	96	60
a	97	61
b	98	62
c	99	63
d	100	64
e	101	65
f	102	66
g	103	67
h	104	68
i	105	69
j	106	6A
k	107	6B
l	108	6C
m	109	6D
n	110	6E
o	111	6F

Char.	Dec.	Hex.
p	112	70
q	113	71
r	114	72
s	115	73
t	116	74
u	117	75
v	118	76
w	119	77
x	120	78
y	121	79
z	122	7A
{	123	7B
|	124	7C
}	125	7D
~	126	7E
□	127	7F
Reservado	128	8A
	a	*a*
	159	9F
	160	A0
¡	161	A1
¢	162	A2
£	163	A3
€	164	A4
¥	165	A5
Š	166	A6
§	167	A7
š	168	A8
©	169	A9

Char.	Dec.	Hex.
ª	170	AA
«	171	AB
¬	172	AC
	173	AD
®	174	AE
¯	175	AF
°	176	B0
±	177	B1
²	178	B2
³	179	B3
Ž	180	B4
µ	181	B5
¶	182	B6
·	183	B7
ž	184	B8
¹	185	B9
º	186	BA
»	187	BB
Œ	188	BC
œ	189	BD
	190	ŸBE
¿	191	BF
À	192	C0
Á	193	C1
Â	194	C2
Ã	195	C3
Ä	196	C4
Å	197	C5
Æ	198	C6

Char.	Dec.	Hex.
Ç	199	C7
È	200	C8
É	201	C9
Ê	202	CA
Ë	203	CB
Ì	204	CC
Í	205	CD
Î	206	CE
Ï	207	CF
Ð	208	D0
Ñ	209	D1
Ò	210	D2
Ó	211	D3
Ô	212	D4
Õ	213	D5
Ö	214	D6
×	215	D7
Ø	216	D8
Ù	217	D9
Ú	218	DA
Û	219	DB
Ü	220	DC
Ý	221	DD
Þ	222	DE
ß	223	DF
à	224	E0
á	225	E1
â	226	E2
ã	227	E3

Char.	Dec.	Hex.
ä	228	E4
å	229	E5
æ	230	E6
ç	231	E7
è	232	E8
é	233	E9
ê	234	EA
ë	235	EB
ì	236	EC
í	237	ED
î	238	EE
ï	239	EF
ð	240	F0
ñ	241	F1
ò	242	F2
ó	243	F3
ô	244	F4
õ	245	F5
ö	246	F6
÷	247	F7
ø	248	F8
ù	249	F9
ú	250	FA
û	251	FB
ü	252	FC
ý	253	FD
þ	254	FE
ÿ	255	FF

G.2. ASCII Control Characters

Char	Definition	Function
SOH	START OF HEADING	A transmission control character used as the first character of a heading of an information message.
STX	START OF TEXT	A transmission control character that precedes a text and that is used to terminate a heading.
ETX	END OF TEXT	A transmission control character that terminates a text.

Char	Definition	Function
EOT	END OF TRANSMISSION	A transmission control character used to indicate the conclusion of the transmission of one or more texts.
ENQ	ENQUIRY	A transmission control character used as a request for a response from a remote station; the response may include station identification and/or station status. When a "Who are you" function is required on the general switched transmission network, the first use of ENQ after the connection is established will have the meaning "Who are you" (station identification). Subsequent use of ENQ may, or may not, include the function "Who are you", as determined by agreement.
ACK	ACKNOWLEDGE	A transmission control character transmitted by a receiver as an affirmative response to the sender.
BEL	BELL	A control character that is used when there is a need to call for attention; it may control alarm or attention devices.
BS	BACKSPACE	A format effector that moves the active position one character position backwards on the same line.
HT	HORIZONTAL TABULATION	A format effector that advances the active position to the next pre-determined character position on the same line.
LF	LINE FEED	A format effector that advances the active position to the same character position of the next line.
VT	VERTICAL TABULATION	A format effector that advances the active position to the same character position on the next pre-determined line.
FF	FORM FEED	A format effector that advances the active position to the same character position on a pre-determined line of the next form or page.
CR	CARRIAGE RETURN	A format effector that moves the active position to the first character position on the same line.
SO	SHIFT OUT	A control character that is used in conjunction with SHIFT IN and ESCAPE to extend the graphic character set of the code.
SI	SHIFT IN	A control character that is used in conjunction with SHIFT OUT and ESCAPE to extend the graphic character set of the code.
DLE	DATA LINK ESCAPE	A transmission control character that will change the meaning of a limited number of contiguously following characters. It is used exclusively to provide supplementary data transmission control functions. Only graphic characters and transmission control characters can be used in DLE sequences.
DC1	DEVICE CONTROL ONE	A device control character that is primarily intended for turning on or starting an ancillary device. If it is not required for this purpose, it may be used to restore a device to the basic mode of operation (see also DC2 and DC3), or for any other device control function not provided by other DCs.
DC2	DEVICE CONTROL TWO	A device control character that is primarily intended for turning on or starting an ancillary device. If it is not required for this purpose, it may be used to set a device to a special mode of operation (in which case DC1 is used to restore normal operation), or for any other device control function not provided by other DCs.

Char	Definition	Function
DC3	DEVICE CONTROL THREE	A device control character that is primarily intended for turning off or stopping an ancillary device. This function may be a secondary level stop, for example, wait, pause, stand-by or halt (in which case DC1 is used to restore normal operation). If it is not required for this purpose, it may be used for any other device control function not provided by other DCs.
DC4	DEVICE CONTROL FOUR	A device control character that is primarily intended for turning off, stopping, or interrupting an ancillary device. If it is not required for this purpose, it may be used for any other device control function not provided by other DCs.
NAK	NEGATIVE ACKNOWLEDGE	A transmission control character transmitted by a receiver as a negative response to the sender.
SYN	SYNCHRONOUS IDLE	A transmission control character used by a synchronous transmission system in the absence of any other character (idle condition) to provide a signal from which synchronism may be achieved or retained between data terminal equipment.
ETB	END OF TRANSMISSION BLOCK	A transmission control character used to indicate the end of a transmission block of data where data is divided into such blocks for transmission purposes.
CAN	CANCEL	A character, or the first character of a sequence, indicating that the data preceding it is in error. As a result, this data is to be ignored. The specific meaning of this character must be defined for each application and/or between sender and recipient.
EM	END OF MEDIUM	A control character that may be used to identify the physical end of a medium, or the end of the used portion of a medium, or the end of the wanted portion of data recorded on a medium. The position of this character does not necessarily correspond to the physical end of the medium.
SUB	SUBSTITUTE	A control character used in the place of a character that has been found to be invalid or in error. SUB is intended to be introduced by automatic means.
ESC	ESCAPE	A control character that is used to provide additional control functions. It alters the meaning of a limited number of contiguously following bit combinations.
FS	FILE SEPARATOR	A control character used to separate and qualify data logically; its specific meaning has to be specified for each application. If this character is used in hierarchical order, it delimits a data item called a file.
GS	GROUP SEPARATOR	A control character used to separate and qualify data logically; its specific meaning has to be specified for each application. If this character is used in hierarchical order, it delimits a data item called a group.
RS	RECORD SEPARATOR	A control character used to separate and qualify data logically; its specific meaning has to be specified for each application. If this character is used in hierarchical order, it delimits a data item called a record.
US	UNIT SEPARATOR	A control character used to separate and qualify data logically; its specific meaning has to be specified for each application. If this character is used in hierarchical order, it delimits a data item called a unit.

