DC-190
ULTRA COUNT

DIGI®
When Accuracy Counts

Counting Scale

Version 4.0

Installation Manual

RICE LAKE WEIGHING SYSTEMS
Commitment Beyond Measurement®

ISO 9001 REGISTERED

74634

Contents

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About This Manual

This manual contains operating procedures for the DC-190 counting scale and provides the user with all the information necessary for setup and operation.

This manual is organized based on the procedures you will likely follow when setting up and using your counting scale. This manual applies to Version 4.0 of the DC-190 Ultra Count software.

Warning *Some procedures described in this manual require work inside the scale base. These procedures are to be performed by qualified service personnel only.*

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at www.rlws.com.

1.0 Introduction

The DC-190 Ultra Count counting scale offers practical solutions for a full range of precision counting applications. Models with an internally mounted load cell are available in capacities of 1.0 to 100 pounds. Models with external platforms are available in capacities of 1.0 to 50,000 pounds. An ultra-high-resolution force balance can also be used as a sample scale.

Features include 200 item code storage, over/under weight and quantity checking capability based on programmable setpoints, and an optional internal battery for standalone applications. The enhanced DC-190 Ultra Count software provides features not found in the standard DC-190 counting scale, including:

- Separate tare registers for each channel
- Selectable fields for RS-232 output
- 32-character ID Code, part name, and lot number fields
- 32-character operator identification can be held through ID Code changes (SPEC-selectable)
- Teraoka Code and numeric input without SPEC change
- Supports unit weight per piece and unit weight per 1000 (SPEC-selectable)
- Supports CR or CR/LF delimiter
- Supports output on stable (SPEC-selectable), output on stable and ≥ setpoint, output on stable *and* in target window (over/under) or *not* in target window (SPEC-selectable)
- Supports simultaneous connection to two printers
- Eltron 27xx series printers can use downloaded label format or fixed format installed in 190
- Code 128 support for Eltron and BCP-30 printers
- BCP-300 company name output can be edited or removed.
- Full barboard support

1.1 Unpacking and Inspection

Immediately after unpacking, visually inspect the DC-190 Ultra Count to ensure all components are included and undamaged. If any items were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

Ensure all accessories are removed from the cartons, then replace all packing materials in the cartons and store in a safe place. Use the original cartons whenever shipment of the scale is required.

1.2 Repacking

If the DC-190 counting scale must be returned for modification, calibration, or repair, it must be properly packed with sufficient cushioning materials and the load cell must be locked to prevent damage to the load cell (see Section 2.1 on page 6).

Whenever possible, use the original carton when shipping the DC-190. Damage caused by improper packaging is not be covered by warranty.

1.3 DC-190 Scale Capacities and Resolutions

Counting scales specify two types of resolution:

- Weight (or external) resolution
- Counting (or internal) resolution

Weight resolution is displayed in increments of the full scale capacity which is divided into weight increments. For example, a 5-lb scale divided into 10,000 display divisions would display weight with 0.0005 lb divisions (10,000 divisions x 0.0005 lb = 5.0 lb).

Counting resolution is based on the internal resolution of the scale. The weight and counting resolutions for the DC-190 single- and dual-platform capacities are listed below.

Tables 1-1 through 1-3 list the scale capacities and resolutions for all models of the DC-190 counting scales.

Model	Capacity (lb)	Weighing Resolution (lb)	Internal Resolution (lb)	Platform Dimensions
S-XL-1.0	1.0	0.0001	0.000001	6” x 8”
S-XL-2.5	2.5	0.0002	0.0000025	7” x 10”
S-XL-5.0	5.0	0.0005	0.000005	11” x 16”
S-XL-10	10.0	0.001	0.00001	
S-XL-25	25.0	0.002	0.000025	
S-XL-50	50.0	0.005	0.00005	
S-XL-100	100.0	0.01	0.0001	

Table 1-1. DC-190 S-XL Scale Capacities

Model	Capacity (lb)		Weighing Resolution (lb)		Internal Resolution (lb)		Platform Dimensions	
	Scale 1	Scale 2	Scale 1	Scale 2	Scale 1	Scale 2	Sample	Bulk
S-XD-1/10	1.0	10	0.0001	0.001	0.000001	0.00001	4” x 6”	9” x 12”
S-XD-1/25		25		0.002		0.000025		
S-XD-1/50		50		0.005		0.00005		
S-XD-2.5/25	2.5	25	0.0002	0.002	0.0000025	0.000025		
S-XD-2.5/50		50		0.005		0.00005		

Table 1-2. DC-190 S-XD Scale Capacities

Model	Capacity (lb)	Weighing Resolution (lb)	Internal Resolution (lb)	Platform Dimensions
S-SL-50	50	0.005	0.00005	13” x 17”
S-SL-100	100	0.01	0.0001	
S-SL-250	250	0.02	0.00025	
S-TL-100	100	0.01	0.0001	17” x 21”
S-TL-250	250	0.02	0.00025	
S-TL-500	500	0.05	0.0005	
S-UL-100	100	0.01	0.0001	24” x 28”
S-UL-250	250	0.02	0.00025	
S-UL-500	500	0.05	0.0005	
NOTE: Other platform sizes are available. Consult factory for more information.				

Table 1-3. Other S-Series Remote Platforms

1.4 DC-190 Console

Figure 1-1 shows the DC-190 console with annunciators and numeric keypad. Annunciators are described in Section 1.4.1; Section 1.4.2 describes the DC-190 keypad.

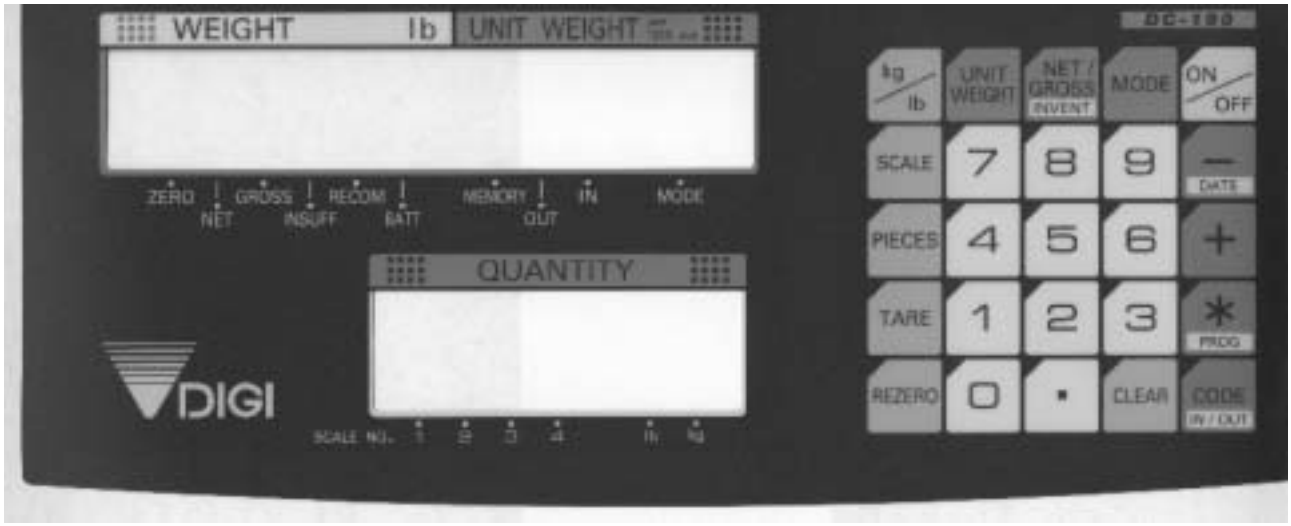


Figure 1-1. DC-190 Keypad and Displays

1.4.1 Annunciators

Table 1-4 shows a list of the annunciators that the DC-190 uses to provide additional information about the value being displayed. The annunciators are illuminated when the specific function is being performed.

Annunciator	Annunciator Meaning
ZERO	Gross weight is at center of zero
NET	Display shows net weight (when tare weight is entered or recalled)
GROSS	Display shows gross weight
INSUFF	Net weight is below specified percentage of scale capacity
RECOM	Unit weight recomputing is possible
BATT	Battery power level is low
MEMORY	Quantity being accumulated or memory overflow error
OUT	Inventory out
IN	Inventory in
UW/1000 Pcs	UNIT-WEIGHT display value is equal to the weight of one piece, not 1000 pieces. Otherwise referred to as average piece weight (A.P.W.)
MODE	In programming mode
lb	Item weighed in lb units
kg	Item weighed in kg units
SCALE NO. (1–4)	Values shown in WEIGHT, UNIT-WEIGHT, and QUANTITY displays are for indicated scale.

Table 1-4. DC-190 Panel Annunciators and Function

1.4.2 DC-190 Keypad

Table 1-5 lists the keys and key functions of the DC-190 Ultra Count keypad (see Figure 1-1 on page 4).

