8530
Cougar™
Industrial Terminal
Service Manual

(for VS Software)

C15537100A
(10/00).00

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	Part / Model Number:
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E-mail Address:	Contact Name:
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INTRODUCTION

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

Information about METTLER TOLEDO Technical Training can be obtained by writing, calling, or faxing:

METTLER TOLEDO
1900 Polaris Parkway
Columbus, Ohio 43240 USA
Phone: (614) 438-4511
Fax: (614) 438-4958
www.mt.com

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 users will be required to correct the interference at their own expense.

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

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Déclaration de conformité
Declaración de Conformidad
Conformiteitsverklaring
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USA

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dichiariamo sotto nostra unica responsabilitá, che il prodotto,

Model/Type: **8530 Cougar ***

(*When installed and operated with an AULT model PW102 series external power supply.)
(A copy of the AULT Declaration of Conformity for the PW102 series supply is on file.)

to which this declaration relates is in conformity with the following standard(s) or other normative document(s).
auf das sich diese Erklärung bezieht, mitder/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
Auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
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Waarnaar deze verklaring verwijst, aan de volgende norm(en) of richtlijn(en) beantwoordt.
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CE Conformity / CE-Konformität / Conformité CE
90/384/EU Nonautomatic Balances and Scales / Nichteselbsttätige Waagen / Balances à Functionnement non automatique
EN45501:1992 Adopted European Standard / Norme Européenne Adoptée / Angenommene Europäische Norm
89/336/EU EMC Directive / EMU-Richtlinie / Directive concernant la CEM
EN55022, B : 1987 Emissions / Funkstörungen
EN50082-2: 1995 Immunity
73/23/EU Low Voltage / Niederspannung / basse tension
EN61010 el. Safety / el. Sicherheit / sécurité el.

Other Directives and Standards / Andere Richtlinien und Normen / Autres documents
corresponding to local requirements / entsprechend lokalen Anforderungen / correspondant aux exigences locales
UL1950 el. Safety / el. Sicherheit / sécurité el. (if UL mark is applied)
C22.2 No. 950-M89 el. Safety / el. Sicherheit / sécurité el. (If CUL mark is applied)
FCC, Part 15, class A Emissions / Funkstörungen

Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures
Worthington, Ohio USA
August 1998

according to EN45014

Precautions

READ this manual BEFORE operating or servicing this equipment.

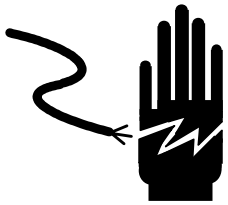
FOLLOW these instructions carefully.

SAVE this manual for future reference.

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

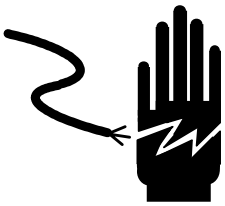
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



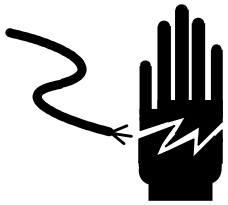
⚠ WARNING

PERMIT ONLY 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.



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

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

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1 Introduction

The Cougar™ industrial terminal is a multi-range, high-performance terminal for use with METTLER TOLEDO POWERCELL® scale platforms. It is compatible with the DigiTOL® POWERCELLs used in TRUCKMATE and RAILMATE vehicle scale models 7260, 7531, 7541, 7560, and 760 DC.

Two versions of the Cougar terminal are available:

The Cougar Standard Software Version has 10 memory locations for storing vehicle weights that can be recalled to complete a transaction and print a ticket. Vehicle weights can be stored in permanent memory for vehicles that will be weighed repeatedly. Vehicle weights can be stored in temporary memory for a single inbound/outbound weighing.

The Cougar VS Software Version has 100 memory locations for storing vehicle weights (permanently or temporarily) that can be recalled to complete a transaction and print a ticket. Up to 10 of those locations can be used as commodity registers with conversion factors for converting weight to a unit of measure such as bushels of wheat or yards of concrete. VS software also provides a Quick Print mode for printing net weights without storing a tare in a memory location. Four printed report formats are available: open temporary registers, permanent registers, scale accumulator, and commodity table.

For information about how to operate these Cougar terminals, refer to the Cougar User's Guides for Standard Software (PN 15472600A) and for VS Software (PN 15339700A).

Model Identification

Each Cougar terminal is marked with a Factory Number. Table 1-1 explains how to use that number to determine the specifications of a particular terminal.

Cougar Terminal Model Configuration		
CTHN	**XXXX**	**XXX**
Type of Terminal	**Type of Software**	**Destination Market**
Cougar Terminal	0000 = Standard 0001 = VS	Finish Code (see Appendix 6)

Table 1-1: Cougar Terminal Factory Numbers

For example, the Factory Number CTHN-0001-000 indicates the following:

CTHN = Cougar Terminal
0001 = VS software
000 = United States is destination market

Specifications

The Cougar terminal conforms to the following specifications.

Physical Dimensions

The Cougar terminal (excluding the mounting bracket) measures

- 10.00 inches (25.4 cm) wide x 7.00 inches (17.78 cm) high
- 3.22 inches (8.18 cm) deep

See Figure 1-1 for mounting dimensions.

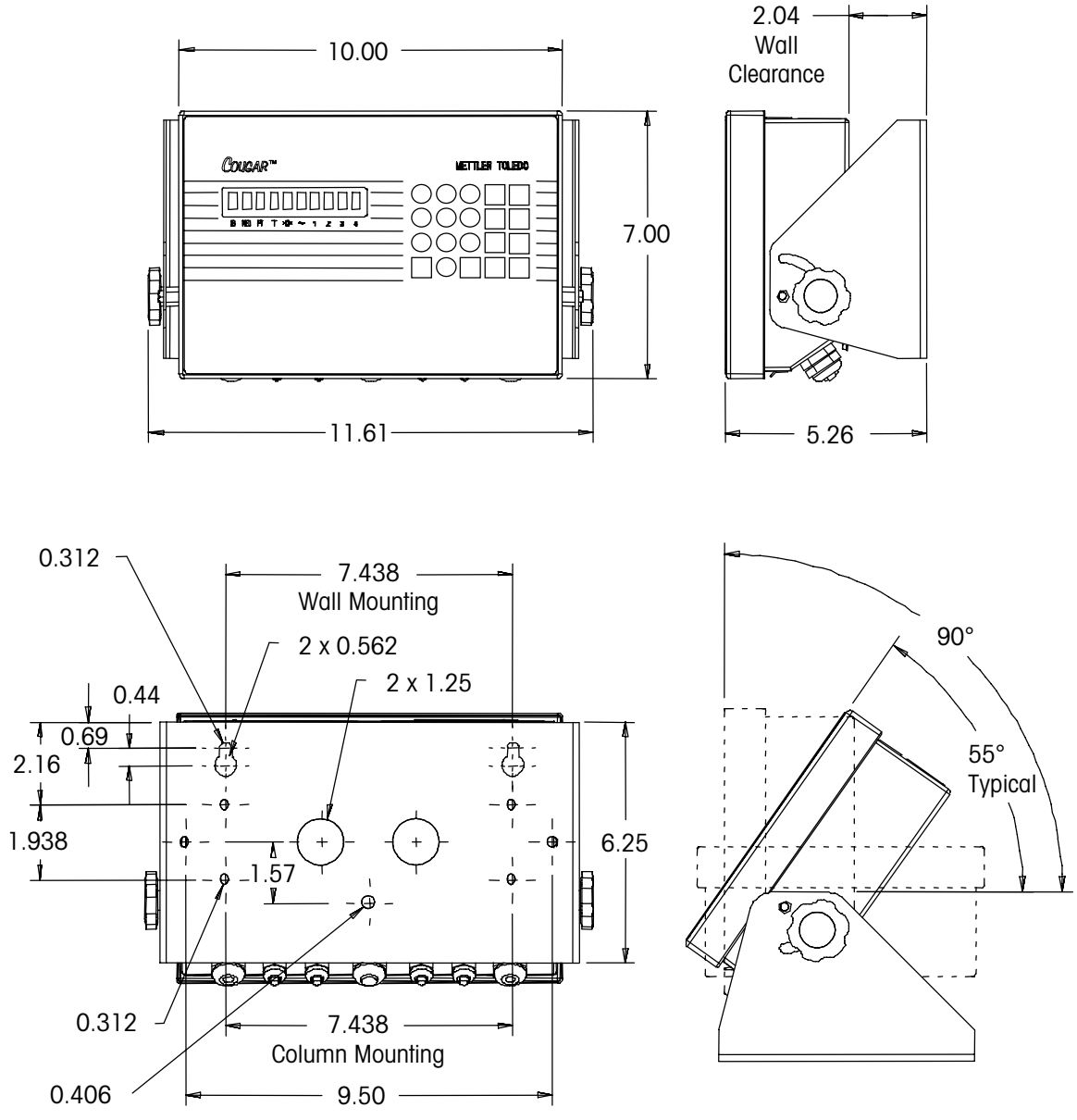
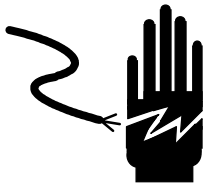


Figure 1-1: Cougar Terminal Dimensions (Dimensions shown are in inches)

Power Requirements



⚠ WARNING

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

The Cougar terminal uses an externally mounted, universal line-switching power supply. It accepts an IEC modular line cord for worldwide operation. The terminal operates at 90 to 265 VAC with a line frequency of 47 to 63 Hz. Power consumption is 12 watts maximum.

The integrity of the power ground is important both for safety and for dependable operation of the Cougar terminal and the scale base used with it. A poor ground can result in an unsafe condition if an electrical short develops in the equipment. A good ground connection is needed to minimize extraneous electrical noise pulses. It is important that equipment does not share power lines with noise-generating equipment such as heavy load switching, motor starter circuits, RF thermal heaters, and inductive loads.

To confirm ground integrity, a commercial branch circuit analyzer like an ICE Model SureTest ST-1D (or equivalent) is recommended. This instrument uses a high-amperage pulse to check ground resistance. It measures the voltage from the neutral wire to the ground connection and will provide an assessment of the line loading. Instructions with the instrument give guidelines about limits that ensure good connections. Visually inspect the installation and question the user to get information about equipment sharing the power line.

If adverse power conditions exist, a dedicated power line or circuit might be required.

Controller PCB

The Cougar terminal's controller printed circuit board (PCB) has a POWERCELL interface that can support up to 24 load cells. Supply voltage for the load cells is 24 VDC.

The printer serial port can be either RS-232 or 20 mA current loop active transmit.

The computer serial port can be either RS-232 or RS-422. Both serial ports are available simultaneously for transmitting; however, only one can receive data.

Connections to the controller PCB are made using removable terminal strips. The wire size for these terminal strips ranges from 23 to 16 AWG.

The controller PCB stores setup parameters in a battery-backed RAM. Scale calibration and other metrological data are stored in a removable EEPROM.

Display and Keyboard

The Cougar terminal has a vacuum fluorescent display that shows weighing data, setup information, and error messages. The display includes seven alphanumeric characters, each measuring 0.55 inch (12.7 mm) high. Cursors below these characters light up to indicate which of the legends printed on the keyboard overlay are currently active.

The terminal's 20-key keyboard is used to enter data and commands. The keyboard consists of a flat membrane switch covered with a domed polyester overlay. The lens is made of polyester and hardcoated to resist damage.

Temperature and Humidity

The Cougar terminal can be operated at temperatures ranging from 14° to 113° F (-10° to 45° C) at 10 to 95% relative humidity, noncondensing.

It can be stored at temperatures ranging from -40° to 158° F (-40° to 70° C) at 10 to 95% relative humidity, noncondensing.

Environmental Protection

The Cougar terminal is designed to meet NEMA 4X (IP65) requirements.

Hazardous Areas

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

⚠ WARNING

THE COUGAR TERMINAL IS NOT INTRINSICALLY SAFE. DO NOT USE IN AREAS CLASSIFIED AS HAZARDOUS BY THE NATIONAL ELECTRICAL CODE (NEC) BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES.

Standards Compliance

The following compliance standards apply to the Cougar industrial terminal.

UL and cUL Listing

The Cougar terminal complies with UL 1950.

CE Conformity

The Cougar terminal conforms to the following European Union regulations:

- EN61010 Safety
- 73/23/EU Low Voltage

Weights and Measures Approval (U.S.)

The Cougar terminal meets or exceeds requirements for Class III or IIIL devices. Certificate of Conformance number 88-259 was issued under the National Type Evaluation Program of the National Conference on Weights and Measures for approval.

Weights and Measures Approval (Australia)

The Cougar terminal meets or exceeds requirements for Class III non-automatic weighing instruments as defined in the National Standards Commission, Document 100. The National Standards Commission has approved the Cougar terminal for use with approved and compatible platforms. Certificate number S376.

Conducted and Radiated Emissions (RFI)

The Cougar terminal meets or exceeds FCC docket 80-284 for conducted and radiated emissions requirements as a Class A digital device.

Radio Frequency Interference Susceptibility

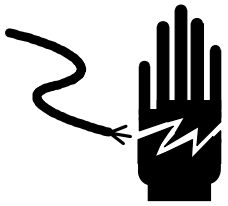
The Cougar terminal meets US, Canadian, and EC requirements for RFI susceptibility as listed in Table 1-2 with a maximum of one display increment of change when calibrated for recommended builds.

RFI Susceptibility			
Radio Frequency Interference	United States	Canadian	EC
	Field Strength	Transmitted Power at Specified Distance	Field Strength
27 MHz	3 volts/meter	4 Watts at 2 meters	N/A
169 MHz	3 volts/meter	N/A	N/A
464 MHz	3 volts/meter	4 Watts at 2 meters	N/A
27-1000 MHz	N/A	N/A	3 volts/meter

Table 1-2: RFI Susceptibility

2 Installation

This chapter gives detailed instructions for installing the Cougar terminal. Please read this chapter thoroughly before you begin installation.



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Environment

If you plan to dispose of the package, please recycle all materials.

Before you install a Cougar terminal, identify the best location for the equipment. When choosing a location, be sure to consider the environmental specifications listed in Chapter 1 of this manual. Scale terminals are designed to operate better and last longer when installed in the proper environment.

Unpacking and Inspection

Please inspect the package when 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 not damaged, remove the Cougar terminal from its protective package, noting how it was packed, and inspect each component for damage. If you need to ship the terminal, it is best to use the original shipping container. The Cougar terminal must be packed correctly to ensure its safe transportation.

The package should include:

- Cougar terminal
- External power supply
- User's guide
- Set of capacity labels

Opening the Enclosure

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

- Insert the tip of a flat-blade screwdriver into one of the two slots (A) located on the bottom of the front panel assembly (see Figure 2-1) and gently push in toward the enclosure. Push in on the side of the slot farthest from the front face of the cover. You should hear a quiet pop when the cover is released.
- Repeat for the other slot.
- After releasing the front panel, lift the bottom of the front panel out until it completely clears the enclosure.
- Squeeze the top of the front panel to the enclosure and raise it to clear the two top clips. The cover will swing down hinged by two wire cables at the bottom.

The openings labeled (B) are for serial I/O cables, the opening labeled (C) is for the power supply, and the opening labeled (D) is for load cell wiring.

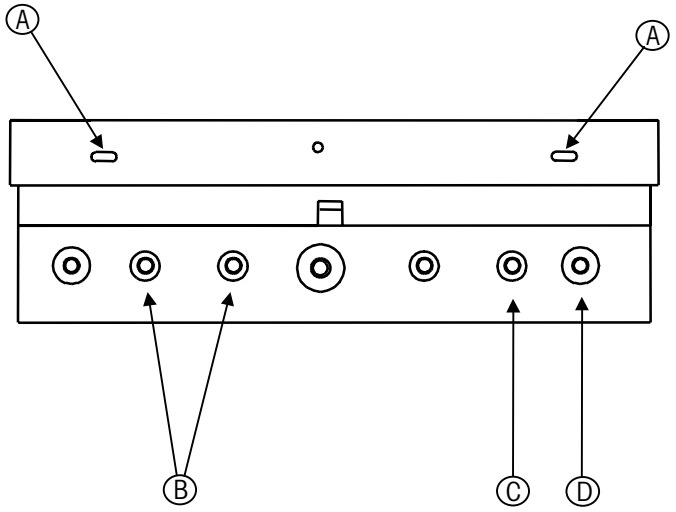


Figure 2-1: Cougar Terminal Access and Connections

To connect the terminal

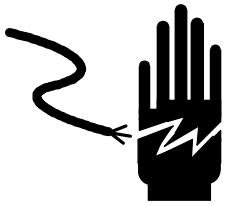
1. Before connecting the wires, pass the cables that enter the enclosure through an appropriately sized cable grip.
2. After resecuring the back cover, tighten the cable grip enough to provide a watertight seal around the cable. This will allow any internal cable slack to be received through the cable grip.
3. Continue to the section entitled Electrical Connections.

Remove Battery Insulator

Before powering up a new Cougar terminal, remove the battery insulator from the PCB. The insulator is a small piece of paper that is placed between the battery and the clip that holds the battery in place. If the insulator is not removed, the terminal will display an **[E14]** error code.

Electrical Connections

Once the Cougar terminal has been opened, you can make the electrical connections.



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Connect the Power Supply Cable

To prevent problems with RFI susceptibility, install the 1-inch ferrite ring (PN 12635700A) when you connect the DC power supply cable:

1. Disconnect the two wires at the end of the power supply cable from the two-position terminal strip.
2. Pass the cable through the cable grip bushing at opening C (see Figure 2-1) on the bottom of the enclosure so that the end with the bare wires is inside the enclosure.
3. Wrap the cable around the ferrite ring two times, as shown in Figure 2-2.

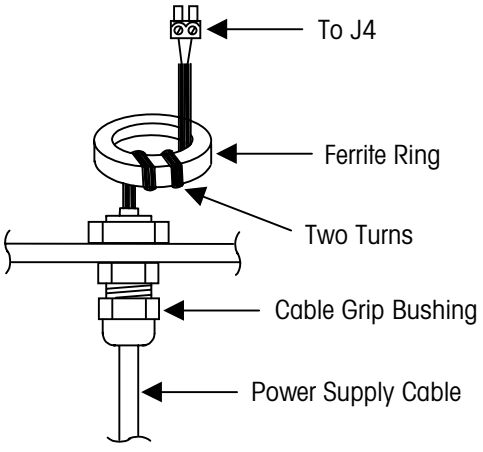


Figure 2-2: Ferrite Ring Installed with Power Supply Cable

4. Reconnect the wires to the two-position terminal strip, connecting the red wire to the (+) terminal and the black wire to the (-) terminal.
5. Plug the terminal strip into the J4 port on the terminal's PCB.
6. Position the ferrite ring as close as possible to the cable grip bushing inside the enclosure.
7. Tighten the cable grip bushing with your fingers to secure the power supply cable.

Connect the POWERCELLs

Connect the POWERCELL load cells to the PCB inside the Cougar terminal. The Cougar terminal is compatible with the DigiTOL POWERCELLs used in vehicle scale Models 7260, 7531, 7541, 7560, and 760 DC. Refer to the weighbridge installation manual for information about weighbridge and home run cable wiring. The POWERCELLs should be wired to the PCB as shown in Table 2-1.

J5 Pin #	Function	Color Code
1	COM A	Yellow
2	COM B	Blue
3	Ground	Green
4	Ground	Brown
5	Ground	Black
6	+24 VDC	White
7	+24 VDC	Red
8	+24 VDC	Orange

Table 2-1: POWERCELL Connector Termination

Serial Port Connections

Printer Port

The Cougar terminal's printer port supplies 20 mA current loop (CL) and RS-232 interfaces for both input and output of serial data in either demand or continuous format output. Only one of the serial ports can be configured for demand mode output. Either or both of the ports can be configured for continuous mode output. Serial data is formatted as either 7 data bits, 1 parity bit, and 1 stop bit or as 8 data bits, no parity bit, and 1 stop bit. A selectable checksum character ensures the integrity of the data transmission.

Both the 20 mA CL and RS-232 interfaces output data simultaneously and can be used at the same time. This enables the terminal to send data to two different devices at the same time.

Serial ASCII command characters for remote CLEAR, TARE, PRINT, and ZERO are accepted into either the 20 mA CL or RS-232 interface. Only one of the interfaces can be used to receive ASCII characters (selected by jumper W2 on the PCB).

Tables 2-2, 2-3, and 2-4 provide printer port interconnect information.

