METTLER TOLEDO

PW200

Person Weighing Scale

Service Manual

CUSTOMER FEEDBACK

Mettler-Toledo, Inc.
Spartanburg Manufacturing Facility
P.O. Box 999
Inman, South Carolina 29349-0999 USA
Fax (864) 472-7575

If you have a problem with one of our products, or just a suggestion on how we can serve you better, please fill out this form and send it to us. Your feedback will help us to improve product performance, quality, and service.

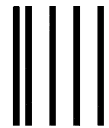|	
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Part / Model Number:	
Provided By:	**Date:**
Customer Name:	
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This information will be forwarded to the providing facility where it will be reviewed and an answer sent to the information provider.

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Response, include root cause analysis and corrective action taken where appropriate.

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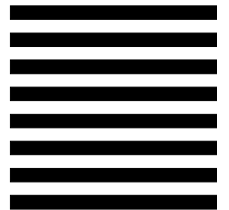
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METTLER TOLEDO

Publication Revision History

An overview of this manual's revision history is compiled below.

Publication Name: <u>METTLER TOLEDO PW Person Weighing Service Manual</u>

Publication Part Number: <u>15366500A</u>   Publication Date: <u>12/98</u>

Part Number	Date	Revisions
15366500A	11/99	REMOVED PRELIMINARY FROM FRONT PAGE

INTRODUCTION

This publication is provided solely as a guide for individuals who have received Technical Training in servicing the METTLER TOLEDO product.

Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

METTLER TOLEDO
1900 Polaris Parkway
Columbus OH 43240-2020
(614) 438-4511

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 own expense.

METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

PRECAUTIONS

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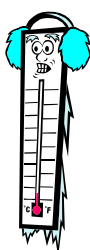
FOLLOW these instructions carefully.
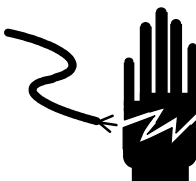
SAVE this manual for future reference.

DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

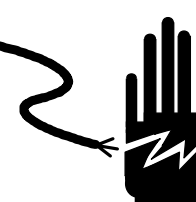ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

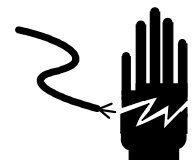CALL METTLER TOLEDO for parts, information, and service.

Note: If the unit has been stored or transported in below freezing temperatures, allow the unit to warm up to room temperature before turning on AC power.

⚠ **WARNING**

DISCONNECT ALL POWER TO THIS UNIT BEFORE INSTALLING, SERVICING, CLEANING, OR REMOVING THE FUSE. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

⚠ **CAUTION**

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

⚠ **WARNING**

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. 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.

⚠ **WARNING**

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD, CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.

⚠ **CAUTION**

BEFORE CONNECTING OR 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 DISCONNECTION'S ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT, OR BODILY HARM.

CONTENTS

1

Introduction

Thank you for purchasing a PW person weighing scale from METTLER TOLEDO. The legal-for-trade model of the PW person weighing scale is a low-profile, 400×0.2 lb (180×0.1 kg) capacity scale designed to meet the needs of the legal-for-trade person weighing applications. The PW scale is Canadian W&M (Approval Number: AM-5234) and NTEP approved for legal-for-trade use.

The PW, like all METTLER TOLEDO products is designed for maximum durability and reliability in even the most demanding application environments. The PW is manufactured in one of METTLER TOLEDO's seven ISO 9000 certified facilities so you are assured to receive a high-quality product.

The scale is designed for use in office and light industrial environments. This unit is not intended for washdown or hazardous area operation, nor for operation in environments of extreme dust, heat, cold, or humidity.

In the unlikely event you experience difficulties operating your scale, please contact your local distributor or METTLER TOLEDO representative closest to you.

Standard Features

The following are standard features built into each PW person weighing scale.

- 550 lb capacity "Eagle" load cell
- Die-cast aluminum base and sub-platter
- Powdercoated steel platter
- RJ-45 Jack for Desktop or Wall-mount display
- RS-232 serial interface connector for host connection
- Sleep mode for energy conservation when using batteries

Optional Accessories

- 2-key desktop display with 14 ft. cable
- 12 VDC, 600 mA power supply unit (wall-mount transformer)
- D-cell alkaline battery kit
- 2-key wall-mount display with 14 ft. cable
- Auto lighter power cord kit

Specifications

The PW person weighing scale conforms to and operates best within the specifications described in this section.

Physical Dimensions

- Base dimensions: 29 cm × 33.5 cm (11.4 in. × 13.2 in.)
- Platter dimensions: 29 cm × 33.8 cm (11.4 in. × 13.3 in.)
- Height with platter: 9.5 cm (3.75 in.)
- Weight with display: 7.75 kg (17.0 lb)
- Weight with display and battery: 8.75 kg (19.25 lb)
- Shipping weight: 10 kg (22.0 lb)
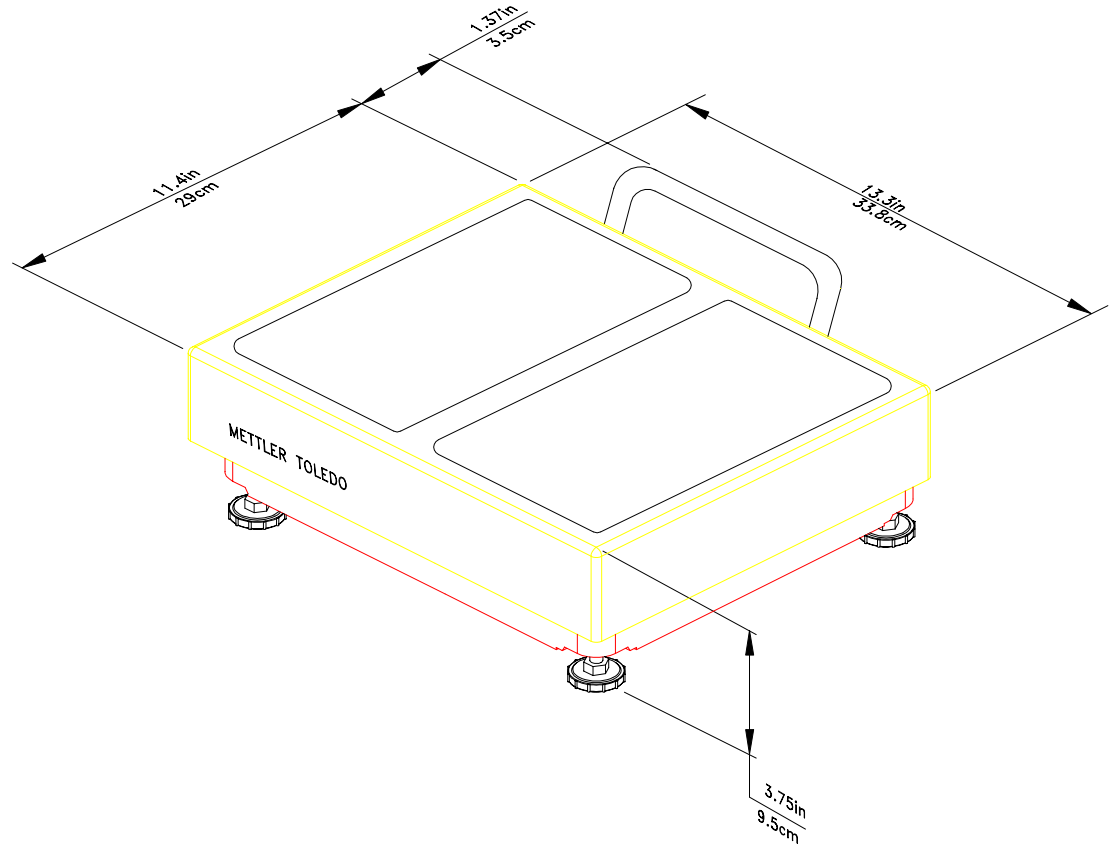
Figure 1-a: Dimensions

Power Requirements

The PW operates over an input voltage range of 7.5 to 12 VDC (at 60 mA).

- An external 12 VDC voltage converter supplies power to the PW.

- An optional D-cell battery KOP can be used to power the scale continuously for a minimum of 40 hours. Battery life is extended with the on/off switch in the "off" position.

- An optional 12 VDC Auto Lighter Jack Cable can power the PW.

Environmental Requirements

The PW operating range is 0 °C to +40 °C (+32 °F to +104 °F) at 10 to 90% relative humidity, non-condensing. The shipping and storage temperature range is −20 °C to +60 °C (-4 °F to +140 °F) at 0 to 95% relative humidity, non-condensing.

The scale is designed for use in person weighing and other light industrial environments. This unit is not intended for washdown or hazardous area operation, nor for operation in environments of extreme dust, heat, cold, or humidity.

Standards Compliance

The PW meets or exceeds Canadian CSA and USA NIST HB-44 requirements for a 2000 division, Class III scale.

AC Power Line Voltage Variation

The PW meets USA NIST HB-44, CSA Canadian Gazette Part 1 line voltage variation specifications as listed in the following table:

Line Voltage Variation Specification	AC Line Voltage			Line Frequency in Hz		
	Minimum	Nominal	Maximum	Minimum	Nominal	Maximum
NIST HB-44	100	120	130	59.5	60	60.5
Canadian CSA	108	120	132	58.8	60	61.2

RFI Susceptibility

The PW meets the requirements of the European Norm. 45501 for RFI susceptibility as listed below with a maximum of one display increment of change when calibrated for recommended builds.

