METTLER TOLEDO

HAWK®

Harsh Version Terminal
Technical Manual

PRECAUTIONS

READ this manual BEFORE operating or servicing this equipment.

FOLLOW these instructions carefully.

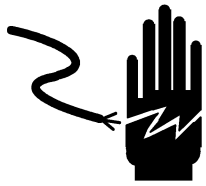
SAVE this manual for future reference.

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.

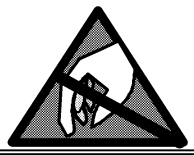
CALL METTLER TOLEDO for parts, information, and service.

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.



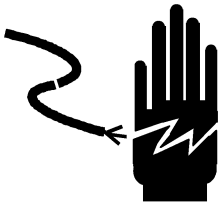
⚠ WARNING

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.



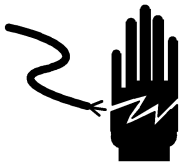
⚠ CAUTION

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

The Hawk Harsh version terminal is a rugged , reliable electronic weighing indicator in an IP65 washdown enclosure designed for easy operation in wahdown applications .

This manual provides essential information for assembling, programming, and maintaining the Hawk terminal (HTHB). Please review this material carefully. You should also consult the technical manual for the scale base being used with the terminal.

Should you need further assistance, please contact your authorized Mettler Toledo representative.

Specifications

Hawk Harsh version Terminal Specifications	
Displayed Resolution	Up to 10,000d
Physical Dimensions (W x D x H)	220mmx200mmx78mm
Construction	304 Stainless Steel
Power	120/220VAC power supply or six "C" cells
Battery Life	Up to 200 hrs with six (6) 'C Cell' batteries powering one (1) 350 ohm load cell
Environmental Protection	Equal to IP65
Display	Six-digit, 25 mm / 1 in tall, high contrast, LCD
Scale Type	Analog: Suitable for 2mV/V and 3mV/V load cells Can power up to four (4) 350 ohm load cells
Keypad	4 color-coded, tactile-feel keys ZERO, TARE, FUNCTION, and PRINT
Approvals	
Operating Temperature	-10°C to 40°C (14°F to 104°F) with10 to 95% relative humidity, non-condensing
Storage Temperature	-20°C to 60°C (-4°F to 140°F) with 10 to 95% relative humidity, non-condensing
Data Output	ASCII via RS-232 standard
Weighing Units	Pounds, kilograms and grams

Table 1-1

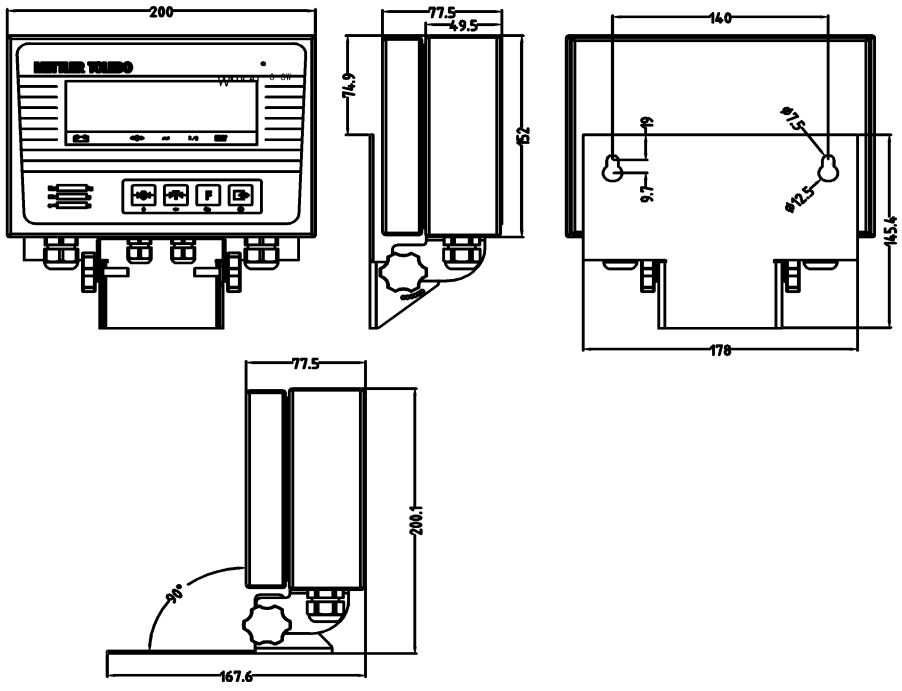
2 Installation

Location

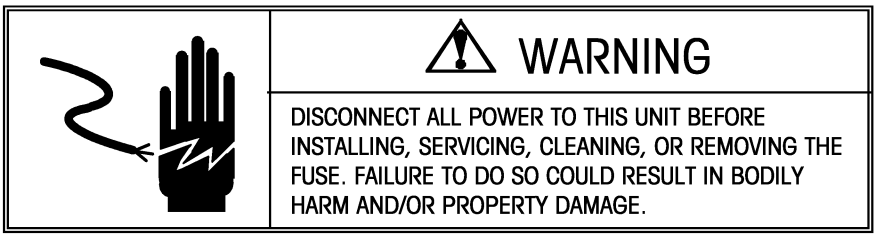
The first step in installing the Hawk Harsh version terminal is to select the best location. Placing the Hawk Harsh version terminal in an appropriate location will enhance its longevity and operation. Keep in mind the following when choosing a location for the Hawk Harsh version terminal:

- The HAWK HARSH VERSION terminal can be operated between a temperature range of 14°F to 113 °F (-10°C to 45 °C) at 10% to 95% humidity, noncondensing.
- The storage temperature range is from -40 to 140 °F (-40 to 60 °C) at 10% to 95% humidity, noncondensing.
- The HAWK HARSH VERSION terminal's enclosure meets NEMA 4X (IP65) requirements for a dust-tight and splash-proof enclosure.
- **The HAWK HARSH VERSION terminal is not intrinsically safe!** However, the HAWK HARSH VERSION terminal is capable of operation with scales and barriers located in a hazardous area. Contact your authorized METTLER TOLEDO representative for assistance with hazardous area applications.