Printer Port	Cougar Signal Description	20 mA CL		RS-232			
		8806	8845	8806, 8807, 8845, 8856, 8857, 8861, 8865	8867	8863	8846
1	TxD RS-232C			3	2	3	2
2	RxD RS-232C						
3	GND/-TxD 20 mA	18	23	7	7	5	5
4	+TxD 20 mA	16	25				
5	+RxD 20 mA	11					
6	-RxD 20 mA	22					
7	+24 VDC						
8	GND						
None	Jumpers	12-23	J101(B-C)	None	None	None	None

Table 2-2: Printer Port Interface Cable Interconnect

Printer Interface Cable Notes:

The jumper shown between pins 12 and 23 must be installed on the 8806 end of the interface cable and remote print pulse input must be enabled in setup Step **[87 1]** for the remote print button on the Model 8806 printer to operate.

The J101 jumper shown for the 8845 document printer is located on the serial interface PCB inside the 8845 printer.

Printer Port	Cougar Signal Description	20 mA CL			RS-232	
		8623 8624	8617 9323 9325	8618	8624	8617 9323 9325
			TB2			TB2
1	TxD RS-232C				3	2
2	RxD RS-232C					
3	GND/-TxD 20 mA	10	9	Input Com	7	3
4	+TxD 20 mA	8	8	20 mA IN+		
5	+RxD 20 mA					
6	-RxD 20 mA					
7*	+24 VDC			+12 VDC		
8*	GND			0 VDC		
None	Jumpers	None	W2: 20 mA	None	None	W2: RS-232

Table 2-3: Printer Port Accessory Interface Cable Interconnect

Accessory Interface Cable Notes:

The W2 jumper shown for the Model 8617 Scoreboard Display, the Model 9323 BCD Converter, and the Model 9325 Analog Output Converter is located on the serial interface PCB inside the accessory.

*Terminals 7 and 8 are available on PCBs A15294400A, B15434900A, and higher.

Printer Port		PC Compatible Computer	
Pin	Description	DB-25-S	DB-9-S
1	TxD RS-232C	3	2
2	RxD RS-232C	2	3
3	Logic Ground	7	5
PC Interface Cable Jumpers		4 5 6 8 20	1 4 6 7 8

Table 2-4: Printer Port Computer Interface Cable Connect

PC Compatible Interface Cable Notes:

The jumpers shown in Table 2-4 are located in the computer end of the interface cable.

ASCII input must be enabled (setup Step **[86 1]**) and jumper W2 on the Cougar terminal's PCB must be OUT (not shorting the pins together) for bidirectional RS-232 communication between the terminal and the computer.

Remote Contact Closure Input

The printer port 20 mA RxD input can be used for remote contact closure input for the function selected in setup Step **[87]**. The contact closure input can be used as a remote PRINT, TARE, or ZERO key if connected to a momentary contact pushbutton. The remote pushbutton can be located up to 1,000 feet from the terminal. Use a shielded, twisted-pair data cable and ground the shield of the cable to the shell of the DB-25 connector on the Cougar terminal end of the cable. Wiring for the remote contact closure input is shown in Figure 2-3.

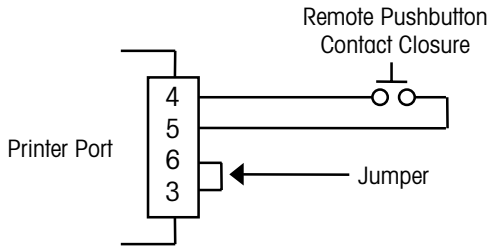


Figure 2-3: 20mA Remote Print Pushbutton

Computer Port

The computer port supplies RS-232 and RS-422/485 interfaces for both input and output of serial data in demand, continuous, or host mode. Serial data is formatted either as 7 data bits, 1 parity bit, and 1 stop bit or as 8 data bits, no parity bit, and 1 stop bit. A selectable checksum character ensures the integrity of the data transmission.

Both the RS-232 and the RS-422 interfaces output demand or continuous data simultaneously and can be used at the same time. This enables the terminal to send data to two different devices at the same time.

Serial ASCII command characters for remote CLEAR, TARE, PRINT, and ZERO are accepted into either the RS-232 or RS-422/485 interface. Only one of the interfaces can be used to receive ASCII characters.

The host mode interface provides advanced computer interfacing capabilities to permit a remote computer to access weight, setpoint, and status information from the Cougar terminal (Standard software only). Control bytes permit remote operation from the computer. Setpoint and tare weight data can be uploaded to the Cougar terminal.

The host mode uses the RS-232 interface for short-distance (50 feet or less) single-scale to computer interfacing applications. The host mode can use the RS-422 interface for long-distance (up to 2,000 feet) single-scale to computer interfacing applications. The host mode can also use the RS-485 interface to connect up to eight Cougar terminals in a multidrop network to a single RS-485 interface of a host computer. Both the single-scale and multidrop host mode interfaces use the same communication protocol. The host mode will operate with only one of the interfaces at a time (either RS-232 or RS-422/485).

Tables 2-5, 2-6, 2-7, and 2-8 provide computer port interconnect information.

Computer Port	Cougar Signal Description	RS-232				RS-422
		8806, 8807, 8845 8856, 8857, 8861, 8865	8867	8863	8846	8861 8865
1	TxD RS-232C	3	2	3	2	
2	RxD RS-232C					
3	Logic GND	7	7	5	5	
4	+TxD RS-422					18
5	-TxD RS-422					19
6	+RxD RS-422					9
7	-RxD RS-422					10

Table 2-5: Computer Port Interconnect When Used with a Printer

Printer Interface Cable Notes:

If XON/XOFF is used with RS-422 communications, then +RxD/-RxD lines must be connected.

Computer Port	Cougar Signal Description	RS-422					RS-232
		8617 9323 9325	9330	8618	9360		8617 9323 9325
					Desk Mount Channels	Wall Mount Terminal Strips	
		TB2	TB2		1 or 3	J20 or J24	TB2
1	TxD RS-232C						2
2	RxD RS-232C						
3	Logic GND						3
4	+TxD RS-422	6	2	RS-485 A+	13	3	
5	-TxD RS-422	7	3	RS-485 B-	24	4	
6	+RxD RS-422				11	1	
7	-RxD RS-422				12	2	
None	Jumpers	W2: RS-485	None	None	None	None	W2: RS-232

Table 2-6: Computer Port Accessory Interface Cable Connect

Accessory Interface Cable Notes:

The W2 jumper shown for the Model 8617 Scoreboard Display, the Model 9323 BCD Converter, and the Model 9325 Analog Output Converter is located on the serial interface PCB inside the accessory.

Recommended computer port connection to the 9360 is by RS-422. Channels 1 and 3 on the 9360 supply RS-422.

Computer Port		PC Compatible Computer	
Pin	**Description**	**DB-25-S**	**DB-9-S**
1	TxD RS-232C	3	2
2	RxD RS-232C	2	3
3	Logic GND	7	5
PC Interface Cable Jumpers		4 — 5 6 — 8 — 20	1 — 4 — 6 7 — 8

Table 2-7: Computer Port Computer Interface Cable Interconnect

PC Compatible Interface Cable Notes:

The jumpers shown in Table 2-7 are located in the computer end of the interface cable.

ASCII input must be enabled (setup Step **[86 1]**) for bidirectional communication between the Cougar terminal and the computer.

Computer Port	Cougar Signal Description	Host Computer	
		RS-422 Single Drop	**RS-485 Multidrop**
1	TxD RS-232C		
2	RxD RS-232C		
3	Logic GND		
4	+TxD RS-422	+RxD	
5	-TxD RS-422	-RxD	
6	+RxD RS-422	+TxD	COM B (+)
7	-RxD RS-422	-TxD	COM A (-)
Computer Port Jumpers		None	10 — 12 11 — 13

Table 2-8: Computer Port RS-422 and RS-485 Host Mode Interconnect

Host Interface Cable Notes:

The jumpers shown in Table 2-8 are located in the computer end of the interface cable.

Single-drop RS-422 or multidrop RS-485 mode is selected in setup Step **[57]**.

Capacity and Increment Size

Table 2-9 lists the increment sizes and capacities available for the Cougar terminal.

Increment Size	Capacity	
	Minimum	Maximum
0.00005	--	3
0.0001	--	6
0.0002	--	12
0.0005	--	30
0.001	1	60
0.002	2	120
0.005	5	300
0.01	10	600
0.02	20	1,200
0.05	50	3,000
0.1	100	6,000
0.2	200	12,000
0.5	500	30,000
1	1,000	60,000
2	2,000	120,000
5	5,000	300,000
10	10,000	600,000
20	20,000	999,980
50	50,000	999,950
100	100,000	999,900

Table 2-9: Increment Sizes and Capacities

Powerup Sequence

The Cougar terminal executes a series of self tests when it is turned on. These tests confirm that the terminal is operating properly. The powerup sequence is as follows:

1. The software part number is displayed briefly.
2. The revision level number of the software is displayed briefly.
3. All segments of the seven display digits are lit briefly.
4. All cursors are lit briefly.
5. All decimal points are lit briefly.

The terminal may display **[E E E]** or **[-E E E]** while attempting to capture zero. Once zero has been captured, the terminal will display weight. If autozero capture and tare interlock are disabled, the terminal will display the current weight without attempting to capture zero. If Auto Zero Maintenance (AZM) is enabled, zero must always be captured before the terminal will print demand mode data or before lb/kg switching.

New Scale Installation

The steps for installing a new vehicle scale are listed below:

1. Install the DigiTOL weighbridge according to the installation manual supplied with the weighbridge.
2. Once the weighbridge has been installed and connected to the Cougar terminal, configure the terminal according to the recommended parameters in the quick setup reference chart in Chapter 3. Refer to the indicator setup section of the weighbridge installation manual for the correct scale capacity, increment size, and number of POWERCELLs.
3. Perform the POWERCELL addressing procedure in setup Step **[04]**. If problems occur during addressing, refer to the troubleshooting information in Chapter 4 of this manual.
4. Once the load cells have been successfully addressed, let the terminal warm up for 30 minutes and use setup Step **[99]** to record the raw count output of each POWERCELL. Refer to the indicator setup section of the weighbridge installation manual for maximum raw count deviation and final shimming instructions if necessary. After final shimming is completed, record the POWERCELL raw count output readings and save that information for future use.
5. Perform the sectional pair shift adjust procedure described in setup Step **[18].** Use either a weight cart or the rear axles of your test truck.
6. Immediately after you have completed the shift adjust but before you exit the setup mode, perform the calibration procedure, Step **[19]**. Use the same weight used for shift adjust.

   For first-time installations, Steps **[18]** and **[19]** must be performed in order without leaving the setup mode. Do not perform the calibration procedure, Step **[19]**, unless the shift adjust procedure, Step **[18]**, has been successfully performed at least once. Once the shift adjust and scale calibration have been performed successfully for the first time, the shift adjust and scale calibration steps can be accessed independently without causing a problem. Do not perform zero or span adjust, Steps **[21]** and **[22]**, until the calibration procedure has been successfully performed at least once.
7. After the shift adjust and calibration procedures have been performed, exit the setup mode and check the scale's weighing performance. For some installations, you might need to shift adjust individual load cells to eliminate side-to-side errors.

   If individual load cells need to be shift adjusted, select individual cell adjust in setup Step **[02 1]** and repeat the shift adjust procedure, Step **[18]**. A weight cart or large forklift truck that can concentrate the weight directly over the load cell that is being adjusted will be much more effective during shift adjustment than the rear axle of a test truck.

   If Step **[18]** does not reduce shift errors to within required limits, use the manual shift adjust procedure, Step **[96]**, to bring the shift errors within tolerance.

8. Once scale calibration has been completed, record and save the calibration data from Step **[97]**. If the Cougar terminal's PCB is replaced, the calibration data saved from Step **[97]** of the old PCB can be entered into the new PCB at Step **[97]** so that the scale will not need to be calibrated again.
9. Once the terminal has been configured and calibrated, it is important to record the raw count output of the load cells in Step **[99]** and either record or print out the calibration parameters. Save the raw count outputs and calibration information for future use.
10. When setup has been completed, remove the shorting block from the W1 CAL jumper. Place the shorting block back onto one of the two pins of jumper W1.

PCB Jumpers and Connectors

Refer to Figure 2-3 for the locations of the jumpers and connectors on the terminal's PCB. For normal operation, jumpers W1, W2, and W3 should be OUT (not shorted). The default setting for jumper W4 is IN (shorted).

Main Logic PCB Jumpers

W1 - Calibration Jumper

IN = Setup Mode
OUT = Normal Operation

W2 - Receive Data Jumper

IN = 20 mA Current Loop RxD
OUT = RS-232 RxD

W3 - DP/Comma Jumper

IN = Comma for Decimal Point
OUT = Period for Decimal Point

W4 - POWERCELL Network Termination Jumper

IN = COM A and COM B Terminated
OUT = COM A and COM B Not Terminated

Main Logic PCB Connectors

J1 - Keyboard Pigtail Connection

J2 - Printer Port

J3 - Computer Port

J4 - Power Connection

J5 - POWERCELL Connection

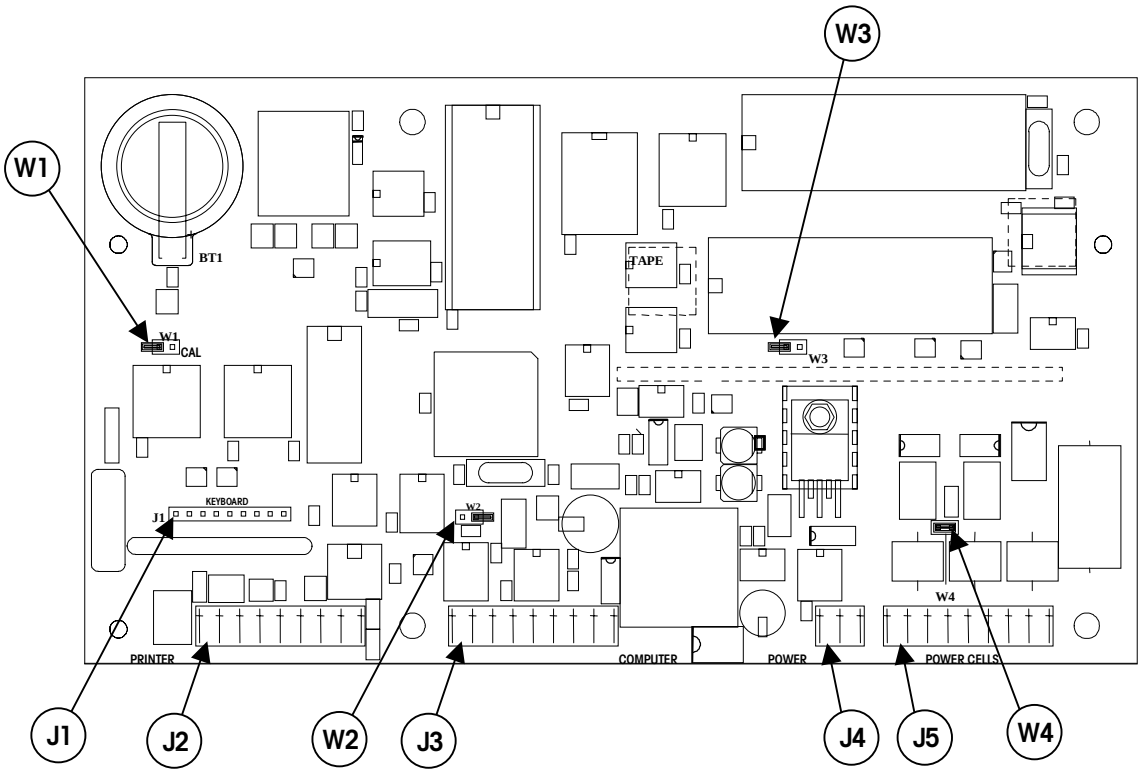


Figure 2-4: Cougar Main Logic PCB

3 Programming and Calibration

This chapter discusses how to program a Cougar VS terminal so that it has the specific operating features that you want.

Keystroke Functions

Throughout this manual we distinguish between key names and commands. Key names such as ENTER are printed in capital letters, and commands such as "select" are printed in lower case. For example:

"Press SELECT..." means to press the SELECT key on the key pad.

"Select an option..." means to use the SELECT key to display an item, then press ENTER.

While in the setup mode, the keyboard is redefined as follows:

Numeric keys (0 to 9) are used to enter data.

1 -- Press the **1** key to access a sequence or to select (Yes).

0 -- Press the **0** key to select (No) or to skip a step. The **0** key is also used to display the next selection when a menu of choices is presented.

CLEAR clears the current entry and allows you to reenter data.

ENTER accepts the displayed selection and advances to the next setup step.

PRINT is used in Step **[97]** to print the calibration parameters.

ZERO accepts the current entry and backs up to the previous setup step.

Enter Setup Mode

Setup mode is used for programming the terminal:

- Disconnect the terminal from its AC power source before entering setup mode.
- Place the W1 jumper (marked CAL) to the IN position (shorting the two pins together) on the PCB. See Figure 2-3 for the jumper location.
- Apply AC power to the terminal. The display will show a series of powerup tests, the software part number, and the software revision level. When those are completed, double dashes **[--]** are displayed to indicate that the terminal is in the setup mode.
- Do not remove the W1 (CAL) jumper or disconnect power from the terminal while it is in setup mode unless the double dashes **[--]** are displayed. If the setup mode is exited incorrectly, the terminal might display an **[E3]** error code.

For new installations, the terminal may display an **[E14]** error code when first powered up. If this happens, make sure the battery insulator has been removed from the battery. Then press ENTER or CLEAR to clear the error code, and then press ZERO to return to the double dashes **[--]**. See Chapter 4 for information about clearing error codes.

Cougar Setup Quick Reference Chart

Recommended default selections are shown in ***Bold Italics***.

00 SCALE CONFIGURATION GROUP

01	Load Cell Type	***1 = POWERCELL***
02	Shift Adjust Mode	0 = Individual DLC ***1 = Sectional Pair***
03	Number of POWERCELLs	
04	Address POWERCELLs	

10 CALIBRATION GROUP

11	Weight Units	0 = Kilograms ***1 = Pounds*** 2 = Tons
13	Autorange	***1 = Single-Range Mode*** 2 = Double-Range Mode 3 = Triple-Range Mode
14	Scale Capacity	
15	High-Range Increment Size	
16	Middle-Range Increment Size	
17	Low-Range Increment Size	
18	Automatic Shift Adjust	
19	Calibration	

20 ZERO MAINTENANCE AND FILTERING GROUP

21	Zero Adjustment	
22	Span Adjustment	
23	AZM Range	0 = Disable AZM 1 = Within ± 0.5 Increment 2 = Within ± 1 Increment ***3 = Within ± 3 Increments***
24	Powerup Zero Capture	0 = Disable Zero Capture 1 = ± 2% of Capacity ***2 = ± 10% of Capacity***
25	Pushbutton Zero Range	0 = Disable Pushbutton Zero 1 = ± 2% of Capacity ***2 = ± 20% of Capacity***
26	Motion Detection	0 = Disable Motion Detection 1 = ± 0.5 Increment 2 = ± 1 Increment 3 = ± 2 Increments ***4 = ± 3 Increments***
27	Display Filtering	0 = Disable Filtering 1 = Light Filtering 2 = Light-Medium Filtering 3 = Medium Filtering ***4 = Medium-Heavy Filtering*** 5 = Heavy Filtering
28	Overcapacity Blanking	***Blank at Capacity + 5 Increments***
29	Accumulator Mode	0 = Accumulator Disabled ***1 = Accumulate Net Weight*** 2 = Accumulate Gross Weight

30 TARE AND DISPLAY GROUP

31	Tare Mode	0 = Disable Tare 1 = Pushbutton Tare Only ***2 = Pushbutton and Keyboard Tare***
32	Tare Interlock	***0 = Disable Tare Interlock*** 1 = Enable Tare Interlock
33	Manual Tare	***0 = Manual Tare All Ranges*** 1 = Low Range Only
34	Autoclear Tare	***0 = Disable Autoclear Tare*** 1 = Enable Autoclear Tare
35	Gross/Net Switching	0 = Disable Gross/Net Key ***1 = Enable Gross/Net Key***
36	Function Key	0 = Disable Function Key ***1 = Enable All Except Setpoints*** 2 = Enable All Functions
37	Stored Tare Memory	0 = Disable Memory ***1 = Enable Memory***
38	Conversion Factor	
39	Conversion Factor Description	

40 PRINTER PORT GROUP

41 Output Data Format	0 = Continuous Output ***1 = Demand Output***
42 Baud Rate	***9600***
43 Parity Bit	0 = No Parity 1 = Odd Parity ***2 = Even Parity*** 3 = Parity Always 0
44 Checksum	***0 = Disable Checksum*** 1 = Enable Checksum
45 Stop Bits	***1 = 1 Stop Bit*** 2 = 2 Stop Bits
46 Alphanumeric Field 1	
47 Alphanumeric Field 2	
48 Alphanumeric Field 3	
49 Alphanumeric Field 4	