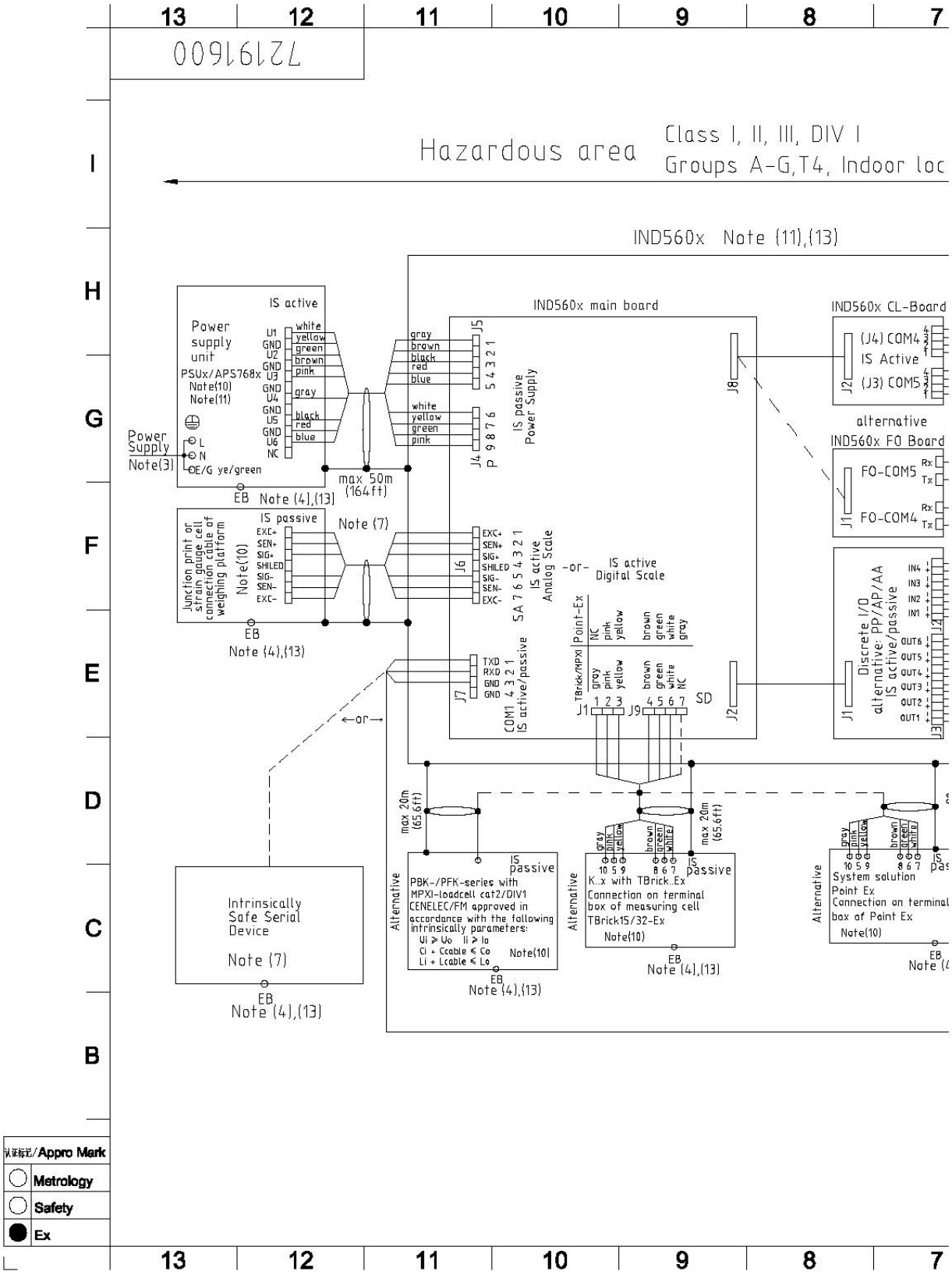
H Certificates and Drawings

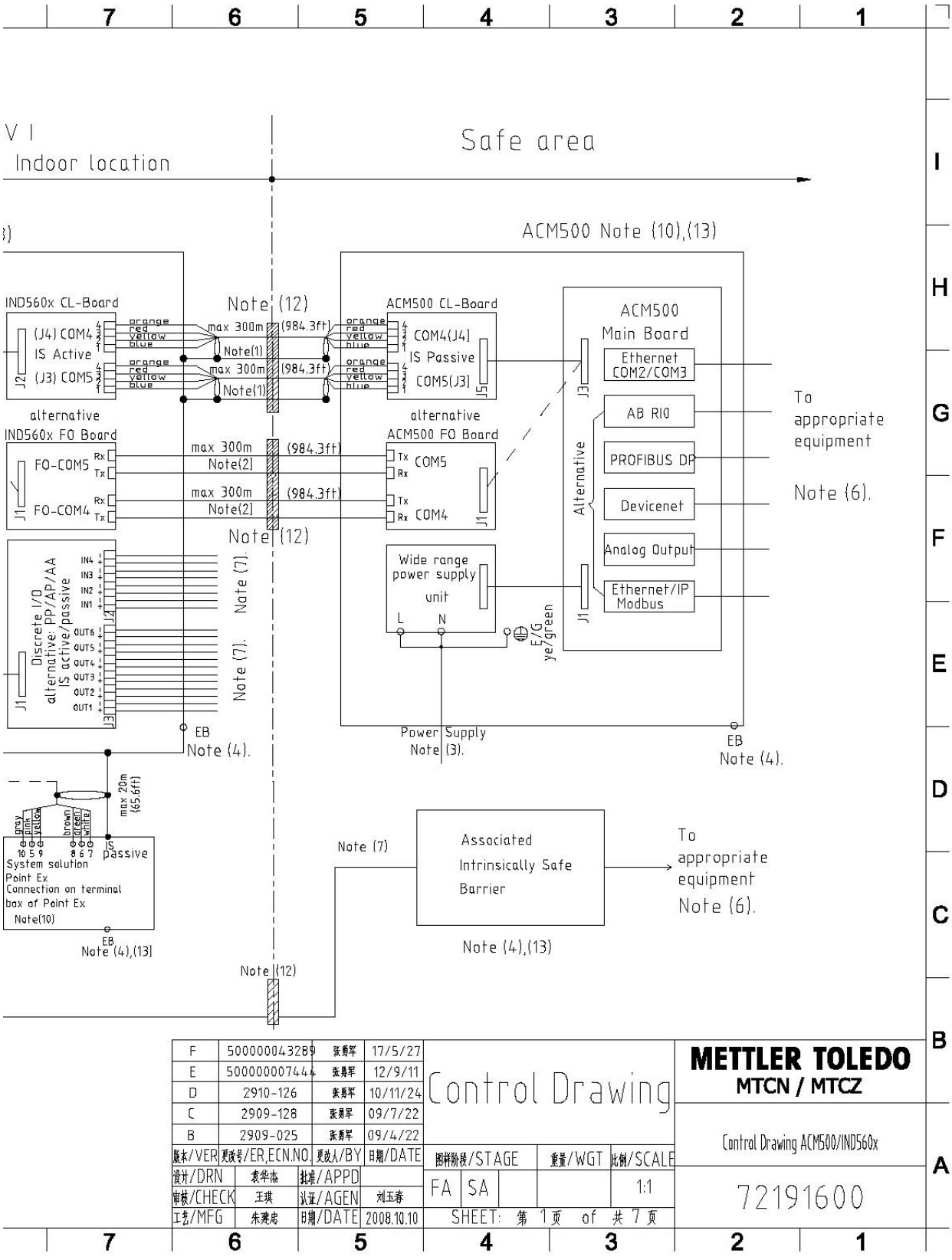
This appendix includes the certificates and control drawings for the IND560x terminal and the PSUx power supply. Refer to this Appendix for specific installation requirements and entity values before beginning the installation.

The documents are organized in the following sequence:

Control Drawing

H.1. Control Drawing





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E	500000007444	张勇军	12/9/11	
D	2910-126	张勇军	10/11/24	
C	2909-128	张勇军	09/7/22	
B	2909-025	张勇军	09/4/22	
版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE	
设计/DRN	袁华磊	批准/APPD		
审核/CHECK	王琪	认证/AGEN	刘玉春	
工艺/MFG	朱建忠	日期/DATE	2008.10.10	