Physical Dimensions



Accessing the terminal



To access the Controller PCB for internal wiring and setting switches:

1. Separate the front panel from the enclosure by inserting the tip of a flat-blade screwdriver into one of the two slots on the bottom of the front panel assembly.

2. Gently push in toward the enclosure. You should hear a quiet "pop" when the cover has been released.

3. Push in on the side of the slot closest to the bottom of the cover. Repeat for the other slot.

4. Lift the bottom of the front panel out until it completely clears the enclosure.

5. Squeeze the top of the front panel to the enclosure slightly and raise it to clear the two top clips. The cover will swing down, hinged by a wire cable at the bottom. Figure 2-1 shows the location of the slots (A). Load Cell Connection Serial Cable AC

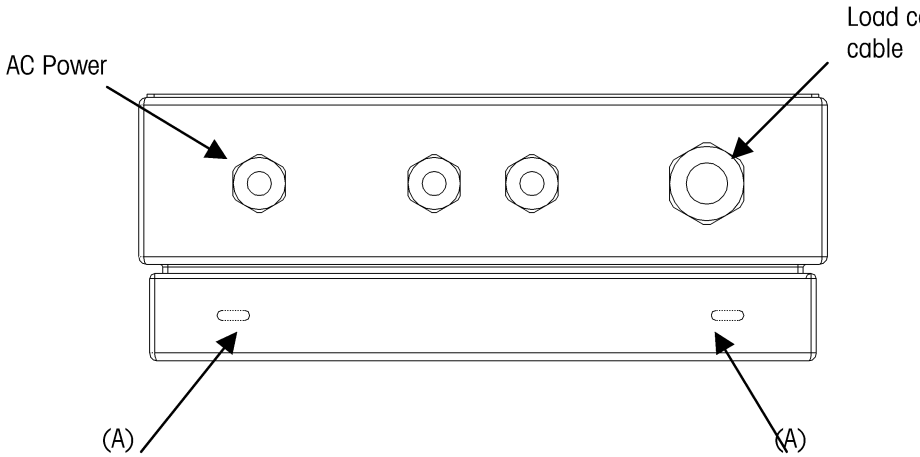


Figure 2-1

Load Cell Wiring

After opening the Hawk Harsh version terminal enclosure and remove the battery cover , the main circuit board is mounted on the front panel . Refer to the Figure 2-2 for the detail cable connection :

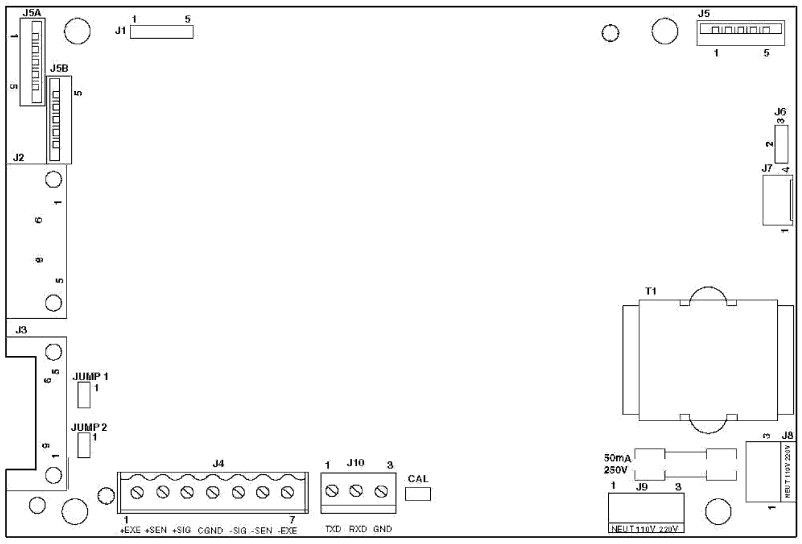


Figure 2-2

The following diagrams show the load cell terminal strip wiring for the Hawk Harsh terminal.

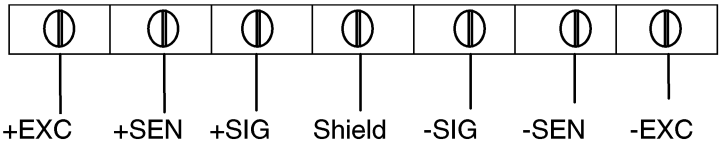


Figure 2-3

Note that jumpers JUMP 1 and JUMP 2 (Figure 2-2) on the Controller PCB are NOT shorting the pins in this configuration.

Standard 4-wire Load Cell Color Code

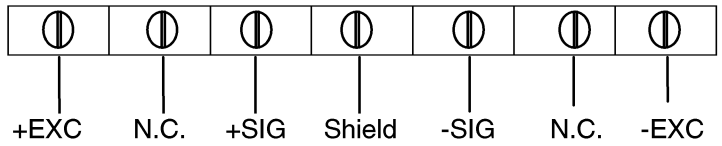


Figure 2-4

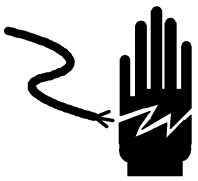
Note that jumpers JUMP 1 and JUMP 2 (Figure 2-2) on the Controller PCB MUST BE shorting the pins in this configuration.

Serial Port Connections

The Hawk Harsh version terminal provides an RS-232 port as standard. This port may be used to send data to a computer, printer, or other serial device. The Figure 2-2 also describes the pin configuration of the RS232 connector on the side of the load cell connection terminal. The maximum recommended cable length for RS-232 communications is 50 feet (15.24 meters).