50 COMPUTER PORT GROUP

51 Output Data Format	***0 = Continuous Output*** 1 = Demand Output
52 Baud Rate	***4800***
53 Parity Bit	0 = No Parity 1 = Odd Parity ***2 = Even Parity*** 3 = Parity Always 0
54 Checksum	***0 = Disable Checksum*** 1 = Enable Checksum
55 Stop Bits	***1 = 1 Stop Bit*** 2 = 2 Stop Bits

60 DEMAND MODE OUTPUT GROUP

61 Autoclear Tare after Print	0 = Disable Autoclear ***1 = Enable Autoclear***
62 Interlock/Autoprint	***0 = Demand Print*** 1 = Print Interlock 2 = Autoprint
63 Minimum Print	***0 = No Minimum*** 1 = 10 Increments 2 = 100 Increments 3 = 500 Increments 4 = 21 Increments 5 = 41 Increments
64 Net Sign Correction	0 = Disable Correction ***1 = Enable Correction***
65 Enable STX	0 = Disable STX ***1 = Enable STX***
66 Function-9	0 = Basic Setup Parameters ***1 = Expanded Setup Parameters***
68 Weight Units	0 = No Weight Unit Printed 1 = Print Weight Unit ***2 = Print Weight Unit and Conversion***
69 Time Delay	
71 Clear ID after Print	0 = Disable ID Autoclear ***1 = Enable ID Autoclear***
72 Consecutive Numbering	0 = Normal Consecutive Numbering ***1 = Increment Consecutive Numbering***
73 Time/Date Format	0 = MM DD YY HH:MM 1 = MM DD YY HH:MM 2 = DD.MM.YY HH:MM 3 = YY MM DD HH:MM ***4 = MM DD YY HH:MM AM/PM*** 5 = DD.MM.YY HH:MM 6 = YY MM DD HH:MM
74 Quick Print Format	0 = Disable Quick Print ***1 = Enable Quick Print***
75 Line Feeds after Quick Print	
76 Inbound Ticket Format	
77 Line Feeds after Inbound Ticket	
78 Outbound Ticket Format	
79 Line Feeds after Outbound Ticket	

80 INTERNATIONAL GROUP

82 lb/kg Switching
0 = Disable lb/kg Switching
1 = Enable lb/kg Switching

83 Powerup Weight Units
0 = Powerup in kg
1 = Powerup in lb

84 Bracketed Weight Print
0 = Disable Bracketed Weight
1 = Enable Bracketed Weight

85 Manual Tare Legend
0 = No Weight Entry Designator
1 = Print PT after Manual Tare
2 = Print H after Manual Tare

86 Remote ASCII Input
0 = Disable ASCII Input
1 = Enable ASCII Input

87 Contact Closure Input
0 = Disable Contact Closure Input
1 = Enable PRINT Key
2 = Enable ZERO Key
3 = Enable TARE Key
4 = Enable CLEAR Key
5 = Enable Blank Display
6 = Enable Lock Keyboard

88 Net Zero Cursor
0 = Gross Zero Only
1 = Gross and Net Zero

89 Permanently Stored Tare
0 = Disable Permanent Tare
1 = Enable Permanent Tare

89A Permanently Stored Inbound Weight
0 = Disable Permanent Inbound
1 = Enable Permanent Inbound

90 LOAD CELL REPLACEMENT GROUP

91 Manual Load Cell Addressing
92 Replacing a POWERCELL
93 Shift Adjust Individual Cell or Sectional Pair
94 Temporarily Reset Shift Constants
95 Expanded Display
0 = Normal Weight
1 = Display Minor Increments

96 Manual Shift Adjust
0 = Disable Manual Shift Adjust
1 = Enable Manual Shift Adjust

97 Shortcut Calibration
0 = Bypass Shortcut Calibration
1 = Access Shortcut Calibration

97A Display Span Value
97B Display Zero Value
98 Load Default Parameters
0 = Skip Default Parameters
1 = Load Default Parameters

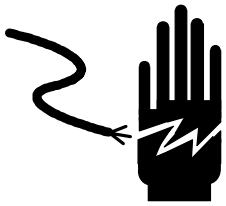
99 Display Raw Count Output of Individual Load Cells

00 Scale Configuration Group

The **[00]** Scale Configuration group allows you to configure and address the load cells that will be used with the Cougar terminal. To access this group, enter 00 at the **[--]** prompt. Steps **[01]** to **[04]** will be prompted in sequence and cannot be selected individually.

01 Load Cell

Note: Shift adjust must be set to sectional pairs when 16 or more POWERCELLs are used.



⚠ WARNING

PERMIT ONLY 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.

This step must be set to 1 to configure the Cougar terminal for use with POWERCELLs.

1. At the **[01 1]** prompt, press ENTER when option 1 is displayed. Options 0 and 2 are not used (the scale will not function if option 0 or 2 is selected).

02 Shift Adjust Mode

POWERCELLs can be shift adjusted individually or in sectional pairs. Individual shift adjusting is used in installations that have excessive side-to-side shift errors. Shift adjusting in sectional pairs is faster and simpler than shift adjusting individually.

1. At the **[02 1]** prompt, press ENTER to accept the displayed selection or enter one of the following shift adjust options:

   0 = Individual POWERCELL shift adjust.

   1 = Sectional pair shift adjust.

03 Number of POWERCELLs

Enter the total number of POWERCELLs (up to 24) used in the weighbridge. If individual POWERCELL shift adjust was selected in Step **[02]**, only numbers from 1 to 16 can be entered. If sectional pair was selected, only even numbers from 2 to 24 can be entered.

1. At the **[03 *]** prompt, press ENTER to accept the displayed selection or enter the number of POWERCELLs to be addressed.

04 POWERCELL Address

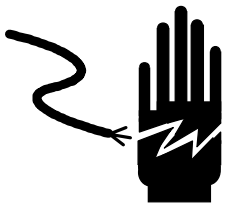
To use a POWERCELL in a scale base, you must program a unique address into the POWERCELL. New load cells are shipped from the factory with a default address of 240. Step **[04]** automatically prompts you through the addressing procedure for all of the load cells in the scale base. Automatic POWERCELL addressing is normally begun with all POWERCELLs disconnected. Refer to the indicator setup section of the weighbridge installation manual for the correct location of POWERCELL addresses in the weighbridge.

1. At the **[04]** prompt, press 0 to skip POWERCELL addressing and return to the **[--]** prompt or press 1 to proceed with addressing.
2. Before addressing POWERCELLs, power down the Cougar terminal and make sure that all POWERCELLs are disconnected from the scale base. Place the W1 jumper on the Cougar PCB to the IN position (shorting the two pins together), then apply power to the terminal. Return to the **[04]** setup prompt and enter 1 to access POWERCELL addressing. After showing **[04 1]** briefly, the display will change to the **[Add 1]** prompt. At this point, connect load cell #1 to the scale and press ENTER.
3. The Cougar terminal then displays **[LC 1]** while load cell #1 is being addressed. Once the load cell has been successfully addressed, the display will change to the **[Add 2]** prompt. Connect load cell #2 and press ENTER. Repeat this procedure for each load cell that needs to be addressed.

If the terminal is unable to communicate with a load cell during the addressing procedure, it will display an **[E8 XX]** error code (XX = the load cell that was not addressed). Press the CLEAR key to clear the error code and reset the terminal to the **[--]** display. See Chapter 4 for troubleshooting information.

Once the load cell communication problem has been corrected, power down the terminal and connect all load cells that have already been successfully addressed. Enter the setup mode and restart step **[04]**. The terminal will check for correctly addressed load cells. When a missing load cell address is detected, the display will show **[04 XX]** briefly then change to **[Add XX]** to prompt you to connect load cell XX and continue the addressing procedure. Repeat the procedure until all cells have been addressed.

10 Calibration Group



⚠ WARNING

PERMIT ONLY 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 **[10]** Calibration group allows you to calibrate the Cougar terminal. To access this group, enter 10 at the **[--]** prompt. Steps **[11]** to **[19]** will be prompted in sequence. Only Steps **[18]** and **[19]** can be selected individually.

11 Weight Units

Select the weight units that will be used for calibration and normal operation of the Cougar terminal.

1. At the **[11 1]** prompt, press ENTER to accept the displayed selection or enter the desired weight units:

   0 = Kilograms (kg).

   1 = Pounds (lb).

   2 = Tons.

13 Autorange Selection

You can program the Cougar terminal for one, two, or three different increment sizes. Refer to Appendix 5 in Chapter 6 for a description of Autorange operation.

1. At the **[13 1]** prompt, press ENTER to accept the displayed selection or enter the desired number of increment ranges:

   1 = Single-range operation.

   2 = Double-range operation.

   3 = Triple-range operation.

14 Scale Capacity

Enter the total capacity of the scale in the weight units selected in Step **[11]**.

1. After **[14]** is displayed briefly, the current scale capacity is shown. Press ENTER to accept the displayed selection or use the numeric keys to enter a new scale capacity. If an error is made during entry, press CLEAR to clear the display. When the desired capacity is displayed, press ENTER. To verify the capacity, refer to the weighbridge's data plate and the indicator setup section of the weighbridge installation manual.

15 High-Range Increment Size

Note: The standard increment size for vehicle scales is 20 lb, 10 kg, or 0.01 ton. If Autorange is being used with a combination rail/truck scale, select a high-range increment size of 50 lb, 20 kg, or 0.02 ton.

If you selected single-range operation in Step **[13]**, enter the increment size here, then continue to Step **[18]**. If you selected double-range or triple-range operation, enter the high-range increment size here. For double-range operation, continue to Step **[17]**. For triple-range operation, continue to Step **[16]**.

1. **[15]** is displayed briefly, then the current increment size. Press ENTER to accept the displayed size or press 0 until the desired decimal point location is shown.
2. Once the correct decimal point location is shown, enter the desired increment size:

   1 = An increment size of 1 after the decimal point has been positioned.

   2 = An increment size of 2 after the decimal point has been positioned.

   5 = An increment size of 5 after the decimal point has been positioned.

16 Middle-Range Increment Size

If you selected triple-range operation in Step **[13]**, enter the middle-range increment size.

1. **[16]** is displayed briefly, then the current increment size. Press ENTER to accept the displayed size or press 0 until the desired decimal point location is shown.
2. Once the correct decimal point location is shown, enter the desired increment size:

   1 = An increment size of 1 after the decimal point has been positioned.

   2 = An increment size of 2 after the decimal point has been positioned.

   5 = An increment size of 5 after the decimal point has been positioned.

17 Low-Range Increment Size

If you selected double-range or triple-range operation in Step **[13]**, enter the low-range increment size.

1. After **[17]** is displayed briefly, the current increment size is shown. Press ENTER to accept the displayed selection or press 0 until the desired decimal point location is shown.
2. Once the correct decimal point location is shown, enter the desired increment size:

   1 = An increment size of 1 after the decimal point has been positioned.

   2 = An increment size of 2 after the decimal point has been positioned.

   5 = An increment size of 5 after the decimal point has been positioned.

18 Automatic Shift Adjustment

Shift adjustment is used to compensate for differences in weight readings when a load is applied at different positions on the scale platform. For new installations, drive the test truck across the weighbridge three to five times in both directions to seat the POWERCELLs and receivers before performing a shift adjustment.

If the Cougar terminal is not in setup mode, disconnect the terminal from its AC power source. Set the W1 CAL jumper on the PCB to the IN position (shorting the two pins together), then reapply power to the terminal. At the **[--]** prompt, enter 18.

1. At the **[18]** prompt, press 0 to skip shift adjustment or press 1 to proceed with shift adjustment.
2. At the **[E SCL]** prompt, remove all weight from the scale platform, then press ENTER. The display will count down from **[16 CAL]** to **[01 CAL]** as the zero reading is recorded.
3. The display will show **[CELL 01]** if individual POWERCELL was selected or **[SEC 01]** if sectional pair was selected in Step **[02]**. Center the test cart or rear axle of the test truck over Cell 1 or Section 1. Make sure the test cart or truck axle is centered from side to side over the section. After the truck comes to a complete stop, release the brakes. If the truck rolls, put it in gear and shut off the engine instead of holding it in position with the brakes. Wait 15 seconds after the truck stops moving to let the

weighbridge settle, then press ENTER. The display will count down from **[16 CAL]** to **[0 CAL]** as the weight reading for Cell 1 or Section 1 is recorded.

4. Repeat this procedure for each load cell until all cells have been shift adjusted. To go back to the previous load cell or section, press ZERO.

For some installations, you might need to shift adjust an individual load cell to eliminate side-to-side errors. Select individual POWERCELL shift adjust in setup Step **[02 0]** and repeat the shift adjust procedure described in Step **[18]**. When the display prompts for **[CELL XX]**, place the test cart directly over the POWERCELL specified. A weight cart or large fork lift truck that can concentrate weight directly over the load cell being adjusted will be more effective during shift adjustment than the rear axle of a test truck. If Step **[18]** is unable to reduce shift errors to within required limits, use the manual shift adjust procedure described in Step **[96]** to correct the problem. Shift adjustment problems are usually caused by a mechanical bind in the weighbridge, an incorrectly shimmed weighbridge, or the test weight not being concentrated over the POWERCELL or section during shift adjustment.

19 Calibration

Note: For new installations, full calibration must be performed immediately after the scale is shift adjusted for the first time. Do not exit setup mode or power down the terminal without first performing a full calibration or else the shift adjust data calculated in Step **[18]** will be lost and an error code will be displayed. After a full calibration has been performed once, it does not have to be done again each time the scale is shift adjusted.

Full calibration is used to set the scale's initial zero reference and its span. Full calibration can be performed with either a known vehicle weight or certified test weights. If a vehicle weight is used, then a span adjustment with certified test weights, Step **[22]**, should be made after calibration to ensure that the scale is calibrated accurately.

If the Cougar terminal in not in setup mode, disconnect the terminal from its AC power source. Set the W1 CAL jumper on the PCB to the IN position (shorting the two pins together), then reapply power to the terminal. When the display shows **[--]**, press 19.

1. At the **[19]** prompt, press 0 to skip calibration and return to the **[--]** prompt or press 1 to proceed with calibration.
2. At the **[E SCL]** prompt, remove all weight from the scale platform, then press ENTER. The display will count down from **[16 CAL]** to **[01 CAL]** as the zero reading is recorded.
3. At the **[Add Ld]** prompt, add test weight to the scale platform, then press ENTER.
4. Use the keyboard to enter the amount of weight that was placed on the scale platform, then press ENTER. The weight value entered must agree with the increment size used by the scale. The display will count down from **[16 CAL]** to **[01 CAL]** as the span is recorded. If necessary, the Cougar will calculate new T1 and T0 parameters and transmit them to the load cell during the countdown.
5. If new parameters were sent to the load cell, the calibration sequence returns to the **[E SCL]** prompt. Remove test weights from the scale platform and press ENTER. The display will count down from **[16 CAL]** to **[01 CAL]**. If no new parameters were sent, continue to the next step.
6. When calibration is done, the display will read **[CAL d]** for a few seconds and then return to the **[--]** prompt.

20 Zero Maintenance and Filtering Group

Note: Do not power down the terminal to access Steps **[21]** and **[22]**. The terminal must be on and displaying weight when you put the jumper on.

To access the **[20]** Zero Maintenance and Filtering group, enter 20 at the **[--]** prompt. If parameter **[20]** is selected, Steps **[21]** to **[29]** will be prompted in sequence. To access Steps **[21]** and **[22]**, the terminal must first be calibrated and displaying weight. Steps **[23]** to **[29]** can be selected individually.

21 Zero Adjustment

The zero value is used to indicate that the scale platform is empty. The zero adjustment lets you reestablish this value to compensate for any changes since the last calibration. The scale must be empty before resetting the zero value.

1. At the **[21 *]** prompt, press 0 to skip zero adjustment or press 1 to record the current weight as the new zero reference.

22 Span Adjustment

Note: For x2 and x5 display increments, the value entered must be divisible by 2 or 5 respectively.

This step adjusts the span reference recorded in Step **[19]**. Place a known test weight on the scale platform before entering the setup mode.

1. At the **[22 *]** prompt, press 0 to skip span adjustment and continue to the next step or press 1 to proceed with span adjustment.
2. At the **[0.0]** prompt, enter the value of the weight on the scale, then press ENTER. The span adjustment value must agree with the increment size of the scale.

23 Auto Zero Maintenance

Auto zero maintenance (AZM) automatically readjusts the scale to zero to compensate for temperature changes or buildup of material on the platform. Step **[23]** selects the range of weight above and below zero within which AZM operates. AZM will adjust for zero changes at the rate of 0.5 increment per second when the weight is within the AZM range. AZM will operate up to a total weight equal to the pushbutton zero range selected in Step **[25]**, ± 2% or ± 20% of scale capacity.

1. At the **[23 3]** prompt, enter one of the following options for the AZM range:

   0 = AZM disabled (not for legal-for trade applications).

   1 = ± 0.5 increment (legal-for-trade: animal, food, and retail scales).

   2 = ± 1 increment (legal-for-trade: all other industrial scales).

   3 = ± 3 increments (legal-for-trade: vehicle scales).

24 Auto Zero Capture at Powerup

Note: US and Canadian legal-for-trade applications limit zero capture at powerup to ± 2%.

If this step is enabled, the Cougar terminal will attempt to capture zero at powerup. The display will flash **[E E E]** or **[-E E E]** if the terminal is unable to capture zero because the weight is over or under the limit.

1. At the **[24 2]** prompt, enter one of the following options for capturing zero at powerup:

   0 = Disable auto zero capture at powerup.

   1 = Enable auto zero capture, limited to ± 2% of scale capacity.

   2 = Enable auto zero capture, limited to ± 10% of scale capacity.

25 Pushbutton Zero Range

Note: Canadian legal-for-trade applications are limited to ± 2% pushbutton zero operation.

Pushbutton zero manually recaptures zero to compensate for material buildup on the scale. To recapture zero, the scale must be in gross weighing mode and not in motion.

1. At the **[25 2]** prompt, enter one of the following options for pushbutton zero range:

   0 = Disable pushbutton zero capture.

   1 = Enable pushbutton zero capture, limited to ± 2% of scale capacity.

   2 = Enable pushbutton zero capture, limited to ± 20% of scale capacity.

26 Motion Detection

Note: Setting motion detection at 0.0 will disable expanded zero capture.

The Cougar terminal includes a stability detector (weight in motion) that requires three successive weight readings within the motion detect window for a "no motion" signal. Zero, tare, and demand mode printing are prevented when the scale is in motion.

1. At the **[26 4]** prompt, enter one of the following options for motion detection:

   0 = Disable motion detection (not legal-for-trade).

   1 = Enable motion detection for weight change greater than ± 0.5 increment.

   2 = Enable motion detection for weight change greater than ± 1 increment.

   3 = Enable motion detection for weight change greater than ± 2 increments.

   4 = Enable motion detection for weight change greater than ± 3 increments.

27 Display Filtering Rate

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

1. At the **[27 4]** prompt, enter the desired filtering setting. Valid settings range from 0 (no filtering) to 5 (heavy filtering). Filtering should be disabled for setpoint and filling applications that require a fast response to weight change.

28 Overcapacity Blanking

The Cougar terminal can be set so that the display goes blank when the weight on the scale platform exceeds a certain weight.

1. After **[28]** is displayed briefly, the current overcapacity blanking weight is shown. Press ENTER to accept the displayed selection or enter a new weight at which the display should blank. Legal-for-trade applications must not exceed 105% of scale capacity. The default selection is capacity plus five increments.

29 Accumulator Mode

Note: To permit accumulation, the FUNCTION key must be enabled in setup Step **[36 1]** or **[36 2]** and print interlock or autoprint must be enabled in setup Step **[62 1]** or **[62 2]**. Units switching should be disabled in setup Step **[82 0]** when accumulation is used.

The scale accumulator adds the selected weight data to the 11-digit accumulator and increments the number of loads consecutive numbering counter when an outbound ticket is printed (if Step **[72]** is enabled, data is accumulated when a Quick Print ticket is printed).

1. At the **[29 1]** prompt, enter one of the following accumulator options:

   0 = Disable accumulator.

   1 = Accumulate net weight only.

   2 = Accumulate gross weight only.

30 Tare and Display Group

The **[30]** Tare and Display group allows you to configure the scale's tare and display operations. To access this group, enter 30 at the **[--]** prompt. If parameter **[30]** is selected, Steps **[31]** to **[39]** will be prompted in sequence. The steps can also be selected individually.

31 Tare Mode

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

1. At the **[31 2]** prompt, select one of the following options for tare operation:

   0 = Disable tare.

   1 = Enable pushbutton tare only.

   2 = Enable both pushbutton tare and keyboard tare.

32 Tare Interlock

Tare interlocks meet legal-for-trade requirements by placing the following restrictions on how tares can be entered or cleared: tare weights can be cleared only at gross zero, tare can be entered only when the scale is in the gross mode, keyboard tare can be entered only at gross zero, previous tare values must be cleared before a new tare value can be entered, multiple or chain tares are inhibited. Tare interlocks should be disabled for setpoint or filling applications.