Key	Description
0 through 9	Used to enter numeric values. When using the scale, first enter a numeric value, then press the appropriate function key.
.	Used to enter numeric values containing a decimal point. NOTE: A numeric value must be entered before the decimal point. For example, .250 would be entered as 0.250. In normal mode, pressing the decimal key without entering a numeric value allows you to recall an item code from memory using the Teraoka Code (see Section 10.8 on page 58).
CLEAR	Clears keyed-in data from the display starting with the last digit entered or clears keyed-in data all at once (depends on SPEC 6, bit 2 setting). In normal weighing mode, can be used to clear the unit weight with a unit weight already entered. When using a recalled item code, press CLEAR to clear both the unit weight and the tare weight.
kg / lb	Switches display between pound (lb) and kilogram (kg). The scale powers up in the pound mode.
SCALE	Used to cycle through Scales 1 through 4.
PIECES	Used to compute unit weight by sampling. Press the PIECES key after placing a 10-piece sample on the platform, or after using the numeric keypad to enter the sample size. On multichannel units, the scale used must be selected.
TARE	Used to set and clear tare weights in the normal weighing mode.
REZERO	Used to reset the scale to zero. Also used in conjunction with other keys to enter the maintenance mode. The REZERO key will not function when the scale is in motion.
UNIT WEIGHT	Used to enter a known unit weight using the numeric keypad.
NET/ GROSS INVENT	Switches between net weight and gross weight display modes. Also used as an inventory key (depends on SPEC 2, bit 0 setting).
MODE	Used to enter the program mode. The *MODE* annunciator is illuminated when the scale is in program mode and the WEIGHT display reads *ProG*. The quantity display shows the letter *C* and the number of item codes in memory.
ON / OFF	Powers the scale on or off.
– DATE	Used to operate the reduction function and to move between specification numbers (high to low) in SPEC setting mode. Also used to program part number in programming item codes. In programming mode, it can be used for viewing or setting date/time.
+	Used to operate the accumulation function and to move between specification numbers (low to high) in SPEC setting mode. Also used to program set points in programming item codes.
* PROG	Used to store specification data in SPEC setting and program modes. Also used as a print key to transmit weight information.
CODE IN / OUT	Used to recall item code data and to switch between item code inventory IN and OUT modes. Also used to program commodity name in programming item codes.

Table 1-5. DC-190 Keypad Keys and Functional Descriptions

2.0 Installation

This section describes the procedure for the installation and setup of the DC-190 counting scale.

2.1 Locking and Unlocking

Caution *Do not turn scale upside down. Always work with scale on its side! Damage to the load cell can occur if the scale is turned upside down.*

The DC-190 counting scale is delivered in a locked position to prevent damage to the load cells during shipment.

Caution *To prevent damage to the load cells, scale must be locked prior to shipment.*

The scale uses either one setscrew for the single-platform scale or two setscrews for the dual-platform scale. The setscrews are located on the bottom of the base and must be removed before the scale is put into service. Use the following procedure to unlock your DC-190 counting scale.

1. Turn scale on side. Loosen locknut 1/4 turn (see Figure 2-1).

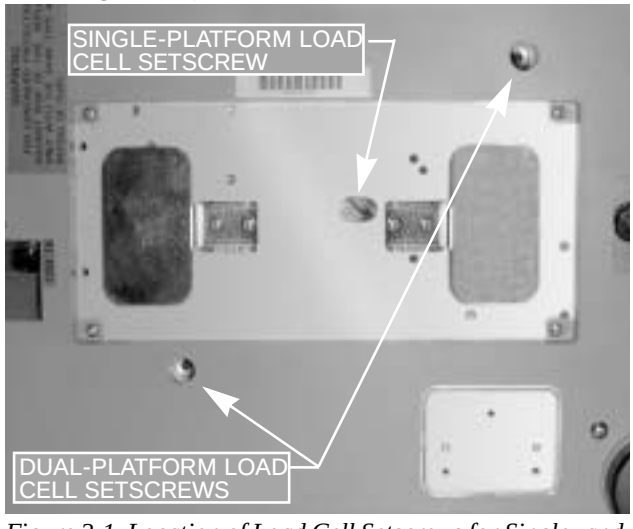


Figure 2-1. Location of Load Cell Setscrews for Single- and Dual-Platform Scales

2. Remove load cell setscrew (see Figure 2-2) using the 2 mm hex wrench provided with scale.

NOTE: *Keep locknut in the approximate original position on the setscrew to prevent damage to load cell when reinstalling.*

NOTE: *Beginning in 2003, setscrews with slotted heads will replace the hex head types, and will no longer require the 2mm hex wrench for removal.*

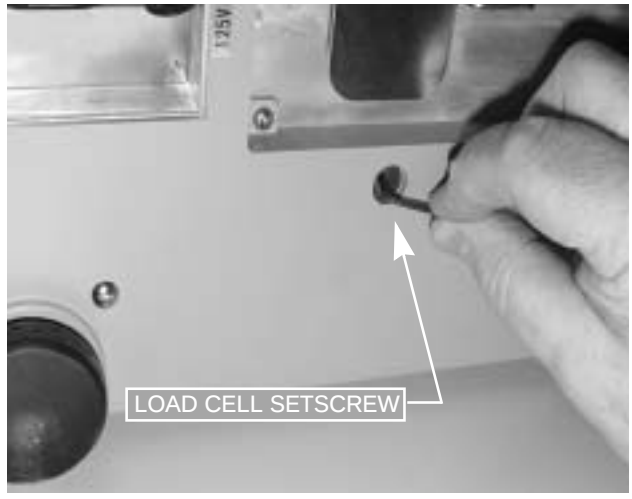


Figure 2-2. Setscrew Removal

3. Tape setscrews to the bottom of the scale or store in a safe location for possible future use.

2.2 Setting Up

Place the scale on a solid, level surface away from fans, breezes, and sources of electrical interference.

Level the scale by turning the four adjustable legs located on the bottom of the scale while referencing the bubble level located on the back of the scale (see Figure 2-3).

NOTE: To ensure greater scale stability, turn in all four adjustable legs before leveling. Turn out adjustable legs to level as needed.

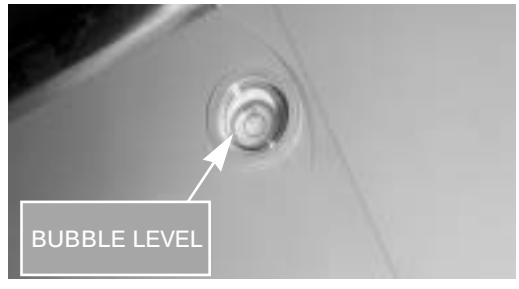


Figure 2-3. Bubble Level

2.3 Powering Up the DC-190

The DC-190 can be operated either from an AC power source or with an optional rechargeable battery pack (DC power). The DC power allows the unit to be completely portable. Instructions for DC operation are contained in Section 2.3.3.

2.3.1 AC Power Source

To power-up the DC-190 using the AC power cord:

1. Connect female end of AC power cord (Figure 2-4) under scale base.

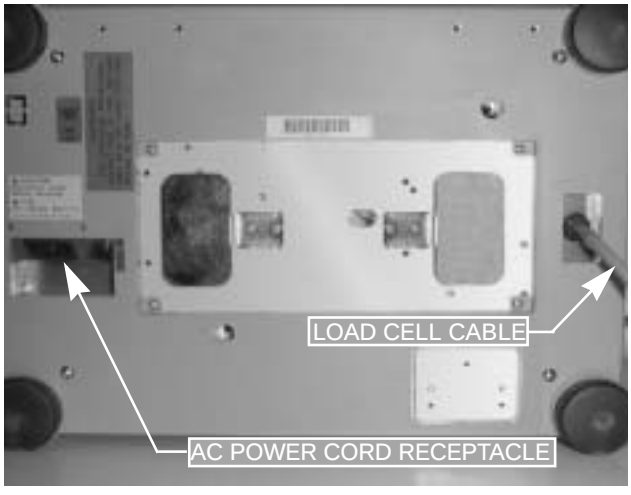


Figure 2-4. Location of AC Power Cord Receptacle and Load Cell Cable

2. Connect load cell cable from scale to Cable Port 1 in the back of the keyboard (Figure 2-5).
3. Plug the AC power cord into a grounded 115 VAC receptacle.

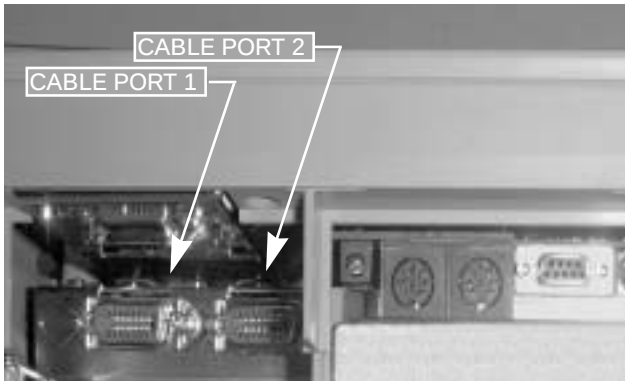


Figure 2-5. Scale Base Connector Ports

4. Press ON/OFF and allow scale to warm up for 10 minutes. The display momentarily shows the revision number, shows all digits from 0 to 9 in a count-up mode, goes blank, shows all 8s, and then enters normal weighing mode.