Radio Interference Frequency	Field Strength
26-1000 MHz	3 volts/meter

Electrical Interfaces

The PW's single board construction has a load cell connector (10 position ZIF), display connector (8 position phone jack), RS-232 interface (9-Pin DSUB), and an input power jack. The following interconnection diagram describes wiring connections for the PW person weighing scale.

The PW can function as a peripheral device to a host through the RS-232 serial port. Calibration and setup can be done using the Host Interface command set. For detailed instructions describing calibration and setup using the Host Interface, please refer to the Appendix at the end of this manual.
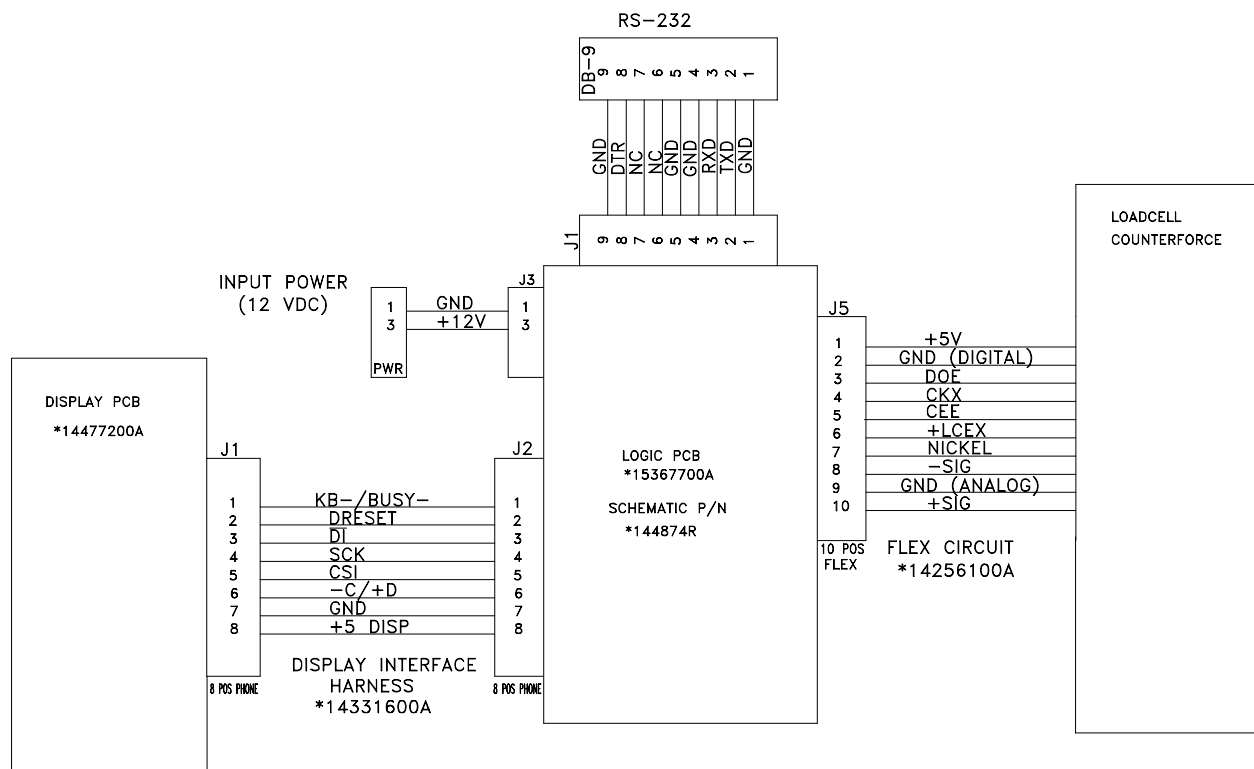

Figure 1-b: Electronic Interface Diagram

2

Installation and Calibration

This chapter gives detailed instructions and important information you will need to install the PW successfully. Please read this chapter thoroughly before you begin installation.

Unpacking and Setup

Please inspect the package as it is delivered by the carrier.

- If the shipping container is damaged, check for internal damage and file a freight claim with the carrier if necessary.

- If the container is undamaged, open the box, remove the scale and place it on a solid, flat surface.

If you choose to dispose of the package, please recycle the materials. The packaging is recyclable natural fiber with biodegradable adhesives.

Please keep the packing material and shipping insert in case the scale needs to be returned to METTLER TOLEDO. The PW is a precision instrument and may be permanently damaged if not shipped in factory-approved packaging.

Package contents for the PW include:

- PW Person Weighing Scale
- Operator's Instructions
- Power Supply
- Optional Accessories

Installation

The PW person weighing scale is fully assembled at the factory, and you should not have to assemble the unit. To install components other than those installed at the factory, please refer to Chapter 5 Service and Maintenance.

1. Locate a suitable environment for the scale. Refer to Chapter 1 for environmental specifications.

2. Remove the packaging material from each side of the scale. Remove the scale by grasping the bottom sides of the scale. **Do not** lift the scale by grasping the sub-platter.

The proper environment enhances the operation and longevity of the scale.

3. Place the scale on a sturdy, level surface and remove any protective shipping materials under the platter.

1. Level the scale by turning the adjustable feet on the bottom of the unit. When the bubble in the bubble indicator (located under the platter) is within the circle, the PW is level (see Figures 2-a and 2-b). The feet must be adjusted so the scale does not rock.
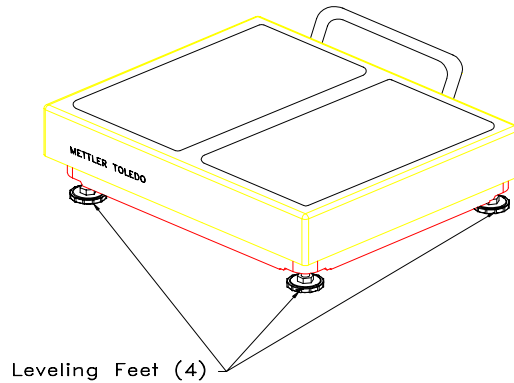
Leveling Feet (4)

Figure 2-a: PW Leveling Feet
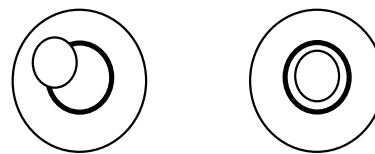
| Incorrect
Bubble is not
within circle | Correct
Bubble is
within circle |

Figure 2-b: PW Level Indicator

5. Unpack the power supply and plug it into the power jack in the scale base. The jack is recessed on the bottom of the base toward the center front. Plug the line cord into a **properly grounded** AC power outlet. Figure 2-c illustrates proper power supply connection.

	⚠ **WARNING!**
	AC power sources must have proper short circuit and over current protection in accordance with local and national electrical regulations. Failure to provide this may result in property damage and/or bodily injury.
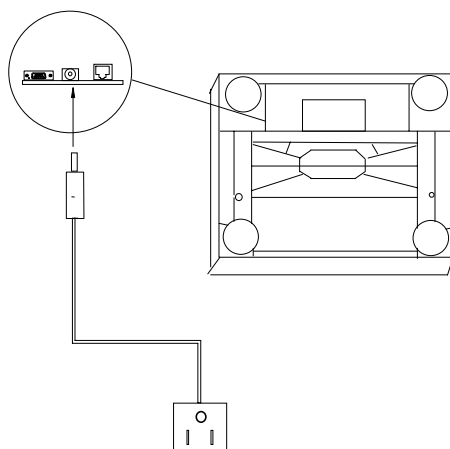
Figure 2-c: Power Supply Connection

Power-up Sequence

To "awaken" the PW whenever it is in sleep mode, press the ZERO key.

The PW goes through a power-up sequence each time power is applied or the scale is brought from its power-down ("sleep") state. The scale performs a diagnostic test on its ROM and RAM, then proceeds to normal operating mode. The power-up sequence is as follows:

1. All segments of the display characters are lighted. This verifies operation of all segments.

2. The scale displays the software part number followed by the software revision status.

3. The scale then captures zero (within ± 10% capacity on power-up) and is ready for normal operation.

Calibration

> ⚠️ **WARNING**
>
> ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. 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.
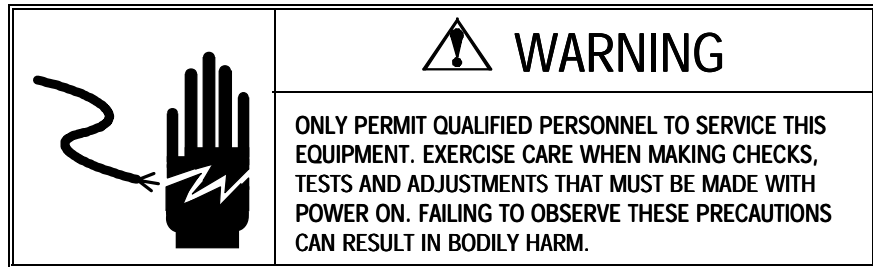
The PW person weighing scale should be calibrated when the unit is initially installed and periodically thereafter to ensure accurate weighing results. You can calibrate the PW at the scale using the UNITS and ZERO keys, or you can calibrate the unit remotely from a computer terminal through its Host Interface. Details on calibration using a Host Interface are given in the Appendix at the end of this manual.