Control Drawing

图样阶段/STAGE		重量/WGT	比例/SCALE
FA	SA		1:1

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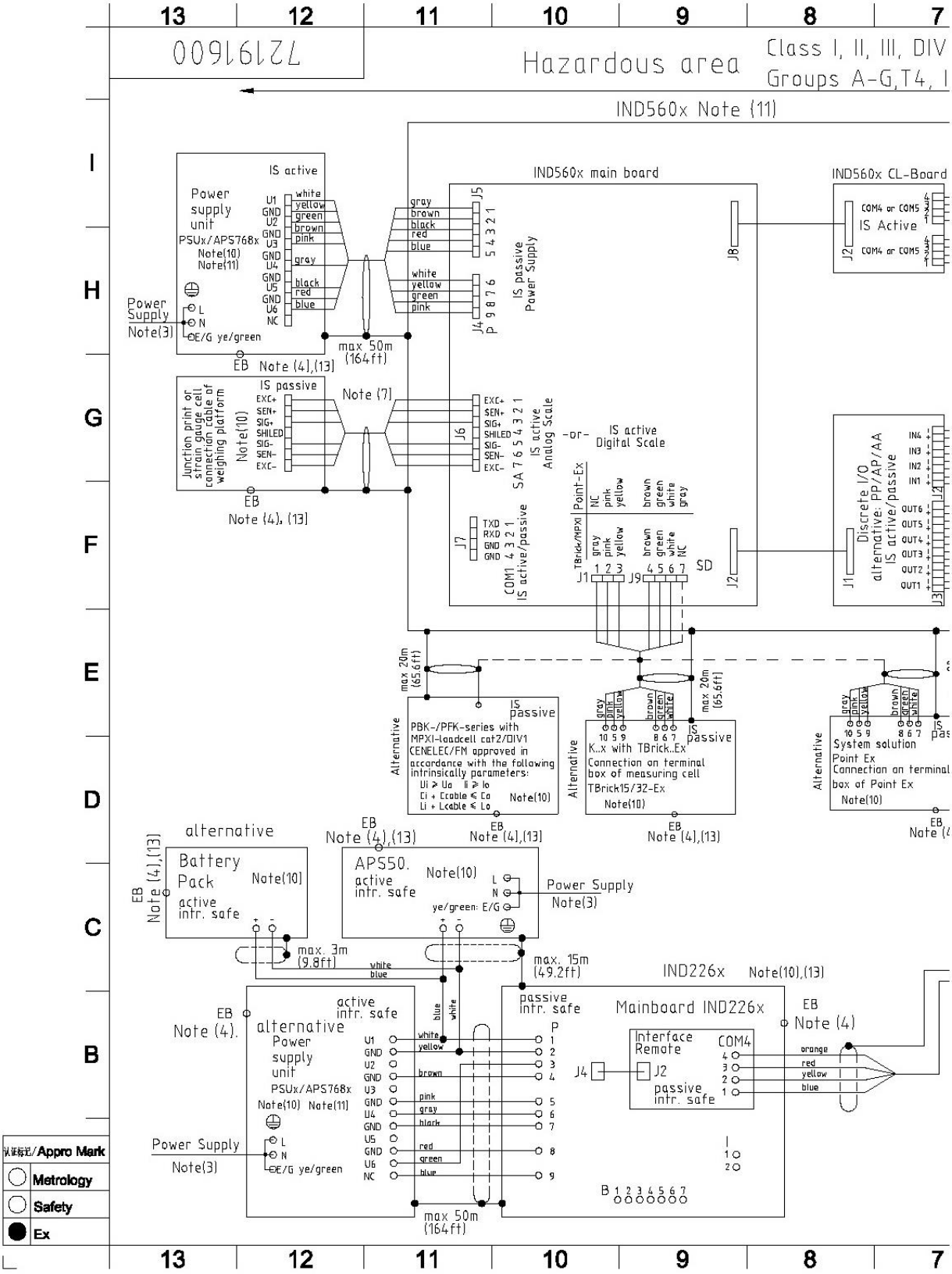
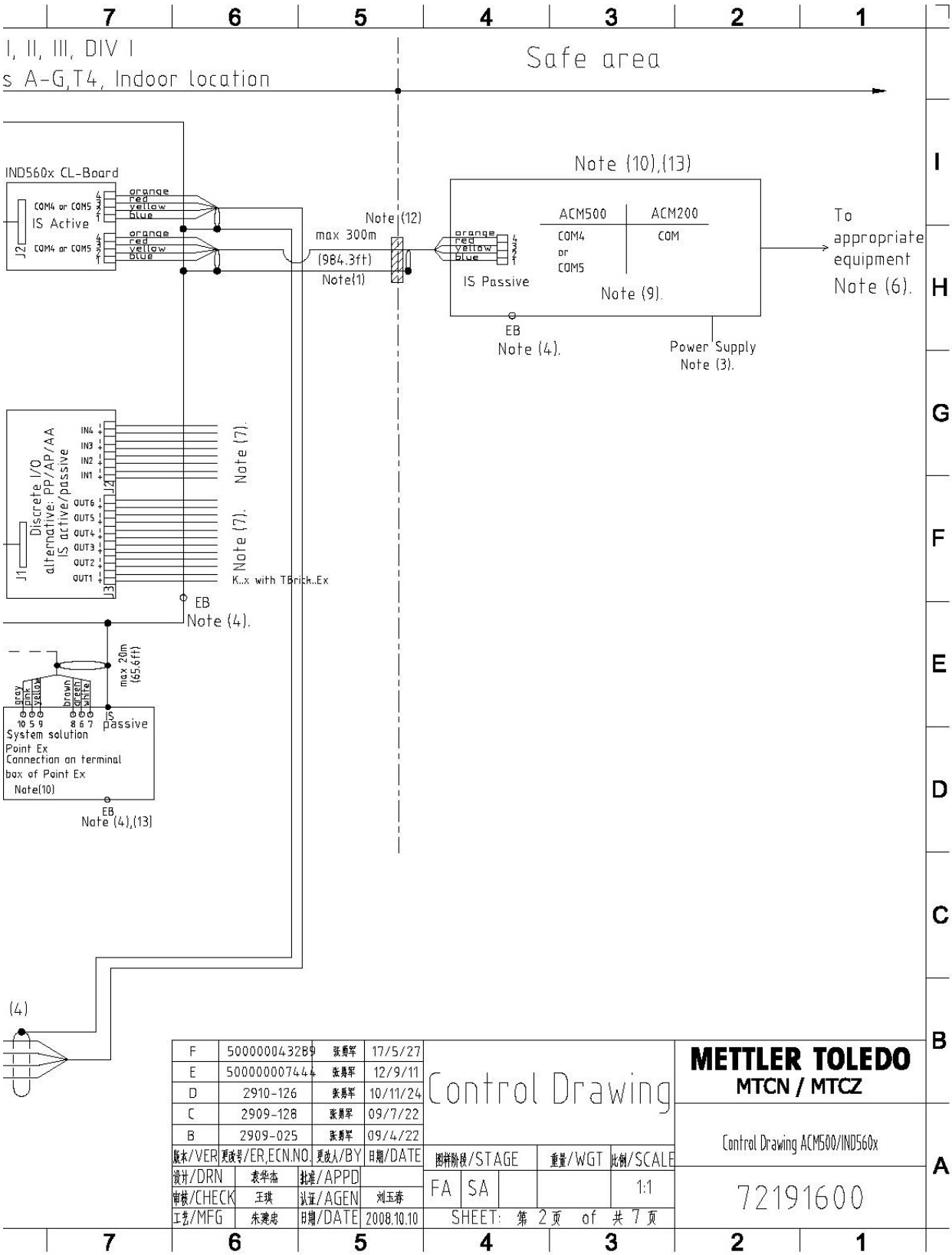
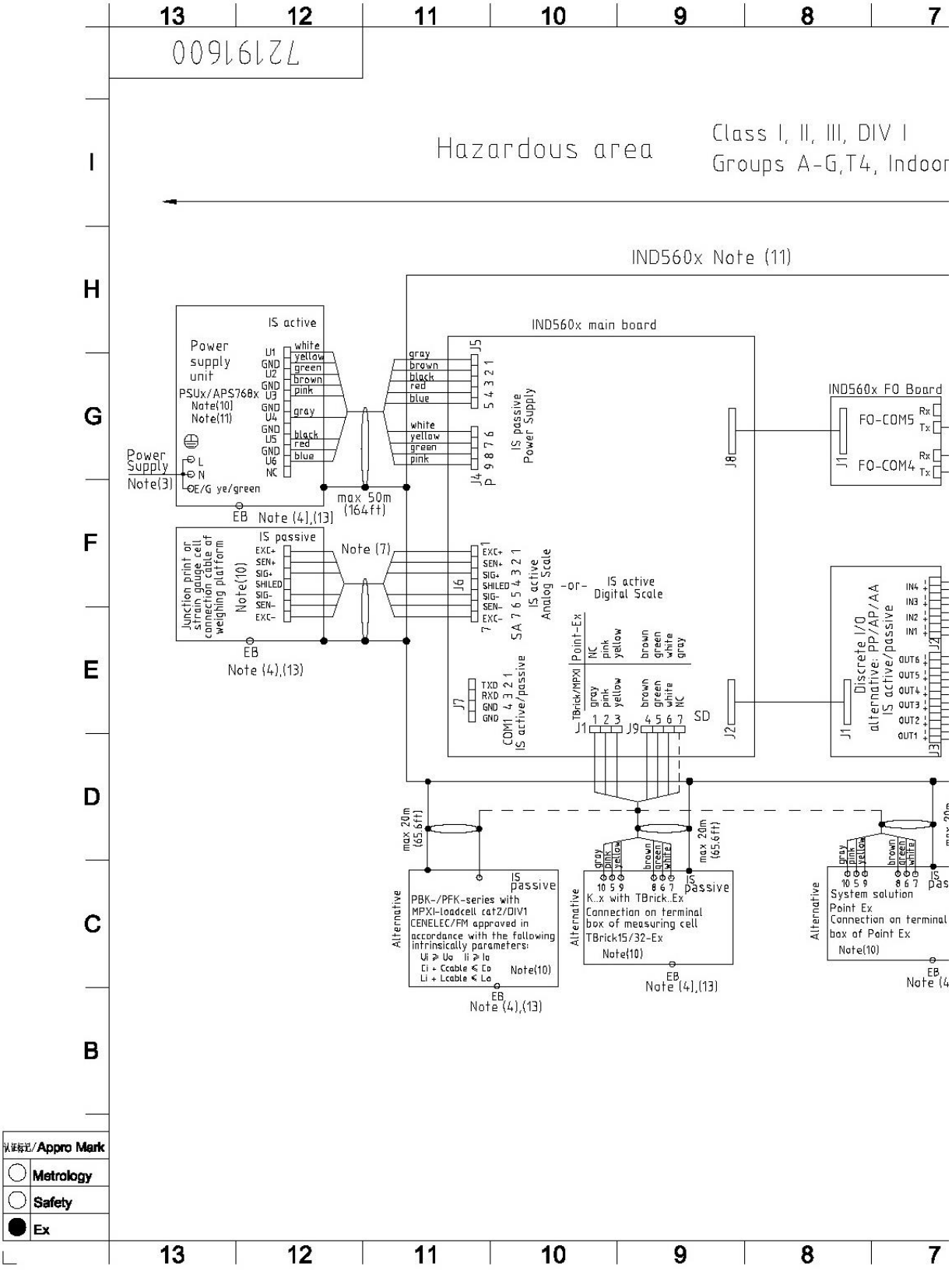
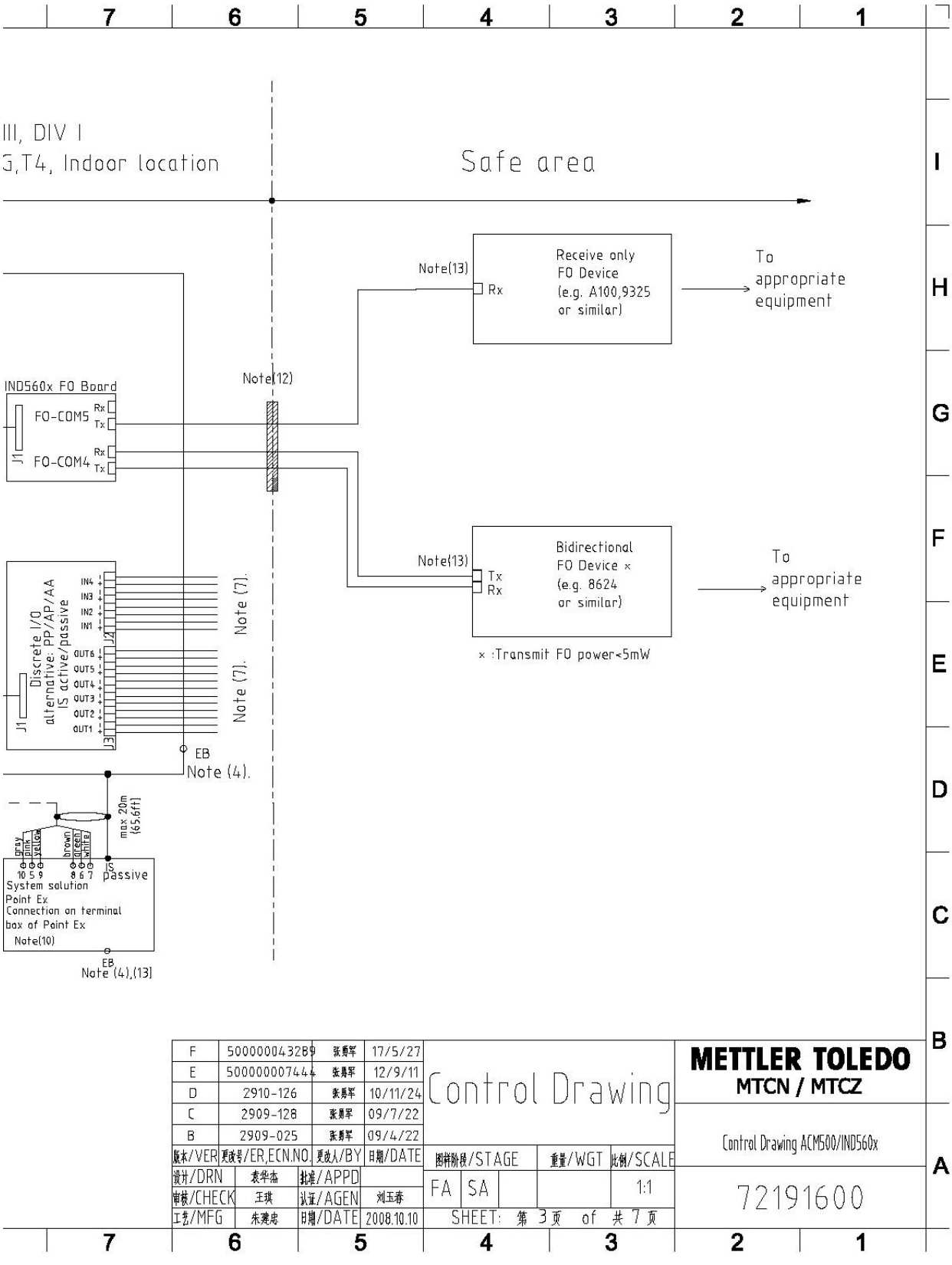
Control Drawing ACM500/IND560x