If the scale is connected to AC power while in the OFF condition, no warm-up is necessary.

NOTE: If the scale displays erratic data, it may be caused by a power transient. Turn the scale off and momentarily unplug it from the wall outlet. Then restart by plugging the scale back in and pressing ON/OFF key. The scale will go through a display check; no warm up is needed.

2.3.2 DC Battery Pack Replacement/Installation

An optional DC battery pack is available and may be purchased from RLWS to ship with the scale or retrofit in the field.

The battery pack is located in the bottom of the scale base and partial disassembly is required to install or replace it. Use the following procedure to install or replace the battery pack.

Caution *To prevent load cell damage, reinstall setscrews before replacing battery.*

1. Unplug scale from power source.
2. Remove scale platter.
3. Remove the four platform support screws from the left-hand platform support assembly (shown in Figure 2-6). Remove the four screws from the right-hand platform support assembly.
4. Remove both platform support assemblies and set aside.

NOTE: The single-platform scale has four platform support (spider) screws while the dual-platform scale has four screws for each of the two platform supports.

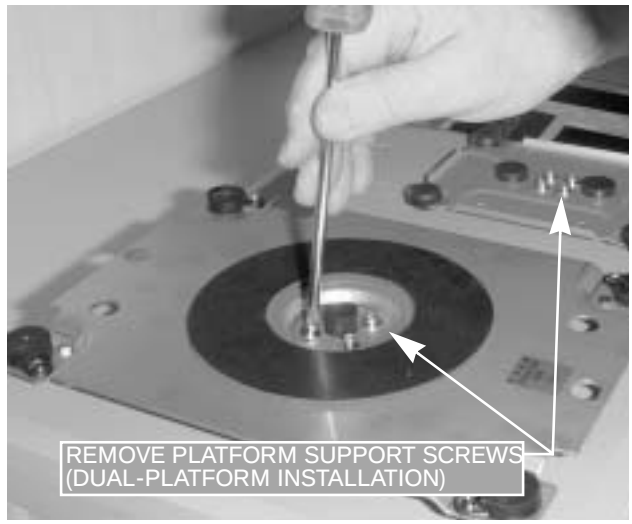


Figure 2-6. Removing Platter Support Screws and Platter Support on a Dual-Platform Scale

5. Place scale on side. Remove four top cover screws (shown in Figure 2-7). Set scale on legs and remove top cover.

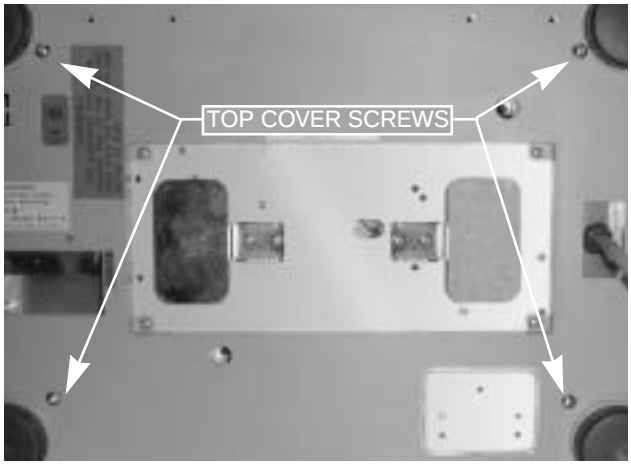


Figure 2-7. Location of Top Cover Screws

6. Disconnect black (–) and red (+) electrical leads from battery (see Figure 2-8). Remove existing DC battery pack. Attach red lead to positive (+) side of battery.
7. Attach black lead to negative (–) side of battery.
8. Place new DC battery pack in battery compartment.

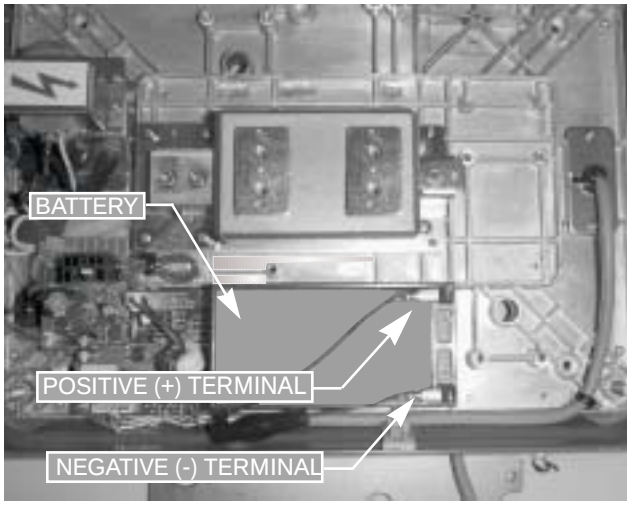


Figure 2-8. Battery Installation

9. Reassemble scale in the reverse order that it was disassembled.
10. Remove setscrew to unlock scale before placing the scale into service.

Caution *If the DC-190 scale is operated with the battery pack removed, isolate the positive (+) and negative (–) leads so that they do not make contact with each other or any part of the scale frame or any sensitive electronic components.*

2.3.3 DC Battery Operation

To power-up the DC-190 using the optional battery:

1. Remove AC power cord from bottom of scale.
2. Turn battery switch to ON (located on the bottom left-hand side of the scale base).
3. Press ON/OFF and allow scale to warm up for 10 minutes. The display momentarily shows revision number, shows all digits from 0 to 9 in a count-up mode, goes blank, shows all 8s, and then enters normal weighing mode.

2.3.4 Battery Charging

A fully charged battery allows for approximately 4 hours of continuous use. Refer to SPEC 1 (Power Auto Off function) for extended hours of use. It will take approximately 8 hours to fully recharge a battery that has been completely dissipated. The console must be connected to the base during the recharge cycle and the AC power cord must be plugged in.

NOTE: *Do not store the scale without turning off the battery power switch! When the battery switch is ON and the AC is not connected, a low level battery current will flow even if the display is OFF. To prevent battery discharge when stored, turn the battery switch OFF whenever the unit is not in use.*

2.4 Setting Time and Date

You can set the time and date printed on DC-190 print tickets. SPEC 5, bits 0 and 1 list three sequence variations of year, month, day that are available to enter dates into the DC-190 counting scale. Printed dates always appear in *mmddyy* format.

To set the date (month, date, and year) and time:

1. Press the MODE key.
2. Press the –/DATE key. The displays shows the date, day, and time.
3. Press the –/DATE key again. Enter month, day, year (*mmddyy*) on the keypad.
4. Press the –/DATE key. Enter the day (0=Mon, 1=Tue…6=Sun.
5. Press the –/DATE key. Enter the time of day using the 24-hour clock. For example, enter 1:35 p.m. as *1335*.
6. Press the */PROG key to store the setting, or press the –/DATE key to exit without saving time and date.

2.5 Installing Cable Strain Relief

To prevent load cell or peripheral cable damage from bending and twisting, cable strain reliefs are used in the back of the DC-190 keyboard. Each DC-190 counting scale comes equipped with these rubber strain reliefs and should be installed on initial scale setup.

1. Remove the three 4 mm x 8 mm panhead screws securing the bracket to the back of the keyboard.
2. Remove rubber strain relief covering the two 14-pin load cell cable ports. If any peripheral devices are installed at this time, remove the rubber strain relief covering the peripheral cable access ports.
3. Route load cell and/or any peripheral device cables through opening in bracket. Connect cables to proper ports.
4. Install rubber strain relief over load cell/ peripheral cables and position into cavity. Gently pull cables to take up any slack.
5. When rubber strain reliefs are securely mounted, reinstall bracket using the three 4 mm x 8 mm panhead screws previously removed.

2.6 Pole Mounting Instructions

1. Disconnect AC power cord from the bottom of the scale. Remove platform.
2. Remove the plastic cover from the upper mounting bracket.

NOTE*: As a precaution, install load cell setscrew.*

3. Turn scale on side.
4. Attach pole mount assembly to base using three 4 mm x 10 mm machine screws (shown in Figure 2-9).