3 Programming and Calibration

Programming Mode



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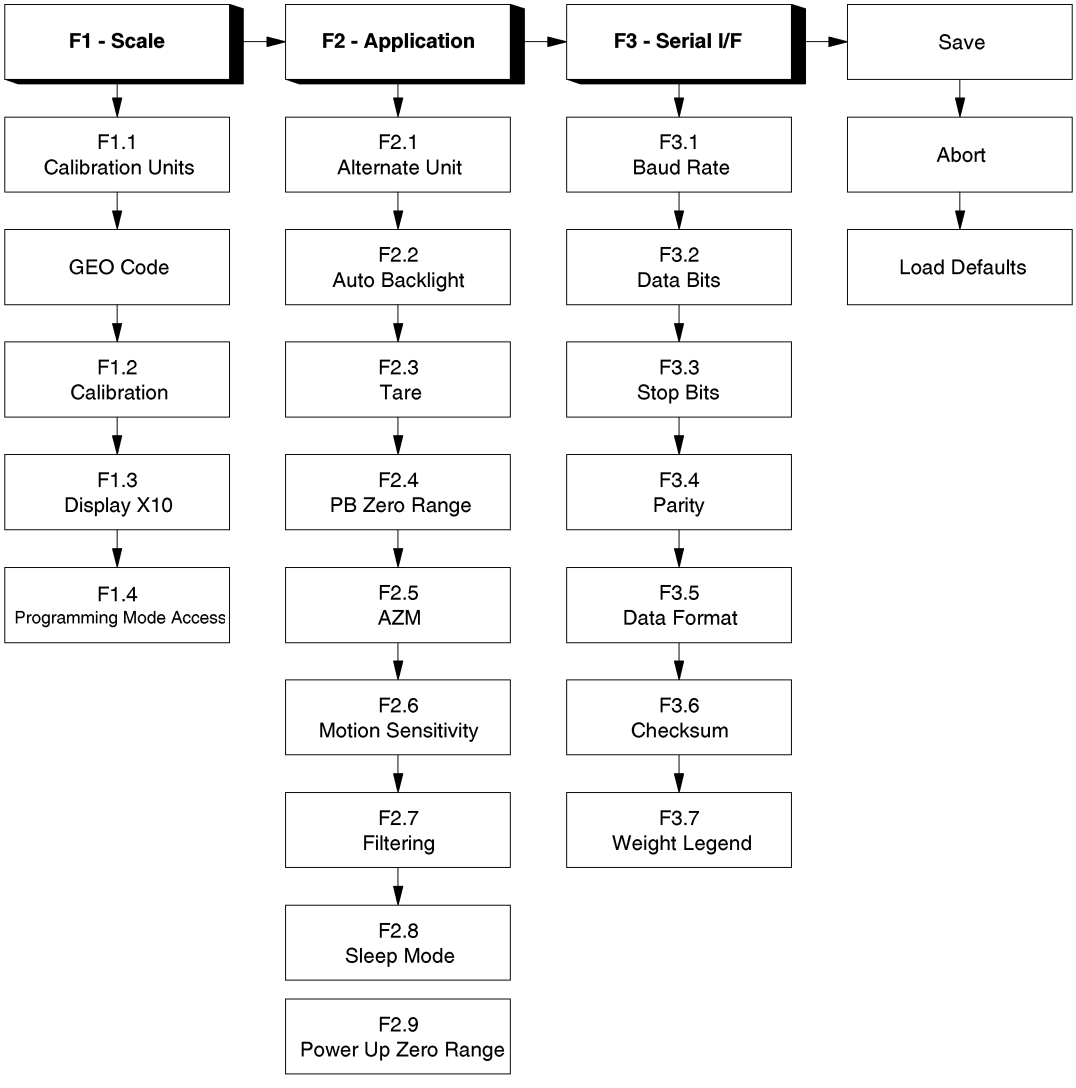
The Hawk Harsh version terminal contains various program blocks and sub-blocks which can be configured to determine how a scale will function. An overview of the programming mode is shown here.



Key Functions

Should you need to reconfigure the Hawk Harsh terminal, you can use the following keys to configure the program blocks which control the following functions in the Hawk Harsh version terminal.

→0←	**ZERO**	Back up to the previous step.
→T← ←	**TARE**	Moves the data entry position one digit to the left.
F	**FUNCTION**	Increments the numeric data entry digit and/or allows the programmer to view the next display in a selection list.
⇔	**PRINT**	Accepts/terminates a data entry.

Entering the Programming Mode

In order for you to access the program blocks which allow you to program the Hawk Harsh terminal, the CAL jumper must be in place shorting the two pins on the Controller PCB. Refer to Figure 2-2 for the CAL position.

To configure the program blocks, you must enter the programming mode by pressing and releasing the **PRINT** and **ZERO** keys simultaneously.

Entering and Configuring Program Blocks

Once the [F1] prompt is displayed, use the **PRINT** key to enter the block or the **FUNCTION** key to skip to the next block. The **ZERO** key is used to go back to the previous block.

Once **PRINT** is pressed, the Hawk Harsh terminal advances to the first parameter in the F1 program block. The display shows the sub-block number and the current value setting. Press **PRINT** to accept the value and advance to the next sub-block or press the **FUNCTION** key to toggle through the choices until the desired selection is displayed.

After the desired selection is displayed, press the **PRINT** key to accept the value. Continue this procedure throughout the setup routine until all required changes have been made.

Exiting the Programming Mode

At the end of all the program blocks, there is the SAVE program block. In this block, you can use the **FUNCTION** key to select SAVE, ABORT or DEFAULT.

SAVE The HAWK HARSH terminal will save all the changes you have made to the program blocks and then exit setup.

ABORT All changes will be discarded and the original programming will remain.

DEFAULT All blocks, except those steps denoted by * in Table 3.1 are reset to the factory defaults.

Legal for Trade (LFT)Operation and LFT Sealing

Legal for trade (LFT) operation is possible through a lock Switch (CAL jumper) located on the PC board . The indicator MUST be set up and calibrated prior to performing this procedure .