1. At the **[32 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

0 = Disable tare interlocks.

1 = Enable tare interlocks.

33 Manual Tare Range

Step **[33]** lets you enable or disable manual (keyboard) tare entry in all weight ranges or in the low range only (when more than one range is selected in Step **[13]**).

1. At the **[33 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Allow manual (keyboard) tare up to total (high-range) scale capacity.

   1 = Limit manual tare to the low-weight range.

34 Autoclear Tare

Autoclear tare allows the Cougar terminal to clear tare automatically when the scale returns to the center of zero (within ± 0.25 increments).

1. At the **[34 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable autoclear tare.

   1 = Enable autoclear tare.

35 Gross/Net Switching

Note: The GROSS/NET key is disabled if Autorange is selected in setup Step **[13 2]** or **[13 3]**.

Gross/net switching allows you to display the gross weight on the scale without losing the current tare weight. Pressing the GROSS/NET key during operation will toggle the display between the gross and net weight.

1. At the **[35 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable gross/net switching.

   1 = Enable gross/net switching.

36 Function Key

The FUNCTION key is used during normal operation to access time, date, consecutive numbering, and setpoints.

1. At the **[36 1]** prompt, select one of the following options for the FUNCTION key:

   0 = Disable FUNCTION key.

   1 = Enable FUNCTION key for all functions except setpoints.

   2 = Enable FUNCTION key for all functions.

37 Stored Tare Memory

Step **[37]** enables the MEMORY key. The MEMORY key can be used to modify permanent stored tare weight records and for accumulation by ID number.

1. At the **[37 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable the MEMORY key.

   1 = Enable the MEMORY key.

38 Weight Conversion Factor

Step **[38]** allows you to view and edit the weight conversion factor. This factor is used to convert the scale for units such as bushels of wheat or corn, yards of concrete, etc. The converted value is equal to the weight reading times the conversion factor.

1. After **[38]** is displayed briefly, the current conversion factor is displayed. If there is no existing factor, the display will show **[1.000000]**. Press ENTER to accept the displayed conversion factor or press CLEAR to edit the conversion factor.
2. If you pressed CLEAR, the display will show **[-------.-]**. Press 0 to shift the decimal point one position to the left until it is in the desired location. Then press 1 to accept the decimal point location that is shown.
3. At the **[.]** prompt, use the numeric keys to enter the desired conversion factor value (up to seven digits). Press ENTER when finished.
4. At the **[X]** prompt, enter the desired number of digits (from 1 to 6) that are to be printed to the right of the decimal point for the converted value.

   For higher capacity scales, you should limit the number of decimal places to be printed. A maximum of seven digits can be printed, including the digits to the right of the decimal point. So, for example, if you program the terminal to print three digits to the right of the decimal point, a weight of 14678.5 will be printed on the ticket as 4678.500.

39 Conversion Factor Description

If you entered a weight conversion factor in Step **[38]**, enter a description of the conversion unit here. The description of the conversion factor can contain up to 12 ASCII coded characters selected from Table 3-1. It can be printed on any demand format tickets.

1. At the **[39]** prompt, press 0 to skip the conversion factor description or press 1 or ENTER to program a conversion factor description.
2. If there is no existing description, the display will show **[000000]**. Otherwise, the first three ASCII code characters will be displayed. Press ENTER to accept the displayed characters and advance to the next set of three characters, or press CLEAR to clear the displayed characters.
3. After clearing a set of characters, enter the new characters, then press ENTER. Repeat this procedure for each of the four sets of characters until the desired description has been entered. Enter 00 for each position in a character set after a description has been completed. For example, the characters that should be entered for the description "BUSHELS" are **[355452] [413845] [520000] [000000]**.

Code	ASCII Character	Hex Value
01	(Space)	20
02	!	21
03	"	22
04	#	23
05	$	24
06	%	25
07	&	26
08	´	27
09	(	28
10	)	29
11	*	2A
12	+	2B
13	,	2C
14	-	2D
15	.	2E
16	/	2F
17	0	30
18	1	31
19	2	32
20	3	33
21	4	34
22	5	35
23	6	36
24	7	37
25	8	38
26	9	39
27	:	3A
28	;	3B
29	<	3C
30	=	3D
31	>	3E
32	?	3F
33	@	40

Code	ASCII Character	Hex Value
34	A	41
35	B	42
36	C	43
37	D	44
38	E	45
39	F	46
40	G	47
41	H	48
42	I	49
43	J	4A
44	K	4B
45	L	4C
46	M	4D
47	N	4E
48	O	4F
49	P	50
50	Q	51
51	R	52
52	S	53
53	T	54
54	U	55
55	V	56
56	W	57
57	X	58
58	Y	59
59	Z	5A
60	[	5B
61	\	5C
62	]	5D
63	^	5E
64	_	5F
65	`	60
66	a	61

Code	ASCII Character	Hex Value
67	b	62
68	c	63
69	d	64
70	e	65
71	f	66
72	g	67
73	h	68
74	i	69
75	j	6A
76	k	6B
77	l	6C
78	m	6D
79	n	6E
80	o	6F
81	p	70
82	q	71
83	r	72
84	s	73
85	t	74
86	u	75
87	v	76
88	w	77
89	x	78
90	y	79
91	z	7A
92	<BEL>	07
93	<SO>	0E
94	<SI>	0F
95	<DC1>	11
96	<DC2>	12
97	<DC3>	13
98	<DC4>	14
99	<ESC>	1B

Table 3-1: Alphanumeric Character Codes

40 Printer Port Group

The **[40]** Printer Port group allows you to configure the printer communications port. To access this group, enter 40 at the **[--]** prompt. The group consists of Steps **[41]** to **[49]**. If parameter **[40]** is selected, the steps will be prompted in sequence. The steps can also be selected individually.

41 Output Data Format

Note: Only one of the two serial ports (printer and computer) can be configured for demand mode output. Both ports can be configured for continuous mode output without any conflict.

The printer port supplies continuous and demand output modes.

Continuous mode is a fixed-format message of weight and status information that is output as the display is updated. The continuous mode is normally used with remote displays, setpoint controllers, or BCD/Analog converters.

Demand mode output is a configurable-format output that is normally used with a printer. Demand mode data is output only when a print request is made by pressing the PRINT key, by an autoprint function, or by an external print request. Demand mode output is inhibited if the weight on the scale is unstable, the weight is out of range, or zero has not been captured after powerup.

1. At the **[41 1]** prompt, press ENTER to accept the displayed selection or enter the desired data output option for the printer port:

   0 = Continuous mode output.

   1 = Demand mode output.

42 Baud Rate

At the **[42 9600]** prompt, select the desired baud rate for the printer port by using the 0 key to toggle through a list of options: 300, 1200, 2400, 4800, 9600. When the desired baud rate is displayed, press 1 or ENTER to accept the selection.

43 Parity Bit

Note: To operate Model 8806 printers, you must select 7 data bits, even parity.

Select the desired data format for the printer port. METTLER TOLEDO products normally use seven data bits, even parity (which is required for Model 8806 printers).

1. At the **[43 2]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = 7 data bits, no parity bit.

   1 = 7 data bits, odd parity bit.

   2 = 7 data bits, even parity bit.

   3 = 8 data bits, no parity bit.

44 Checksum

Checksum is used to detect errors in the transmission of data. Checksum is defined as the 2's complement of the seven low-order bits of the binary sum of all characters preceding the checksum character, including the <STX> and <CR> characters. The checksum calculation for multiple lines of data includes the <LF> character from the previous line of data.

1. At the **[44 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable checksum.

   1 = Enable checksum.

45 Stop Bits

Select the number of stop bits to be transmitted for each ASCII character.

1. At the **[45 1]** prompt, press ENTER to accept the displayed selection or enter the desired number of stop bits:

   1 = 1 stop bit.

   2 = 2 stop bits.

46 Alphanumeric Field 1

Cougar terminals provide four custom programmable alphanumeric fields that can be printed on demand format tickets. Each field can contain up to 24 ASCII characters (for valid character entries, see Table 3-1).

1. At the **[46]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Skip Field 1 programming and advance to next step.

   1 = Program Field 1.

2. The first three ASCII code characters of the alphanumeric field will be displayed **[000000]**. Press ENTER to accept the displayed characters and advance to the next set of three characters, or press CLEAR to clear the displayed characters.

3. After clearing a set of characters, enter the new characters, then press ENTER. Repeat this procedure for each of the eight sets of characters until the desired description has been entered. Entering a character code of 00 will end the description; no characters are printed after a 00 character.

47 Alphanumeric Field 2

To program Alphanumeric Field 2, follow the same procedure that was used to program Alphanumeric Field 1.

1. At the **[47]** prompt, select one of the following options:

   0 = Skip Field 2 programming and advance to next step.

   1 = Program Field 2.

48 Alphanumeric Field 3

To program Alphanumeric Field 3, follow the same procedure that was used to program Alphanumeric Field 1.

1. At the **[48]** prompt, select one of the following options:

   0 = Skip Field 3 programming and advance to next step.

   1 = Program Field 3.

49 Alphanumeric Field 4

To program Alphanumeric Field 4, follow the same procedure that was used to program Alphanumeric Field 1.

1. At the **[49]** prompt, select one of the following options:

   0 = Skip Field 4 programming and advance to next step.

   1 = Program Field 4.

50 Computer Port Group

The **[50]** Computer Port group allows you to configure the computer port. To access this group, enter 50 at the **[--]** prompt. If parameter **[50]** is selected, Steps **[51]** to **[57]** will be prompted in sequence. The steps can also be selected individually.

51 Output Data Format

Note: Only one of the two serial ports (printer and computer) can be configured for demand mode output. Both ports can be configured for continuous mode output without any conflict.

The computer port supplies continuous and demand output modes.

1. At the **[51 0]** prompt, press ENTER to accept the displayed selection or enter the desired data output option for the computer port:

   0 = Continuous mode output.

   1 = Demand mode output.

52 Baud Rate

At the **[52 4800]** prompt, select the desired baud rate for the computer port by using the 0 key to toggle through a list of options: 300, 1200, 2400, 4800, 9600. When the desired baud rate is displayed, press 1 or ENTER to accept the selection.

53 Parity Bit

Select the desired data format for the computer port. METTLER TOLEDO products normally use seven data bits, even parity (which is required for Model 8806 printers).

1. At the **[53 2]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = 7 data bits, no parity bit.

   1 = 7 data bits, odd parity bit.

   2 = 7 data bits, even parity bit.

   3 = 8 data bits, no parity bit.

54 Checksum

Checksum is used to detect errors in the transmission of data. Checksum is defined as the 2's complement of the seven low-order bits of the binary sum of all characters preceding the checksum character, including the <STX> and <CR> characters. The checksum calculation for multiple lines of data includes the <LF> character from the previous line of data.

1. At the **[54 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable checksum.

   1 = Enable checksum.

55 Stop Bits

Select the number of stop bits to be transmitted for each ASCII character.

1. At the **[55 1]** prompt, press ENTER to accept the displayed selection or enter the desired number of stop bits:

   1 = 1 stop bit.

   2 = 2 stop bits.

60 Demand Mode Output Group

The **[60]** Demand Mode Output group lets you configure the Cougar terminal for use with printers. To access this group, enter 60 at the **[--]** prompt. If parameter **[60]** is selected, Steps **[61]** to **[79]** will be prompted in sequence. The steps can also be selected individually.

61 Autoclear Tare after Print

The terminal can be set to clear the tare automatically after printing a weight reading.

1. At the **[61 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Retain tare after printing (tare must be cleared manually).

   1 = Clear tare automatically after printing.

62 Print Interlock/ Autoprint

Step **[62]** lets you to control how and when data is output to a printer. Normal demand mode printing takes place whenever a print request is made, providing there is no motion on the scale and zero has been captured (a negative gross weight will not be printed).

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

Autoprint sends a print request every time the weight on the scale settles to a positive value larger than the minimum print value. Do not use autoprint with a minimum print selection of 0; this will cause autoprint to operate erratically.

1. At the **[62 0]** prompt, press ENTER to accept the displayed selection or enter the desired print option:

   0 = Normal demand mode printing.

   1 = Print interlock.

   2 = Autoprint.

63 Minimum Print

Note: Minimum print must be set to a value other than zero for autoprint to operate properly.

The displayed weight must exceed the minimum print value before a print function can occur. Minimum print also controls resetting autoprint and print interlock.

1. At the **[63 0]** prompt, press ENTER to accept the displayed selection or enter the desired minimum print option:

   0 = No minimum print.

   1 = Minimum print of 10 increments.

   2 = Minimum print of 100 increments.

   3 = Minimum print of 500 increments.

   4 = Minimum print of 21 increments.

   5 = Minimum print of 41 increments.

64 Net Sign Correction

Step **[64]** allows storage of a gross weight and a tare weight in the tare register. When the tare weight value is larger than the weight currently on the scale, the demand mode printer output is rearranged so that the larger value is the gross weight, the smaller value is the tare weight, and the net weight is positive. The display will show a negative net weight value, but the data printed will be a positive net weight.

1. At the **[64 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable net sign correction.

   1 = Enable net sign correction.

65 Enable STX Character

Demand mode output normally has an ASCII Start of Text <STX> character, hex 02, at the beginning of the data transmission. The leading <STX> character can be inhibited for applications that are not compatible with the <STX> character. The <STX> character is required for use with METTLER TOLEDO Model 8806 printers.

1. At the **[65 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Do not send <STX> character.

1 = Send <STX> character.

66 FUNCTION-9 Access to Setup Parameters

Step **[66]** lets you select which setup parameters can be accessed by pressing the FUNCTION key, then the 9 key, and then entering the four-digit password. You can get FUNCTION-9 access to these setup steps without installing the W1 jumper.

1. At the **[66 1]** prompt, select the desired FUNCTION-9 access option:

   0 = Access to the following basic setup parameters:

   Alphanumeric Field 1 **[46]**

   Alphanumeric Field 2 **[47]**

   Alphanumeric Field 3 **[48]**

   Alphanumeric Field 4 **[49]**

   Autoclear Quick Print ID after Quick Printing **[71]**

   Time and Date Format **[73]**

   Number of Line Feeds after Quick Print Ticket Printing **[75]**

   Number of Line Feeds after Inbound Ticket Printing **[77]**

   Number of Line Feeds after Outbound Ticket Printing **[79]**

   1 = Access to basic setup parameters plus the following additional parameters:

   Enable/Disable Memory Key **[37]**

   Conversion Factor **[38]**

   Conversion Factor Description **[39]**

   Quick Print Ticket Print Format **[74]**

   Inbound Ticket Print Format **[76]**

   Outbound Ticket Print Format **[78]**

68 Weight Unit Description

Step **[68]** lets you select whether to print the weight unit description and conversion description.

1. At the **[68 2]** prompt, press ENTER to accept the displayed selection or enter the desired print option:

   0 = No weight unit description printed.

   1 = Print display weight unit description.

   2 = Print display weight unit and conversion descriptions.

69 Demand Mode Output Time Delay

Step **[69]** lets you add a time delay (from 0.0 to 9.9 seconds) between each line of demand mode data output. Time delays are used to keep a printer's input buffer from overflowing when large tickets or reports are printed at rates faster than 300 baud. If erratic printing occurs, increase the time delay until the problem is corrected.

1. At the **[69 *]** prompt, press ENTER to accept the current time delay or enter a new time delay.

71 Clear ID after Print

Step **[71]** selects whether the ID must be cleared manually or will be cleared automatically after a weight reading is printed.

1. At the **[71 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = ID must be cleared manually.

   1 = ID is cleared automatically after printing.

72 Increment Consecutive Numbering

Step **[72]** selects whether consecutive numbering should be incremented after a Quick Print.

1. At the **[72 1]** prompt, select one of the following options:

   0 = Do not increment consecutive numbering after Quick Print.

   1 = Increment consecutive numbering after Quick Print and outbound print.

73 Time/Date Format

Step **[73]** selects the time and date format to be printed. Time is entered in Function 6 as 24-hour military time. Date is entered in Function 7 in the format selected here.

1. At the **[73 4]** prompt, press ENTER to accept the displayed selection or enter the desired time/date print format:

   0 = MM DD YY HH:MM

   1 = MM DD YY HH:MM

   2 = DD.MM.YY HH:MM

   3 = YY MM DD HH:MM

   4 = MM DD YY HH:MM AM/PM

   5 = DD.MM.YY HH:MM

   6 = YY MM DD HH:MM

74 Quick Print Format

Step **[74]** lets you program the Quick Print ticket format.

1. At the **[74]** prompt, select one of the following options:

   0 = Skip Quick Print format programming and continue to the next setup step.

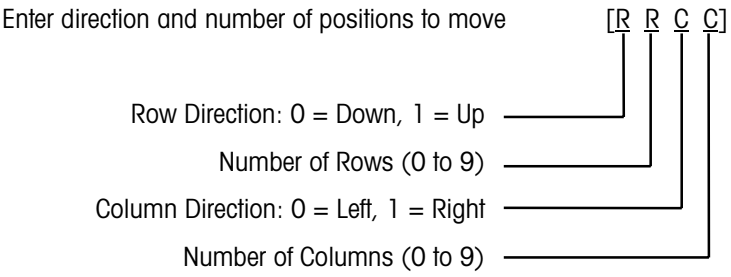
   1 = Program Quick Print ticket format.

   FUNCTION = Relocate existing ticket format position on printout.

2. If 1 was selected, edit the print fields. A ticket format can have up to 24 print field entries. Each print field entry consists of a six-digit value **[RRCCVV]**. The RR and CC values define where the print field will be printed. The RR value is the number of rows or lines down from the top of the ticket. The CC value is the number of columns or characters from the left edge of the ticket. The VV value is the literal text field or variable data field to be printed. See Table 3-2 for a list of print field definitions. Items enclosed by quotation marks are literal text fields and are printed exactly as shown in the table (except that the quotation marks are not printed). Variable data fields are replaced with the actual value of the variable selected. Both literal text fields and variable data fields can be repeated as many times as desired in a ticket format.

3. To terminate a ticket, enter a print field of **[000001]**. Any print fields after a **[000001]** entry will not be printed. If you do not want a particular ticket format (Quick Print, inbound, or outbound) to print, enter **[000001]** as the first print field. Incorrect entries can be corrected by pressing the CLEAR key once, then reentering the print field. Press the CLEAR key twice to exit the print field setup mode.

Once you have entered a complete ticket format and exited Step **[74]**, you can adjust the position of the entire ticket format up, down, left, or right on the paper without having to reenter all print field entries. To relocate the ticket format, press the FUNCTION key at the **[74]** prompt. When the display reads **[0000]**, enter a four-digit number (RRCC) describing how far and in what direction you want the ticket to be moved on the paper.



Code	Literal Text or Variable Field	Length
01	"GROSS"	5
02	"TARE"	4
03	"NET"	3
04	"TIME"	4
05	"DATE"	4
06	"VEHICLE"	7
07	"ID"	2
08	"NO."	3
09	"CN"	2
10	"CONVERSION FACTOR"	17
11	Gross Weight	9 to 15
12	Tare Weight	9 to 15
13	Net Weight	9 to 12
14	Time	8
15	Date	8
16	Memory Address	2
17	User ID	6
18	Quick Print User ID	12
19	Consecutive Number	6
20	Conversion Factor	7
21	Converted Gross Weight	8 to 21
22	Converted Tare Weight	8 to 21
23	Converted Net Weight	8 to 21
24	Displayed Weight	9 to 15
25	Converted Displayed Weight	8 to 21
26	Stored Inbound Memory Address	2
27	Stored Inbound User ID	6
30	"BRUTO"	5
31	"TARA"	4
32	"NETO"	4
33	"BRUTTO"	6
34	"TARAR"	5
35	"NETTO"	5
36	"NUMBER"	6
37	"CUSTOMER"	8
38	"PRODUCT"	7
39	Conversion Factor Description	12
40	"INBOUND"	7
41	"OUTBOUND"	8
42	"WEIGHT"	6

Code	Literal Text or Variable Field	Length
46	Alphanumeric Field 1	24
47	Alphanumeric Field 2	24
48	Alphanumeric Field 3	24
49	Alphanumeric Field 4	24
50	"LIQUIDO"	7
51	"FECHA"	5
52	"HORA"	4
53	"VEHICULO"	8
54	"NR"	2
55	"NC"	2
56	"FACTO DE CONVERSA"	17
57	"KONDE"	5
58	"NUMMER"	6
59	"PRODUKT"	7
60	"TID"	3
61	"DATA"	4
62	"BIL"	3
63	"ANTAL"	5
64	"UHRZEIT"	7
65	"DATUM"	5
66	"KFZ-NR"	6
67	"KENNZEICHEN"	11
68	"FORTL NC"	8
70	"T"	1
71	"t"	1
72	"CU YD"	5
73	"BU"	2
74	"BRL"	3
75	"GAL"	3
83	Commodity Net Weight	8
84	Commodity Description	9
85	Commodity Conversion Factor	8
86	Commodity Memory Address	2
87	Commodity User ID	6
92	BEL (07h)	1
93	SO (0Eh)	1
94	SI (0Fh)	1
95	DC1 (11h)	1
96	DC2 (12h)	1
97	DC3 (13h)	1
98	DC4 (14h)	1
99	ESC (1Bh)	1

Table 3-2: Print Field Definitions

The gross, tare, net, and displayed weight print fields in Table 3-2 are 9 characters long. If weight units are printed (setup Step **[68 1 or 2]**), the fields will be 11 or 12 characters long to accommodate the lb, kg, or t legend. The inbound stored weight field will add a (1) legend printed after it, increasing the total length to 15 characters.