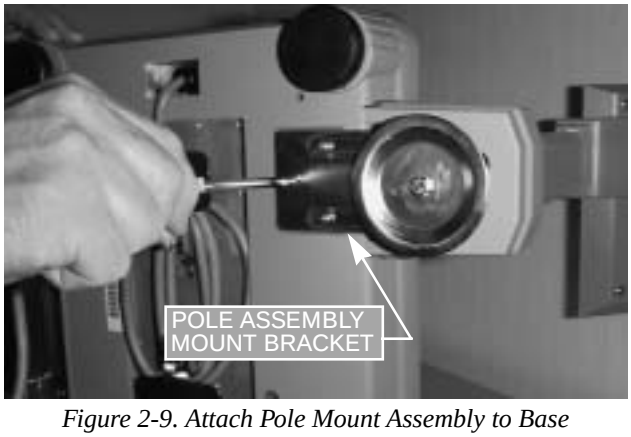


Figure 2-9. Attach Pole Mount Assembly to Base

5. Route load cell and peripheral device cables through center of pole mount assembly.
6. Mount keyboard on bracket using six 4 mm x 10 mm machine screws (Figure 2-10).

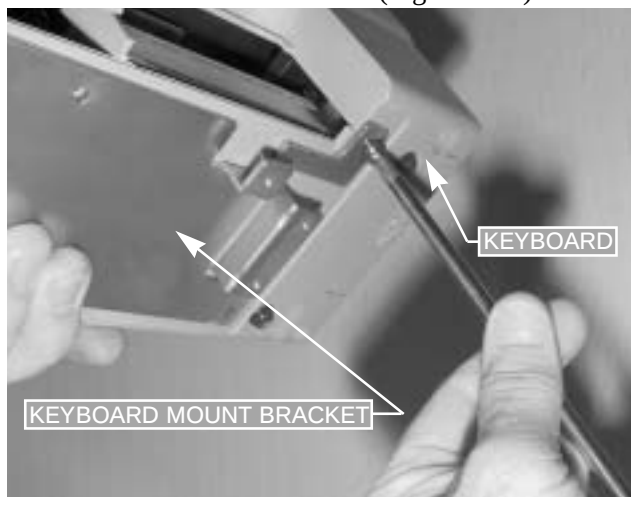


Figure 2-10. Attach Keyboard to Pole Mount Assembly

7. Attach load cell cable to Cable Port 1. If any other scales or peripheral devices are to be installed, remove plastic knockout from plastic shroud as required. Install plastic cover using two 4 mm x 8 mm panhead screws.
8. Install plastic cover over base of pole mount assembly.
9. Remove the load cell setscrew previously installed.

2.7 Load Cell Replacement

Load cell replacement requires partial disassembly of the scale base. Sections 2.7.1 and 2.7.2 describe the procedure for replacing in single- and dual-platform scales. On a dual-platform scale, there are two load cell cables connected to a common power board. Load cell replacement requires unsoldering and soldering of load cell connections to the power board.

2.7.1 Single-Platform Load Cell Replacement

NOTE: *Prior to replacing load cell, install load cell setscrew as detailed in Section 2.1.*

1. Disconnect AC power plug from bottom of scale and remove platform.
2. Remove four platform support machine screws and remove platform support.
3. Turn scale on side. Remove the four panhead machine screws for top cover (Figure 2-7). Set scale on its four legs and remove top cover.
4. Disconnect DC power supply plug from power board (Figure 2-11). Remove four machine screws securing board to chassis.

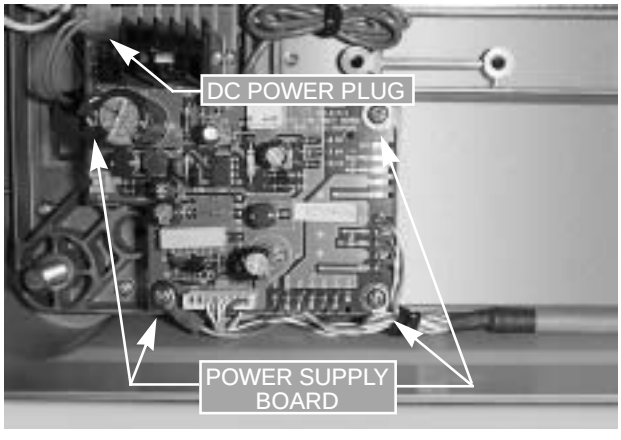


Figure 2-11. Disconnect DC Power Supply Plug and Remove the Four Power Supply Board Screws

5. Unsolder the five load cell wires at power board.
6. Remove four machine screws securing the platform attach bracket (Figure 2-12) to the load cell bracket. Remove platform attach bracket.

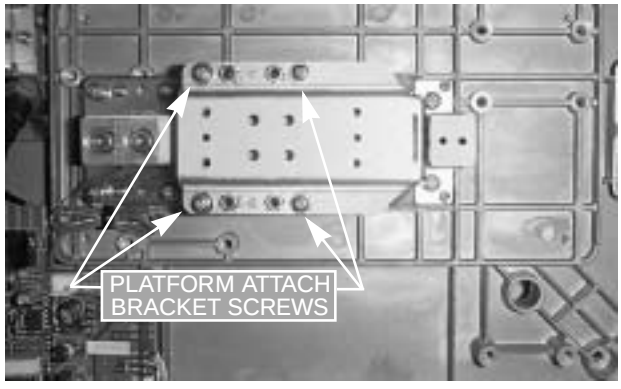


Figure 2-12. Remove Platform Attach Bracket

7. If replacement load cell includes bracket, go to Step 12.
8. If replacement load cell does not include bracket, remove two 6 mm x 20 mm socket head load cell cap screws from load cell bracket (Figure 2-13). Remove load cell bracket.

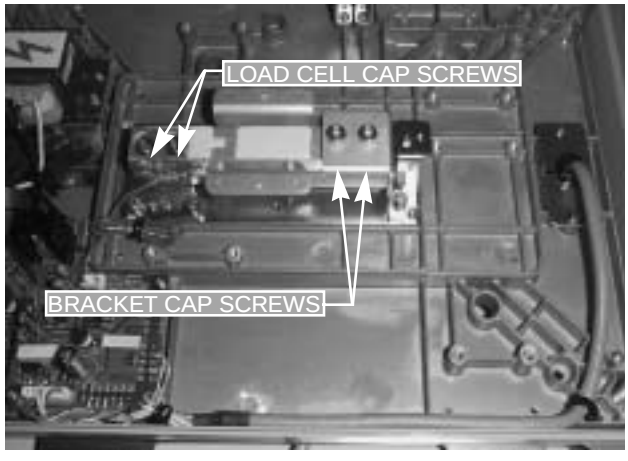


Figure 2-13. Remove Load Cell Bracket

9. Remove two 6 mm x 25 mm load cell cap screws (Figure 2-13). Remove load cell mount spacers.
10. Insert load cell mount spacers in new load cell and install load cell in scale chassis using the two 6 mm x 25 mm cap screws.
11. Insert the load cell bracket using the 6 mm x 20 mm cap screws previously removed.
12. Install platform attach bracket using four machine screws. Ensure that the cell is level with the spider assembly.
13. Solder new load cell cable wires to designated wire solder points (refer to wire color code on power board).

14. Install power board using the four machine screws previously removed. Route load cell cable under power board as shown in Figure 2-11. Reinstall ground terminal under one machine screw head.
15. Connect DC inlet power supply.
16. Replace scale base cover and platform support brackets in the reverse order of disassembly.
17. Remove load cell setscrew before putting the scale back into service.Recalibrate both scales. See Section 5.0 on page 25.
18. Recalibrate scale (see Section 5.0 on page 25).

2.7.2 Dual-Platform Load Cell Replacement

NOTE: *Prior to replacing load cell, install load cell setscrews as detailed in Section 2.1.*

1. Remove both platforms. Disconnect AC power cord from bottom of scale.
2. Remove four platform support machine screws from each platform and remove both platform supports.
3. Turn scale on side. Remove the four panhead machine screws for top cover (Figure 2-7). Set scale on its four legs and remove top cover.
4. Disconnect DC power supply plug from power board (Figure 2-11). Remove four machine screws securing board to chassis.

The following procedure shows removal of one of the two load cells. General instructions are applicable to either load cell.

5. Unsolder the five load cell wires at power board.
6. Remove four machine screws securing the platform attach bracket (Figure 2-14) to the load cell bracket. Remove platform attach bracket.

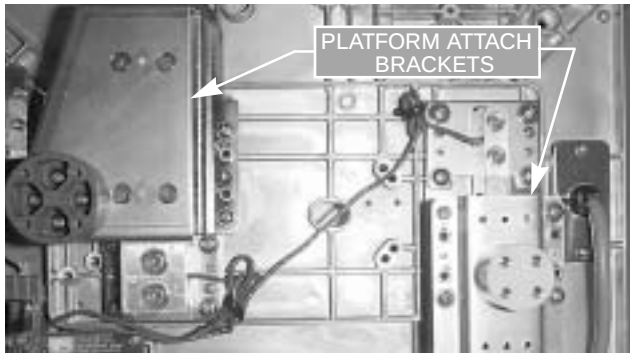


Figure 2-14. Remove Platform Attach Bracket

7. If replacement load cell includes bracket, go to Step 12.
8. If replacement load cell does not include bracket, remove two load cell cap screws from load cell bracket (Figure 2-15). Remove load cell bracket.