To calibrate the PW at the scale:

1. Disconnect the power from the scale.

2. Remove the platter, break the legal-for-trade lead and wire seal (if present), then remove the cross drilled screw to give access to the calibration push-button.

3. Connect the power to the scale.

4. Enter the setup mode by pressing and holding the UNITS key for up to eight seconds until the message **Setup** is displayed. Release the UNITS key.

5. Activate the calibration switch by inserting a tool (0.1" diameter) through the calibration opening. Depress and hold the calibration switch.

This prompt only appears if the calibration button is depressed

6. Press the UNITS key several times until the **APP** prompt appears, then press the ZERO key to display the desired approval option.

7. Press UNITS to select the displayed approval option.

CALIBRATION
SWITCH
LOCATION

Figure 2-d: Calibration switch opening
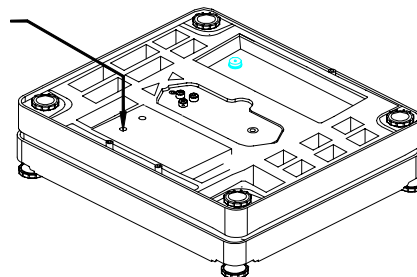
Press and hold the UNITS button until the **Alt** prompt appears, then press ZERO to display the desired primary and secondary units. Select from the following options:

- kg/kg
- lb/lb
- lb/kg
- kg/lb

Calibration units are selected according to the scale build. For example, if a scale has a kilogram build, select **kg** as the primary unit. Alternately, if the scale has a pound build, select **lb** as the primary unit.

8. Press UNITS to select the displayed units option.

If a different capacity/increment option is selected, the Cal prompt automatically appears.

9. Press UNITS until the **Build** prompt appears, then press ZERO to display the desired capacity/increment option. Capacity/increment options include:

Display Prompt	Build
400-01	400 x 0.1 lb
400-02	400 x 0.2 lb
180-01	180 x 0.1 kg
180-02	180 x 0.2 kg

10. Press UNITS to select the displayed capacity/increment option.

11. Press UNITS until the **CAL** prompt appears, then press ZERO to display Y or N. Select Y(es) to calibrate or select N(o) to abort calibration. If Y(es), press UNITS to begin the calibration process.

12. Release the calibration button.

13. At the **Empty** prompt, set the empty platter on the sub-platter, then press UNITS.

14. At the 50 lb or 20 kg prompt, place the appropriate test weight on the platter, then press UNITS. The scale automatically determines a span factor then indicates **Done** while the calibration values are saved.

15. Disconnect the power from the scale.

16. Reassemble the scale.

The PW is now calibrated and ready to configure to your needs. Chapter 3 of this manual gives setup and configuration details.

Metrological Seal Installation

If a lead and wire seal is required for W & M sealing, the PW scale can be sealed after calibration and setup by installing a wire seal on the metrology lock screw and the cross drilled loadcell bolt, as shown in Figure 2-e.
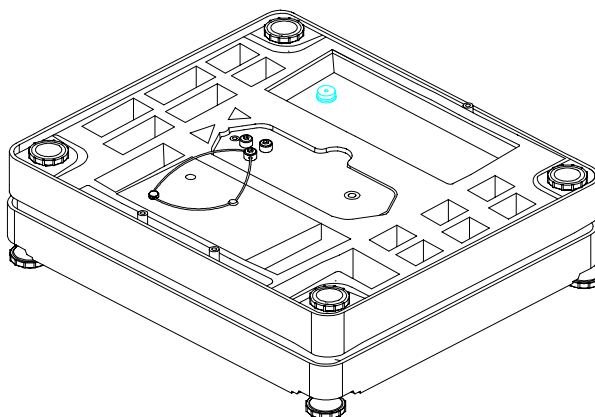
Figure 2-e: Wire Seal Installation

3

Configuring the Setup Parameters

This chapter discusses basic information related to PW configuration and specific instructions on configuring each program block and operating parameter.

Basic Information

> ### ⚠ ⚠ WARNING
>
> ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. 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.
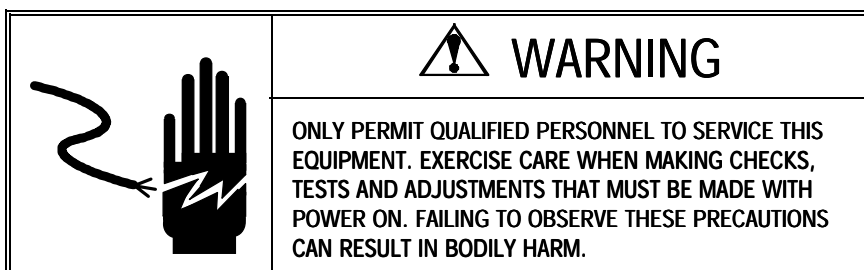
The following sections describe some basic information that you will need to know as you configure the setup parameters and use the PW in normal operating mode.

The Display

The PW's display consists of six digits and five cursor positions. Each digit is composed of seven segments and is 12 mm high. The PW's cursor can appear above one or more of the legends printed on the display to indicate the current unit, stable conditions, zero, or options in setup mode.

The display area also indicates over-capacity and under-capacity conditions. Over- and under-capacity are indicated on the display as follows:
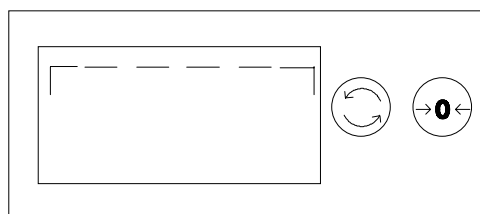
Over Capacity
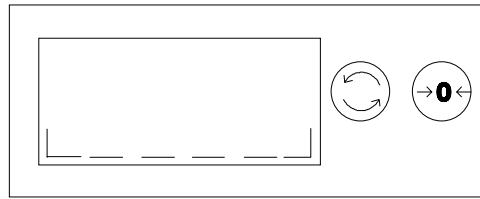
Under Capacity

Figure 3-a: Over/Under Capacity Display

Keys and Navigation

The PW keypad contains a UNITS key and a ZERO key:
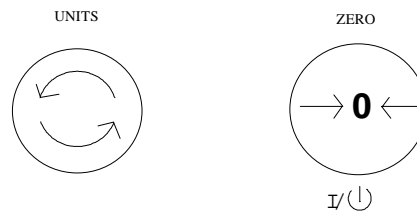
UNITS   ZERO

Figure 3-b: UNITS and ZERO Key

The functions for each key **in normal operating mode** are as follows:

- **UNITS**—Press UNITS to switch between the selected main units and alternate units.

- **ZERO**—Press ZERO to zero an empty scale, if weight such as an empty container is on the platter. You can zero the scale only if the weight of the empty container is within the 2% zero capture range (discussed later in this chapter in the section entitled Auto Zero Capture Program Block).

If the scale is in Sleep mode (as defined in the Sleep program block), press ZERO to "awaken" the scale. The scale then goes through its normal power-up sequence and returns to normal operating mode.

The functions for each key **in setup mode** are as follows:

- **UNITS**—Press and hold UNITS to enter setup mode. When a program block option is displayed for selection, press UNITS to confirm the selection.

- **ZERO**—Press ZERO to scroll through a list of parameter options.

Program Block Access

The PW's operational parameters are configured in setup mode through a series of program blocks. The program blocks are accessed as follows:

1. Press and hold the UNITS key for up to eight seconds until the message **Setup** is displayed. Release the UNITS key. When released, the PW displays the **Pb0** prompt indicating the first program block.

Reset to Factory Defaults

A default value for each program block parameter is configured at the factory. See Appendix –7 for factory defaults. To reset all program block parameters:

1. From within setup mode, press UNITS to display the **End** prompt.

2. Press ZERO until the **Default** prompt is displayed.

3. Press UNITS to reset all parameters to factory default values.

Exit Setup

Exit setup mode as follows:

1. Press UNITS to display the **End** prompt.

2. Press ZERO to display the desired exit option. Exit options include:

   - No—Do not exit setup mode at this time.

   - Save—Save all changes program block parameters then exit setup mode.

   - Abort—Exit setup mode but do not save any changes made in this session.

   - Default—Reset all program block parameters to default values, then exit setup mode.

3. Press UNITS to carry out the displayed option. The PW automatically exits setup mode and returns to normal operating mode unless No is selected.

There are three alternate ways to exit the setup mode:

   - The scale automatically leaves the setup mode after it has been calibrated.

   - Disconnect the power from the scale. Changes **will not** be saved.

   - Hold down the UNITS key for more than seven seconds. Then release the UNITS key while a category name is shown. Changes **will be** saved.

Configuring Setup Parameters

This section describes the program blocks that govern normal operation including:

- Push Button Zero
- Alternate Unit
- Filter
- Baud
- ASCII

- Parity
- Stop Bits
- Protocol
- Sleep
- End

The Approval, Capacity/Increment, Display Mode, and Calibrate program blocks are hidden in setup mode when the calibration button is not depressed. These program blocks are accessible only when the calibration button is depressed. Please refer to Chapter 2 for calibration details.