72191600


72191600
Hazardous area
Class I, II, III, DIV
Groups A-G,T4, I
IND560x Note (11)
IND560x main board
IND560x CL-Board
IS active
Power supply unit
PSUx/APS768x
Note(10)
Note(11)
Power Supply
Note(3)
max 50m (164ft)
EB Note (4),(13)
IS passive
Junction print or strain gauge cell connection cable of weighing platform
Note (7)
IS active Digital Scale
-or-
IS active Analog Scale
IS passive Power Supply
Discrete I/O alternative: PP/AP/AA
IS active/passive
max 20m (65.6ft)
PBK-/PFK-series with MPXI-Loadcell cat2/DIV1
CENELEC/FM approved in accordance with the following intrinsically parameters:
Li ≥ Ua Ii ≥ Io
Ci + Ccable ≤ Ca
Li + Lcable ≤ La
Note(10)
K..x with TBrick..Ex
Connection on terminal box of measuring cell
TBrick15/32-Ex
System solution
Point Ex
Connection on terminal box of Point Ex
alternative
Battery Pack
active intr. safe
APS50.
Power Supply
max. 3m (9.8ft)
max. 15m (49.2ft)
IND226x
Mainboard IND226x
passive intr. safe
Interface Remote
COM4
max 50m (164ft)
Appro Mark
Metrology
Safety
Ex