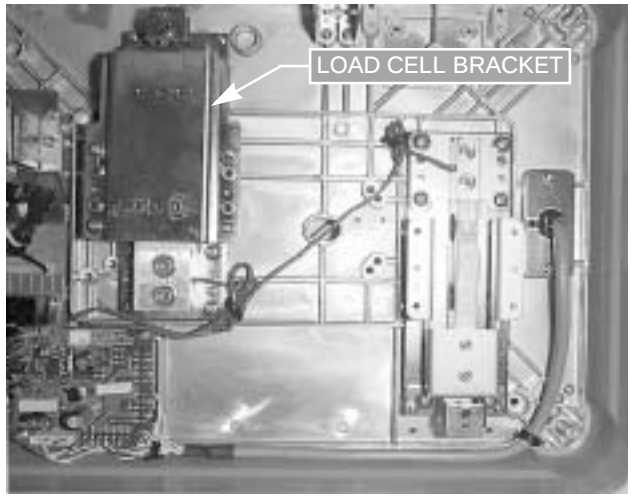


Figure 2-15. Remove Load Cell Bracket

9. Remove two load cell cap screws. Remove load cell mount spacers.
10. Insert load cell mount spacers in new load cell and install load cell in scale chassis using the two cap screws.
11. Insert the load cell bracket using the cap screws previously removed.
12. Install platform attach brackets using four machine screws. Ensure that the cells are level with the spider assembly.
13. Solder new load cell cable wires to designated wire solder points (refer to wire color code on power board).
14. Install power board using the four machine screws previously removed. Route load cell cable under power board as shown in Figure 2-11. Reinstall ground terminal under one machine screw head.
15. Connect DC inlet power supply.
16. Replace scale base cover and platform support brackets in the reverse order of disassembly.
17. Remove load cell setscrews before putting the scale back into service.
18. Recalibrate both scales. See Section 5.0 on page 25.

3.0 Scale Setup

This section provides information about attaching scales and serial devices to the DC-190. Information presented describes both physical connections and values that must be specified when configuring the DC-190 (see Section 4.0). If you know what scales and serial devices will be connected to the DC-190, you can use the SPEC Code Worksheets Section 10.1 on page 50 to record these values for later configuration.

3.1 Scale Configurations

The DC-190 can be connected to up to three analog scale bases using the load cell ports (PORT 1 and PORT 2 shown in Figure 3-1). An Ohaus® Explorer force balance can also connected to either the FORCE BALANCE or 232/PRINTER serial port for a total of four scale channels.

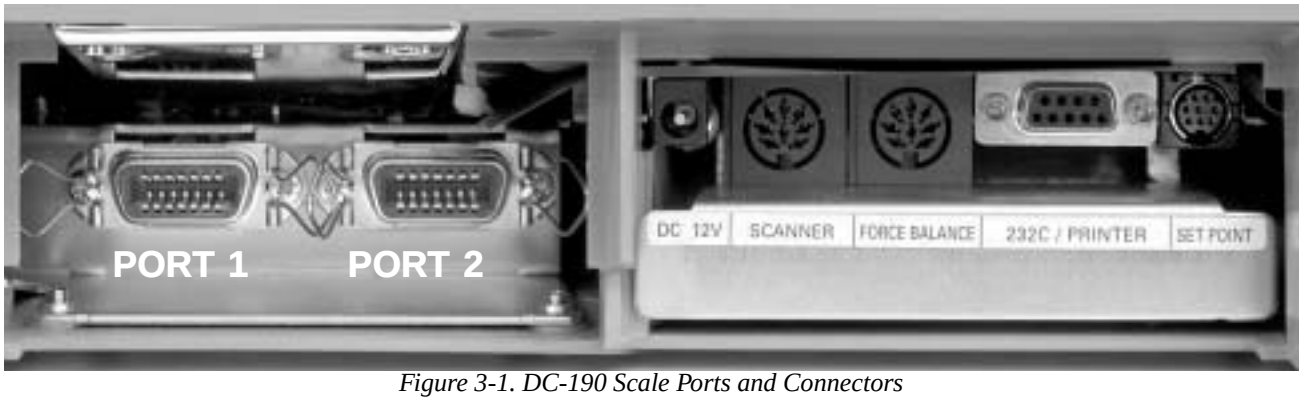


Figure 3-1. DC-190 Scale Ports and Connectors

Attach SX-L single and SX-D dual scale platforms to PORT 1 (left connector); attach external scale base to PORT 2 (right connector). For three-scale configurations using either an SX-L and two external bases or three external bases, an optional Y-cable must be used to connect two of the bases to PORT 1. (A wiring diagram of the Y-cable is shown in Section 10.5 on page 55.)

3.1.1 Configuring SPECs 16 and 17

SPECs 16 and 17 are used to assign the annunciators for each of the four scale channels (*Scale No.* annunciator on the DC-190 console). *All scale channels must be assigned, regardless of the actual number of scales attached.* Table 3-1 shows the values and default bit configurations for SPECs 16 and 17.

SPEC	Default Setting	Bits 3 and 2	Bits 1 and 0
16	0001	Scale 1 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance	Scale 2 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance
17	1011	Scale 3 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance	Scale 4 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance

Table 3-1. Specifications 16 and 17 Default Settings

When configuring SPECs 16 and 17, use the following rules:

- If a force balance is attached, it must be configured as Scale 1. That is, SPEC 16, bits 3 and 2, (Scale 1) must be set to *Force Balance* (11).
- Scales attached to Port 1 are configured as *Internal Scale 1* and *Internal Scale 2*, regardless of whether the actual scale base is internal (SX-L, SX-D) or external.

- The scale attached to Port 2 is configured as *External Scale*.
- All Scales (1–4) must be configured, and the value of each bit pair must be unique: each Scale (1–4) must have a different value. For example, do not attempt to configure two or more scales as *External Scale*; doing so will cause the DC-190 to lock up with an all *888888*s display. See Section 10.7 on page 57 for information about clearing this error condition.

SPECs 16 and 17 do not turn on the additional scales; by default, only one scale is enabled. Scales 2 and 3 are turned on and off using SPEC 25, bit 1 (Scale Type, single or dual) and SPEC 32, bit 0 (Scale Connected to Port 2). The force balance is turned on and off in SPEC 8, bit 3 (Force Balance on RS-232C port); the port used by the force balance is selected in SPEC 13, bits 2, 1, and 0 (RS-232 Connectors).

Caution *When adding a second or third platform to the DC-190, plug in the remote scale (or dummy plug) before connecting AC power to the DC-190 and before enabling the added scales in the configuration SPECs. Do not unplug a remote scale while the DC-190 is powered on.*

3.1.2 Scale Configurations, No Force Balance Attached

Table 3-2 lists several scale configurations for single, dual, and console-only models of the DC-190 with no force balance attached. Required values for each configuration are shown for SPECs 16 and 17 (including *Scale No.* assignments), SPEC 25 (bit 1), and SPEC 32 (bit 0). Because no force balance is attached, SPEC 8, bit 3, must be set to 0 for all listed configurations.

DC-190 Model	PORT 1 Connector	PORT 2 Connector	SPEC 16	SPEC17	SPEC 25	SPEC 32
	S-XL platform (SCALE 1)	—	0001	1011	xx0x	xxx0
	S-XL platform (SCALE 1)	External scale (SCALE 2) *See note below*	0010	0111	xx0x	xxx1
	S-XL platform (SCALE 1) External scale (SCALE 2) *Requires Y-cable*	External scale (SCALE 3)	0001	1011	xx1x	xxx1
	S-XD, small platform (SCALE 1) S-XD, large platform (SCALE 2)	—	0001	1011	xx1x	xxx0
	S-XD, small platform (SCALE 1) S-XD, large platform (SCALE 2)	External scale (SCALE 3)	0001	1011	xx1x	xxx1
	External scale (SCALE 1)	—	0001	1011	xx0x	xxx0
	External scale (SCALE 1)	External scale (SCALE 2) *See note below*	0010	0111	xx0x	xxx1
	External scale (SCALE 1) External scale (SCALE 2) *Requires Y-cable*)	External scale (SCALE 3)	0001	1011	xx1x	xxx1

NOTES:
- *SPEC 8, bit 3, must be set to 0 (0xxx) if no force balance is connected to the* DC-190*. Setting this bit to 1 with no force balance connected will cause the scale to lock up.*
- Console-only configurations require external AC adapter.
- If an external scale is attached to PORT 2 and only one scale is attached to the PORT 1 connector, the external scale is configured using Scale 3 parameters (SPECs 33, 36, and 37).