Procedure

Set up Indicator, and calibrate. After this is done, remove power from the Indicator.

At the bottom of the rear cover of the Indicator are two slots. There is a spring clip at each slot location which holds the cover in place. Insert the small screwdriver blade into each slot and press and work the back cover off. With the cover removed, proceed as follows:

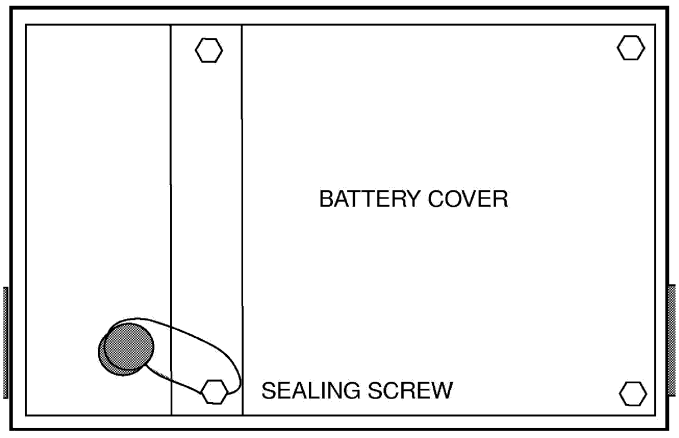
Remove the rear cover. Inside is the battery compartment which is wired to the PC board underneath.

Remove batteries if installed.

Remove the four corner screws from the battery board. One of the screws is crossed drilled to accept a wire seal when used for legal for trade applications.

Carefully lift the battery board up and out of the indicator making sure that that the wires are not pulled off of the battery connector on the main PC board.

Refer to the illustration on the left and notice the position of the CAL jumper. This is shown with the jumper in place. To **lock out the menus**, remove the jumper and position it on one pin. This removes the jumper and stores it in the event it has to be replaced to recalibrate.



Replace the battery cover and four battery cover screws . One of these screws is cross drilled and can accept a wire seal .

See the Figure 3-1 , place wire seal through the holes in the screw and ribs as shown and compress lead seal in place .

Closing the indicator

After the indicator has been calibrated and sealed , replace the rear cover and snap into place . Connect power to the indicator and verify operation .

Factory Default Settings

The following is a list of the factory default setup parameters in the HAWK HARSH terminal.

STEP	DEFAULT	DESCRIPTION
F1.1	*	Calibration units – No default
GEO	*	Gravity adjust – No default
F1.2	0	Skip calibration
F1.3	0	Normal weight display
F1.4	0	Master Mode disable
F2.1	0	Alternative units = none (Unit Switch disable)
F2.2	0	Auto Backlight disable
F2.3	1	Tare enable
F2.4	1	Push button zero enabled, 2% range
F2.5	1	Auto zero maintenance enabled within 0.5d window
F2.6	1	Motion sensitivity +/- 1d
F2.7	0	No Filtering
F2.8	0	Sleep mode disable
F2.9	1	Auto zero capture at powerup range of +/- 2%
F3.1	9600	Serial output baud rate
F3.2	7	Data bits
F3.3	2	Stop bits
F3.4	2	Even parity
F3.5	2	Print format = single line gross-tare-net
F3.6	1	Checksum enable
F3.7	0	No legend for gross weight field

Table 3-1

F1 Scale Block

This program block allows the user to set and calibrate the features that affect weighing performance.

[F1.2 2] CALIBRATION UNITS

Enter the value that corresponds to the type of test weights that will be used for calibration.

1 = lb

2 = kg

3 = g

[GEO 12] GRAVITY ADJUST

The terminal is calibrated with a GEO code of 12 at the factory. To adjust the factory calibration to your specific area, refer to Appendix 3 for your GEO code. Enter the new GEO code and the calibration will automatically be adjusted for your desired location.

[F1.2 0] SCALE CALIBRATION

0 = Skip Calibration and proceed to F1.3

1 = Enter into the Calibration Sub-block.

[CAP.] SCALE CAPACITY

"CAP" displays momentarily then current scale capacity is shown. This value is available for numeric entry editing. Press **FUNCTION** to clear the data before entering new data.

Table 3.2 shows all possible selections for capacity and increments.

Increment Size	Scale Capacities (lb, kg or g)											
0.001	1	-	-	2	-	3	4	5	6	-	8	10
0.002	2	-	3	4	5	6	8	10	12	15	16	20
0.005	5	6	-	10	-	15	20	25	30	-	40	50
0.01	10	12	15	20	25	30	40	50	60	-	80	100
0.02	20	24	30	40	50	60	80	100	120	150	160	200
0.05	50	60	-	100	-	150	200	250	300	-	400	500
0.1	100	120	150	200	250	300	400	500	600	-	800	1000
0.2	200	240	300	400	500	600	800	1000	1200	1500	1600	2000
0.5	500	600	-	1000	-	1500	2000	2500	3000	-	4000	5000
1	1000	1200	1500	2000	2500	3000	4000	5000	6000	-	8000	10000
2	2000	2400	3000	4000	5000	6000	8000	10000	12000	15000	16000	20000
5	5000	6000	-	10000	-	15000	20000	25000	30000	-	40000	50000

Table 3.2

[Incr.] INCREMENT SIZE

"Incr" displays momentarily then the current increment size is displayed for editing. Press the **FUNCTION** key to toggle through valid selections.

[E SCAL] Empty scale platform and press **PRINT** to continue.

[15 CAL] Delay while initial is set (display counts down). If motion sensitivity is not disabled and motion is detected at this step, the display will show **[E 30]**. Press **PRINT** and the display returns to the **[E SCAL]** prompt.

[Add Ld] Place test weight on the scale platform. Press **PRINT**.

[0000'0'] Enter test weight value. No decimal point is permitted. Maximum test weight is 100% of full scale capacity. Minimum is 20% of full scale capacity.