The PW can also be configured remotely through the METTLER TOLEDO Host Interface. Details for configuring the scale using the Host Interface are given in the Appendix at the end of this manual.

To configure the PW at the scale, enter the setup mode by pressing and holding the UNITS key for up to eight seconds until the message **Setup** is displayed. Release the UNITS key, then configure the PW program block parameters.

Push-button Zero Program Block

The Push-button Zero program block lets you configure the range within which the PW can capture zero. The only push-button zero capture range currently supported is ± 2%.

To configure the program block:

1. Press UNITS to display the **Pb0** prompt, then press ZERO.

2. Press UNITS again to accept the 2 pct option. The PW continues to the Alternate Units program block.

Alternate Units Program Block

This program block lets you select the primary and alternate weighing units. The alternate unit is accessed in normal operation using the UNITS key. This program block may have been configured in calibration to reflect the desired main and alternate units.

To configure the Alternate Units program block for normal operation:

1. If the **Alt** prompt is not displayed, press UNITS to display it, then press ZERO.

2. Press ZERO to display the desired primary and alternate weight unit combination. Options are shown using a number 1 and number 2 over the lb and kg legend in the display. If the primary unit and the alternate unit are the same, the display shows three lines over the lb or kg legend.

    To configure:

- lb (primary) and kg (alternate)—display reads 1 2 unit
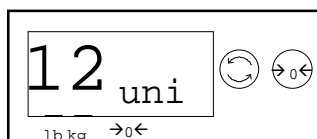
- lb (alternate) and kg (primary)—display reads 2 1 unit

- lb as primary and alternate (no unit switching)—display reads three bars over lb legend
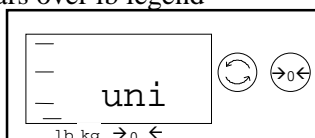
- kg as primary and alternate (no unit switching)—display reads three bars over kg legend
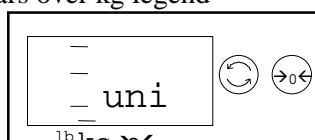
3. Press UNITS to accept the displayed option. The PW continues to the Filter program block.

Filter Program Block

The Filter program block lets you configure the noise filter that is used in determining weight stability on the scale. The PW disregards environmental noise such as vibrations that affect the weighing accuracy according to the filter setting.

To configure the program block:

1. If the **Filter** prompt is not displayed, press UNITS to display it, then press ZERO.

2. Press ZERO to display the desired noise filter. Options include:

   - Light
   - Heavy
   - Medium

Settling time increases with heavier filter setting.

3. Press UNITS to accept the displayed filter option. The PW continues to the Baud program block.

Baud Program Block

This program block lets you set the baud rate (the speed at which data is transmitted in bits-per-second).

To configure the Baud program block:

1. If the **Baud** prompt is not displayed, press UNITS to display it, then press ZERO.

2. Press ZERO to display the desired baud rate. Options include:

    - 1200
    - 2400
    - 4800
    - 9600

3. Press UNITS to accept the displayed baud rate option. The PW continues to the ASCII program block.

ASCII Program Block

The ASCII program block lets you select the number of bits that make up an ASCII character. Most METTLER TOLEDO equipment communicates using seven data bits.

To configure the program block:

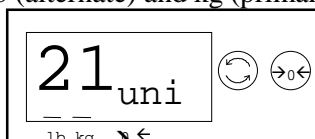1. If the **ASCII** prompt is not displayed, press UNITS to display it, then press ZERO.

2. Press ZERO to display the desired bit selection. Options include:

    - Seven (7)
    - Eight (8)

3. Press UNITS to accept the displayed option. The PW continues to the Parity program block.

Parity Program Block

The Parity program block lets you select the parity option for data transmission. Parity is an error checking mechanism. To configure the program block:

1. If the **Par** prompt is not displayed, press UNITS to display it, then press ZERO.

2. Press ZERO to display the desired parity option. Options include:

    - Space
    - Mark
    - Odd
    - Even
    - None

3. Press UNITS to accept the parity option. The PW continues to the Stop program block.

Stop Program Block

The Stop program block lets you select the number of stop bits to be transmitted for each ASCII character. Most METTLER TOLEDO products will work with either 1 or 2 stop bits.

To configure the program block:

1. If the **Stop** prompt is not displayed, press UNITS to display it, then press ZERO.

2. Press ZERO to display 1 or 2 stop bits, then press UNITS to accept the displayed selection. The PW continues to the Protocol program block.

Protocol Program Block

The Protocol program block lets you select a pre-configured set of scale parameters specific to your company and needs. Protocols are configured in the factory according to your ordering information. This section gives instructions on how to select a protocol only.

To select a protocol:

1. If the **Proto** prompt is not displayed, press UNITS to display it, then press ZERO.

Mettler Toledo "Toledo" protocol is the protocol described in this document

2. Press ZERO to display the desired protocol. Options include:

   • Toledo
   • Disable

3. Press UNITS to accept the protocol option. The PW continues to the Sleep program block.

Sleep Program Block

The Sleep program block lets you configure the sleep timer. Power consumption is reduced by approximately 80% while in Sleep mode. **IMPORTANT: For battery powered units, it is important to turn battery power off (using the rocker switch underneath the scale) when the scale is not in use.**

To configure the Sleep program block:

In normal operating mode the scale is powered-up by pressing the ZERO (ON/OFF) key.

1. If the **Sleep** prompt is not displayed, press UNITS to display it, then press ZERO.

2. Press ZERO to display the desired sleep timer option. Options include:

   - **Disable**—the PW will not power-down regardless of time between transactions (inactivity).

   - **5 min.**—the PW will enter Sleep mode after 5 minutes with no activity.

3. Press UNITS to accept the sleep timer option. The PW continues to the CAL program block.

End Program Block

The End program block lets you save the configuration and exit setup mode. This program block does not have parameters to configure.

To use the End program block:

1. Press UNITS to display the **End** prompt.

2. Press ZERO to display the desired exit option. Exit options include:

   - **No**—Do not exit setup mode at this time. PW returns to the **Approval** prompt.

   - **Save**—Save all changes program block parameters then exit setup mode.

   - **Abort**—Exit setup mode but do not save any changes made in this session.

Default values include the standard Toledo protocol.

   - **Default**—Reset all program block parameters to default values, then exit setup mode.

   - **Def x**—Company specific.

3. Press UNITS to carry out the displayed option.

4

Operating Instructions

This chapter gives information that an operator will need to become familiar with the scale and perform its functions in normal operating mode. The scale operates based on the current program block configuration. Please refer to Chapter 3 for more information on configuring the PW.

Keypad and Display

The PW has a simple LCD weight display with two keys that are used to perform scale functions. Weight is displayed using up to six 7-digit numeric characters with decimal point and comma. Cursors (horizontal bars) at the bottom of the display indicate current weight units and zero condition when zero is captured.
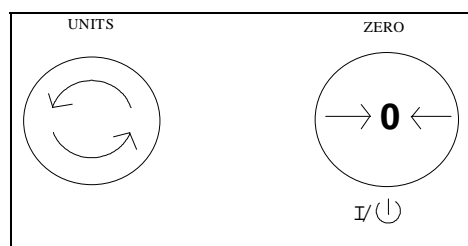

Figure 4-a: PW Keypad
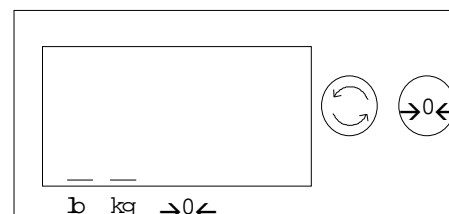
Figure 4-b: PW Display

Operator Functions

Operator functions described in this chapter include:

*   Unit switching
*   Zeroing the scale
*   Repower from Sleep mode

Person Weighing

Before weighing using the PW, please be sure the scale is configured as desired (Chapter 3) and power is applied as instructed in Chapter 2 of this manual.

To take a weight:

You may wish to recapture zero periodically when the scale is in continuous use. It is not necessary to press ZERO before each transaction.

1. Press ZERO to capture zero. The display reads **0.0** and a cursor appears above the zero indicator in the legend.

2. The person to be weighed steps on the platter. The display reads the weight with a cursor above the current weight units legend.

Unit Switching

The PW lets you view the displayed scale weight in primary and secondary units. Alternate units must be configured (in setup mode) to convert and display in alternate units.

To switch units:

If primary and alternate units are the same (as configured in the Alternate Units program block), unit switching is effectively disabled. The UNITS key displays the same weight and unit when the UNITS key is pressed.

1. With scale weight displayed, press the UNITS key. The PW automatically converts the displayed weight to weight in the alternate unit as indicated by the cursor.

2. Press UNITS again to reconvert alternate units back to primary units and return weight display to the primary unit.

Repowering from Sleep

If the PW display is blank after a period of inactivity, the ZERO key "awakens" the unit from its power-saving (sleep) mode.

When the ZERO key is pressed, the PW goes through its power-up sequence and returns to normal operating mode.