The converted gross, tare, net, and displayed weight fields in Table 3-2 are 8 characters long. If the converted description is printed (setup Step **[68 2]**), the fields will be lengthened by 2 to 13 characters to accommodate the commodity description.

75 Line Feeds after Quick Print Ticket

Step **[75]** lets you determine how many additional blank lines should follow the end of a Quick Print ticket. Additional line feeds are normally used with Model 8845 document printers to advance the paper out of the printer far enough to allow the printed form to be torn off. An entry of 00 is normally used with Model 8806 ticket printers.

1. At the **[75 00]** prompt, press ENTER to accept the number of line feeds displayed or edit the selection. To change the number of line feeds, press CLEAR and enter the desired number of line feeds (00 to 99), then press ENTER.

76 Inbound Ticket Format

Step **[76]** lets you program an inbound ticket format. The inbound ticket format is printed when a vehicle weight is stored in memory.

1. At the **[76]** prompt, enter 0 to continue to the next setup step or enter 1 to program an inbound ticket format.

To program an inbound ticket format, follow the procedure described in setup Step **[74]**.

77 Line Feeds after Inbound Ticket

Step **[77]** lets you determine how many additional blank lines should follow the end of an inbound ticket. Additional line feeds are normally used with Model 8845 document printers to advance the paper out of the printer far enough to allow the printed form to be torn off. An entry of 00 is normally used with Model 8806 ticket printers.

1. At the **[77 *]** prompt, press ENTER to accept the number of line feeds displayed or change the number. To change the number of line feeds, press CLEAR and enter the desired number of line feeds (00 to 99), then press ENTER.

78 Outbound Ticket Format

Step **[78]** lets you program an outbound ticket format. The outbound ticket format is printed when a vehicle weight is stored in memory.

1. At the **[78]** prompt, enter 0 to continue to the next setup step or enter 1 to program an outbound ticket format.

To program an outbound ticket format, follow the procedure described in setup Step **[74]**.

79 Line Feeds after Outbound Ticket

Step **[79]** lets you determine how many additional blank lines should follow the end of an outbound ticket. Additional line feeds are normally used with Model 8845 document printers to advance the paper out of the printer far enough to allow the printed form to be torn off. An entry of 00 is normally used with Model 8806 ticket printers.

1. At the **[79 00]** prompt, press ENTER to accept the number of line feeds displayed or edit the selection. To change the number of line feeds, press CLEAR and enter the desired number of line feeds (00 to 99), then press ENTER.

80 International Group

The **[80]** International group allows you to configure the terminal for international use. To access this group, enter 80 at the **[--]** prompt. If parameter **[80]** is selected, Steps **[82]** to **[89]** will be prompted in sequence. The steps can also be selected individually.

82 lb/kg Units Switching

This feature allows you to switch the display between lb and kg during operation. Note that lb/kg switching is inhibited until zero has been captured after powerup. The lb/kg feature should be disabled for accumulation, setpoint, stored tare, or scale memory applications. If powerup kg is selected and lb/kg switching is disabled, the decimal point in the demand mode output will be replaced with a comma.

1. At the **[82 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable lb/kg switching.

   1 = Enable lb/kg switching.

83 Powerup Weight Unit

Select the weight unit (lb or kg) that the scale will use when it is powered up. If powerup kg is selected and lb/kg switching is disabled, the decimal point in the demand mode output will be replaced with a comma.

1. At the **[83 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Powerup in kg weight units.

   1 = Powerup in lb weight units.

84 Bracketed Weight Printing

European legal-for-trade applications require a leading "<" and a trailing ">" bracket around printed weights if the weight is an actual measured value rather than a manual (keyboard) value. If both the gross and tare weight values are actual measured values, then the net weight field will also have brackets printed around it.

1. At the **[84 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable measured weight brackets.

   1 = Enable measured weight brackets.

85 Print "PT" for Keyboard Entered Tare

Certain export legal-for-trade applications require printing the abbreviation "TRH" after manual (keyboard) tare weights and the abbreviation "NETC" after net weights that result from manual (keyboard) tare. German legal-for-trade applications use the abbreviation "PT" to indicate manual (keyboard) tare. "THR," "PT," and "NETC" abbreviations are printed only if the terminal is set to power up in kg with lb/kg switching disabled, as selected in Steps **[82]** and **[83]**.

1. At the **[85 2]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Do not print any tare weight entry designator.

   1 = Print "PT" after manual tare.

   2 = Print "H" after manual tare.

86 Remote ASCII Input Character

Note: The W2 jumper on the PCB must be out (not shorting the pins together) for the RS-232 interface of the printer port to accept ASCII characters.

Both the printer and computer ports can accept ASCII control characters to simulate the keys on the terminal's keyboard (see Table 3-3 for a list of ASCII characters that the terminal will respond to).

1. At the **[86 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable ASCII input for both printer and computer ports.

   1 = Enable ASCII input for both printer and computer ports.

ASCII Character	Key Equivalent or Function
A	**lb/kg**
B	Blank Display
C	**Clear**
E	**Enter**
F	**Function**
I	**ID**
L	Lock Keyboard
M	**Memory**

ASCII Character	Key Equivalent or Function
N	**Gross/Net**
P	**Print**
T	**Tare**
U	Unlock Keyboard
W	Display Weight
Z	**Zero**
0	**0**
1	**1**

ASCII Character	Key Equivalent or Function
2	**2**
3	**3**
4	**4**
5	**5**
6	**6**
7	**7**
8	**8**
9	**9**

Table 3-3: Remote ASCII Serial Input Commands

Note: Keyboard equivalents to the ASCII characters in Table 3-3 are printed in **Bold**.

87 Contact Closure Input

Note: If 1, 2, or 3 is selected, the printer port will not accept single ASCII character commands.

The printer port 20 mA current loop input can be used as a contact closure input to simulate the PRINT, ZERO, TARE, CLEAR, blank display, and lock keyboard commands on the Cougar terminal. The contact closure input is a momentary contact (0.3 to 3 seconds) for the PRINT, ZERO, TARE, and CLEAR commands. The contact closure input must be disabled for ASCII character input on the printer port, as set in Step **[86 1]**. See Chapter 2 for wiring information on the contact closure input.

1. At the **[87 1]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable contact closure input.

   1 = Enable remote PRINT, momentary contact.

   2 = Enable remote ZERO, momentary contact.

   3 = Enable remote TARE, momentary contact.

   4 = Enable remote CLEAR, momentary contact.

   5 = Enable blank display, momentary contact.

   6 = Enable lock keyboard, momentary contact.

88 Net Zero Cursor

United States and Canadian legal-for-trade applications require a zero cursor at gross zero. Australian legal-for-trade applications require a zero cursor at gross and net zero.

1. At the **[88 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Light the zero cursor at gross zero only.

   1 = Light the zero cursor at both gross and net zero.

89 Permanently Stored Tares

Step **[89]** lets you configure the scale memory to permanently store tare weights.

1. At the **[89 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable permanent storage of tare weights.

   1 = Enable permanent storage of tare weights.

89A Permanently Stored Inbound Weights

Step **[89A]** controls whether permanent registers can be used to store inbound tare weights. If this step is enabled, an inbound weight can be stored in the same permanent register used for data accumulation. Permanent registers used for inbound stored weight operation must be created with a stored tare value of 0. If this step is disabled, an inbound weight can be stored only in a temporary memory address, while outbound data can be accumulated into any permanent register with a stored tare value of 0. This step is skipped if permanent storage of tare weights was disabled in Step **[89]**.

1. At the **[89A 0]** prompt, press ENTER to accept the displayed selection or enter the desired option:

   0 = Disable storage of inbound weight in permanent registers.

   1 = Enable storage of inbound weight in permanent registers.

90 Load Cell Replacement Group

The steps in the **[90]** Load Cell Replacement group are accessed individually. Normally, Steps **[91]** to **[99]** are used only during initial installation or if a malfunction occurs.

91 Manually Addressing an Individual POWERCELL

Note: If Step **[91]** is accessed with more than one POWERCELL connected, the POWERCELL with the highest current address will be readdressed. If **[00]** is entered for a new address at the **[CELL]** prompt, then all POWERCELLs connected to the scale will be readdressed to the factory default address of 240.

Step **[91]** is used to manually force an address into a POWERCELL that already has been addressed. It can also be used to reset the addresses of all POWERCELLs to the factory default address of 240. An **[E8]** error code is displayed if this step is unsuccessful in addressing a POWERCELL.

1. At the **[--]** prompt, enter 91.
2. When the display reads **[91]**, enter one of the following options:

   0 = Skip manual POWERCELL addressing and return to the **[--]** prompt.

   1 = Begin manual POWERCELL addressing.
3. The **[LC OFF]** prompt indicates that power has been cut off to all POWERCELLs. Disconnect all POWERCELLs except the one to be addressed, then press ENTER.

4. At the **[CELL]** prompt, enter the new address (from 01 to 24) for the POWERCELL. To reset the POWERCELL to the factory default address of 240, enter 00 as the address. If an **[E8]** error message is displayed, manual addressing was unsuccessful; press CLEAR to return to the **[--]** prompt.
5. At the **[LC OFF]** prompt, power is again cut off to all POWERCELLs. If you are finished addressing the POWERCELLs, reconnect them and then press ENTER to return to the **[--]** prompt. If you want to address more POWERCELLs, enter 91 again.

Normally, a POWERCELL is addressed during initial installation only, and the address is stored in the POWERCELL. There is no need to readdress a POWERCELL when the terminal's PCB is replaced or its software is upgraded. A POWERCELL that has been addressed should never need to be addressed again. A POWERCELL that has lost its address is defective and **MUST** be replaced. The only reason to readdress a working POWERCELL is to move it to a new location in the weighbridge. If a POWERCELL that has been operating is no longer communicating (displaying an **[E8]** error code), do not try to readdress it. Most likely, the problem is due to a defective cable, POWERCELL, or PCB.

92 Replacing a POWERCELL

Note: If a replacement POWERCELL has been given the same address as another load cell in the system, the replacement load cell must be readdressed as 240, as described in Step **[91]**.

Step **[92]** is used to address a replacement POWERCELL. It automatically addresses the new POWERCELL (default address of 240) with the same address as the one that is being replaced. This step will work correctly only if there is only one POWERCELL to be replaced and if the replacement POWERCELL has an address of 240. If more than one POWERCELL is to be replaced or the replacement POWERCELL has already been addressed, use step **[91]** to manually address the replacement POWERCELL.

1. At the **[--]** prompt, enter 92.
2. When the display reads **[92]**, enter one of the following options:

   0 = Skip automatic POWERCELL addressing and return to the **[--]** prompt.

   1 = Begin automatic POWERCELL addressing.
3. The **[LC OFF]** prompt indicates that power has been cut off to all POWERCELLs. Disconnect the defective POWERCELL and connect the replacement POWERCELL.
4. Press ENTER. The Cougar terminal applies power to the POWERCELLs and checks for a missing cell address. When it identifies the missing address, the terminal will program the address into the replacement POWERCELL. After the replacement POWERCELL has been installed and addressed, perform the automatic single-section shift adjust, Step **[93]**, for the replacement POWERCELL.

93 Automatic Single-Section Shift Adjust

Step **[93]** performs a shift adjust for a single section (or an individual POWERCELL if the individual cell shift adjust mode was selected in Step **[02]**). Although shift adjust does not require the use of certified test weights, the load used must be concentrated directly over the section or cell for best results.

1. At the **[--]** prompt, enter 93.
2. When the display reads **[93]**, enter one of the following options:

   0 = Skip automatic single-section shift adjust and return to the **[--]** prompt.

   1 = Begin automatic single-section shift adjust.
3. At the **[SEC]** or **[CELL]** prompt, enter the number of the section or POWERCELL to be shift adjusted. Press ENTER.
4. At the **[E SCL]** prompt, remove all weights from the scale platform, then press ENTER. The display will count down from **[16 CAL]** to **[01 CAL]** as a zero reference is recorded for the scale.
5. At the **[LOAd xx]** prompt, place a test weight on the scale platform directly over the section or POWERCELL specified by the prompt, then press ENTER. The display will count down from **[16 CAL]** to **[01 CAL]** as a weight reading is recorded.
6. At the **[LOAd xx]** prompt, place a test weight on the scale platform directly over the comparison section or POWERCELL specified by the prompt, then press ENTER. The display will count down from **[16 CAL]** to **[01 CAL]** as a weight reading is recorded.
7. At the **[E SCL]** prompt, remove all weights from the scale platform, then press ENTER. The display will count down from **[16 CAL]** to **[01 CAL]** as a zero reference is verified. The display then returns to the **[--]** prompt.

The section or POWERCELL has now been shift adjusted. Exit the setup mode and retest the weighbridge for shift errors. If shift errors persist, it is possible that the test weight used during the shift adjust was not concentrated sufficiently over the section or cell. Verify that the raw count output of the individual POWERCELLs is within the range specified in the indicator setup section of the weighbridge installation manual for maximum raw count deviation. If necessary, perform final shimming as described in the weighbridge installation manual and repeat the shift adjust procedure if needed.

94 Temporarily Reset Shift Constants

Step **[94]** allows you to view the weighbridge's performance as though no shift adjustment had been made. Using this function does not erase the actual shift adjust coefficients; they are simply not used while this step is enabled. If power is cycled to the terminal or if calibration is attempted, Step **[19]**, then this step is automatically disabled.

1. At the **[--]** prompt, enter 94.
2. When the display reads **[94 0]**, enter one of the following options:

   0 = Normal operation (shift constants are used).

   1 = Test mode enabled (shift constants are not used).

95 Display Expanded Counts

Step **[95]** gives access to an expanded display. The number displayed is equal to ten times the number of increments that would normally be displayed. For example, a displayed weight of 10,000 lb is actually 500 20-lb increments (500 x 20 = 10,000). If Step **[95]** is enabled and 10,000 lb is placed on the weighbridge, then the Cougar terminal would display **5000**, with each count being equal to 2 lb.

1. At the **[--]** prompt, enter 95.
2. When the display reads **[95 0]**, enter one of the following options:

   0 = Display normal weight.

   1 = Display increments times ten.

96 Manual Shift Adjust

Manual shift adjust is used as a last resort to eliminate shift errors that cannot be removed by the automatic shift adjust, Steps **[18]** and **[93]**. Problems with shift adjustment are usually caused by a mechanical bind in the weighbridge, an incorrectly shimmed weighbridge, or an insufficient concentration of the test weight over the section or POWERCELL during shift adjust.

1. At the **[--]** prompt, enter 96.
2. When the display reads **[96 0]**, enter one of the following options:

   0 = Skip manual shift adjust and return to the **[--]** prompt.

   1 = Enable manual shift adjust and return to the **[--]** prompt.

Manual Shift Adjust Procedure

Note: The manual shift adjust procedure is performed when the terminal is in normal operating mode. It is a trial and error method of adjusting the shift compensation and may have to be repeated several times to obtain the correct weight reading. Each time the procedure is repeated, enter a different value at the **[LOAd A]** prompt. Once the **[LOAd B]** value has been entered, there is no need to enter it again. When the terminal prompts for **[LOAd B]**, press ENTER.

Once you have enabled manual shift adjust, exit the setup mode. In normal operating mode, the Cougar terminal will display expanded weight at ten times the normal resolution (the displayed weight resolution will be by 2-lb increments if the terminal is programmed for 20-lb increments).

1. Place a test weight over the section or POWERCELL to be adjusted. The weight value displayed is the **LOAd B** value used during the shift adjust procedure; record this number for use later in the procedure.
2. Press the FUNCTION key then the 0 key.
3. At the **[SEC]** or **[CELL]** prompt, enter the section number or POWERCELL address to be shift adjusted, then press ENTER.
4. At the **[LOAd A]** prompt, enter the desired target value (the actual weight of the test weight on the weighbridge) and press ENTER.
5. At the **[LOAd B]** prompt, enter the original weight value displayed when the test weight was first placed on the weighbridge, then press ENTER. After a few seconds the terminal will display a new weight reading, which should be closer to the correct weight.
6. If a mistake is made during entry, press the ZERO key to back up a step. Pressing the ZERO key at the **[SEC]** or **[CELL]** display will abort the manual shift adjust procedure.

Once the shift adjustment has been completed, enter the setup mode and disable manual shift adjustment, Step **[96 0]**. The terminal will then display **[SA CAL]** for save calibration. Press 1 to permanently store the new shift constants. If you press 0 at this

point, the changes made during manual shift adjustment will be lost and the shift constants will revert to their previous values.

After completing the manual shift adjustment procedure, recalibrate the scale if span or zero was affected. Verify that all sections weigh within tolerance and then recalibrate the scale using Step **[19]** if necessary.

Manual Shift Adjust Example

With weight concentrated over Section 1, the weight value displayed is 13,458 lb. The target value (actual test weight value) is 13,500 lb, with a resulting error of 42 lb.

Press the FUNCTION key then the 0 key.

Enter 01 for the section number, followed by the ENTER key

After **[LOAD A]** is displayed, enter 13,500 and press ENTER.

After **[LOAD B]** is displayed, enter 13,458 and press ENTER.

The adjusted weight is now displayed. If the displayed weight is less than the desired target value of 13,500, repeat the procedure and enter a larger **[LOAD A]** value. If the displayed weight is greater than the desired target value, repeat the procedure and enter a smaller **[LOAD A]** value.

97 Shortcut Calibration Data

Step **[97]** provides direct access to the span, zero, and shift adjust calibration constants. If the PCB is replaced, the Cougar terminal can be recalibrated by entering the previously recorded shortcut calibration data. Shift adjust and recalibration with test weights is not required if the shortcut calibration data is entered into a replacement PCB.

1. At the **[--]** prompt, enter 97.
2. When the display reads **[97 0]**, enter one of the following options:

   0 = Skip shortcut calibration and return to the **[--]** prompt.

   1 = View shortcut calibration display and edit it if desired.

   PRINT = Print shortcut calibration values.

97A Display Span Value

Step **[97A]** lets you view the span value and edit it if desired. This step is skipped if shortcut calibration was disabled in Step **[97]**.

1. After **[97A]** is displayed briefly, the current span value is shown. Press ENTER to accept the displayed value or press CLEAR to clear the display and enter a new span value.

97B Display Zero Value

Step **[97b]** lets you view the zero offset value and edit it if desired. This step is skipped if shortcut calibration was disabled in Step **[97]**.

1. After **[97b]** is displayed briefly, the current zero offset value is shown. Press ENTER to accept the displayed value or press CLEAR to clear the display and enter a new zero offset value.

2. After **[CELL 01]** or **[SEC 01]** is displayed briefly, the current shift adjust value for the first load cell or section is shown. Press ENTER to accept the displayed value or press CLEAR and enter a new shift adjust value. Repeat this procedure for each load cell or section.
3. At the **[SA CAL]** prompt, press 1 to save the calibration data that you entered. If you press 0 at this point, the new calibration values that were entered will be lost and the calibration values will revert to the previous settings.

98 Load Default Parameters

Step **[98]** allows you to replace the current setup parameters with the factory default settings indicated in the Setup Quick Reference Chart on pages 3-2 to 3-4. Setup steps for which no defaults are indicated are not affected and will retain their current values.

1. At the **[--]** prompt, enter 98.
2. When the display reads **[98 0]**, enter one of the following options:

   0 = Bypass load default parameters and return to the **[--]** prompt.

   1 = Advance to **[LOAd]** prompt.
3. At the **[LOAd]** prompt, enter one of the following options:

   0 = Bypass load default parameters and return to the **[--]** prompt.

   1 = Load the factory default parameters.

   PRINT = Display EEPROM byte address and hexadecimal value.
4. If 1 was selected, the **[LOAd]** message will stop flashing and the display will return to the **[--]** prompt once the default parameters have been loaded. If PRINT was selected, the display will show **[xxx yy]**, where **xxx** is the EEPROM byte address and **yy** is the hexadecimal value of the EEPROM. Pressing the PRINT key will advance the display to the next EEPROM byte address until address 127 is displayed or the CLEAR key is pressed.