[15 CAL] Delay while span is set (display counts down). If motion is detected at this step then the display will show [E 30]. Press **PRINT** to return to the [Add Ld] prompt.

[CAL d] "Calibration done" is displayed momentarily.

[F1.3 0] EXPANDED DISPLAY

0 = Normal display mode

1 = Weight displayed in minors

[F1.4 0] PROGRAMMING MODE ACCESS

If CAL jumper is installed on the Controller PCB, this step has no effect, and the programming is always accessible.

If CAL jumper is not installed on the Controller PCB:

0 = No access to Master Mode

1 = Programming blocks F2 and F3 may be accessed to change the parameters. Programming block F1 may only be viewed.

F2 Application Block

[F2.1 0] ALTERNATE UNITS

Select the unit of measure desired as a secondary unit.

0 = No unit switching

1 = lb

2 = kg

If the calibration unit is "kg ", the available choice is only "lb".

If the calibration unit is "lb" or 'g', the choice is only 'kg".

If unit switching is enabled, a quick press of the **FUNCTION** key will change the unit.

[F2.2 0] AUTO BACKLIGHT

0 = Backlight can only be turned on manually by pressing the **FUNCTION** key.

1 = The backlight turns on during motion and stays on for 6 seconds after no-motion.

The manual on/off is always available. If unit switching is enabled, press and hold the **FUNCTION** key for 3 seconds to turn the back light

on. If unit switching is disabled, a quick press of the **FUNCTION** key will turn the backlight on and off.

[F2.3 1] TARE

0 = Tare disabled

1 = Tare enabled

[F2.4 1] PUSHBUTTON ZERO RANGE

0 = Pushbutton zero disabled

1 = Enable pushbutton zero within +/- 2% of scale capacity

2 = Enable pushbutton zero within +/- 20% of scale capacity

[[F2.5 1] AUTOZERO MAINTENANCE

Auto Zero maintenance automatically compensates for small changes in zero resulting from material build-up or temperature changes. This sub-block lets you select the weight range (+/-) around gross zero within which the HAWK HARSH terminal will capture zero . If residual weight on the scale exceeds the weight range, the HAWK HARSH terminal will not capture zero.

0 = No AZM

1 = AZM within 0.5d window

2 = AZM within 1d window

3 = AZM within 3d window

If AZM is disabled, the HAWK HARSH terminal will display weight after power-up. Otherwise, if the weight is not in zero-capture range, display shows [E E E] or [-E-E-E], until weight is within the capture range. AZM is disabled in NET mode.

[F2.6 1] MOTION SENSITIVITY SELECTION

The motion detection feature determines when a no-motion condition exists on the scale platform . The sensitivity level determines what is considered stable. Printing, pushbutton zero, and tare entry will wait for scale stability before carrying out the command.

0 = Motion detector disabled

1 = 1.0 d motion sensitivity

2 = 3.0 d motion sensitivity

[F2.7 0] FILTER

This function will compensate for environmental disturbances such as vibration or noise.

0 = NONE

1 = LIGHT

2 = NORMAL

3 = HEAVY

[F2.8 0] SLEEP MODE

0 = Disable

1 = Enable the sleep mode automatically after 5 minutes of stability.

[F2.9 1] POWER-UP ZERO RANGE

0 = Auto zero capture at power-up disabled.

1 = Auto zero capture at power-up range of +/- 2%.

2 = Auto zero capture at power-up range of +/- 10%.

F3 Interface Block

The following section will introduce the detail steps of configuring the RS232 output.

[F3.1 9600] BAUD RATE

[XXXX] XXXX = a selection list of 1200, 2400, 4800, or 9600 baud

[F3.2 7] DATA BITS

7 = 7 data bits

8 = 8 data bits

[F3.3 2] STOP BITS

1 = 1 stop bit

2 = 2 stop bits

[F3.4 2] PARITY

0 = No parity

1 = Odd parity

2 = Even parity

[F3.5 2] DATA OUTPUT FORMAT

0 = Toledo continuous with STX

1 = Demand, single line, displayed weight only

2 = Demand, single line, gross, tare, net

3 = Demand, three line gross, tare, net

[F3.6 1] **CHECKSUM (Only if F3.5 = 0)**

0 = No checksum

1 = Checksum

[F3.7 0] **GROSS WEIGHT LEGEND**

0 = No Legend

1 = B (bruto)

2 = G (gross)

Exit Sub-Block

There are three ways to exit the programming mode:

[SAVE] Press **PRINT** to accept the changes in the program block and exit programming.

[Abort] Press **PRINT** to ignore the changes in the program block and exit programming.

[dFAULT] Press **PRINT** to reset all program block parameters to factory default data and exit programming.

Parameters marked with an asterisk (*) in Table 3.1 will not be reset.

Calibration

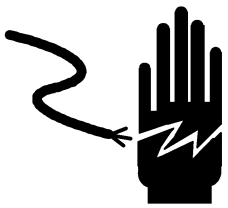
When the HAWK HARSH terminal is used in legal-for-trade commercial applications, it must be calibrated with certified test weights to the capacity and increment size shown on the data plate. The capacity and increment size is selectable in the programming mode in sub-block F1.2. Calibration is also completed in sub-block F1.2.

Gravity Adjustment

The HAWK HARSH terminal has built in compensation provisions to allow factory calibration with destination correction capabilities to compensate for variances on gravitational forces. If the HAWK HARSH terminal is subjected to a different gravitational force at its destination location, this can be compensated for electronically by adjusting the geo value. The geo value has 32 settings. The geo value for any world location can be found in the geo value table in Appendix 3 as long as the geographical coordinates and elevation above sea level are known.

4 Maintenance and Troubleshooting

Cleaning



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Periodically clean the keyboard and covers with a soft clean cloth that has been dampened with a mild window type cleaner or detergent. DO NOT USE ANY TYPE OF INDUSTRIAL SOLVENT OR CHEMICALS. DO NOT SPRAY CLEANER DIRECTLY ONTO THE UNIT. DO NOT HOSE DOWN.