Table 3-2. DC-190 Scale Configurations (No Force Balance Connected)

3.1.3 Scale Configurations, Including Force Balance

Table 3-2 lists several scale configurations for single, dual, and console-only models of the DC-190 with a force balance attached. Required values for each configuration are shown for SPECs 16 and 17 (including *Scale No.* assignments), SPEC 25 (bit 1), and SPEC 32 (bit 0). Because a force balance is attached, SPEC 8, bit 3, must be set to 1 for all listed configurations.

DC-190 Model	PORT 1 Connector	PORT 2 Connector	SPEC 16	SPEC17	SPEC 25	SPEC 32
	S-XL platform (SCALE 2)	—	1100	0110	xx0x	xxx0
	S-XL platform (SCALE 2)	External scale (SCALE 3)	1100	1001	xx0x	xxx1
	S-XL platform (SCALE 2) External scale (SCALE 3) *Requires Y-cable*	External scale (SCALE 4)	1100	0110	xx1x	xxx1
	S-XD, small platform (SCALE 2) S-XD, large platform (SCALE 3)	—	1100	0110	xx1x	xxx0
	S-XD, small platform (SCALE 2) S-XD, large platform (SCALE 3)	External scale (SCALE 4)	1100	0110	xx1x	xxx1
	External scale (SCALE 2)	—	1100	0110	xx0x	xxx0
	External scale (SCALE 2)	External scale (SCALE 3)	1100	1001	xx0x	xxx1
	External scale (SCALE 2) External scale (SCALE 3) *Requires Y-cable*)	External scale (SCALE 4)	1100	0110	xx1x	xxx1

NOTES:
- *Any attached force balance must be configured as SCALE 1 (see SPECs 16 and 17 above).*
- *SPEC 8, bit 3, must be set to 1 (1xxx) to enable the force balance.*
- Console-only configurations require external AC adapter.

Table 3-3. DC-190 Scale Configurations (Force Balance Connected)

3.2 Serial Configurations

The DC-190 provides three serial communications ports (see Figure 3-1 on page 12). Table 3-4 lists the ports, connector type, type of serial data transmitted, and the SPEC numbers used to set the serial port characteristics, including data length, baud rate, stop bits, and parity bits for the port.

Port Label	Connector Type	Serial Data/Device Types	Serial Port Specifications
SCANNER	8-pin DIN	Bar code pens and scanners	SPECs 14 and 15
FORCE BALANCE	8-pin DIN	Force balance input Printer output PC output	SPECs 8 and 9 SPECs 10 and 11
232C/PRINTER	9-pin D-sub		

Table 3-4. DC-190 Serial Ports

Serial data transmitted or received on these ports can be any of the following types:

- Continuous input from an Ohaus Explorer force balance
- Printer output, with fixed format print drivers for various ticket, tape, and label printers (see description of SPECs 3 and 11 in Section 4.2 on page 18)
- Comma-delimited PC data (Program mode only), with selectable fields (see Section 4.4 on page 24)

SPEC 13, bits 2, 1, and 0, determine the type of device attached to the DIN-8 (FORCE BALANCE) and D-sub (232C/PRINTER) serial ports. See Section 3.2.1 on page 15.

NOTE: *When attaching peripheral devices to the DC-190, connect all devices with the scale powered off and unplugged. (Pressing the* ON/OFF *button does not completely power-down the scale.) Once devices are attached, reconnect power to the scale and press the* ON/OFF *button.*

3.2.1 Configuring SPEC 13

SPEC 13 determines the type of data sent or received on the DIN-8 (FORCE BALANCE) and D-sub (232C/PRINTER) serial ports. Table 3-5 shows the values that can be assigned to SPEC 13.

SPEC 13 Value	Device Type Attached to FORCE BALANCE (DIN-8) Port	Device Type Attached to 232C/PRINTER (D-Sub) Port
x000	Force Balance or no device	Printer
x001	Printer	Force Balance or no device
x010	PC	Printer
x011	Printer	PC
x100	Force Balance or no device	PC
x101	PC	Force Balance or no device

Table 3-5. SPEC 13 Values, Bits 2, 1, and 0

Depending on the value specified for SPEC 13, the characteristics of each serial port may be controlled by SPECs 8 and 9 or by SPECs 10 and 11:

- If a force balance is attached (or if the port is assigned as a *Force Balance* in SPEC 13), the port characteristics are set by SPECs 8 and 9. SPEC 8, bit 3, must be set to 1 if a force balance is attached.
- If a printer is attached (or if the port is assigned as a *Printer* port in SPEC 13), the port characteristics are set by SPECs 10 and 11. SPEC 10, bit 3, must be set to 1 if a printer is attached to either port.
- If a PC is attached (or if the port is assigned as a *PC* port in SPEC 13), the port characteristics are set by whichever pair of SPECs (8 and 9 or 10 and 11) are not claimed by the other port. The port designated for *Force Balance* or *Printer* takes priority over the *PC* port.

NOTE: SPEC 8, bit 3 (Force Balance Attached) and SPEC 10, bit 3, (Printer Attached) enable their associated serial port to receive continuous data from a force balance (SPEC 8) or to send printer data. Do not set these bits to 1 (on) unless that device type is actually attached and powered on. Enabling these bits without the device attached will cause the scale to lock up with an all *888888*s display. See Section 10.7 on page 57 for information about clearing this error condition.

The default value of SPEC 13, x001, sets up the DC-190 for a force balance on the DIN-8 port and a printer on the D-sub port. Both SPEC 8, bit 3, and SPEC 10, bit 3, are set to 0 (off) by default: any attached devices must be enabled in SPEC configuration before they can be used.

3.2.2 FORCE BALANCE (DIN-8) and 232C/PRINTER (D-Sub) Port Connections

Table 3-6 shows possible serial device configurations for each valid setting of SPEC 13, including the SPEC numbers used to set serial port characteristics in each listed configuration.

NOTE: The DC-190 can also be configured for two printers, using SPEC 13 values of x010 or x011. The printer drivers and commands sent to each port are set using SPEC 3 and SPEC 11, bit 2. See Section 4.2 on page 18 for more information.

SPEC 13	FORCE BALANCE PORT (DIN-8)		232C/PRINTER PORT (D-SUB)	
	Device Type	Port Control Specs	Device Type	Port Control Specs
x000	 or NONE	SPEC 8 = 1xxx SPEC 9 = x1xx *See Note 1*		SPEC 10 = 1xxx SPEC 11 = xxxx *See Note 2*
x001		SPEC 10 = 1xxx SPEC 11 = xxxx *See Note 2*	 or NONE	SPEC 8 = 1xxx SPEC 9 = x1xx *See Note 1*
x010		SPEC 8 = 0xxx SPEC 9 = x1xx		SPEC 10 = 1xxx SPEC 11 = xxxx *See Note 2*
x011		SPEC 10 = 1xxx SPEC 11 = xxxx *See Note 2*		SPEC 8 = 0xxx SPEC 9 = x1xx
x100	 or NONE	SPEC 8 = 1xxx SPEC 9 = x1xx *See Note 1*		SPEC 10 = 1xxx SPEC 11 = xxxx
x101		SPEC 10 = 1xxx SPEC 11 = xxxx	 or NONE	SPEC 8 = 1xxx SPEC 9 = x1xx *See Note 1*

NOTES:

1. SPEC 8, bit 3, must be set to 0 (0xxx) if no force balance is connected to the DC-190*. Setting this bit to 1 with no force balance connected will cause the scale to lock up.*

2. SPEC 10, bit 3, must be set to 0 (0xxx) if no printer is connected to the DC-190*. Setting this bit to 1 with no printer connected will cause the scale to lock up.*

Table 3-6. SPEC 13 Settings and Controlling Port Specifications for Serial Device Connections

3.2.3 SCANNER Port Connections

The SCANNER port is a dedicated port, used only for barcode pens or scanners. The port is enabled by setting SPEC 14, bit 3, to 1. SPECs 14 and 15 set the data length, baud rate, stop bits, and parity bits for the port. See Section 4.2 on page 18 for more information about SCANNER port specifications.

Section 10.10 on page 60 provides scanner setup information for the PSC QuickScan 6000 scanner.

4.0 Configuration Settings

This section presents the setup and configuration of the DC-190 counting scale to be used specifically by distributors and service technicians. These configuration settings customize the counting scale for individual applications.

Setting configuration allows you to easily modify the functionality of your DC-190. Use the tables in this section to view the options you can modify. For example, to enable the Unit Weight Auto-Recomputing function, go to SPEC 5 in the specification table. Go across the row and see that bit 2 controls this function. The default for SPEC 5 is 1011, which means that the Unit Weight Auto-Recomputing function is turned off. To turn it on, change the bit string to 1111.

The following tables list the DC-190 specifications and their corresponding default values. Each specification (SPEC) consist of four bits (bits 3 through 0) and represent various settings or selections.