5

Service and Maintenance

This chapter gives information on servicing, upgrading, and maintaining the PW including cleaning and regular maintenance, troubleshooting, and installing optional equipment KOPs.

Cleaning and Regular Maintenance

You may need to wipe the keypad and platter with a clean, soft cloth that has been dampened with a mild cleaner. Do not use any type of industrial solvent such as toluene or isopropanol (IPA). These may damage the display finish. Do not spray cleaner directly onto the terminal.

Troubleshooting

The PW scale is designed to be virtually error free and reliable. If problems do occur, do not attempt to repair the scale before you have determined the source of the problem. Record as much information as possible about what has happened including any messages and physical responses. The following troubleshooting information may help to determine the cause of the problem.

	⚠ WARNING
	DISCONNECT ALL POWER TO THIS UNIT BEFORE INSTALLING, SERVICING, CLEANING, OR REMOVING THE FUSE. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

	⚠ CAUTION
	OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

Wall Transformer

The wall transformer (when connected to the proper AC input and disconnected from the scale) may read as low as 10.7 VDC or as high as 18.3 VDC. The wall transformer should read from 11 VDC, up to 17 VDC when connected to the scale. If the voltages measured are not within this range, replace the wall transformer. The center conductor of the wall transformer is positive.

Main PCB

From PC - **DB25-F** RS232 SERIAL PORT	**To PW - DB9-M (Male)**
2 TRANSMIT	3 RECEIVE
3 RECEIVE	2 TRANSMIT
7 SIG GROUND	1 SIG GROUND

Table 1 Standard PC RS232 DB-25 To PW

From PC - **DB9-F** RS232 SERIAL PORT	**To PW - DB9-M (Male)**
2 RECEIVE	2 TRANSMIT
3 TRANSMIT	3 RECEIVE
5 SIG GROUND	1 SIG GROUND

Table 2 Standard PC RS232 DB9 To PW

To test the Main PCB:

1. Start your communications software.

2. Set your software for:

   - 7 data bits
   - Even parity
   - 1 stop bit
   - Baud rate that matches the computer's baud rate

3. Send an uppercase "W" from your PC to the scale. The scale should respond with the current weight. If the scale does not respond, verify the communications setup. If the problem persists, replace the Main PCB and/or load cell.

Blank or Half Display

Remove power, then check the display interface harness from the scale to the display. Apply power to the unit. If the blank display continues, replace the 0270 Display PCB and/or the display interface harness.

No Keypad Interaction

To test operation of the keypad, remove power, then reapply. With power to the unit and the W1 calibration jumper installed, attempt to enter setup mode by pressing and holding the UNITS key. If the display does not indicate setup mode, replace the keypad.

Indicator Locked
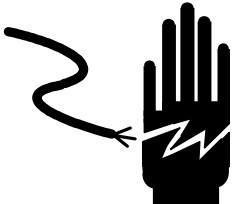
To test operation of the indicator, remove power, then reapply. With power to the unit, add weight. If no motion is displayed, replace either the load cell or the Logic PCB.

Load Cell/Spider Replacement

This product was designed for depot repair. Please contact your local distributor or Mettler Toledo sales representative for repair information. Scales returned for repair must be packaged using the original packing materials. Replacement parts for the load cell are not available. Should the load cell need replacement the scale must be returned for depot repair.

Installing the Battery KOP

The following instructions describe battery installation (optional) for the PW scale. Under normal operation, battery life is approximately 40 hours. Sleep mode reduces power consumption by 80% and extends battery life. For prolonged battery life, turn the scale off when not in use.

⚠ WARNING!
Always remove all power before operating on any equipment. Mettler-Toledo recommends that only qualified technicians open the unit up for maintenance and repair. If you must open the PW, read this section carefully to avoid damage to the internal components.

1. Remove the power and turn the PW over on the platter side. Be extremely careful not to damage the display.

2. Install the battery plates (P/N 14553600A) with the M4-0.7X10 Pan HD screws (P/N R0513100A) in the base of the scale.
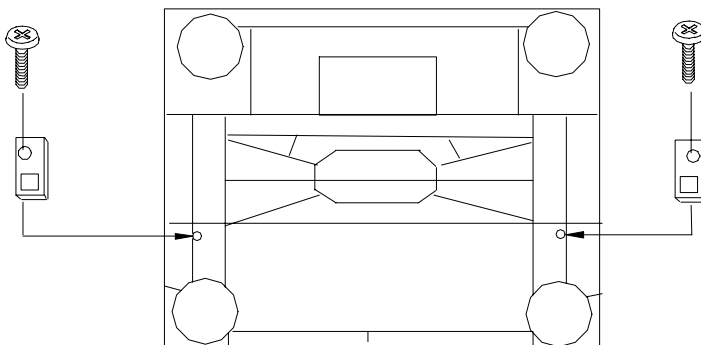
3. Install the plastic D-cell battery holder P/N 13257500A. Attach with four M3-0.5X8 Pan HD screws (R0513200A) and washers (R0526300A). Note the polarity of the battery holder and terminal positions.

Terminal Ends
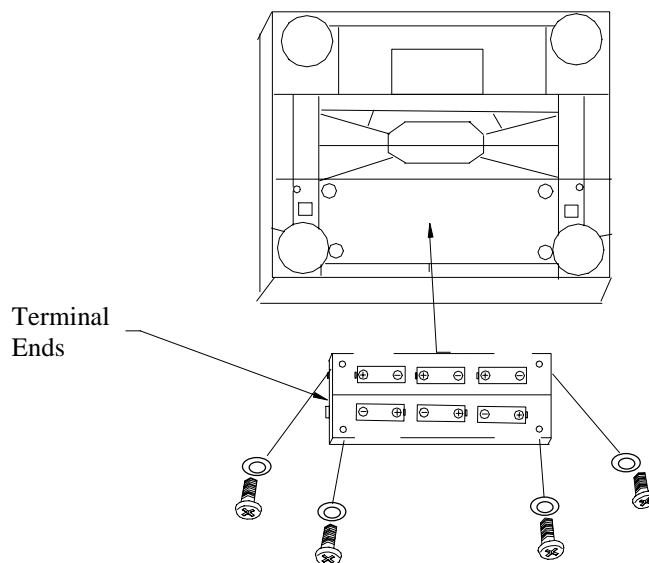
4. Attach the harness assembly (P/N 14544600A) to the battery holder.
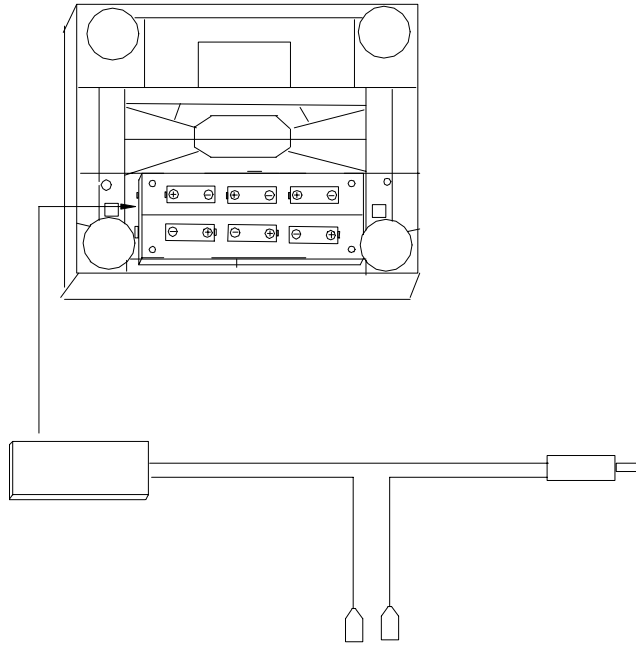
5. Insert the on/off rocker switch (P/N 14262400A) into the switch hole of the battery cover (P/N 14545200A) noting the orientation of the switch.

Orient as Shown
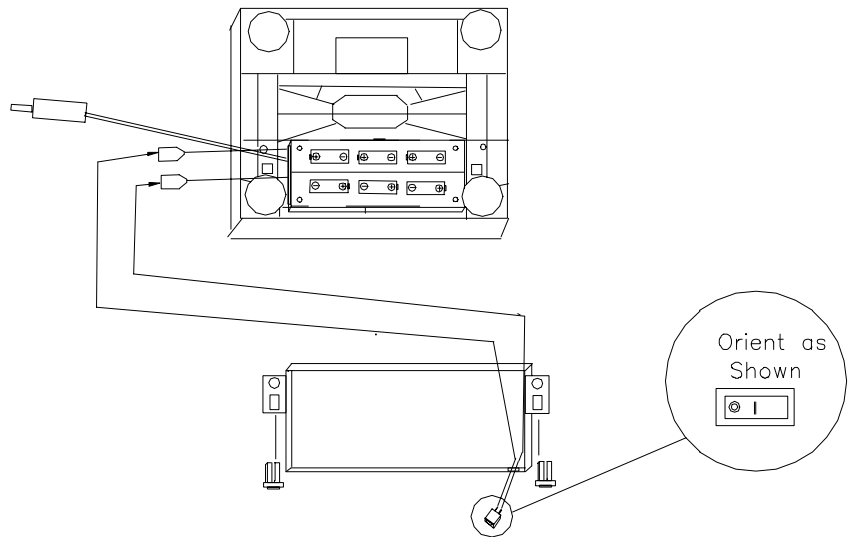
6. Insert the two fasteners (P/N 12051300A) into the battery cover.