Troubleshooting

If operational difficulties are encountered, first obtain as much information as possible regarding the problem. Failures and malfunctions often may be traced to simple causes such as loose connections, low battery power, or improper setup. Additional troubleshooting is best performed by substitution. A PCB or load cell believed to be defective may be checked by replacing the suspect part with known good part and then observing whether the problem is corrected.

Error Codes

The table on the next page lists the error messages that may be displayed by the HAWK HARSH terminal.

Error Message	Description	Probable Action
E1	ROM error	Check Power Supply Voltages. Replace Controller PCB.

E2	Internal RAM error	Check Power Supply Voltages. Replace Controller PCB.
E7	EEPROM data incorrect.	Check Power Supply Voltages. Replace Controller Logic PCB.
E30	Scale in motion during calibration	Press **PRINT** to return to [E SCAL] or [ADD LD].
E32	Insufficient calibration test weight or insufficient signal from load cell	Press **PRINT,** then add additional test weight. Recalibrate using more test weight.
E34	Calibration Test Weight too large	Press **PRINT.** Use test weight less than 100% of scale capacity.
EEE	Scale not zeroed at power up	Auto Zero on power-up (F2.5) is enabled and the weight is greater than zero. Zero the scale or remove the weight until zero is captured. Re-calibrate the scale.
-EEE	Scale not zeroed at power up.	Auto Zero on power-up (F2.5) is enabled and the weight is on the platform. Add weight until zero is captured. (Put platform on). Re-calibrate the scale.
|- - - - -|	Overload indication.	Weight on scale exceeds calibrated capacity by more than 9d. Decrease load on scale.
|- - - - -|	Underload indication.	Weight on scale is below gross zero by more than 9d. Increase load on scale.

Voltage Checks

AC Power Test

Using a Multi-meter, check the AC input power. Input power must be within -15% and +10% of the nominal AC line voltage.

Controller PCB Input Voltage Test

Confirm the AC adapter is outputting a voltage of at least 9 VDC. If the HAWK HARSH terminal has power and the Controller PCB does not function properly, replace the PCB.

Check Battery Voltage—(Units with internal battery packs)

If the HAWK HARSH terminal does not respond when power is applied and the unit is turned on by pressing the **PRINT** key, for approximately 3 seconds the battery pack may be completely discharged. Install a new set of six "C" cells and retest.

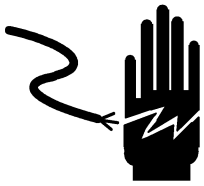
RS232 Serial Output Test

Use the following test procedure to determine whether the RS232 serial port is operational.

- Remove power and disconnect the data cable from the HAWK HARSH terminal.
- Set the volt meter to read 20 volts DC.
- Connect the red lead to pin 3 of the HAWK HARSH terminal's serial port connect the black lead to pin 5.

- Apply power. The meter should read as follows:
- In Demand mode, the meter should read between -5 and -15 VDC with no fluctuation.
- To test the Demand output, press the **PRINT** key on the HAWK HARSH terminal. The display should fluctuate between -5 volts to +5 volts for the duration of the transmission, then become stable again. This indicates the terminal has transmitted data.
- In Continuous mode, the meter should fluctuate between -5 and +5 VDC continuously. The constant fluctuation on the meter display indicates the scale/terminal is transmitting information.

Parts Replacement and Adjustments



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

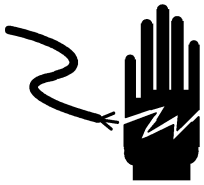
BEFORE CONNECTING OR DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT, ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTION'S ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR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

Keyboard Replacement

1. Remove power by removing the six "C" size batteries from the rear battery compartment and/or disconnecting the AC power adapter.
2. Remove the four screws securing the front and back portions of the cover.
3. Disconnect the keyboard tail from the Controller PCB and discard the old front cover.
4. Connect the keyboard tail of the new front cover to J5 of the Controller PCB.
5. Secure the front cover to the back cover with the four screws.
6. Apply power then press and hold the **ON/OFF (PRINT)** key for 3 seconds.
7. Test the operation of the new keyboard.

Controller PCB Replacement

If the Controller PCB is suspected to be faulty, use the following procedure to replace the PCB.



WARNING

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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.

1. Remove power by removing the six "C" size batteries from the rear battery compartment and/or disconnecting the AC power adapter.
2. Remove the four screws securing the front and back halves of the cover.
3. Disconnect the keyboard tail from the Controller PCB and set the front cover aside.
4. Disconnect the battery harness from the Controller PCB.
5. Disconnect the AC adapter harness from the Controller PCB.
6. Remove the two hex standoffs from the side of the enclosure that secures the serial output connector to the back cover of the HAWK HARSH terminal.
7. Remove the four screws that secure the Controller PCB to the back cover.
8. Using proper static electricity precautions, carefully remove the Controller PCB and place it in a protective static bag.
9. Install the new Controller PCB using the same four screws removed in the previous step.
10. Install the two hex standoffs to the side of the enclosure that secure the serial output connector to the back cover of the HAWK HARSH terminal.
11. Reconnect the AC adapter and battery harnesses removed previously.
12. Connect the keyboard tail of the front cover to J5 of the Controller PCB.
13. Secure the front cover to the back cover with the four screws.
14. Apply power to the HAWK HARSH terminal then press and hold the **ON/OFF (PRINT)** key for 3 seconds.
15. Reprogram, recalibrate and test the operation of the new Controller PCB.