99 Display Raw Count Output of Individual POWERCELLs

Step **[99]** displays the raw count output of individual POWERCELLs. It is used to verify that the Cougar terminal is communicating with individual POWERCELLs and to determine that the POWERCELLs have been shimmed correctly. An error code is displayed if the terminal is unable to communicate with a specified POWERCELL.

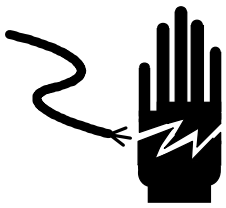
1. At the **[--]** prompt, enter 99.
2. When the display reads **[99]**, enter the address of the POWERCELL you wish to view (01 to 24), then press ENTER.
3. The display briefly shows the load cell number **[CELL xx]**. Then the raw count output of the cell is displayed. Press ENTER again to display the raw count output of the next cell.
4. Press CLEAR to return to the **[--]** prompt. If a cell address of 00 is entered, the terminal will return to the **[--]** prompt.

Final Installation Instructions

Once you have finished calibrating and configuring a Cougar terminal, it is important to record or print out the raw count outputs of the load cells at Step **[99]** and save this information for future use. If a printer is connected to the terminal, you can print out the setup and calibration parameters by pressing the PRINT key while the terminal is displaying the **[--]** prompt.

Remove the shorting block from the W1 (CAL) jumper. Place the shorting block on one of the two pins of the W1 jumper.

4 Service and Maintenance



⚠ WARNING

PERMIT ONLY 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.

Tools and Supplies

You should keep the following items on hand for service and maintenance of the Cougar terminal. A full set of common hand tools might also be required.

- Volt-Ohm meter
- Multiple DigiTOL load cell simulator (PN 0964-0033)
- Soft, lint-free cleaning cloth
- Anti-static bags (5 inches x 8 inches) for PCB (PN 14006300A)
- Anti-static wrist strap and mat
- METTLER TOLEDO screwdriver (PN 14476100A)

Cleaning and Regular Maintenance

Wipe the keyboard and covers with a clean, soft cloth that has been dampened with a mild glass cleaner. Do not use any type of industrial solvent such as toluene or isopropanol (IPA) on the keyboard/display assembly. These may damage the terminal's finish. Do not spray cleaner directly onto the terminal.

Regular maintenance inspections by a qualified service technician are also recommended. You can use the Maintenance Log found in Chapter 6 to keep track of maintenance performed on the terminal.

Troubleshooting

Cougar terminals are designed to be reliable and virtually error free. If problems do occur, determine the source of the problem before attempting to repair the scale or terminal. Use the error codes table below to help identify the problem.

Error Codes and Actions

The following table lists the terminal's error messages and suggests possible causes and remedies. If an error code is displayed, record the error code, disconnect AC power to the terminal, wait 15 seconds, then reconnect AC power. If that does not clear the error code, try the remedies recommended in the following table. If more than one remedy is listed for an error code, perform the corrective measures in the order listed and retest between measures. Check the terminal's power supply before replacing any parts. PCB malfunctions could be caused by an incorrect power supply voltage. If there is a problem with a POWERCELL, check the load cell cable and pit power supply voltages before replacing any parts. Most load cell errors are caused by defective load cell cables.

Error Message	Description	Remedy
E1	Fatal ROM Error	1. Replace EPROM. 2. Replace Main PCB.
E2	Fatal Internal RAM Error	1. Replace Main PCB.
E3	Corrupt Setup Memory Error	1. Enter setup and reprogram. 2. Replace Main PCB.
E4	Fatal External RAM Error	1. Replace Main PCB.
E5	Display Verify Error	1. Replace Main PCB.
E7 XX	Data Format Error in POWERCELL XX	1. Recalibrate scale. 2. Replace load cell. 3. Replace Main PCB.
E8 XX	No Communication with POWERCELL XX	1. Check pit power supply voltages. 2. Check COM A and COM B voltages. 3. Check Cougar power supply voltages. 4. Check all load cell cables. 5. Check Main PCB with POWERCELL simulator. 6. Replace Main PCB. 7. Replace POWERCELL XX.
E9 XX	POWERCELL XX out of Range Under	1. Check weighbridge for mechanical bind. 2. Check for load cell cable damage. 3. Check pit power supply voltages. 4. Replace POWERCELL XX.
E10 XX	RAM Error in POWERCELL XX	1. Recalibrate scale. 2. Replace POWERCELL XX. 3. Replace Main PCB.
E11 XX	ROM Error in POWERCELL XX	1. Replace POWERCELL XX. 2. Replace Main PCB.

Error Message	Description	Remedy
E13 XX	NOVRAM Error in POWERCELL XX	1. Check pit power supply voltages. 2. Check load cell cable XX. 3. Replace POWERCELL XX. 4. Replace Main PCB.
E14	Battery-Backed RAM Memory Loss	1. Press CLEAR key. 2. Remove battery insulator, then press CLEAR key. 3. Replace battery. 4. Check Cougar power supply voltages. 5. Replace Main PCB.
E16	Math Overflow Error	1. Enter setup and reprogram. 2. Replace Main PCB.
E21	Illegal Scale Capacity	1. Press CLEAR key. Enter correct capacity.
E24	Illegal High-Range Division	1. Press CLEAR key. Enter correct division size.
E25	Illegal Mid-Range Division	1. Press CLEAR key. Enter correct division size.
E26	Illegal Low-Range Division	1. Press CLEAR key. Enter correct division size.
E27	Illegal Overcapacity Entry	1. Press CLEAR key. Enter legal overcapacity value.
E32	Insufficient Test Weight (Calibration Error)	1. Make sure correct capacity was entered. 2. Use more test weight.
E34	Test Weight Larger than Capacity (Calibration Error)	1. Press CLEAR key. Test weight must be less than 105% of capacity. Make sure correct capacity was entered.
E35	Illegal Test Weight Increment (Calibration Error)	1. Press CLEAR key. Test weight value entered must match the increment size entered in setup.
E36	Insufficient Counts or Build too Small for Load Cell Capacity (Calibration Error)	1. Press CLEAR key to clear. 2. Check weighbridge for mechanical bind. 3. Make sure correct capacity and increment size were entered. 4. Check shift adjust values in setup Step **[97]**. If shift adjust value = 0, then Step **[18]** must be performed. 5. Recalibrate with larger test weight. 6. Check pit power supply voltages. 7. Make sure raw count cell output increases as load increases. 8. Replace Main PCB.
E37	Calibration Data Checksum Error	1. Recalibrate Cougar. 2. Check Cougar power supply voltages. 3. Replace Main PCB.
E38	Poor Build for Counting	1. Press CLEAR key to accept current build. 2. Recalibrate with larger capacity.
E40 XX	Bad Record at Memory Address XX	1. Press CLEAR key to erase bad record.
E41	Stored Weight in Wrong Weight Units (lb/kg)	1. Operator is attempting to perform an operation with stored tare weights or accumulation, and the weight units have changed from lb to kg or vice versa. Press the lb/kg key to return to original weight units and repeat the store operation.

Error Message	Description	Remedy
E42	Cannot Recall Tare in Net Mode	1. Operator is attempting to recall a stored tare weight with the scale in net weight mode. Select a permanent register with a stored tare weight of zero or clear the tare before attempting to recall a stored tare weight.
E43	Invalid Accumulation	1. Net weight accumulation was selected in Step **[29 1]** and operator is attempting to accumulate in the gross weight mode.
E50	Illegal POWERCELL Command	1. Check AC power and ground. 2. Check Cougar power supply voltages. 3. Replace Main PCB.
E E E **or** **-E E E**	Scale Not Zeroed	1. Press ZERO key. 2. Check weighbridge for mechanical bind. 3. Recalibrate scale.

Testing Operational Voltages

To test operational voltages, you must open the Cougar terminal's enclosure and test voltages on the PCB. All DC voltages listed are measured with respect to logic ground, black meter lead connected to V1 on the PCB. The POWERCELL supply voltage is not regulated, and the value measured is determined by both the number of POWERCELLs in the weighbridge and the AC line voltage. The DC voltage values are based on a power AC line voltage of from 103 to 130 VAC. Refer to Figure 4-1 and Table 4-1 for voltage test locations and levels.

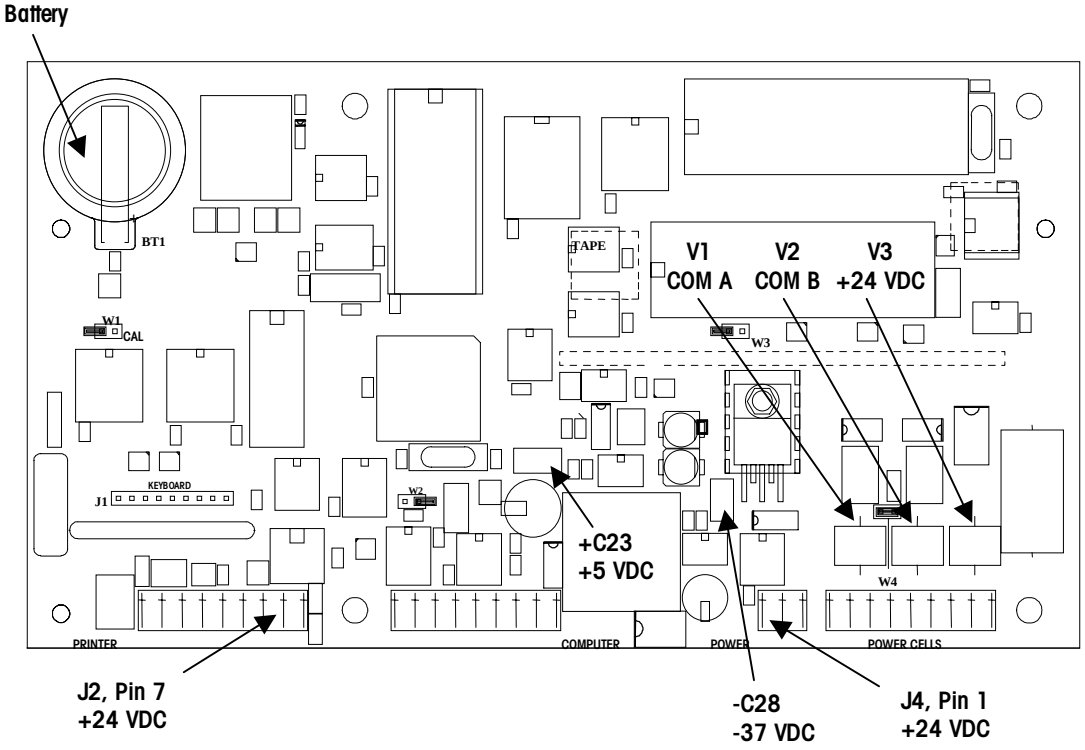


Figure 4-1: Cougar Main Logic PCB

Voltage	Description	Acceptable DC Voltage		Maximum AC Ripple	Plus Meter Lead	Notes
		Minimum	Maximum			
+24 VDC	Raw Supply + 24	+17 VDC	+28.5 VDC	0.3 VAC	J4-1	1
+24 VDC	POWERCELL Supply	+16.5 VDC	+28 VDC	0.3 VAC	V3	2
+5 VDC	+5 Logic Supply	+4.75 VDC	+5.25 VDC	0.1 VAC	+C23	3
-37 VDC	Display Supply	-33 VDC	-38 VDC	0.1 VAC	-C28	4
Battery	RAM Memory	+2.4 VDC	+3 VDC	0.02 VAC	+ Battery	5
COM A	POWERCELL Data Line	+1.9 VDC	+2.7 VDC	N.A.	V1	6
COM B	POWERCELL Data Line	+1.9 VDC	+2.7 VDC	N.A.	V2	
+24 VDC	8618 Supply	+17 VDC	+28.5 VDC	0.3 VAC	J2-7	7

Table 4-1: Main PCB DC Power Supply Voltage Checks

Main PCB DC Power Supply Voltage Notes:

1. +24VDC: Raw POWERCELL supply voltage, measured at pin 1 of the J4 connection.
2. +24 VDC: POWERCELL supply voltage, measured at the top end of V3. The +24 volt supply is switched off during POWERCELL addressing, setup Steps **[04]**, **[91]**, and **[92]**.
3. +5 VDC: Regulated Control Logic supply, measured at the positive end of C23.
4. -37 VDC: Display voltage, measured at the negative end of CR28.
5. Battery: Battery-backed RAM Memory, measured at positive terminal of battery with AC power disconnected.
6. COM A and COM B: The POWERCELL COM A and COM B data lines are toggling between ground and +5 VDC approximately 375,000 times per second. The COM line will measure about 2.4 VDC with the home run load cell cable disconnected from the J5 load cell connector. Replace the terminal's PCB if the COM voltages are incorrect with the home run cable disconnected.
7. +24 VDC: 8618 supply voltage, measured at pin 7 of the J2 connection.

Weighbridge Troubleshooting

Two types of POWERCELLs are used in DigiTOL weighbridges: NMOS POWERCELLs and CMOS POWERCELLs. The CMOS POWERCELL is a new type of cell that can operate directly from the terminal's +24 VDC supply and does not require the Pit Power Supply PCB. The CMOS POWERCELL can be used to replace a NMOS POWERCELL in an existing weighbridge and will operate with the Pit Power Supply PCB. The NMOS POWERCELL cannot be used in CMOS weighbridges that do not have the Pit Power Supply PCB.

CMOS POWERCELLs can also be used with the Intrinsic Safety Barrier (Model 0917-0198) in areas classified as Hazardous by the National Electrical Code (NEC) because of combustible or explosive atmospheres. **The Cougar terminal MUST be located in the nonhazardous area if used with the CMOS POWERCELL and the intrinsic safety barrier.** For troubleshooting information, refer to the Model 0917-0198 CMOS Intrinsic Safety Barrier installation instruction manual and the DigiTOL Hazardous Area Wiring Diagram (TC100442).

The Cougar terminal communicates with the POWERCELLs using a master/satellite, two-wire, half-duplex, multidrop communication protocol at 375,000 baud. The terminal is the master and the POWERCELLs are satellites that transmit data only when the terminal requests data. The COM A and COM B data lines from the terminal are wired in parallel to all POWERCELLs. A shorted data line can result in **[E8]** error codes for some or all POWERCELLs in the weighbridge.

NMOS Weighbridges (Pit Power Supply PCB)

The home run cable from the Cougar terminal terminates in the weighbridge at the Pit Power Supply PCB. The Pit Power Supply converts the +24 VDC POWERCELL supply from the terminal into the +18.5 VDC and +8.5 VDC power supplies required by NMOS POWERCELLs. The Pit Power Supply has connections for six POWERCELLs. Weighbridges with more cells use the Pit Power Supply Expander PCB to provide more POWERCELL connections.

All DC voltages listed are measured with respect to logic ground, black meter lead connected to pin 5 of terminal strip J6 on the Pit Power Supply PCB. The +24 VDC

POWERCELL supply voltage is not regulated, and the value measured is determined by the number of POWERCELLs in the weighbridge, the AC line voltage, and the length of the home run cable. The DC voltage values are based on a power AC line voltage of from 103 to 130 VAC. Refer to Table 4-2 and Figure 4-2 for test points and voltages.

Voltage	Description	Acceptable DC Voltage		Maximum AC Ripple	Plus Meter Lead	Notes
		Minimum	Maximum			
+22 VDC	POWERCELL Supply	+16 VDC	+28 VDC	0.2 VAC	J6-Pin 1	
+8.5 VDC	Cell Logic Supply	+7.5 VDC	+9 VDC	0.2 VAC	J1-Pin 4	
+18.5 VDC	Cell Analog Supply	+17 VDC	+19 VDC	0.2 VAC	J1-Pin 3	1
COM A	POWERCELL Data Line	+1.9 VDC	+2.7 VDC	N.A.	J6-Pin 8	
COM B	POWERCELL Data Line	+1.9 VDC	+2.7 VDC	N.A.	J6-Pin 7	2
Chassis Ground	Chassis Ground	-1 VDC	+1 VDC	1 VAC	Ground Pad	3

Table 4-2: Pit Power Supply PCB Voltage Checks

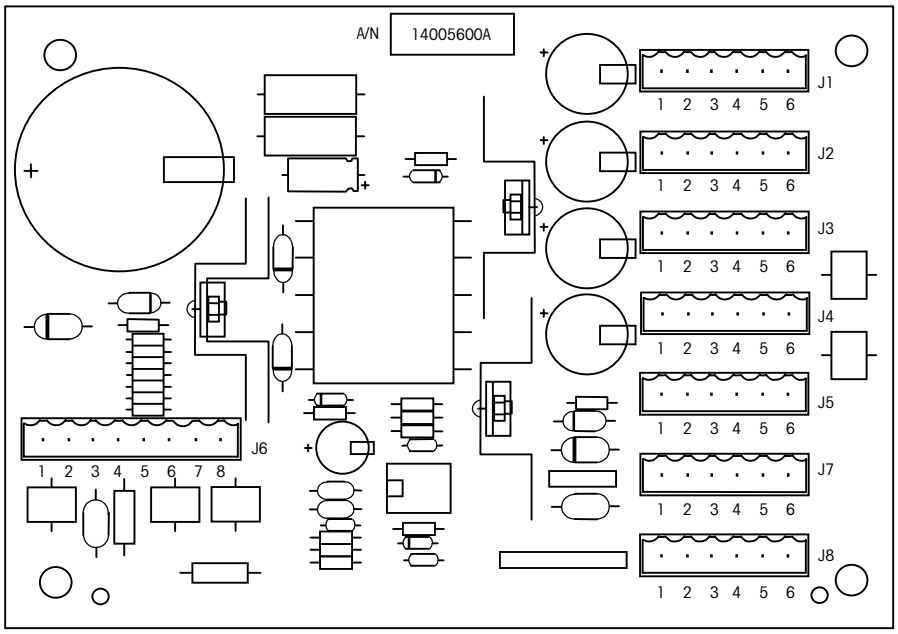


Figure 4-2: Pit Power Supply PCB

Pit Power Supply Voltage Notes

1. The Pit Power Supply is protected against short circuits. If the +8.5 or +18.5 VDC power supplies are shorted to ground, the Pit Power Supply PCB will shut down to prevent damage. When the short is removed, the power supply voltage will come back. If the +8.5 or +18.5 VDC power supply voltages are missing or very low, disconnect all POWERCELLs and cell cables from the Pit Power Supply and retest. If the missing power supply voltage reappears, reconnect one POWERCELL and cable at a time to find the problem.

2. The COM A and COM B data lines are toggling between ground and +5 VDC about 375,000 times per second. A voltmeter will measure the average voltage of the COM line, which should be about 2.4 VDC. The actual level of the voltage measured is not critical. The important thing is that the COM lines are close to the same value and are not high or low. If one of the COM lines is high or low, disconnect all of the POWERCELLs and load cell cables from the Pit Power Supply and measure the COM line voltages again. If the COM line voltages test at an acceptable level on the Cougar terminal's Main Logic PCB but are bad with the Pit Power Supply connected, then the Pit Power Supply is probably defective.

   The Pit Power Supply includes surge voltage suppression devices on the power supply lines and on the COM A and COM B data lines to protect the POWERCELLs and terminal from lightning-induced surge voltages. The surge suppression devices can fail by shorting to chassis ground. Testing the Pit Power Supply PCB requires a digital multimeter that has a diode test setting.

   A good Pit Power Supply will measure as an open circuit between the COM lines and chassis ground when using the diode test setting on your digital multimeter. Reverse the polarity of your meter leads and recheck between the COM lines to chassis ground. You should get the same open circuit reading. If the diode test setting on your digital multimeter shows a measurable resistance between chassis ground and either of the COM A or COM B data lines, then the Pit Power Supply is defective.

3. An excessive voltage between chassis ground and logic ground (greater than 1.5 volts) can cause a problem with intermittent **[E8]** error codes. This condition is aggravated by connecting to the RS-232 interface on either the printer or computer port. Voltage between chassis ground and logic ground is typically caused by leakage between the +18.5 VDC supply and chassis ground. Disconnect any external equipment from the terminal and disconnect all POWERCELLs and cell cables from the Pit Power Supply and retest. Reconnect one POWERCELL and cable at a time to find the source of the chassis ground to logic ground voltage.

CMOS Weighbridges (Nonhazardous Area Version Only)

CMOS Power Cell weighbridges use a Connector PCB in place of the Pit Power Supply. The home run cable from the Cougar terminal terminates at terminal strip J8 of the Connector PCB. The Connector PCB has terminations for six CMOS POWERCELLs. Weighbridges with more than six cells add a second or third Connector PCB in a daisy chain fashion with terminal strip J1 of the first Connector PCB wired to terminal strip J8 on the next connector PCB.

Intrinsically Safe versions use a reduced POWERCELL supply voltage that will typically measure from 8.0 to 10.5 VDC. Intrinsically Safe versions POWERCELL COM A and COM B data line voltages will typically measure 0.5 VDC with six POWERCELLs connected to a home run cable.