7. Install the terminal spade lugs on the terminals of the switch that is installed into the battery cover.

Six alkaline 1.5 VDC 14AH batteries (P/N 13293700A) are required for operation.

8. Connect the plug into the receptacle on the Logic PCB as shown below and install the six 1.5 VDC batteries.
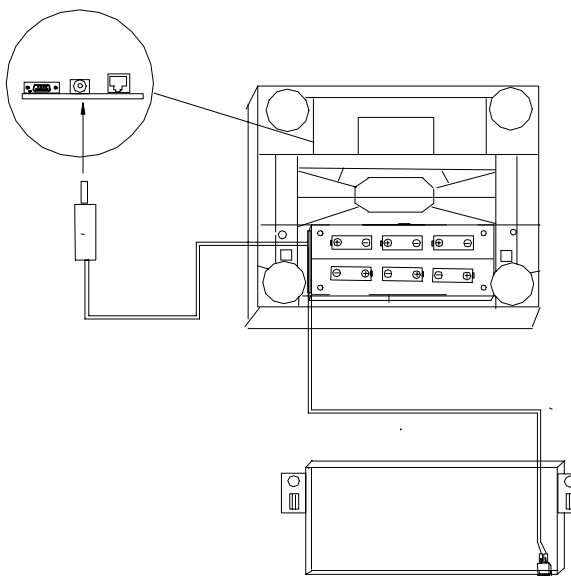
9. Carefully attach the battery cover paying close attention to the routing of the cable to the Main PCB. Close the battery cover fasteners.

Open
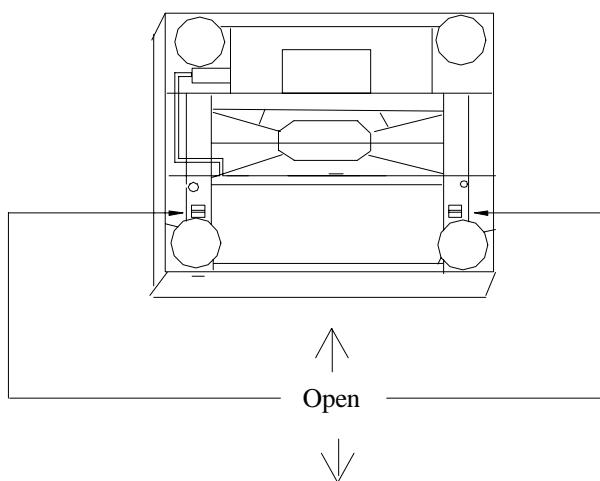
Installing the Desktop Display

To install the desktop mount display:

1. Install the display interface harness (P/N 14331500A) into the display as shown. Install the Logic PCB in the PW making sure to route the cable to prevent damage to the cable.
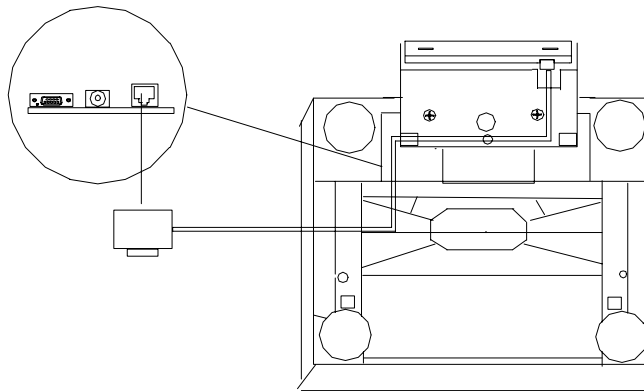
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6

Parts and Accessories

Please refer to the following diagrams and parts lists when ordering parts and accessories for the PW scale

PW Scale Parts
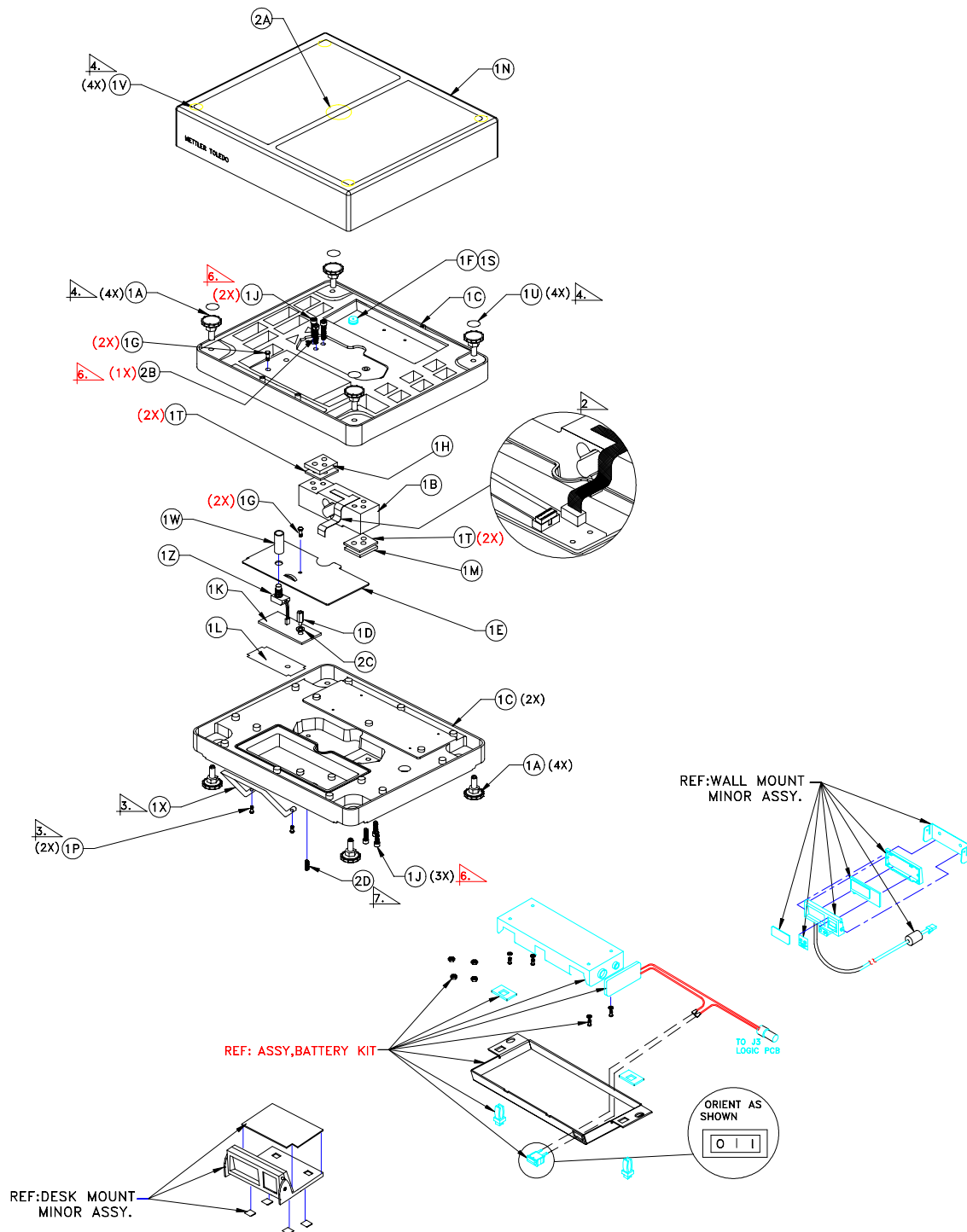
Symbol	Part Number	Description	Qty
		Parts List—PW Person Weighing Scale	
1A	14629400A	Adjustable Foot	8
(*) 1B	15232600A	Qualified,Assy. L/C 250KG Eagle Plus	1
1C	A14647800D	Machined Base,8270	2
1D	14497000A	Hex Standoff, M4,M/F,16MM	1
1E	14544000B	PCB Cover Plate,W/Hole	1
1F	14813500B	Level, w/o Adhesive	1
1G	R0514600A	Screw, M4 x 8 Hex Drilled	2
1H	15365400A	Spacer,L/C Alum,1.5x1.25x.188	1
1J	R0543300A	Cap Screw, M8 x 35, SOC	5
1K	15367700A	Main PCB Assembly,PW200	1
1L	A14591600A	Insulator,8270 Hi Res	1
1M	15365400B	Spacer, L/C Alum,1.5x1.25x0.125	1
1N	15366800A	Assy,Platter,W/Antislip	1
1P	R0513100A	Scr,M4-0.7x10 Phd TTorx	2
1S	146052R	Spec,Adhesive,409	Suff
1T	15366000A	Spacer,1.5x1.25x.120 Fiber	2
1U	15366200A	Pads,Velco Hook	4
1V	15366200B	Pads,Velco Loop	4
1W	15366100A	Shield,Switch Nut	1
1X	15366300A	Handle,Scale PW200	1
1Z	15367600A	Harn,Assy,Pushbottom	1
2A	13333200C	Center,Spider,Pad	1
2B	R0541600A	Scr,Cap M8x30 Soc Drilled	1
2C	R0248100A	Washer,FL#10x3/8 SS	1
2D	R0515300A	Scr,Set M6x12	1
*	142128R	Tape,Acylic Foam	Suff
*	13786200A	Polybag, 18"x18"	1
*	153674R	Diagram,Packing PW200	0
*	153673R	Layout,Dimensional PW200	0

(*) Loadcell assembly is not a field replaceable unit.