Power-Up Sequence

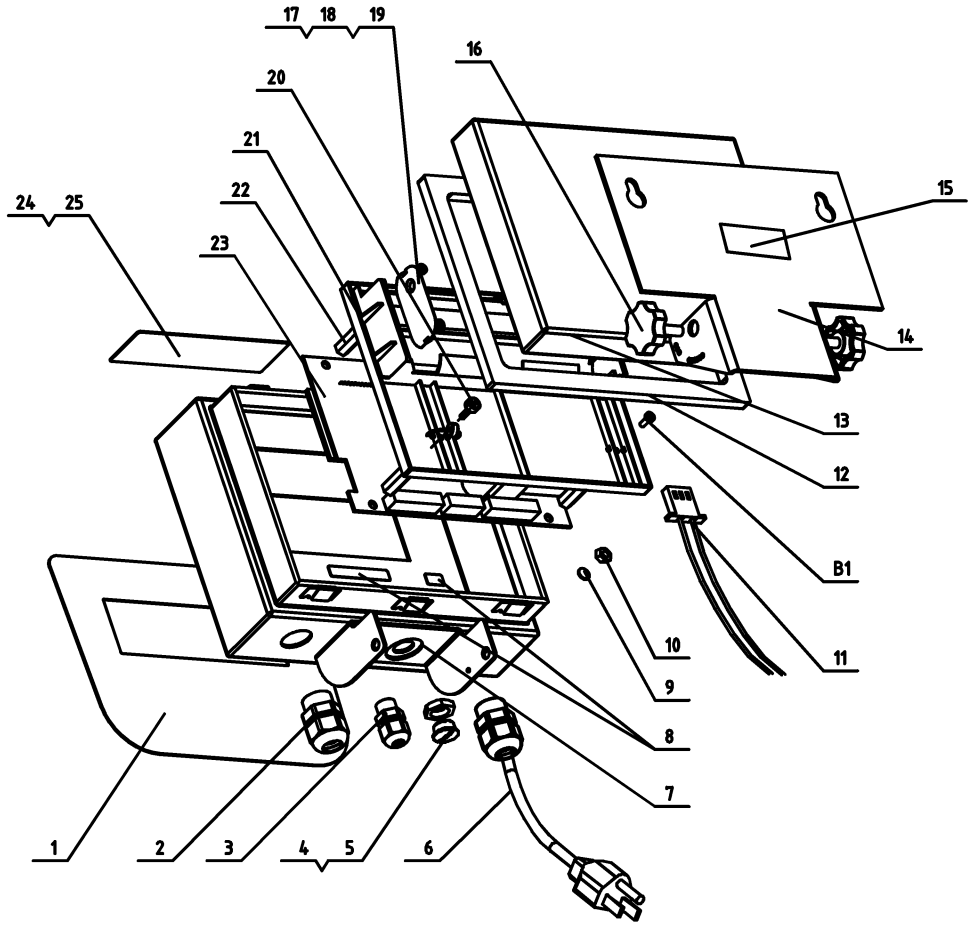
The HAWK HARSH terminal goes through a series of self tests when it is turned on. These tests confirm normal internal operation. The power-up sequence is as follows.

While the display is checked by showing all numbers 0-9, a diagnostic self test is performed on the memory and microprocessor. An error message is displayed if any component fails the test.

- The program number [125362] is shown next, followed by the revision [Sr. 1.20].
- If everything tests okay, the HAWK HARSH terminal will show [0.00] on the display.
- The power-up sequence requires a few seconds to complete.

5 Parts List

HAWK HARSH Terminal



Sym	Qty	P/N	Description
1	1	138031	Keyboard , Hawk Harsh version
2	1	119939	Cable clamp, PG11
3	1	112948	Cable clamp,PG7
4	1	129165	Sealed insert , PG7
5	1	129166	Locked nuts , PG7
6	1	123260	Power line cord , AUS cord
7	1	138039	Front panel assembly Hawk Harsh version
8	1	134275	Data label
9	1	119273	Label , Grounded
10	1	119319	Hex nuts , M4 Keps
11	1	124466	Harness battery ,
12	1	133513	Sealing gasket
13	1	133505	Bottom base
14	1	123266	Wall mount bracket
15	1	103596	Label , power warning
16	2	119952	Knob
17	1	127396	Battery spring III
18	1	127395	Battery spring II
19	1	127394	Battery spring I
20	1	133510	Battery chamber
21	4	133514	Hex nuts , M3/4 X32
22	1	133185	Main PC board assembly
23	1	128080	Data label
24	1	127591	Transpency cover
25	3	119323	Screw M3X8

6 Appendices

Appendix 1: Demand Mode Output

Demand mode output occurs when a print request is received form the **PRINT** push button. The line format, baud rate, character length, and parity are selectable in the programming mode.

Demand mode output is prevented when the scale is "in motion" or when the weight is below 20d of gross weight or over capacity. When one of those situations occurs, the print request is ignored and is not stored. Zero must be captured at powerup before a demand mode output can occur. After one output, the HAWK HARSH terminal must see motion before it will send data again.

Weight Field Format

Displayed Weight Format (Gross or Net)

Data	MSD	-	-	-	-	-	LSD	SP	Units	SP	B	CR	LF
Note	C							D	E	D	B	F	H

Table 6-1: Gross Weight

Data	MSD	-	-	-	-	-	LSD	SP	Units	SP	N	CR	LF
Note	I							D	E	D	J	F	H

Table 6-2: Net Weight

Single Line – Gross, Tare, Net Weights

Single-line gross weight format is output if no tare weight has been taken.

Data	MSD	-	-	-	-	-	LSD	SP	Units	SP	B	MSD	-	-	-	-	-	LSD	SP	Units
Note	C							D	E	D	B	K							D	E

Single Line – Gross, Tare, Net Weights (Continued)

Data	SP	T	MSD	-	-	-	-	-	LSD	SP	Units	SP	N	CR	LF
Note	D	J	I							D	E	D	J	F	H

Table 6-3: Sinale Line – Gross. Tare. Net Weiahts

Multiple Line – Gross, Tare, Net Weights

If no tare weight has been taken, only the gross weight field is output.