I, II, III, DIV I
s A-G,T4, Indoor location
Safe area
IND560x CL-Board
COM4 or COM5
IS Active
J2
orange
red
yellow
blue
max 300m
(984.3ft)
Note(1)
Note (12)
Note (10),(13)
ACM500
ACM200
COM4
or
COM5
COM
IS Passive
Note (9).
To
appropriate
equipment
Note (6).
EB
Note (4).
Power Supply
Note (3).
Discrete I/O
alternative: PP/AP/AA
IS active/passive
J1
J2
J3
IN4
IN3
IN2
IN1
OUT6
OUT5
OUT4
OUT3
OUT2
OUT1
Note (7).
K..x with TBrick..Ex
EB
Note (4).
max 20m
(65.6ft)
grey
pink
yellow
brown
green
white
10 5 9
8 6 7
IS passive
System solution
Point Ex
Connection an terminal
box of Point Ex
Note(10)
EB
Note (4),(13)
(4)
F 500000043289 张勇军 17/5/27
E 500000007444 张勇军 12/9/11
D 2910-126 张勇军 10/11/24
C 2909-128 张勇军 09/7/22
B 2909-025 张勇军 09/4/22
版本/VER 更改号/ER,ECN.NO. 更改人/BY 日期/DATE
设计/DRN 袁华磊 批准/APPD
审核/CHECK 王琪 认证/AGEN 刘玉春
工艺/MFG 朱建忠 日期/DATE 2008.10.10
Control Drawing
图样阶段/STAGE 重量/WGT 比例/SCALE
FA SA 1:1
SHEET: 第 2 页 of 共 7 页
METTLER TOLEDO
MTCN / MTCZ
Control Drawing ACM500/IND560x
72191600


72191600
Hazardous area
Class I, II, III, DIV I
Groups A-G,T4, Indoor
IND560x Note (11)
IND560x main board
IND560x FO Board
IS active
Power supply unit
PSUx/APS768x
Note(10)
Note(11)
Power Supply
Note(3)
L
N
PE/G ye/green
EB Note (4),(13)
max 50m (164ft)
IS passive
Junction print or strain gauge cell connection cable of weighing platform
Note(10)
Note (7)
IS passive Power Supply
IS active Analog Scale
-or- IS active Digital Scale
Point-Ex
TBrick/MPXI
COM1 IS active/passive
SD
FO-COM5
FO-COM4
Discrete I/O alternative: PP/AP/AA IS active/passive
max 20m (65.6ft)
Alternative
IS passive
PBK-/PFK-series with MPXI-loadcell cat2/DIV1 CENELEC/FM approved in accordance with the following intrinsically parameters:
Ui ≥ Uo Ii ≥ Io
Ci + Ccable ≤ Co
Li + Lcable ≤ Lo
Note(10)
K..x with TBrick..Ex
Connection on terminal box of measuring cell TBrick15/32-Ex
Note(10)
System solution Point Ex
Connection on terminal box of Point Ex
Note(10)
Appro Mark
Metrology
Safety
Ex



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E	500000007444	张勇军	12/9/11	
D	2910-126	张勇军	10/11/24	
C	2909-128	张勇军	09/7/22	
B	2909-025	张勇军	09/4/22	
版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE	
设计/DRN	袁华磊	批准/APPD		
审核/CHECK	王琪	认证/AGEN	刘玉春	
工艺/MFG	朱建忠	日期/DATE	2008.10.10	

Control Drawing

图样阶段/STAGE		重量/WGT	比例/SCALE
FA	SA		1:1

SHEET: 第 3 页 of 共 7 页

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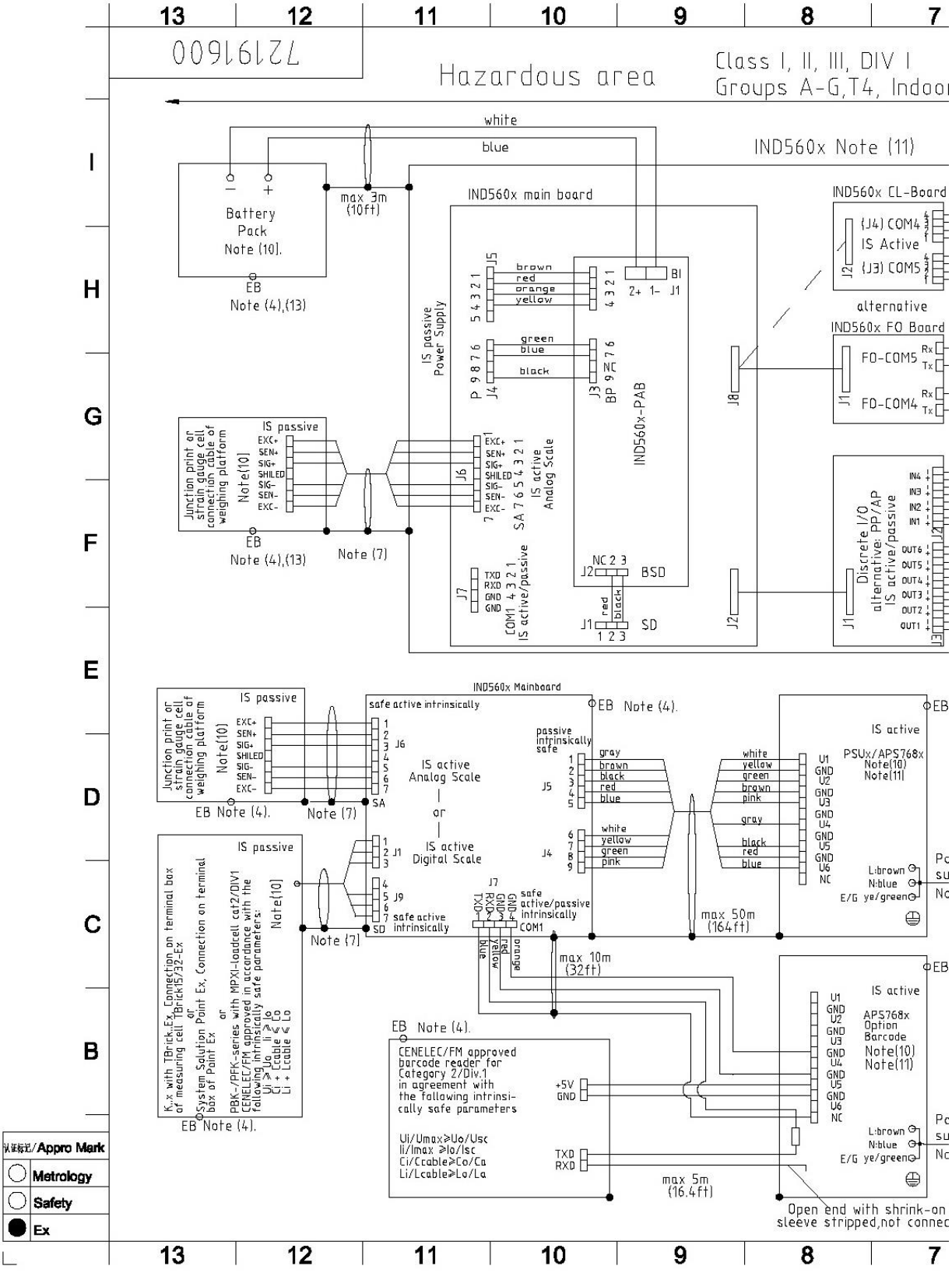
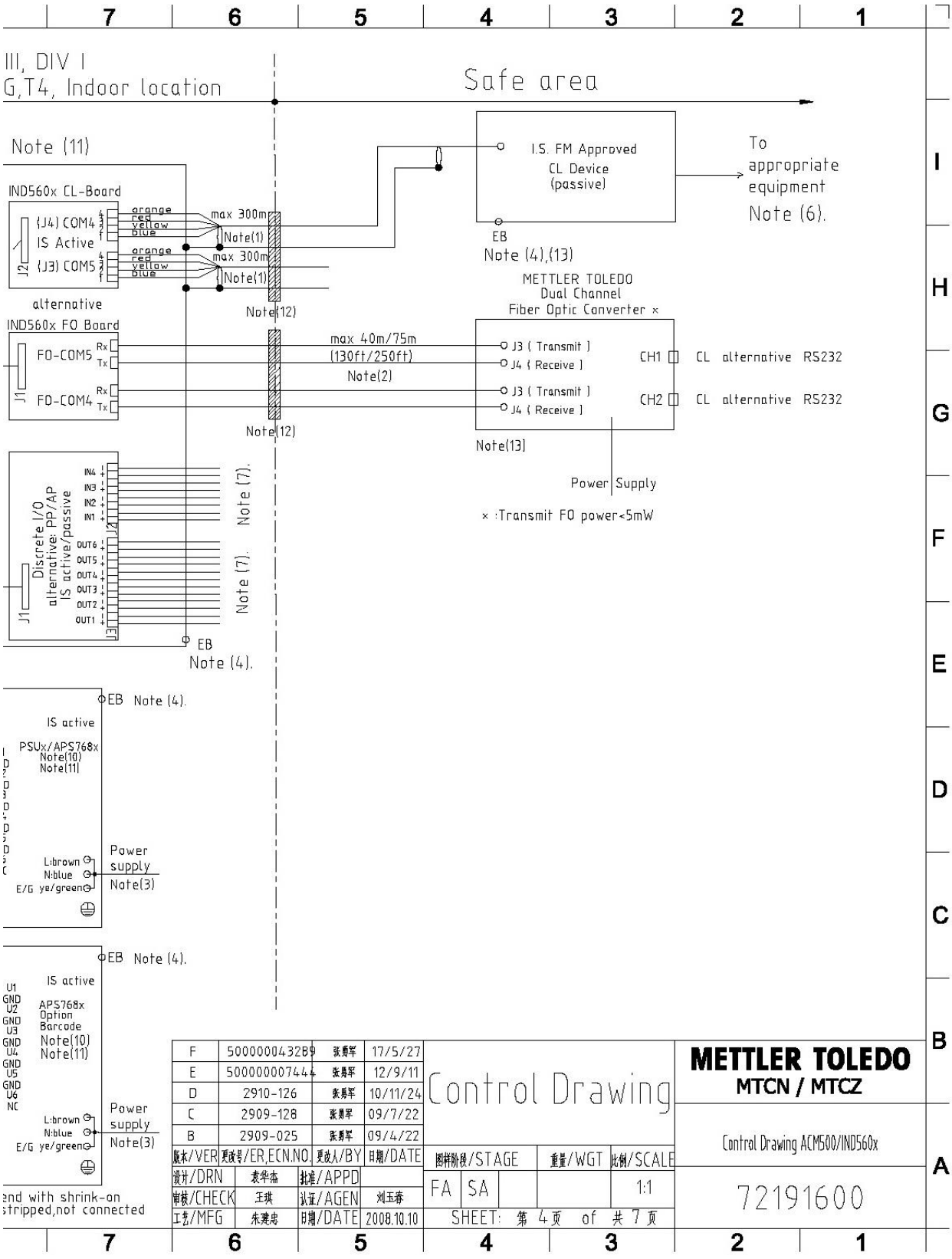
Control Drawing ACM500/IND560x