Desktop Display Parts
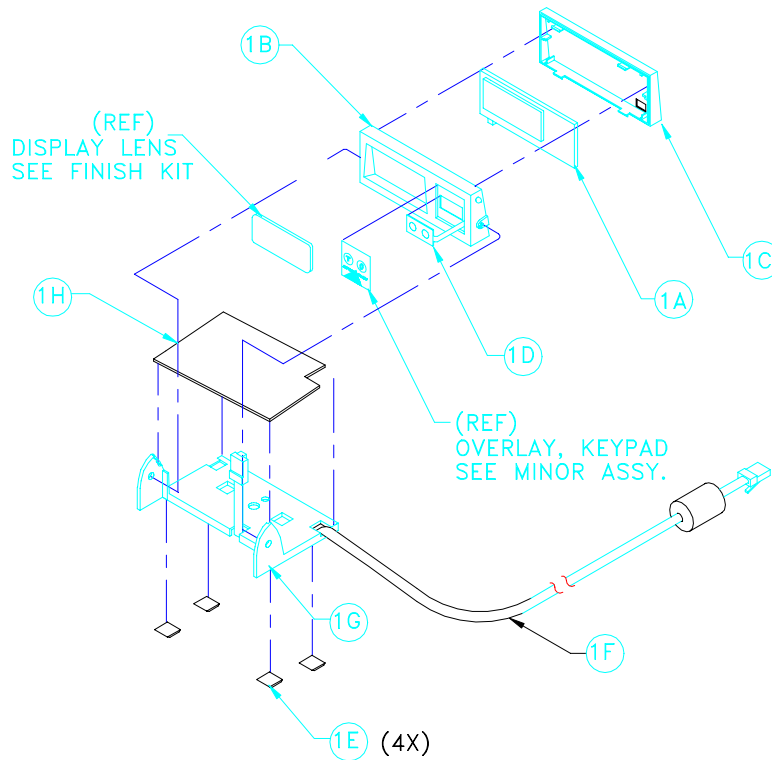
Parts List—Desktop Display			
Ref #	Part Number	Description	Qty
1A	14477200A	PCB Assembly, Display	1
1B	A14248600B	Display Cover Front	1
1C	14248700B	Display Cover Rear	1
1D	A14249100A	Keypad (2 Button)	1
1E	15354700A	Bumper,Rubber Tapered Square	4
1F	14331500A	Harness, Display Interface,Tower Mt.	1
1G	A14248800A	Display Base Mount	1
1H	15365500A	Plate,Steel, Powdercoated	1

Wall Mount Display Parts

(REF)
DISPLAY LENS
SEE FINISH ASSY.

(REF)
OVERLAY,KEYPAD
SEE MINOR ASSY.
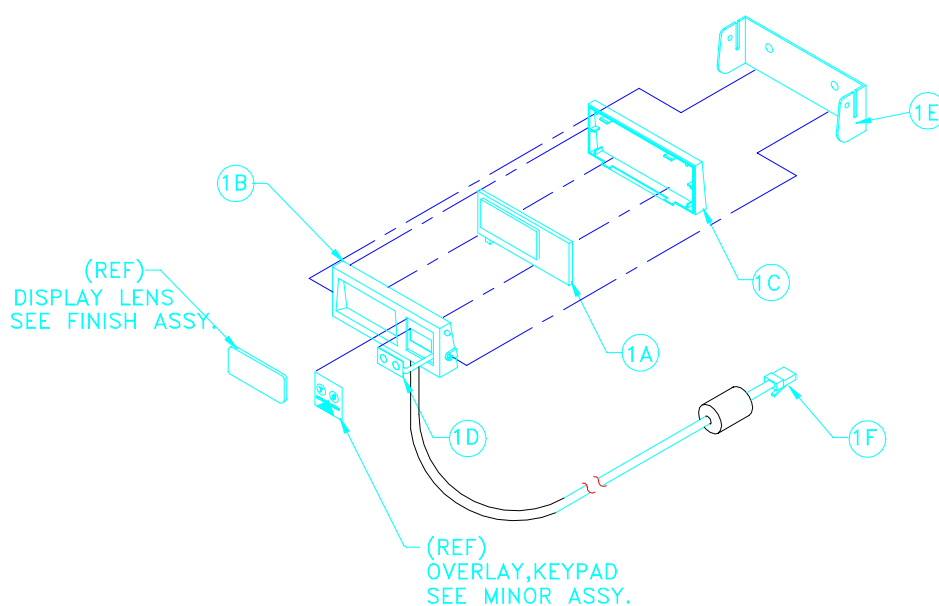
Parts List		Wall Mount Display	
Ref#	Part Number	Description	Qty
1A	B14220300A	PCB,ASSY. DISPLAY,8217	1
1B	A14248600A	DISPLAY COVER FRONT	1
1C	14248700A	DISPLAY COVER REAR	1
1D	A14249100A	KEYPAD 2 BUTTON	1
1E	14890400A	WALL MOUNT BRACKET	1
1F	14331500A	HARNESS DISPLAY W/FERRITE	1

Appendix: Host Interface

The METTLER TOLEDO PW Person Weighing scale can function as a peripheral device to a host computer. In host mode you can:

- Calibrate the scale

- Configure setup parameters

- Request and receive weight data when the scale is in a stable state

The scale does not reply to host commands if it is in calibration mode or if the scale cannot capture zero on power-up.

- Request and receive the scale's status when the scale is in an unstable or invalid state

- Zero the scale and/or switch units (depending on setup)

This section presents information and instructions on how to use the PW in host mode.

Communication Parameters

Data is transmitted and received by the scale through an RS-232 serial port connection. The following communication parameters are supported:

- Baud Rate (1200, 2400, 4800, 9600)
- Parity (no, even, odd, mark, space)
- ASCII bit string (7 or 8)
- Stop bits (1, 2)

Protocols

The scale can be programmed to respond to a selected "menu" of defined protocols. The host sends requests to the scale in the form of ASCII data and control characters as determined by the selected protocol. The scale responds to the host with a string of ASCII characters. ASCII characters and their binary conversions are listed in the following table:

ASCII Characters and Conversions

ASCII CHAR.	DEC	HEX	76543210	ASCII CHAR.	DEC	HEX	76543210
NULL	0	00	00000000	@	64	40	01000000
SOH	1	01	00000001	A	65	41	01000001
STX	2	02	00000010	B	66	42	01000010
ETX	3	03	00000011	C	67	43	01000011
EOT	4	04	00000100	D	68	44	01000100
ENQ	5	05	00000101	E	69	45	01000101
ACK	6	06	00000110	F	70	46	01000110
BELL	7	07	00000111	G	71	47	01000111
Backspace	8	08	00001000	H	72	48	01001000
TAB	9	09	00001001	I	73	49	01001001
Line Feed	10	0A	00001010	J	74	4A	01001010
Vert. Tab	11	0B	00001011	K	75	4B	01001011
Form Feed	12	0C	00001100	L	76	4C	01001100
Carr. Return	13	0D	00001101	M	77	4D	01001101
Shift Out	14	0E	00001110	N	78	4E	01001110
Shift In	15	0F	00001111	O	79	4F	01001111
Data Link Esc	16	10	00010000	P	80	50	01010000
DC1	17	11	000010001	Q	81	51	01010001
DC2	18	12	00010010	R	82	52	01010010
DC3	19	13	00010011	S	83	53	01010011
DC4	20	14	00010100	T	84	54	01010100
NAK	21	15	00010101	U	85	55	01010101
SYNCH IDLE	22	16	00010110	V	86	56	01010110
End Trans. Block	23	17	00010111	W	87	57	01010111
CANCEL	24	18	00011000	X	88	58	01011000
End Of Medium	25	19	00011001	Y	89	59	01011001
Substitute	26	1A	00011010	Z	90	5A	01011010
ESCAPE	27	1B	00011011	[	91	5B	01011011
FS (Cursor Right)	28	1C	00011100	\	92	5C	01011100
GS (Cursor Left)	29	1D	00011101	]	93	5D	01011101
RS (Cursor Up)	30	1E	00011110	^	94	5E	01011110
US (Cursor Down)	31	1F	00011111	_	95	5F	01011111
SPACE	32	20	00100000	`	96	60	01100000
!	33	21	00100001	a	97	61	01100001
"	34	22	00100010	b	98	62	01100010