Data	MSD	-	-	-	-	-	LSD	SP	Units	SP	B	CR	LF
Note	C							D	E	D	B	F	H

Table 6-4: Multiple Line – Gross Weight

Data	MSD	-	-	-	-	-	LSD	SP	Units	SP	T	CR	LF
Note	K							D	E	D	J	F	H

Table 6-5: Multiple Line – Tare Weight

Data	MSD	-	-	-	-	-	LSD	SP	Units	SP	N	CR	LF
Note	I							D	E	D	J	F	H

Table 6-6: Multiple Line – Net Weight

Demand Format Notes

B Selectable gross weight legend. Selectable in the programming mode as a space, "B" for bruto or "G" for gross.

C The gross weight data fields are padded with leading spaces to 7 digits.

D ASCII Space <SP> character, hex value 20.

E Weight units (lb, kg, g) as selected in setup and by the FUNCTION key.

F ASCII Carriage Return <CR> character, hex value OD.

G Optional checksum character: 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. The checksum calculation for multiple lines of data includes the <LF> character from the previous line of data.

H ASCII Line Feed <LF> character, hex value OA.

I The net weight field is right justified and padded with spaces to seven digits.

A negative net weight is indicated by a minus character before the most significant digit of the weight value. For example, a weight of –55.00 is printed with one leading space (^{S}p=space): ^{S}p-55.00.

J Weight field descriptors. The "T" and "N" legends are printed (for net weight) after the tare and net weight fields to identify them.

*The tare weight data field is padded with leading spaces to 7 digits.

Appendix 2: Continuous Mode Output

The continuous output format is output as the display is updated (approximately 1 times per second). The format is fixed except for baud rate, data bits, stop bits, parity, and the selectable checksum character. The continuous output mode provides compatibility with METTLER TOLEDO products that require real-time weight data (for example, Models 8624, 9323, 9325, and 9360 accessories).

Continuous data output at a 1200 baud rate will slow the display update rate. Use 4800 baud or faster to maintain the maximum update rate.

The continuous output includes status bytes that indicate the operating conditions in the terminal.

Character	1	Status			Indicated Weight						Tare Weight							
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	1
Data	STX	SWA	SWB	SWC	MSD	-	-	-	-	LSD	MSD	-	-	-	-	LSD	CR	CHK
Note	A	B			C						D						E	F

Table 6-8: Continuous Format Output

Continuous Format Notes

A ASCII Start of Text <STX> character, hex value 02.

B SWA, SWB, and SWC: Status Words A, B, and C. Refer to Tables 6-9, 6-10, and 6-11 for status bytes.

C Displayed weight: Six digits of displayed weight. No decimal point in field.

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

E ASCII Carriage Return <CR> character, hex value OD.

F Optional checksum character: 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.

Status Byte Definition

Function	Decimal Point Selection	Bit						
		6	5	4	3	2	1	0
Decimal Point or Dummy Zero	XOO XO X 0.X 0.0X 0.00X 0.000X 0.0000X	A L W A Y S A	A L W A Y S A	*		0 0 0 0 1 1 1 1	0 0 1 0 0 0 1 1	
Increment Size	X=1 X=2 X=5	1	1	0 1 1		1 0 1	*	

Table 6-9: Status Word A Bit Definitions
*Bits not applicable to function.

Function	Bit
Gross/Net, Net=1	0
Under Zero, Negative = 1	1
Overcapacity = 1	2
Motion = 1	3
Lb/kg, kg = 1	4
Always a 1	5
Powerup not zeroed = 1	6

Table 6-10: Status Word B Bit Definitions

Function	Bit
Always a 0	0
Always a 0	1
Always a 0	2
Print Request = 1	3
Expanded Weight = 1	4
Always a 1	5
Hand Tare, Metric = 1	6

Table 6-11: Status Word C Bit Definitions

Appendix 3: Geo Codes

Use the following Geo Codes if you relocate the Hawk Harshto a location other than the original location where it was calibrated.

Northern and southern latitude in degrees and minutes	Height above sea-level in meters										
	0 325	325 650	650 975	975 1300	1300 1625	1625 1950	1950 2275	2275 2600	2600 2925	2925 3250	3250 3575
	Height above sea-level in feet										
	0 1060	1060 2130	2130 3200	3200 4260	4260 5330	5330 6400	6400 7460	7460 8530	8530 9600	9600 10660	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° 10′	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
45° 38′ — 46° 45′	18	18	17	17	16	16	15	15	14	14	13
46° 45′ — 47° 51′	19	18	18	17	17	16	16	15	15	14	14
47° 51′ — 48° 58′	19	19	18	18	17	17	16	16	15	15	14
48° 58′ — 50° 6′	20	19	19	18	18	17	17	16	16	15	15
50° 6′ — 51° 13′	20	20	19	19	18	18	17	17	16	16	15
51° 13′ — 52° 22′	21	20	20	19	19	18	18	17	17	16	16
52° 22′ — 53° 31′	21	21	20	20	19	19	18	18	17	17	16
53° 31′ — 54° 41′	22	21	21	20	20	19	19	18	18	17	17
54° 41′ — 55° 52′	22	22	21	21	20	20	19	19	18	18	17
55° 52′ — 57° 4′	23	22	22	21	21	20	20	19	19	18	18
57° 4′ — 58° 17′	23	23	22	22	21	21	20	20	19	19	18
58° 17′ — 59° 32′	24	23	23	22	22	21	21	20	20	19	19
59° 32′ — 60° 49′	24	24	23	23	22	22	21	21	20	20	19
60° 49′ — 62° 9′	25	24	24	23	23	22	22	21	21	20	20

Northern and southern latitude in degrees and minutes	Height above sea-level in meters										
	0 325	325 650	650 975	975 1300	1300 1625	1625 1950	1950 2275	2275 2600	2600 2925	2925 3250	3250 3575
	Height above sea-level in feet										
	0 1060	1060 2130	2130 3200	3200 4260	4260 5330	5330 6400	6400 7460	7460 8530	8530 9600	9600 10660	10660 11730
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° 35′ — 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