72191600


13
12
11
10
9
8
7
I
H
G
F
E
D
C
B
72191600
Hazardous area
Class I, II, III, DIV I
Groups A-G,T4, Indoo
IND560x Note (11)
white
blue
Battery Pack Note (10).
max 3m (10ft)
EB Note (4),(13)
IND560x main board
IS passive Power Supply
IND560x-PAB
IND560x CL-Board
(J4) COM4 IS Active
(J3) COM5
alternative
IND560x FO Board
FO-COM5
FO-COM4
brown
red
orange
yellow
green
blue
black
BI
2+ 1- J1
BSD
SD
Junction print or strain gauge cell connection cable of weighing platform Note(10)
IS passive
EXC+
SEN+
SIG+
SHILED
SIG-
SEN-
EXC-
IS active Analog Scale
Note (7)
TXD
RXD
GND
COM1 IS active/passive
Discrete I/O alternative: PP/AP IS active/passive
IN4
IN3
IN2
IN1
OUT6
OUT5
OUT4
OUT3
OUT2
OUT1
IND560x Mainboard
safe active intrinsically
EB Note (4).
IS active Analog Scale
or
IS active Digital Scale
passive intrinsically safe
gray
brown
black
red
blue
white
yellow
green
pink
PSUx/APS768x Note(10) Note(11)
L:brown
N:blue
E/G ye/green
max 50m (164ft)
safe active/passive intrinsically
COM1
max 10m (32ft)
IS passive
K..x with TBrick..Ex Connection on terminal box of measuring cell TBrick15/32-Ex
or
System Solution Point Ex, Connection on terminal box of Point Ex
or
PBK-/PFK-series with MPXI-loadcell cat2/DIV1 CENELEC/FM approved in accordance with the following intrinsically safe parameters:
Ui ≥ Uo Ii ≥ Io
Ci + Ccable ≤ Co
Li + Lcable ≤ Lo
Note(10)
safe active intrinsically
EB Note (4).
APS768x Option Barcode Note(10) Note(11)
CENELEC/FM approved barcode reader for Category 2/Div.1 in agreement with the following intrinsically safe parameters
Ui/Umax ≥ Uo/Usc
Ii/Imax ≥ Io/Isc
Ci/Ccable ≥ Co/Ca
Li/Lcable ≥ Lo/La
+5V
GND
TXD
RXD
max 5m (16.4ft)
Open end with shrink-on sleeve stripped,not connec
Appro Mark
Metrology
Safety
Ex