ASCII CHAR.	DEC	HEX	76543210	ASCII CHAR.	DEC	HEX	76543210
#	35	23	00100011	c	99	63	01100011
$	36	24	00100100	d	100	64	01100100
%	37	25	00100101	e	101	65	01100101
&	38	26	00100110	f	102	66	01100110
'	39	27	00100111	g	103	67	01100111
(	40	28	00101000	h	104	68	01101000
)	41	29	00101001	i	105	69	01101001
*	42	2A	00101010	j	106	6A	01101010
+	43	2B	00101011	k	107	6B	01101011
,	44	2C	00101100	l	108	6C	01101100
-	45	2D	00101101	m	109	6D	01101101
.	46	2E	00101110	n	110	6E	01101110
/	47	2F	00101111	o	111	6F	01101111
0	48	30	00110000	p	112	70	01110000
1	49	31	00110001	q	113	71	01110001
2	50	32	00110010	r	114	72	01110010
3	51	33	00110011	s	115	73	01110011
4	52	34	00110100	t	116	74	01110100
5	53	35	00110101	u	117	75	01110101
6	54	36	00110110	v	118	76	01110110
7	55	37	00110111	w	119	77	01110111
8	56	38	00111000	x	120	78	01111000
9	57	39	00111001	y	121	79	01111001
:	58	3A	00111010	z	122	7A	01111010
;	59	3B	00111011	{	123	7B	01111011
<	60	3C	00111100			124	7C	01111100
=	61	3D	00111101	}	125	7D	01111101
>	62	3E	00111110	~	126	7E	01111110
?	63	3F	00111111		127	7F	01111111

Mettler Toledo Protocol Host Commands

Following is a listing of host commands and scale responses. Brackets "<>" are used to indicate that the characters within are a description of the transmitted data and are not part of the transmitted data string. <STX> indicates an ASCII Start of Text character (hex 02). <CR> indicates an ASCII Carriage Return (hex 0D).

Host Command	Description	Scale Response
W*	Send normal resolution weight data (non-status responses always 8 chars)	<STX>XXX.XX<CR> or <STX>?<status byte><CR> or
H	Send high resolution weight data (non-status responses always 9 chars)	<STX>XXX.XXX<CR> or <STX>?<status byte><CR>
Z	Zero scale unless in motion or out of range under or over capacity	<STX>?<status byte><CR> Scale status byte
A	Perform a confidence test of RAM, ROM, and EEPROM. Store results of tests in confidence status byte for later retrieval	<STX><CR> The scale echoes back a <CR> indicating the command was received
B	Send results of confidence test	<STX>?<status byte><CR> Confidence test status byte
C	Initiate host interface scale configuration	<STX>CALIBRATE?<CR>
S	Initiate host interface setup	<STX>SETUP?<CR>
E	Enter "echo" serial port test mode. All characters sent to the scale will be echoed back to the host. "F" terminates the test	<STX>E<CR> The scale echoes back the letter E indicating the command was received
L	Switch to/send avoir (lb) weight	Same as for W above.
K	Switch to/send metric weight	Same as for W above.
F	Exit "echo" serial port test mode	<STX>F<CR> The scale echoes back the letter F indicating the command was received

Table Note:

* A status byte message **<STX>?<status byte><CR>** is sent in place of the requested weight data field if the scale is in motion, under zero, or over capacity when the weight data request is sent. The question mark "?" indicates that the following data is a non-ASCII status byte rather than weight data. See below for status byte definitions.

Scale Status Byte Format

When communicating in host mode using the standard Toledo protocol, the PW may receive status bytes containing information such as motion and over/under-capacity conditions. The message **STX<STATUS BYTE>CR** on the display indicates receipt of a status byte. The status byte sent is an ASCII character that must be converted to binary form for decoding the bits. The ASCII character table with binary conversion (given in the previous section) can be used to convert status bytes. The bits of the status byte in the standard Toledo protocol are defined as follows:

Status Byte	
Bit No.	**Bit Description**
6	Always 1
5	Always 1
4	1 = Center of zero 0 = Not at center of zero
3	1 = Outside zero capture range 0 = Within range
2	1 = Under zero 0 = Within weighing range
1	1 = Over capacity 0 = Within weighing range
0	1 = Scale in motion 0 = Stable weight data

Calibrate Using Host Interface

ComTool (PN KN000000K64) can be used for all host to scale communications.

The PW Person Weighing scale can be calibrated using the host interface. The command to initiate the calibration sequence is available in the METTLER TOLEDO command set. Calibration is based on the current scale configuration for units and capacity/increment. These can be changed (through the keypad or the host interface) before calibrating the scale through the host interface.

To calibrate using the host interface:

1. Remove the platter, break the legal-for-trade lead and wire seal (if present), then remove the cross drilled screw to give access to the calibration pushbutton.

2. Using a non-conducting tool depress and hold the calibration push button by inserting the tool into the hole from which the cross drilled screw was removed.

3. Send the command **C** to initiate calibration sequence. The scale responds **<STX>CALIBRATE?<CR> <LF>**.

4. Send the command **Y** to continue with the calibration sequence, or send the command **N** to abort the sequence. The scale responds **<STX>UNLOAD SCALE- Y? <CR> <LF>**.

5. After re-installing the platter, remove any weight on the platter and send the command **Y** to continue. A stable zero reading is taken, then the scale responds **<STX>ADD 50 LB- Y? <CR> <LF>** or **<STX>ADD 20 KG- Y? <CR> <LF>**

6. Add the requested calibration weight to the scale, then send the command **Y** to continue. The scale responds **<STX>CAL DONE <CR> <LF>** or **<STX>INCORRECT AMOUNT OF WEIGHT <CR> <LF>**.

Configure Scale Parameters Using Host Interface

Configuration parameters can also be sent using the host interface. A command to send a new scale configuration over the host interface is available in the METTLER TOLEDO command set.

To configure using the host interface:

1. From the host computer, send the host command **S** to initiate the configuration setup sequence. The scale responds **<STX>SETUP?<CR>**.

2. Send the command **Y** to continue. The scale responds **<STX>READY<CR>**.

3. Determine the command string representing the configuration parameters. The command string consists of 22 characters. The command string represents a 10 byte bit-mapped setup array stored in EEPROM. The 10 byte array is expanded for serial transmission so that the high-order four bits of each byte are zeroes and the low-order four bits are numbers representing the desired option for each program block.

The tables below list the programming options available in each program block. Use the numbers in parentheses as the command line string characters for each operating parameter. These tables represent the parameters in the Toledo protocol as the PW is shipped from the factory. Your company may want to configure a unique protocol with options and defaults other than those shown here.

PW Program Block Configuration Options						
Pushbutto nZero	Approval	Capacity/ Increment	Alt Unit	Display Mode	Filter	Baud
± 2% (1) *	Canada (1)	180 x 0.1 kg (1)	kg/lb (1)	Test (1)	Light (1) *	300 (1)
	HB44 (2)	400 x 0.2 lb (2) *	lb/lb (2)	Expand (2)	Medium (2)	1200 (2)
	None (3) *	180 x0.05kg (3)	lb/kg (3) *	Normal (3) *	Heavy (3)	2400 (3)
		400 x 0.1 lb (4)	kg/lb (4)			4800 (4)
						9600 (5) *

PW Program Block Configuration Options						
ASCII Bit String	Parity	Stop Bits	Protocol	Sleep Mode	Calibrat e	End
7 (1) *	Space (1)	1 (1) *	Disabled (1)	0 min (1) *	No (1)	Default (1)
8 (2)	Mark(2)	2 (2)	Toledo (2) *	5 min (2)	Yes (2)	Abort (2)
	Odd (3)		Proto 1 (3)			Save (3)
	Even (4) *		Proto 2 (4)			No (4)
	None (5)		Proto 3 (5)			
			Proto 4 (6)			

* Factory default settings

Before sending the **DONE** reply, the configuration file is analyzed just as if it had been constructed using the keyboard.

You can also obtain the current configuration by sending the command string **<STX>00000000000000000000<E TX>**. The scale responds with a string representing the current configuration.

4. Send the command string using the start of text and end of text characters. The scale echoes the command **<STX>XXXXXXXXXXXXXXXXXXXX**<CR> as verification of receipt. For example:
Host send: 2,0,0,0,0,0,0,0,1,2,1,4,1,5,1,3,3,4,3,1,0,3
Scale reply:
<STX>,NUL,NUL,NUL,NUL,NUL,NUL,NUL,SOH,STX,SOH,EOT,SO H,ENQ, SOH,ETX,ETX,EOT,ETX,SOH,NUL<ETX>

5. Send the command Y to use the current configuration string, or N to abort configuration. The scale responds **<STX>DONE<CR>** when configuration is complete or **<STX>ABORT<CR>** if you sent the command **N** to abort. For example:
Host sends: Y or N (hex 89 or hex 78)
Scale reply: <STX> DONE<CR> or <STX> ABORT<CR>

METTLER TOLEDO

Publication Problem Report

If you find a problem with our documentation, please complete and fax this form to (864) 472-7625

Publication Name: <u>METTLER TOLEDO PW Person Weighing Service Manual</u>

Publication Part Number: <u>15366500A</u>   Publication Date: <u>12/98</u>

PROBLEM(S) TYPE:	DESCRIBE PROBLEM(S):	INTERNAL USE ONLY
☐ **Technical Accuracy**	☐ Text ☐ Illustration	
☐ **Completeness** What information is missing?	☐ Procedure/step ☐ Illustration ☐ Definition ☐ Example ☐ Guideline ☐ Feature ☐ Explanation ☐ Other (please explain below)	☐ *Info. in manual* ☐ *Info. not in manual*
☐ **Clarity** What is not clear?		
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