- SPECs 00–19 (Table 4-1) are customer specifications and use the 141 access code
- SPECs 20–39 (Table 4-2 on page 21) are weight and measurement specifications and use the 142 access code
- SPECs 40–59 use the 143 access code
- SPECs 40–45 are RS-232 specifications (see Table 4-3 on page 24)
- SPECs 46–59 are not used. These SPECs must be set to 0000.

NOTE: *Worksheets for each of the access code groups are included in Section 10.1 on page 50. These worksheets can be used to record and plan configuration settings for each SPEC.*

4.1 Configuration Procedure

The general procedure for setting SPEC codes is as follows:

1. Press and hold the REZERO key then use the numeric keypad to enter the access code number (141, 142, or 143). The number of the first SPEC code for that access code appears in the WEIGHT display; the value of the four bits for that SPEC appear in QUANTITY display. Bit 3 is the left digit in QUANTITY display.
2. Press the + key to move up through each specification until the desired specification is obtained. (Press the – key to move down through each specification.) The + and – keys wrap from the first SPEC of each access code to the last. For example: with SPEC 0 displayed (*SPC00*), pressing the + key displays SPEC 1; pressing the – key wraps to SPEC 19, the last of the 141 access code SPECs.
3. Enter the new bit string (four bits required), starting with bit 3. Press + or – to store bit settings into temporary memory.
4. Repeat Steps 2 and 3 until all specifications are changed.
5. Press the * key to store the new values in RAM and exit configuration mode.
6. Press MODE to return to weighing mode.
7. Power scale off, then on, to permanently update the changed SPECs and initialize the scale with the new settings.

4.2 Customer Specification (141 Settings)

To configure customer specifications, press and hold the REZERO key and enter 141 using the numeric keypad. *SPC00* appears in the WEIGHT display and configuration of four bits (for SPEC 0) appears in QUANTITY display. Follow the procedure described in Section 4.1 on page 17 to update the SPEC settings for the 141 access code.

SPEC	Default	Bit 3	Bit 2	Bit 1	Bit 0
0	0000	Transfer Tare Weight 0: No (hold tare) 1: Yes (transfer tare)	Tare Accumulation 0: No (overwrite tare) 1: Yes (add to existing tare)	Terminator (RS-232 only) 0: Carriage return 1: Carriage return + linefeed	Piece Weight Selection 0: Unit wt per 1000 1: Average piece wt (APW)
1	0000	Power Auto Off Function: Function used to preserve and extend battery life. All four bits are used to specify the number of minutes (binary) before the scale enters autopower off mode.Examples below show the binary code, time delay, and description. Settings can range from 0–15 minutes in 1-minute increments. Binary Code 8421 Time (min) Description 0000 0 Autopower off is disabled. 0111 7 If net weight is zero and no motion for 7 minutes, scale goes into autopower off mode. 1111 15 If net weight is zero and no motion for 15 minutes, scale goes into autopower off mode. NOTE: *Powering down means that accumulated value is lost and not retained upon power up. However, all total inventory values stored with item codes are retained.*			
2	1000	Scale Specification 00: Gram (no units switching) 01: Kg 10: Lb 11: Not used NOTE: Values *01 and 10 allow Lb/Kg units switching if SPEC 2, bit 1 is set 0.*		Kg/Lb Lamp Enable 0: Yes 1: No	Inventory Display by Net/Gross Key 0: No (Net/Gross toggle) 1: Yes (INVENT key shows inventory quantity)
3	0000	RS-232 Port Commands (D-sub) 00: Standard RS-232 (PC, force balance) 01: TM-U295 ticket printer 10: TM-U200 (with or without cutter) 11: TM-U200 (with feed for tear-off)		Print Commands (8-pin DIN) 00: BCP-30 (barcode printer, force balance) 01: TM-U295 ticket printer 10: TM-U200 (with or without cutter) 11: TM-U200 (with feed for tear-off)	
4	1001	Set New Item Code During Normal Mode 0: Yes 1: No	Insufficient Sample Level 00: 0.1% 01: 0.2% 10: 0.0%		Negative Counting 0: No 1: Yes
5	1011	Sampling Time for Unit Weight Calculations 0: 10 times 1: 5 times	Unit Weight Auto-Recomputing 0: Press PIECES key after adding number of pieces 1: Scale automatically recomputes after adding number of pieces without pressing PIECES key	Date Order 00: Year, Month, Day 01: Day, Month, Year 11: Month, Day, Year	
6	1001	Display Accuracy of Unit Weight 0: No 1: Yes	Clear Key Operation 0: Clear all data 1: Clear last character	RS-232 Continue Sending Rate to PC 0: High 1: Low	Auto Shift to Next Character After Two Digits of Teraoka Code Entry 0: No (requires + key) 1: Yes

Table 4-1. DC-190 141 Settings

SPEC	Default	Bit 3	Bit 2	Bit 1	Bit 0
7	0000	Setpoint Buzzer 0: Yes 1: No	Setpoint Latch 0: Latching 1: Non-latching	Setpoint Type 00: % Quantity 01: % Weight 10: Quantity 11: Weight	
NOTE: See Section 3.2.2 on page 16 for more information about configuring SPECs 8–11					
8	0010	Force Balance Attached 0: No 1: Yes	RS-232C Data Length 0: 7 bits 1: 8 bits	RS-232C Baud Rate 00: 1200 01: 2400 10: 4800 11: 9600	
9	0111	RS-232C Stop Bits 0: 1 bit 1: 2 bits	Force Balance Type 0: Not used 1: Ohaus Explorer	RS-232C Parity Bit 00: No 01: Odd 10: Not used 11: Even	
10	0111	Printer or PC Attached 0: No 1: Yes	RS-232C Data Length 0:7 bits 1: 8 bits	RS-232C Baud Rate 00: 1200 01: 2400 10: 4800 11: 9600	
11	0100	RS-232C Stop Bits 0: 1 bit 1: 2 bits	Printer Driver 0: Eltron printer driver or comma-delimited file 1: BCP30, BCP-300, or Epson printer	RS-232 Parity Bit 00: No 01: Odd 10: Not used 11: Even	
12	1000	RS-232 (PC/PRN) Output 00: Not available 01: When counting condition (PC) 10: By * key (printer and PC) 11: In both cases		Eltron Format 0: Eltron fixed label format (also for BCP30, BCP300) 1: Custom download format	RS-232C PC Data Sent with Header Codes 0: Yes 1: No
NOTE: See Section 3.2.1 on page 15 for more information about configuring SPEC 13					
13	0001	RS-232 PC Header 0: Header codes 1: Field titles	RS-232 Connectors If only one RS-232 device (printer or PC) is connected to the scale, select one of the four settings below: DIN-8 (FORCE BALANCE) D-Sub (232C/PRINTER) 000: Force Balance (SPEC 8, 9 Printer (SPEC 10, 11) 001: Printer (SPEC 10, 11) Force Balance (SPEC 8, 9) 100: Force Balance (SPEC 8, 9 PC (SPEC 10, 11) 101: PC (SPEC 10, 11) Force Balance (SPEC 8, 9) If two RS-232 devices (printer and PC) are connected to the scale, select one of the two settings below: DIN-8 (FORCE BALANCE) D-Sub (232C/PRINTER) 010: PC (SPEC 8, 9) Printer (SPEC 10, 11) 011: Printer (SPEC 10, 11 PC (SPEC 8, 9)		
NOTE: See Section 10.10 on page 60 for PSC QuickScan 6000 scanner setup information (SPECs 14 and 15).					
14	1010	RS-232C Connection (Barcode pen) 0: No 1: Yes	RS-232C Data Length (Barcode pen) 0: 7 Bits 1: 8 Bits	RS-232C Baud Rate (Barcode pen) 00: 1200 01: 2400 10: 4800 11: 9600	

Table 4-1. DC-190 141 Settings (Continued)

SPEC	Default	Bit 3	Bit 2	Bit 1	Bit 0
15	0011	RS-232C Stop Bits (Barcode pen) 0: 1 Bit 1: 2 Bits	RS-232C with Header (Barcode pen) 0: Yes (first character recognized as header) 1: No (every bar code treated as ID code)	RS-232C Parity Bit (Barcode pen) 00: No 01: Odd 10: Not used 11: Even	
NOTE: All scale channels must be assigned in SPECs 16 and 17, regardless of the actual number of scales attached. See Section 3.1.1 on page 12 for detailed information about configuring these SPECs.					
16	0001	Scale 1 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance		Scale 2 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance	
17	1011	Scale 3 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance		Scale 4 00: Internal Scale 1 01: Internal Scale 2 10: External Scale 11: Force Balance	
18	0000	Setpoint TTL Output 0: Active low (0V) 1: Active high (+5V)	Number of Setpoints. Values for 3–6 setpoints are valid only if SPEC 7, bits 0 and 1, are set to 10 or 11 (Quantity or Weight). 000: 2 setpoints 001: 3 setpoints 010: 4 setpoints 011: 5 setpoints 100: 6 setpoints		
19	1000	Display “not F” Message for Items not Stored in Memory 0: Yes 1: No	Link to IMS (US version) 0: No 1: Yes	Type of Force Balance (Japan version only) 0: SHG-300 1: HR-60	Print when Pressing + or – Key in Add Mode 0: Yes 1: No (print only with *)

Table 4-1. DC-190 141 Settings (Continued)

4.3 Weight and Measurement Specifications (142 Settings)

To configure weight and measurement specifications, press and hold the REZERO key and enter 142 using the numeric keypad. *SPC20* appears in WEIGHT display and configuration of four bits (for SPEC 20) appears in QUANTITY display. Follow the procedure described in Section 4.1 on page 17 to update the SPEC settings for the 142 access code.