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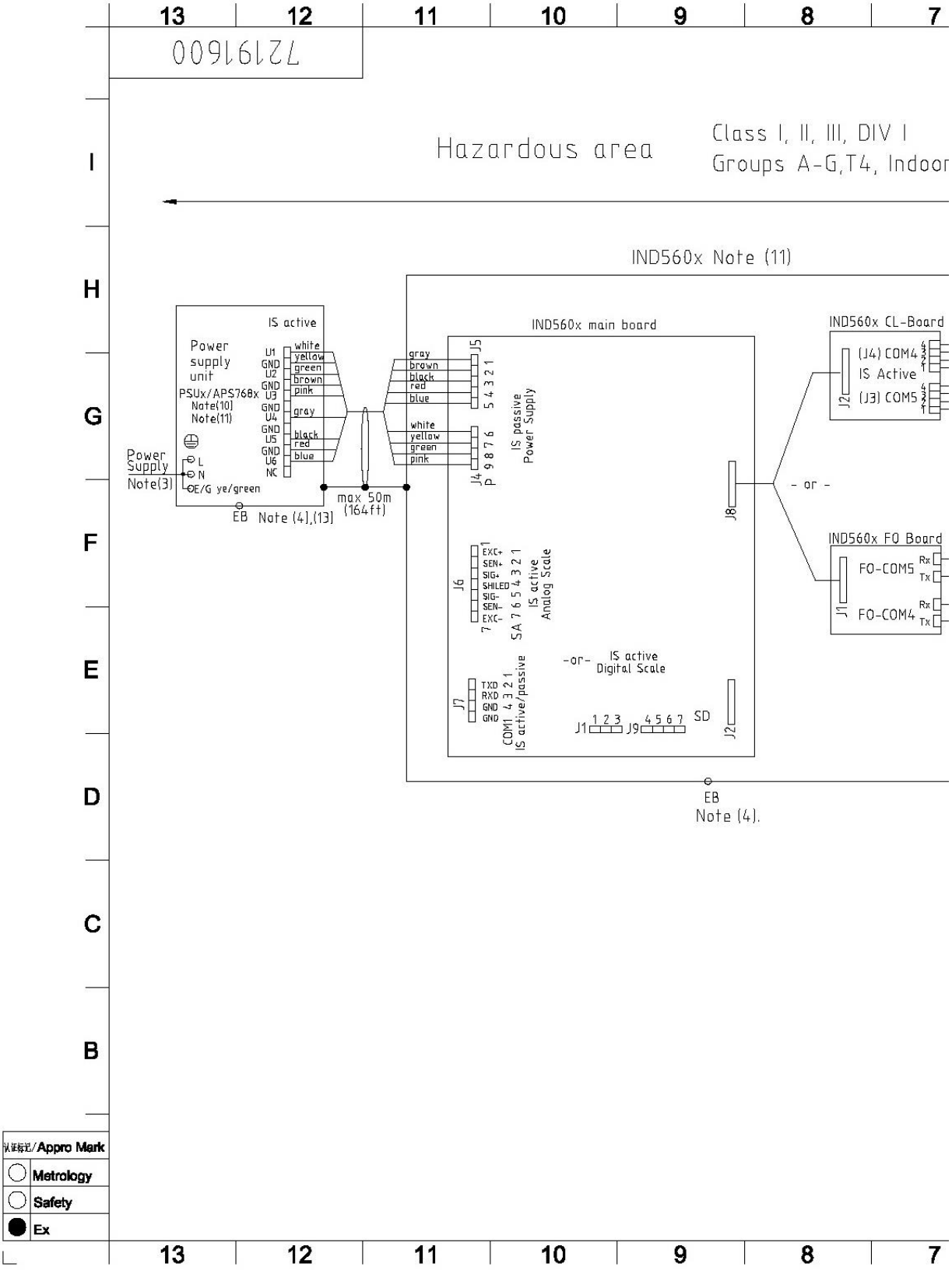
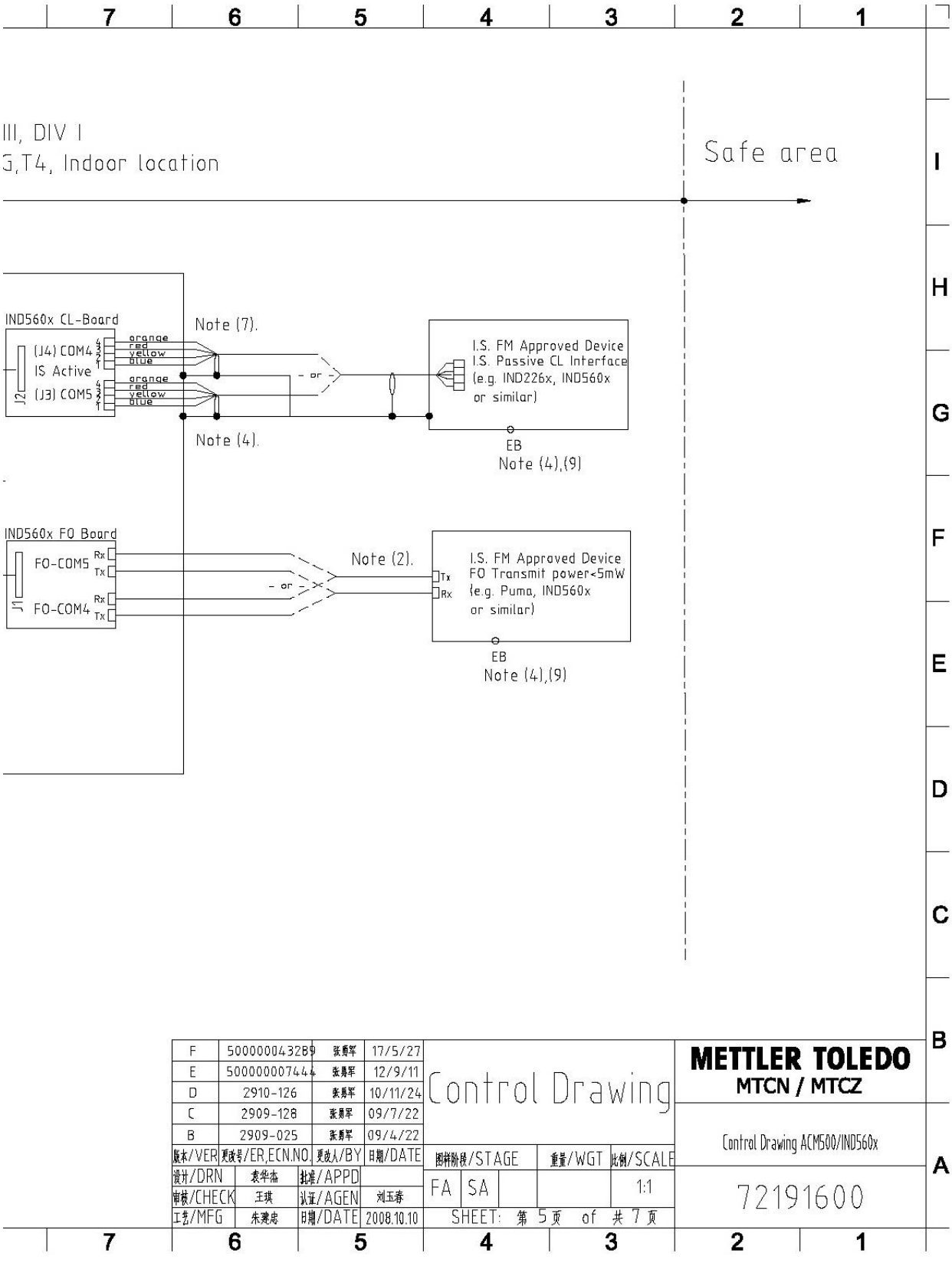
E	500000007444	张勇军	12/9/11
D	2910-126	张勇军	10/11/24
C	2909-128	张勇军	09/7/22
B	2909-025	张勇军	09/4/22

DRN	袁华森	APPD	
CHECK	王琪	AGEN	刘玉春
MFG	朱建忠	DATE	2008.10.10

STAGE	WGT	SCALE
FA SA		1:1


13 12 11 10 9 8 7
72191600
Hazardous area
Class I, II, III, DIV I
Groups A-G,T4, Indoor
IND560x Note (11)
IS active
Power supply unit
PSUx/APS768x
Note(10)
Note(11)
U1 GND U2 GND U3 GND U4 GND U5 GND U6 NC
white yellow green brown pink gray black red blue
Power Supply Note(3)
L N
E/G ye/green
EB Note (4),(13)
max 50m (164ft)
gray brown black red blue
white yellow green pink
J5 5 4 3 2 1
J4 P 9 8 7 6
IS passive Power Supply
IND560x main board
IND560x CL-Board
(J4) COM4
IS Active
(J3) COM5
J2
J8
- or -
IND560x FO Board
FO-COM5
FO-COM4
Rx
Tx
J1
J6
EXC+ SEN+ SIG+ SHIELD SIG- SEN- EXC-
7 6 5 4 3 2 1 SA
IS active Analog Scale
-or- IS active Digital Scale
J7
TXD RXD GND GND
COM1 4 3 2 1
IS active/passive
J1 1 2 3 J9 4 5 6 7 SD
J2
EB
Note (4).
Appro Mark
Metrology
Safety
Ex
13 12 11 10 9 8 7

H I G F E D C B



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E	500000007444	张勇军	12/9/11	
D	2910-126	张勇军	10/11/24	
C	2909-128	张勇军	09/7/22	
B	2909-025	张勇军	09/4/22	
版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE	
设计/DRN	袁华磊	批准/APPD		
审核/CHECK	王琪	认证/AGEN	刘玉春	
工艺/MFG	朱建忠	日期/DATE	2008.10.10	

图样阶段/STAGE		重量/WGT	比例/SCALE
FA	SA		1:1

7219160O

IND560x Intrinsically saf

Power Supply

Passive	Ui/V	Ii/mA	Pi/W	Ci/uF	Li/mH
P1(J5.1)	10.5	74	0.78	0.24	-
P3(J5.3)	5.9	240	1.41	0.48	-
P5(J5.5)	12.6	92	1.16	0.36	-
P6(J4.1)	8.7	133	1.16	0.13	-
P8(J4.3)	12.6	42	0.53	-	-
P9(J4.4)	7.15	107	0.77	0.24	-

Analog Scale Interface

Active	Uo/V	Io/mA	Po/W	Co/uF	Lo/mH
SA1-7(J6)	5.88	133	0.8	0.2	0.3

Digital Scale Interface

Active	Uo/V	Io/mA	Po/W	Co/uF	Lo/mH
SD1(J1.1)	12.6	42	0.53	0.4	1.0
SD2(J1.2)	8.7	133	1.16	0.87	0.3
SD5(J9.2)	5.36	30	0.04	0.1	0.1
SD6(J9.3)	5.36	30	0.04	0.1	0.1
SD7(J9.4)	12.6	92	1.16	0.14	0.3

Serial interface COM1 (RS232)

Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM1.1/1.2 (J7.1/J7.2)	±5.36	±18.1	24.2	100	100
Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
COM1.1/1.2 (J7.1/J7.2)	±10	-	-	Negligible	Negligible

Ri min=297Ohm

Power Input PAB

	Ui/V	Ii/mA	Pi/W	Ci/uF	Li/mH
BI 1- (J1-1)	Ground				
BI 2+ (J1-2)	12.0	3030	6.83	0.49	-

Appro Mark
○ Metrology
○ Safety
● Ex

nsically safe entity parameters

Discrete I/O Board

Active/Active IO Borad

Li/mH	Outputs Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
-	A-OUT1+(J3.1)---A-OUT6+(J3.11)	12.6	92	627	100	400
-	Inputs Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
-	A-IN1+(J2.1)---A-IN4+(J2.7)	5.88	2	2.94	100	100
-						
-						
-						

Active/Passive IO Borad

Lo/mH	Outputs Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
0.3	P-OUT1+(J3.12)---P-OUT6+(J3.2)	15	40	150	10	10
	Inputs Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
	A-IN1+(J2.8)---A-IN4+(J2.2)	5.88	2	2.94	100	100

Passive/Passive IO Borad

Lo/mH	Outputs Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
1.0	P-OUT1+(J3.12)---P-OUT6+(J3.2)	15	40	150	10	10
0.3	Inputs Passive	Ui/V	Ii/mA	Pi/mW	Ci/nF	Li/uH
0.1	P-IN1+(J2.8)---P-IN4+(J2.2)	30	50	375	10	10
0.1						
0.3						

Serial CL data interface

Active	Uo/V	Io/mA	Po/mW	Co/nF	Lo/uH
COM4/5	5.36	107	144	600	400

Lo/uH
100

Serial FO data interface

Li/uH
egligible

Peak light output power is Pout < 5mW at transmission data line per output FO-COM4 and FO-COM5.