Note: In general, COM A to GND should equal COM B to GND, and the voltage should be between 0 and 2.5 volts. The actual voltage depends on the number of load cells in the system and the cable lengths. A measurement of 0 or +5 volts on either line or unequal voltages on the two lines suggests a problem.

All DC voltages are measured with respect to logic ground, black meter lead connected to terminal strip J2-GND on the Connector PCB. The DC voltage values listed in Table 4-3 are based on a power AC line voltage of from 103 to 130 VAC. Refer to Table 4-3 and Figure 4-3 for test points and voltages.

Voltage	Description	Acceptable DC Voltage		Maximum AC Ripple	Plus Meter Lead	Notes
		Minimum	Maximum			
+22 VDC	POWERCELL Supplies: +VA, +VB, and +VC	+16 VDC	+28 VDC	0.2 VAC	J2-VA J3-VB J4-VC	1
COM A	POWERCELL Data Line	+0.8 VDC	+2.7 VDC	N.A.	J2-A	2
COM B	POWERCELL Data Line	+0.8 VDC	+2.7 VDC	N.A.	J2-B	
Chassis Ground	Chassis Ground	-1 VDC	+1 VDC	1 VAC	J2-CGND	3

Table 4-3: CMOS POWERCELL Connector PCB Voltage Checks

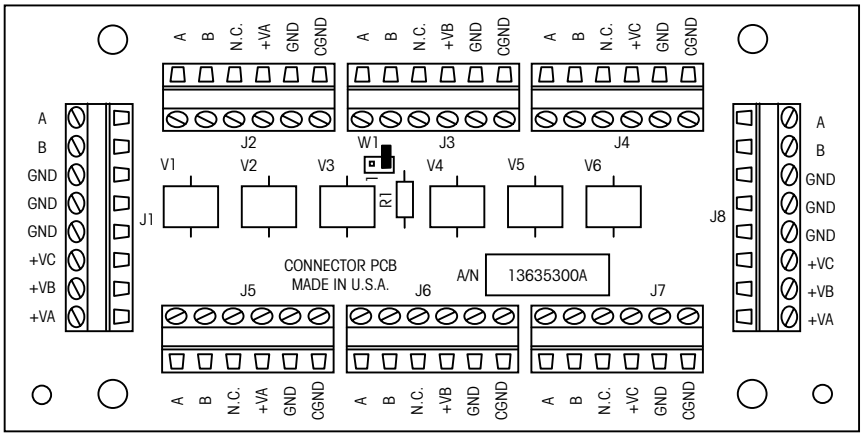


Figure 4-3: CMOS POWERCELL Connector PCB

CMOS POWERCELL Connector PCB Voltage Notes:

1. The +22 VDC POWERCELL supply voltage is split into three +22 VDC supply lines: +VA, +VB, and +VC. Each +22 VDC power supply is wired and measured independently.
2. The COM A and COM B data lines are toggling between ground and +5 VDC about 375,000 times per second. The average DC voltage measured between the COM lines and ground for the CMOS POWERCELLs varies with the number of POWERCELLs in the system. COM line voltage will vary from 2.5 VDC (with no cells connected) to 0.8 VDC (with 12 cells connected). The COM A and COM B voltage will drop with each successive load cell plugged into the system. The actual level of the voltage measured is not critical. The important thing is that the COM lines are close to the same value and are not high or low. If one of the COM lines is high or low, disconnect all of the POWERCELLs and load cell cables from the Connector PCB and measure the COM line voltages again. If the COM line voltages test at an acceptable level on the Cougar terminal's PCB but are bad with the Connector PCB connected, then the Connector PCB is probably defective.

The Connector PCB includes surge voltage suppression devices on the power supply lines and on the COM A and COM B data lines to protect the POWERCELLs and terminal from lightning-induced surge voltages. The surge suppression devices can fail by shorting to chassis ground. Testing the Connector PCB requires a digital multimeter that has a diode test setting.

A good connector PCB will measure as an open circuit between the COM lines and chassis ground when using the diode test setting on your digital multimeter. Reverse the polarity of your meter leads and recheck between the COM lines to chassis ground. You should get the same open circuit reading. If the diode test setting on your digital multimeter shows a measurable resistance between chassis ground and either of the COM A or COM B data lines, then the Connector PCB is defective.

3. An excessive voltage between chassis ground and logic ground can cause a problem with intermittent **[E8]** error codes. This condition is aggravated by connecting to the RS-232 interface on either the printer or computer port. Voltage between chassis ground and logic ground is typically caused by leakage between the +22 VDC supply and chassis ground. Disconnect any external equipment from the terminal and disconnect all POWERCELLs and cell cables from the Connector PCB and retest. Reconnect one POWERCELL and cable at a time to find the source of the chassis ground to logic ground voltage.

Troubleshooting Intermittent POWERCELL [E8] Error Codes

Several different problems can cause intermittent **[E8]** error codes to be displayed. Try the following suggestions to correct the problem.

1. Visually inspect all load cell cables and load cell connectors for damage. Flex the load cell cable where the cable comes out of the load cell connector and watch the terminal's display for errors. Any load cell cable that is bent very sharply at the load cell connector may be damaged internally. Verify that all load cell connectors are clean and greased and show no signs of corrosion. A damaged load cell cable can also cause intermittent **[E9]** error codes.
2. Make sure that all cable wiring is tightly terminated at J-box terminal strips. Gently pull on individual wires and tighten any loose terminal strip screw in the Pit Power Supply and pit supply expanders. Check for corrosion on cable wiring.
3. For NMOS POWERCELLs, check the +18.5 VDC and +8.5 VDC power supplies from the Pit Power Supply. The Pit Power Supply is protected against short circuits so that DC output voltages turn off automatically if a short occurs. The output voltages turn back on automatically when the short is removed. For CMOS POWERCELLs check the +22 VDC power supply to the Connector PCB.
4. Disconnect all external equipment such as scoreboards, printers, and computers from the Cougar terminal and determine if the intermittent **[E8]** error codes have been eliminated. Connections between the terminal's communication ports and external equipment can cause intermittent **[E8]** error codes. Data cables routed in the same conduit as AC power lines can cause erratic operation and **[E8]** error codes.

   Another problem can occur when a terminal is connected to external equipment with RS-232 or RS-422/485 interfaces. Most computers and printers connect logic ground to chassis ground. Cougar terminals are designed with a floating logic ground for increased protection from lightning damage. When the terminal's RS-232 interface is connected to a computer that connects logic ground to chassis

ground, this also connects the terminal's logic ground to chassis ground. Connecting the logic ground to chassis ground can cause intermittent **[E8]** error codes.

CAUTION: Connecting a Cougar terminal's logic ground to chassis ground will degrade the terminal's lightning immunity.

If the RS-232 or RS-422/485 interfaces are the cause of the **[E8]** error codes or if there is a history of lightning-related damage, an optical isolator should be installed between the terminal and the external device. Contact METTLER TOLEDO Technical Support at 1-800-786-0040 for optical isolator recommendations for RS-232 and RS-422/485 interfacing. The printer port 20 mA current loop interface is optically isolated and does not require additional isolation.

5. Measure between the COM A to ground and COM B to ground. The COM lines toggle between 0 and +5 VDC. A typical digital voltmeter will read from 1.9 VDC to 2.7 VDC between a COM line and ground for NMOS POWERCELLs (0.8 to 2.7 for CMOS POWERCELLs) when the terminal and POWERCELLs are communicating properly. If one of the COM lines is disconnected from the terminal, a common symptom is a constant **[E8]** error code for a particular cell that suddenly changes to a constant **[E8]** error code for a different cell.

   If one of the COM lines is dead (reading a steady voltage near 0 VDC or +5 VDC) and is not toggling, then the terminal's PCB may be defective. A dead COM line can also be caused by a damaged Pit Power Supply, a shorted load cell cable, or a damaged load cell. Try disconnecting part of the scale from the terminal (for example, disconnect the expander PCB) and see if the dead COM line becomes active.

   Note: For CMOS systems, COM A to GND should equal COM B to GND, and the voltage should be between 0 and 2.5 volts. The actual voltage depends on the number of load cells in the system and the cable lengths. A measurement of 0 or +5 volts on either line or unequal voltages on the two lines suggests a problem.

6. For NMOS applications, check the Cougar's +24 VDC power supply at the Pit Power Supply terminal strip TB6. If the +24 VDC supply is below +16.5 VDC, refer to the weighbridge installation manual for the maximum cable length allowed for the scale base used. Also check the AC line voltage. Low AC line voltage can cause intermittent **[E8]** error codes. Large office machines such as photocopiers or refrigerators can cause a low line voltage if powered from the same AC power source as the terminal. A constant-voltage AC power source should be installed if low AC line voltage is detected. Contact METTLER TOLEDO Technical Support at 1-800-786-0040 for constant-voltage power source recommendations.

Other Problems

Operational or output data problems may be due to incorrect setup. Check the jumper selections and setup parameters described in Chapters 2 and 3 of this manual. If the problem is with data output, verify that the interconnect cable is wired correctly. Refer to the Electrical Connections section in Chapter 2.

Often, the quickest way to locate malfunctions in a Cougar terminal is by substituting parts. Check all power supply voltages before replacing any components. Refer to the interconnect diagram for additional troubleshooting information.

If you think that the printed circuit board is defective, you can check it by replacing it with a good PCB and noting whether the problem is corrected. Do not automatically program the replacement PCB like the suspect PCB because the problem could be caused by a programming error. Refer to Chapter 3 for programming information.

Use a properly grounded static wrist strap when handling PCBs. Use an antistatic bag to store both the new and the suspect PCB. Once the problem is corrected, reinstall all replaced PCBs one at a time and retest them. This step will help you avoid replacing a good PCB. Exchange PCBs or subassemblies are available from your authorized METTLER TOLEDO representative.

PCB Replacement

To replace the Cougar terminal's PCB, first open the enclosure. Disconnect the keyboard pigtail and terminal strips from the PCB. Remove the four Phillips head PCB retaining screws and remove the PCB.

Install a new PCB, making sure to insert the keyboard pigtail through the opening in the PCB. Replace the four PCB retaining screws. Reconnect the keyboard pigtail and terminal strips. Make sure that the jumper settings are correct, then seal the enclosure.

Battery Replacement

⚠ CAUTION

THERE IS A DANGER OF EXPLOSION IF THE BATTERY IS REPLACED INCORRECTLY. REPLACE ONLY WITH METTLER TOLEDO PART NUMBER 12895900A. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

Time and date, stored tare weights, setpoint values, ID, CN, and accumulated data are stored in battery-backed nonvolatile RAM to prevent loss of data if AC power is removed. If the Cougar terminal loses battery-backed data when AC power is removed, then the lithium battery on the PCB may have failed. Check the battery voltage test points.

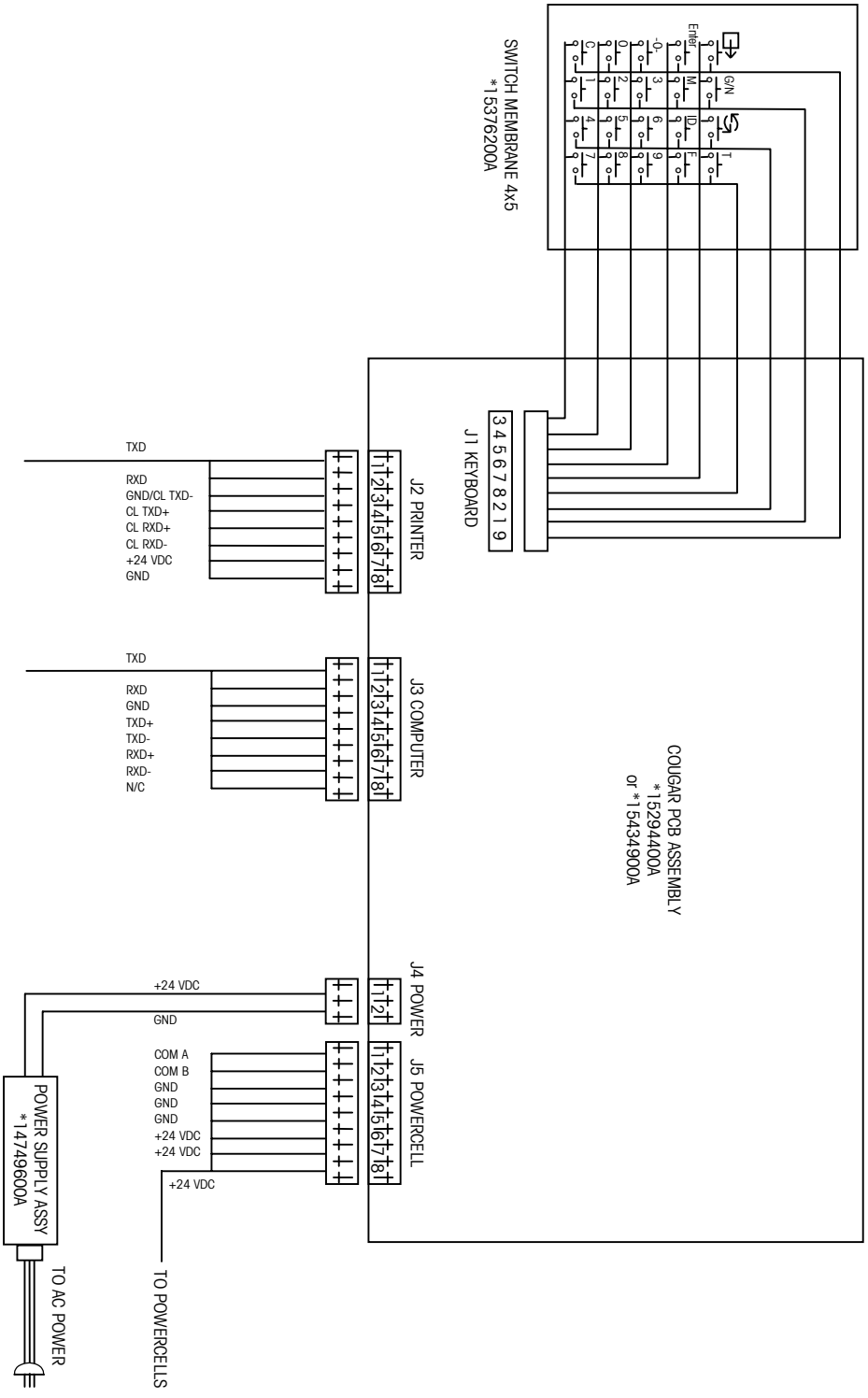
To replace the battery, open the enclosure. Put on the rubber gloves provided with the lithium battery kit. The gloves are to protect the battery surface from your skin's oils and acids. The conductive surface of the battery must be kept clean or the battery will fail prematurely.

Carefully slide the battery out of the holder. Slide the replacement battery into the holder. Be sure to install the new battery with the plus side of the battery showing. Be careful not to contaminate the surface of the new battery.

Enter the setup mode and reprogram the Cougar terminal. Time and date, stored tare weights, setpoint values, ID, CN, and accumulated data will be lost and will need to be reentered.

Cougar Interconnect Diagram

The following interconnect diagram shows the wiring connections for a Cougar terminal.



5 Parts and Accessories

Refer to the following diagram and parts list when ordering parts and accessories for Cougar terminals.

Cougar Parts

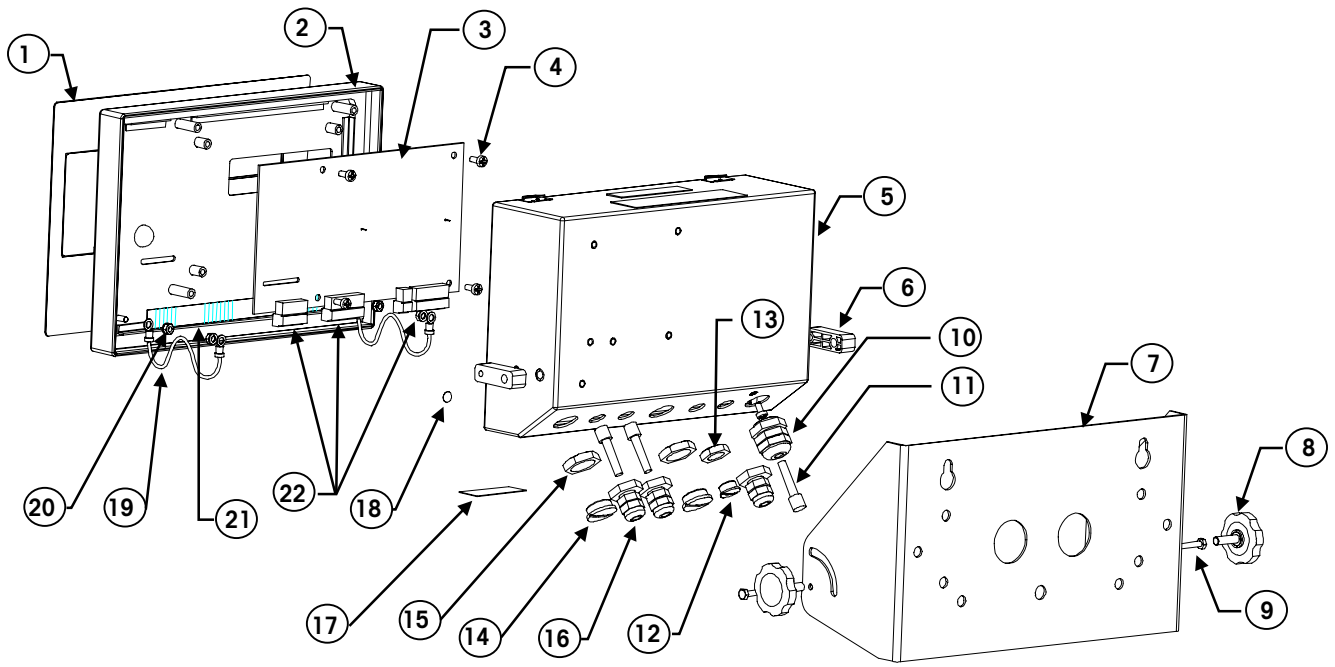


Figure 5-1: Cougar Terminal Parts

Cougar Parts List			
Ref. #	**Part Number**	**Description**	**Quantity**
1	*15376200A	Keyboard Assembly	1
2	*15322300A	Front Cover Assembly	1
3	*15294400A	PCB Assembly (VS)	1
4	R0511100A	Taptite Screw, Phillips, M4x10	4
5	*14465700A	Enclosure Assembly	1
6	14734500A	Spacer, Mounting Bracket	2
7	*14734400A	Mounting Bracket	1
8	14734600A	Plastic Knob, M6x20	2
9	R0520400A	Pan Head Screw, M4x8	1
10	13002300A	Cord Bushing, 0.200-0.394	1
11	14467600A	Hole Plug, 0.24-0.38	3
12	14399900A	Hole Plug, PG7	1
13	14577900A	Hex Nut, PG7	1
14	14724000A	Threaded Plug, PG11	2
15	14724100A	Hex Nut, PG11	2
16	12901800A	Cord Bushing, 0.118-0.255	3
17	*12699700A	Warning Label, Disconnect Power	1
18	14531400A	Ground Label, BSI, 0.31 OD	1
19	14467500A	Tension Cable, 3″	2
20	R0519600A	Hex Nut, KEPS, M4	5
21	*15322100A	Field Termination Label	1
22	14113300A	Terminal Strip, Eight Position	3
Not Shown	R0528000A	Hex Head Screw, M4x20, SS	2
Not Shown	*14749600A	Power Supply Assembly	1
Not Shown	10839700A	Foot, Adhesive Back	4
Not Shown	11511200A	Foot, Adhesive Back	1
Not Shown	*15399700A	Address Label Set	1
Not Shown	*14235400A	Capacity Label	1
Not Shown	*14476100A	Screwdriver	1
Not Shown	*12363300A	Security Seal Label	2
Not Shown	*14901700A	Capacity Label, CE	1
Not Shown	12895900A	Battery	1

* Part numbers may have a revision-level prefix.

Recommended Spare Parts

METTLER TOLEDO recommends that you keep the following spare parts on hand.

Recommended Spare Parts		
Part Number	**Description**	**Quantity**
*15476800A	Overlay/Keyboard/Cover Assembly	1
*15294400A	PCB Assembly (VS)	1

* Part numbers may have a revision-level prefix.

6 Appendices

Appendix 1: Demand Mode Output

Demand mode output occurs any time an inbound, outbound, or Quick Print ticket format is printed. Demand mode output is prevented when the scale is "in motion," or when the weight is under gross zero or over capacity. When one of those situations occurs, the print request will be stored and acted upon as soon as the terminal is no longer prevented from outputting data. Demand mode output can also be prevented by minimum print and print interlock.

Print Field Notes

Each line of a demand mode transmission begins with an ASCII <STX> character, hex value 02, if <STX> character output is enabled. A leading <STX> character is required by Model 8806 printers.