Li/mH
-

F	500000043289	张勇军	17/5/27	
E	500000007444	张勇军	12/9/11	
D	2910-126	张勇军	10/11/24	Control Drawing
C	2909-128	张勇军	09/7/22	
B	2909-025	张勇军	09/4/22	
版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE	图样阶段/STAGE 重量/WGT 比例/SCALE
设计/DRN	袁华磊	批准/APPD		FA SA 1:1
审核/CHECK	王琪	认证/AGEN	刘玉春	
工艺/MFG	朱建忠	日期/DATE	2008.10.10	SHEET: 第 6 页 of 共 7 页

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Control Drawing ACM500/IND560x

72191600

13 12 11 10 9 8 7

72191600

ACM500 Intrinsically safe entity parameters

ACM500 CL Board (passive) - Intrinsically Safe Entity Values

Passive interface	Ui	Ii	Pi	Ci	Li
COM4, Terminals 1-4	10 V	300 mA	500 mW	120 nF	0 mH
COM5, Terminals 1-4	10 V	300 mA	500 mW	120 nF	0 mH

Table 1

ACM500 FO board (active)

Fiber optic light output power (Pout) for COM4 and COM5 is limited to 5mW maximum per transmission data line.

Table 2

ACM200 Intrinsically safe entity parameters

Passive interface	Ui	Ii	Pi	Ci	Li
COM, Terminals 1-4	10 V	300 mA	500 mW	120 nF	0 mH

11. Also certified according NEC505: AEx ib IIC T4 Zone1 or AEx me [ib] IIC T4
12. Install cable seal between differently rated areas per country-specific regulations.
13. Various combinations of the options shown are possible based on physical hardware limits of the IND560x terminal.

WEEE/Appro Mark	
○	Metrology
○	Safety
●	Ex

I H G F E D C B

13 12 11 10 9 8 7

CENELEC approval	cFMus approval
Cables conforming to EN50039 and EN60079-14 for intrinsically safe circuits	For installation please refer to ANSI/ISA RP 12.06.01, "Installation of intrinsically-safe devices in CLASS I hazardous areas" Canadian installation in accordance with Canadian Electrical Code C22.1 Cable as per country-specific regulations for intrinsically- safe circuits

1. Don't connect cable shield at ACM500 end. Maximum length 300m (1000 ft.).

2. HCS Fiber maximum length 300m (1000 ft.) or POF Fiber maximum length 40m (130ft) @115Kbd and 75m (250ft) @9600bd.

3. Mains connection in accordance with country-specific regulations; for supply voltage and frequency refer to rating plate.

4. Connection of equipotential bonding (EB) as per country-specific regulations. It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.	4. Connection of equipotential bonding (EB) as per ANSI/NFPA 70,Article 504 and ANSI/IA RP 12.06.01 or Canadian Electrical Code C22.2. It must be ensured that the housings of all devices are connected to the same potential via the EB terminals. No circulating current may flow via the shielding of the intrinsically safe cables.

5. Install cabling securely so that it is protected from damage and it does not move.

6. Maximum input voltage permitted: Um=250Vrms or DC.

7. Connection to an intrinsically safe approved apparatus in accordance with following conditions:

Ui ⩾ Uo (Voc) Ci + Ccable < Co (Ca)

Ii ⩾ Io (Isc) Li + Lcable < Lo (La)

Pi ⩾ Po

Discrete I/O active input: connection to simple apparatus according NEC (NFPA 70), section 504.2 and 504.4

8. Ambient temperature range: -10℃ to +40℃

9. Installation as described ACM500 installation information 64061976 (multilingual).
Installation as described IND560x installation information 64061929 (multilingual).
Installation as described IND226x/ACM200 installation information 72203959 (German) 72210036 (US).
Installation as described Puma installation information D14724300A.

10.	FM project	FMc or CSA
IND560x	3035339	3035339C
IND226x	3028618,3030647	3028618C,3030647C
ACM200	3030961	3030961C
ACM500	3034372	3034372C
PSUx	300810,3024135	1360311(CSA)
APS768x	3040399	3040399C
Battery Pack	3031092	3031092C
TBrickEx	3017821	1647044(CSA)
PointEx	3020293	1620259(CSA)
APS500/501	3031533	3031533C
MPXI	pending	pending

F	500000043289	张勇军	17/5/27
E	500000007444	张勇军	12/9/11
D	2910-126	张勇军	10/11/24
C	2909-128	张勇军	09/7/22
B	2909-025	张勇军	09/4/22

版本/VER	更改号/ER,ECN.NO.	更改人/BY	日期/DATE
设计/DRN	袁华磊	批准/APPD	
审核/CHECK	王琪	认证/AGEN	刘玉春
工艺/MFG	朱建忠	日期/DATE	2008.10.10

Control Drawing

图样阶段/STAGE		重量/WGT	比例/SCALE
FA	SA		1:1

SHEET: 第 7 页 of 共 7 页

METTLER TOLEDO
MTCN / MTCZ

Control Drawing ACM500/IND560x

72191600

H.2. US Approval Documents

For Approval Documents, please visit www.mt.com/compliance.

FM Certificate for US is FM16US0438X and supplements.

H.2.1. Special Conditions: FMus

- Avoid electrostatic charging during operation and maintenance.
- Operation is only permitted when operational and process related electrostatic charges are not present

H.3. Canadian Approval Documents

For Approval Documents, please visit www.mt.com/compliance

FM Certificate for Canada is FM16CA0199X.

H.3.1. Special Conditions: FMca

- Avoid electrostatic charging during operation and maintenance.
- Operation is only permitted when operational and process related electrostatic charges are not present

H.4. European Approval Documents

For Approval Documents, please visit www.mt.com/compliance.

ATEX Certificate for Europe is BVS 09 ATEX E 010X and supplements.

H.4.1. Special Conditions (ATEX)

The following special conditions must be followed when the IND560x is being installed inside a hazardous area:

- Avoid electrostatic charging during operation and maintenance.
- Operation is only permitted when operational and process related intensive electrostatic charges are eliminated.
- The terminal type IND560x-PANEL has to be mounted into a cabinet/enclosure which is certified for use as Category II 2D. Mounting must be completed with the gasket included with the IND560x panel mount. After mounting, IP65 protection must be guaranteed.
- UV light must be avoided.
- Only cable glands and blanks shall be used which are certified for that purpose.

H.5. IECEx Approval Documents

For Approval Documents, please visit www.mt.com/compliance.

IECEx Certificate is IECEx BVS 10.0096X.

H.5.1. Special Conditions (IECEx)

The following special conditions must be followed when the IND560x is being installed inside a hazardous area:

- Avoid electrostatic charging during operation and maintenance.
- Operation is only permitted when operational and process related electrostatic charges are not present.
- The terminal type IND560x-PANEL has to be mounted into a cabinet/enclosure which is certified for use in Zone 21. Mounting must be completed with the gasket included with the IND560x panel mount. After mounting, IP65 protection must be guaranteed.
- UV light must be avoided.

H.6. Declaration of Conformity

For Approval Documents, please visit www.mt.com/compliance.

METTLER TOLEDO Service

To protect your METTLER TOLEDO product's future:

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation, protecting your investment. Contact us about a METTLER TOLEDO service agreement tailored to your needs and budget.

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.

www.mt.com/IND560

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