Each line of data ends with an ASCII <CR> character, hex value 0D, a checksum character (if checksum is enabled), and an ASCII <LF> character, hex value 0A.

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.

All weight data fields are padded with leading spaces to nine characters in length. A negative net weight value is indicated by a minus character before the most significant digit of the weight value. For example, a weight of -34.5 is output with four leading spaces ($^{S}_{P}$ = space): $^{S}_{P}{}^{S}_{P}{}^{S}_{P}{}^{S}_{P}$-34.5.

If weight units printing is enabled, then each weight data field will have a two- or three-character weight unit legend after the nine digits of weight data.

A stored inbound weight field is printed with a **(1)** after it on both inbound and outbound ticket formats.

Tare and net weight fields are not printed if the terminal is in the gross weight mode.

If bracketed printing is enabled, then all truly measured weight values (as opposed to hand-entered tares) are preceded by an ASCII < character and followed by an ASCII > character.

If print weight expanded is enabled, an ASCII <SO> character, hex value 0E, is output before the net weight data field, or gross weight field if the terminal is in the gross mode. An ASCII <SI> character is output at the end of each line of data if print weight expanded is enabled.

The time and date format is output as listed in Table 6-1.

Step **[73]** Selection	Time Output Format	Date Output Format
1	HH:MM	$MM^{S}_{P}DD^{S}_{P}YY$
2	HH:MM	DD.MM.YY
3	HH:MM	$YY^{S}_{P}MM^{S}_{P}DD$
4	$HH:MM^{S}_{P}PM$	$MM^{S}_{P}DD^{S}_{P}YY$

Table 6-1: Time and Date Output Formats

Print Interlock

When print interlock is enabled, only one print of a transaction is permitted. To reset the interlock, the weight on the scale must return to a net weight that is less than the minimum print value. After the interlock has reset, a single print of a transaction other than the minimum print value is possible.

Autoprint

Autoprint enables the Cougar terminal to output a Quick Print ticket automatically when the weight on the scale settles to no motion. The weight on the scale must be greater than the minimum print value. After an autoprint, the net weight on the scale must return to a weight value less than the minimum print value to reset the autoprint feature. The PRINT key is disabled when autoprint is enabled.

Net Sign Correction

Net sign correction enables the terminal to store a tare value that is greater than the gross weight on the scale and print a positive net weight. This is done by swapping the gross and tare weight values so that the larger value is the gross weight and the smaller value is the tare weight. Net sign correction affects only the demand mode data output. The displayed weight and continuous data output will continue to show a negative net weight value.

Net Sign Correction Example:	**Data Output Is:**
Weight on the scale = 35100 lb	64080 lb
Tare weight entered = 64080 lb	35100 lb Tare
Displayed weight = -28980 lb	28980 lb Net

Appendix 2: Continuous Mode Output

The continuous output format is output as the display is updated (approximately 15 times per second). It is fixed except for baud rate, 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 8617, 8623, 8624, 9323, 9325, and 9360 accessories).

		Status			Indicated Weight						Tare Weight							
Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data	STX	SWA	SWB	SWC	MSD	-	-	-	-	LSD	MSD	-	-	-	-	LSD	CR	CHK
Note	A	B			C						D						E	F

Table 6-2: 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 6-3, 6-4, and 6-5.

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 0D.

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.

Function	Decimal Point Selection	Bit 2	1	0
Decimal Point or Dummy Zero	XOO	0	0	0
	XO	0	0	1
	X	0	1	0
	O.X	0	1	1
	O.OX	1	0	0
	O.OOX	1	0	1
	O.OOOX	1	1	0
	O.OOOOX	1	1	1

Function	Bit
Setpoint 1, Feeding = 0	3
Setpoint 2, Feeding = 0	4
Always a 1	5
Setpoint 3, Feeding = 0	6

Table 6-3: Status Word A Bit Definitions

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
Always a 0	6

Table 6-4: Status Word B Bit Definitions

Function	Bit
Always a 0	0
Always a 0	1
Always a 0	2
Print Request = 1	3
Setpoint 4, Feeding = 0	4
Always a 1	5
Always a 0	6

Table 6-5: Status Word C Bit Definitions

Appendix 3: Remote ASCII Control Character Input

The printer or computer port of the Cougar terminal will accept a single, upper case, ASCII character for each key on the terminal's keyboard. In addition, characters are accepted to lock and unlock the keyboard or to blank and unblank the display. Refer to Table 6-6 for valid ASCII command characters.

The parity and baud rate of the data input are the same as those selected for data output. The ASCII command character must be a single character. Do not send a Carriage Return <CR> or a Line Feed <LF> character after the command character, or the terminal might operate erratically.

ASCII Character	Keyboard Equivalent or Function
A	**lb/kg**
B	Blank Display
C	**Clear**
E	**Enter**
F	**Function**
I	**ID**
L	Lock Keyboard
M	**Memory**
N	**Gross/Net**
P	**Print**
T	**Tare**
U	Unlock Keyboard

ASCII Character	Keyboard Equivalent or Function
W	Display Weight
Z	**Zero**
0	**0**
1	**1**
2	**2**
3	**3**
4	**4**
5	**5**
6	**6**
7	**7**
8	**8**
9	**9**

Table 6-6: Remote ASCII Serial Input Commands

Keyboard equivalents to the ASCII character commands in Table 6-6 are printed in **Bold**.

Appendix 4: Basic Weighing Concepts

This Appendix explains some of the specialized terminology and concepts that are used in the weighing industry.

Zero

Zero is the empty weight of the scale platform or weighbridge. The gross zero reference is recorded during calibration.

Pushbutton Zero is a way for the operator to capture a new gross zero reference point. The weight on the scale must be stable and be within the pushbutton zero capture range, typically ±20% of full scale capacity. The zero of the scale can change because material builds up on the scale or because the temperature changes.

Auto Zero Maintenance (AZM) is a way for the terminal to gradually rezero itself in order to compensate for small changes in zero. Class IIIL legal-for-trade vehicle scales use an AZM range of ±3 displayed increments above/below gross zero. AZM is active any time the weight on the scale is stable and is within the AZM range.

Tare

Tare is the empty weight of a vehicle. Tare is normally used to determine the net weight of the contents of a vehicle. It can be used in the following ways:

Autotare

An autotare is taken by pressing the TARE key when an empty vehicle is on the scale. The terminal then displays a zero weight with the net cursor lit. The vehicle is loaded and driven back onto the scale. The terminal then displays the net weight of the contents. If the TARE key is pressed while the terminal is in the net mode, the current weight on the scale becomes the new tare value. Tare interlocks inhibit replacement autotare.

Keyboard Tare

Keyboard entered tare is used when the empty weight of the vehicle is a known value. The known tare weight is entered using the numeric keys, and the TARE key is pressed. The terminal will then display the net weight of the contents of the vehicle.

Chain Tare

Chain tare is a rarely used mode of keyboard entered tare. If a tare is entered using the numeric keypad while the terminal is in the net weight mode, the tare value entered is added to the existing tare weight value. Tare interlocks inhibit this mode.

Tare Interlocks

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

Sections

Vehicle scale weighbridges are normally divided into what are called "sectional pairs" or sections. A section is a pair of load cells that are side by side in the weighbridge (see Figure 6-1). Sections are primarily a consideration when dealing with shift errors.

Section 1	Section 2	Section 3	Section 4	Section 5
1	3	5	7	9
2	4	6	8	10

Figure 6-1: Load Cells and Sections in a Typical Vehicle Scale

Setpoints

Setpoints are on/off outputs that indicate whether the weight displayed on the scale is greater than or less than a preprogrammed weight value. Setpoints are typically used in material filling applications in order to fill a vehicle to a preset weight. A Cougar terminal provides four single-speed setpoints. It does not provide discrete electrical outputs. The setpoint information is coded into the continuous serial data output. In order to use the terminal's setpoint capabilities, you need an additional piece of equipment that understands the continuous format data output. METTLER TOLEDO Model 3015 Setpoint Controllers and Model 9215 Batching Controllers are examples of devices that understand the continuous format data output and can convert the setpoint data into high-level on/off outputs designed to control material feeders.

Inbound/Outbound Weighing

Vehicle scales are often used in an inbound/outbound mode of operation where the vehicle is loaded or unloaded at the user's site. In the inbound/outbound mode the vehicle empty (tare) weight is not known, so the vehicle must be weighed twice (once empty and once loaded). In the past this was normally done by printing the inbound weight, printing the outbound weight, and then calculating the difference (net weight) by hand.

A Cougar terminal simplifies inbound/outbound weighing by permitting the operator to store the inbound vehicle weight in memory and then recalling that weight at a later time. Once the inbound weight is recalled, the terminal calculates the net weight and prints an outbound ticket.

Net Sign Correction

Net sign correction is a feature that permits the Cougar terminal to be used for both shipping (inbound empty) and receiving (inbound loaded) operations. If net sign correction is enabled, The terminal will swap the gross and tare weight fields on the printed ticket, if necessary, so that the larger weight is the gross weight, the smaller weight is the tare weight, and the difference is always a positive net weight.

One-Pass Weighing

One-pass weighing is a mode where the user has a fleet of vehicles with known empty (tare) weight. The tare weight is recalled by ID with the loaded vehicle on the scale.

Appendix 5: Autorange Operation

Range switching occurs when the total number of displayed increments for a range is equal to the total number of displayed increments for the high range. For example, assume that a terminal is programmed as follows:

[11 0] Calibrate in pounds

[13 2] Dual-range operation is selected

[14] [400000] Scale Capacity

[15] [50] High range increment size

[17] [20] Low range increment size

The following equations and Table 6-7 show how to calculate the largest weight that can be displayed in the lower ranges. For the correct scale capacity and minimum increment size, refer to the indicator setup section of the weighbridge installation manual.

$$\textit{Low Range Capacity} = \frac{\textit{Scale Capacity, Step [14]} \times \textit{Low Range Increment Size, Step [17]}}{\textit{High Range Increment Size, Step [15]}}$$

$$\textit{Mid Range Capacity} = \frac{\textit{Scale Capacity, Step [14]} \times \textit{Mid Range Increment Size, Step [16]}}{\textit{High Range Increment Size, Step [15]}}$$

Display	Displayed Increment Size	Range Calculation Formula	Active Weight Range
Low Increment Range	20 lb	Capacity × Low Increment ÷ High Increment = Low Increment Range (400,000 × 20) ÷ 50 = 160,000 lb	0 lb to 160,000 lb
High Increment Range	50 lb	From Top of the Low Increment Range to Capacity	160,050 lb to 400,000 lb

Table 6-7: Autorange Operation Example

Autorange works on the displayed weight value. Once a tare is taken, the net weight is displayed in the low increment size until the net weight exceeds the low increment range. If the gross, tare, and net weights are not in the same increment range, the total of the net and tare weight might not exactly equal the gross weight.

Example: A tare weight of 46,020 lb is taken. The net weight of the contents of the vehicle is 180,050 lb. The total of the tare and net weight is 226,070 lb, which is an invalid increment size. The terminal will use the valid increment size for the gross weight, which in this case is 50 lb increments, resulting in a printed gross weight of 226,100 lb. This value is the same gross weight that would be displayed if the tare weight was cleared.

Appendix 6: Market Destination

Use the following table to determine the finish code for a particular market destination. Refer to the Model Identification section in Chapter 1.

Finish Code	Destination Market	Preferred Language	Alternative Language	Voltage and Frequency	Power Cord Configuration	Weight Unit	Retail Currency	Currency Abbreviation
000	United States	English	English	120/60	A	LB	Dollar	$
001	United States	English	English	220/60	K	LB	Dollar	$
002	Denmark	Danish	Swed/Norw	230/50	N	KG	Dan Krone	Kr
003	UK	English	English	240/50	C	KG	Pound St	£
004	Italy	Italian	English	230/50	B	KG	Lire (Lit)	L
005	Switzerland	German	English	230/50	M	KG	Swiss Franc	Fr
006	Switzerland	Italian	English	230/50	M	KG	Swiss Franc	Fr
007	Switzerland	French	English	230/50	M	KG	Swiss Franc	Fr
008	Amer. Somoa	English	English	120/60	A	LB	Dollar	$
009	Argentina	Spanish	English	220/50	D	KG	Peso	$
010	Australia	English	English	240/50	D	KG	Aus. Dollar	$
011	Austria	German	--	230/50	B	KG	Schilling	S
012	Barbados	English	English	120/50	A	KG	Barbados $	$
013	Belgium	Flemish	Dutch	230/50	B	KG	Bel. Franc	Fr
014	Belgium	French	English	230/50	B	KG	Bel. Franc	Fr
015	Bermuda	English	English	115/60	A	LB	Dollar	$
016	Bermuda	English	English	115/60	A	KG	Dollar	$
017	Brazil	Portuguese	English	120/60	A	KG	Real $	R$
018	Brazil	Portuguese	English	220/60	A	KG	Real $	R$
019	Canada	English	English	120/60	A	LB	Can. Dollar	$
020	Canada	French	English	120/60	A	KG	Can. Dollar	$
021	Czech Rep.	Czech	English	230/50	B	KG	Koruna	Kcs**
022	Chile	Spanish	English	220/50	E	KG	Chile Peso	$
023	China	Chinese	English	220/50	F	KG	Renmimbi	RMB
024	Colombia	Spanish	English	120/60	A	KG	Peso	$
025	Costa Rica	Spanish	English	120/60	A	KG	Colon	>
026	Curacao	Dutch	English	120/50	A	KG	Guilder	ANG
027	Dom. Republic	Spanish	English	120/60	A	LB	RD Dollar	RD$
028	Dom. Republic	Spanish	English	120/60	A	KG	RD Dollar	RD$
029	Ecuador	Spanish	English	120/60	A	KG	Sucre	Sl.
030	Egypt	Arabic	English	220/50	F	KG	Pound	£
031	El Salvador	Spanish	English	120/60	A	LB	Colon	>
032	El Salvador	Spanish	English	120/60	A	KG	Colon	>
033	Finland	Finnish	English	230/50	B	KG	Marrka	MK

Finish Code	Destination Market	Preferred Language	Alternative Language	Voltage and Frequency	Power Cord Configuration	Weight Unit	Retail Currency	Currency Abbreviation
034	France	French	--	230/50	B	KG	Fr. Franc	F
035	Germany	German	--	230/50	B	KG	D. Mark	DM
036	Greece	Greek	English	230/50	B	KG	Drachma	Dr
037	Guatemala	Spanish	English	120/60	A	Span. LB	Quetzales	Q
038	Guatemala	Spanish	English	120/60	A	KG	Quetzales	Q
039	Honduras	Spanish	English	120/60	A	LB	Lempiras	L
040	Honduras	Spanish	English	120/60	A	KG	Lempiras	L
041	Hong Kong	Chinese	English *	200/50	C	KG	HK Dollar	$
042	Hungary	English	--	230/50	B	KG	Forint	F
043	Iceland	English	English	230/50	B	KG	Krona	Kr.
044	India	--	English*	240/50	G	KG	Rupee	Re
045	Indonesia	--	English*	220/50	F	KG	Rupiah	Rp
046	Ireland	English	English	230/50	C	KG	Punt	£
047	Israel	Hebrew	English	230/50	H	KG	Shekel	NIS
048	Jamaica	English	English	110/50	A	LB	Jam. Dollar	$
049	Jamaica	English	English	110/50	A	KG	Jam. Dollar	$
050	Japan	Japanese	--	100/50,60	I	KG	Yen	¥
051	Jordan	Arabic	English*	220/50	C	KG	JD	JD
052	Lebanon	Arabic	English*	110/50	F	KG	L Pound	L£
053	Malaysia	Malay	English*	240/50	C	KG	Ringgit	M$
054	Mexico	Spanish	English	120/60	A	KG	Peso	N$
055	Morocco	Arabic	--	230/50	B	KG	Dirham	***
056	Netherlands	Dutch	German	230/50	B	KG	D. Guilder	G
057	New Zealand	English	English	230/50	D	KG	NZ Dollar	$
058	Nicaragua	Spanish	English	120/60	A	KG	Nio	C$
059	Norway	Norweig	Swed/Dan	230/50	B	KG	Krone	Kr
060	Pakistan	Pakistani	English*	240/50	G	KG	Rupee	PRe
061	Panama	Spanish	English	120/60	A	KG	Dollar	$
062	Paraguay	Spanish	Portuguese	220/50	A	KG	Guarani	G.
063	Peru	Spanish	English	220/60	A	KG	Nuevos Soles	S/.
064	Philippines	Filipino	English*	115/60	A	KG	Peso	PP
065	Poland	Polish	German	230/50	B	KG	Zloty	Z
066	Portugal	Portuguese	Spanish	230/50	B	KG	Escudo	$
067	Puerto Rico	English	Spanish	120/60	A	LB	Dollar	$
068	Puerto Rico	English	Spanish	120/60	A	KG	Dollar	$
069	Russia (CIS)	Russian	English	230/50	B	KG	Ruble	R
070	Saudi Arabia	Arabic	English*	127/60	A	KG	SR	SR
071	Singapore	Chinese	English*	230/50	C	KG	S Dollar	S$
072	Slovak Rep.	German	English	230/50	B	KG	Koruna	Kcs**
073	South Africa	English	English	220/50	G	KG	Rand	R
074	South Korea	Korean	English	110/60	B	KG	Won	W****

Finish Code	Destination Market	Preferred Language	Alternative Language	Voltage and Frequency	Power Cord Configuration	Weight Unit	Retail Currency	Currency Abbreviation
075	Spain	Spanish	English	230/50	B	KG	Pesetas	Pta
076	Sweden	Swedish	Norw/Dan	230/50	B	KG	Kroner	Kr
077	Taiwan	Chinese	English*	110/60	A	KG	New Tai Dollar	NT$
078	Thailand	Thai	English*	220/50	F	KG	Baht	B
079	Trinidad	English	English	120/60	A	KG	$	$
080	Turkey	Arabic	--	230/50	B	KG	Lira	£
081	Turkey	Turkish	--	230/50	B	KG	Lira	£
082	Uruguay	Spanish	English	220/50	D	KG	Peso	$
083	Venezuela	Spanish	English	120/60	A	KG	Bolivares	Bs.
084	Virgin Islands	English	English	120/60	A	LB	Dollar	$
085	Virgin Islands	English	English	120/60	A	KG	Dollar	$
086	UK	English	English	120/50	C	KG	Pound St.	£
090	Romania	Romanian	English	220/50	B	KG	Leu	Rol.
091	Bolivia	Spanish	English	220/50	A	KG	Boliviano	BOB
092	Latvia	English	English	230/50	B	KG	Latas	Lv
093	Lithuania	English	English	230/50	B	KG	Litas	Lt
094	Croatia	English	English	230/50	B	KG	Kuna	kn
999	W/O Finish	None	None	None	None	None	None	None

Table Notes

* English okay for technical documentation.

** Kcs has a small "v" above the letter "c".

*** Currency abbreviation is not known (no retail market).

**** The letter "W" for Won has a double line (=) through the middle.

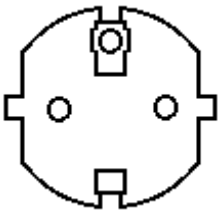
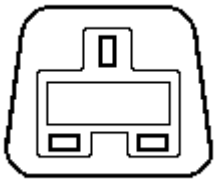
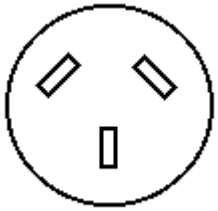
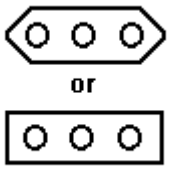
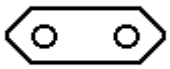
Preferred Language: Language that is normally accepted in that region.

Alternative Language: Language (English, Spanish, French, German) that is also acceptable.

Power Cord Configuration: The "one" configuration most accepted in that region. See the drawings on the following page.

Retail Currency: The full official name of the currency used.

Currency Abbreviation: The currency abbreviation that should appear on keys and displays.

Power Cord Configurations for Market Destinations		
Configuration A 	**Configuration B** 	**Configuration C** 
Configuration D 	**Configuration E**  or	**Configuration F** 
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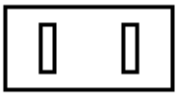
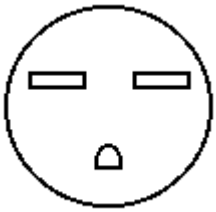
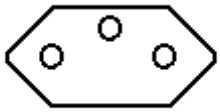
Configuration J 	**Configuration K** 	**Configuration L** 
Configuration M 	**Configuration N** 	

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METTLER TOLEDO
1900 Polaris Parkway
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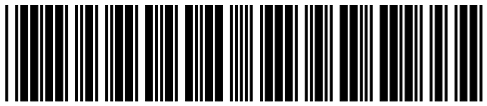
(10/00).00



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