SPEC	Default	Bit 3	Bit 2	Bit 1	Bit 0
20	*none*	Minimum Display (PORT 1, Scale 1) MUST BE SET PRIOR TO CALIBRATION! 00: 2 01: 1 10: 5 11: 10		Minimum Display (PORT 1, Scale 2) MUST BE SET PRIOR TO CALIBRATION! 00: 2 01: 1 10: 5 11: 10	
21	*none*	Eltron Printer Selection 0: Eltron Model 2722 1: Eltron Model 2742 or 2642 *NOTE: Must be set to 0 if an Eltron printer is not being used.*	Weight Decimal Point Position (PORT 1, Scale 1) MUST BE SET PRIOR TO CALIBRATION! 000: 00000 011: 00.000 001: 0000.0 100: 0.0000 010: 000.00 101: .00000		
22	*none*	*Not used*	Weight Decimal Point Position (PORT 1, Scale 2) MUST BE SET PRIOR TO CALIBRATION! 000: 00000 011: 00.000 001: 0000.0 100: 0.0000 010: 000.00 101: .00000		
23	0000	Display Resolution for Scales 1, 2, 3, and 4. (Specify *Not Used* for force balance.) 00: 1/10000 01: 1/5000 10: 1/2500 11: Not used		Zero Setting Range 00: +Unlimited/–10% FS 01: ±2% FS 10: ±10% FS 11: Not used	
24	0000	Masked Display at Minus Weight 0: Gross 1: Net	Display at Minus Weight 0: Minus display 1: Masked	Zero Lamp Lighting Method 0: Gross 1: Net	Low Battery (turn off display when low battery) 0: No 1: Yes
25	00_0	Scale Starting Method 0: Automatic 1: Manual (must press REZERO key on startup)	Internal Resolution Protected by Span Switch 0: No (internal resolution can be viewed by pressing REZERO * * +) 1: Yes (protected until internal span switch pressed)	Scale Type 0: Single scale 1: Dual scale *NOTE: If you are not connected to a dual-platform scale, or do not have two scales wired into Cable PORT 1, set this bit to 0 (single scale). Selecting 1 (dual scale) can damage the console's electronic components.*	Gross Mode Available 0: Yes (allows gross mode selection from keypad) 1: No (inhibits gross mode; switching not allowed)
26	0000	Zero Tracking When Tare Is Present 0: Yes 1: No (zero tracking is off with tare in system)	Rezero with a Tare Weight 0: Yes 1: No	Initial Start Range 00: +Unlimited/–10% FS 01: ±2% FS 10: ±10% FS 11: Not used	

Table 4-2. DC-190 142 Settings

SPEC	Default	Bit 3	Bit 2	Bit 1	Bit 0
27	0100	Comma Display 0: No 1: Yes	Keypad Entry of Tare 0: No 1: Yes	Tare Range 00: 100% FS 10: 5% FS	 01: 50% FS 11: Not used
28	0000	Auto Tare Clear when Rezeroed 0: No 1: Yes (REZERO clears tare value)	Automatic Unit Weight Clear Condition 00: Over net 5d and gross 21d, weight stable 01: Greater than or equal to net 1d, weight stable 10: Greater than or equal to net 1d, quantity > 0, weight stable		Automatic Unit Weight Clear 0: No 1: Yes
29	0000	Digital Tare Rounding 0: Tare exactly 1: Round to nearest increment	Tare Value Exchange with TARE key 0: Yes (allow tare addition/subtraction) 1: No	Tare Addition 0: Yes (new tare weight added to existing tare) 1: No	Tare Subtraction 0: Yes (new tare weight subtracted from existing tare) 1: No
30	none	Load Cell Sensitivity Selection (mV/V)—PORT 1, Scale 1 Load cell sensitivity is automatically set at calibration. Manual adjustments can be made to reduce noise.			
		Spec Min Max 0000: 3.46 4.00 0001: 3.00 3.46 0010: 2.59 3.00 0011: 2.25 2.59	Spec Min Max 0100: 1.95 2.25 0101: 1.69 1.95 0110: 1.46 1.69 0111: 1.27 1.46	Spec Min Max 1000: 1.09 1.27 1001: 0.95 1.09 1010: 0.82 0.95 1011: 0.71 0.82	Spec Min Max 1100: 0.61 0.71 1101: 0.53 0.91 1110: 0.46 0.53 1111: 0.40 0.46
31	none	Load Cell Sensitivity Selection (mV/V)—PORT 1, Scale 2 Load cell sensitivity is automatically set at calibration. Manual adjustments can be made to reduce noise.			
		Spec Min Max 0000: 3.46 4.00 0001: 3.00 3.46 0010: 2.59 3.00 0011: 2.25 2.59	Spec Min Max 0100: 1.95 2.25 0101: 1.69 1.95 0110: 1.46 1.69 0111: 1.27 1.46	Spec Min Max 1000: 1.09 1.27 1001: 0.95 1.09 1010: 0.82 0.95 1011: 0.71 0.82	Spec Min Max 1100: 0.61 0.71 1101: 0.53 0.91 1110: 0.46 0.53 1111: 0.40 0.46
32	1010	Calibration Mode Protected by Span Switch 0: Yes (span switch must be pressed before calibration) 1: No	Low Battery Annunciator Enabled 0: Yes 1: No	Auto Exit from Part Accumulation and Reduction Mode 0: No (must press CLEAR to perform another accumulation) 1: Yes (exits to counting mode after three seconds)	Scale Connected to PORT 2 0: No 1: Yes CAUTION: *If you are not connecting a scale to this connector, select 0. Selecting 1 can damage the console's electronic components.*
33	0___	Over Weight Mask at: 0: +1d 1: +9d	Weight Decimal Point Position (PORT 2, Scale 2 or 3) MUST BE SET PRIOR TO CALIBRATION! 000: 00000 001: 0000.0 010: 000.00 011: 00.000 100: 0.0000 101: 0.00000		
34	0000	Not used	A/D Output (PORT 1, Scale 1) 0: For std/normal load cell (≤ 18 mV) 1: For abnormal load cell with too large offset (> 18mV)	A/D Filtering (PORT 1, Scale 1) 00: Normal 01: Protect from small vibration/fast change in display 10: Protect from medium vibration 11: Protect from large vibration, slow change in display	

Table 4-2. DC-190 142 Settings (Continued)

SPEC	Default	Bit 3	Bit 2	Bit 1	Bit 0
35	0000	Not used	A/D Output (PORT 1, Scale 2) 0: For std/normal load cell (≤ 18 mV) 1: For abnormal load cell with too large offset (> 18mV)	A/D Filtering (PORT 1, Scale 2) 00: Normal 01: Protect from small vibration/fast change in display 10: Protect from medium vibration 11: Protect from large vibration, slow change in display	
36	__00	Minimum Display (PORT 2, Scale 2 or 3) MUST BE SET PRIOR TO CALIBRATION! 00: 2 01: 1 10: 5 11: 10		A/D Filtering (PORT 2, Scale 2 or 3) 00: Normal 01: Protect from small vibration/fast change in display 10: Protect from medium vibration 11: Protect from large vibration, slow change in display	
37	1001	Load Cell Sensitivity Selection (mV/V)—PORT 2, Scale 2 or 3 Load cell sensitivity is automatically set at calibration. Manual adjustments can be made to reduce noise.			
		Spec *Min* *Max* 0000: 3.46 4.00 0001: 3.00 3.46 0010: 2.59 3.00 0011: 2.25 2.59	*Spec* *Min* *Max* 0100: 1.95 2.25 0101: 1.69 1.95 0110: 1.46 1.69 0111: 1.27 1.46	*Spec* *Min* *Max* 1000: 1.09 1.27 1001: 0.95 1.09 1010: 0.82 0.95 1011: 0.71 0.82	*Spec* *Min* *Max* 1100: 0.61 0.71 1101: 0.53 0.91 1110: 0.46 0.53 1111: 0.40 0.46
38	0010	A/D Output (Scale 3) 0: For std/normal load cell (≤ 18 mV) 1: For abnormal load cell with too large offset (> 18mV)	Digital Tare with Weight on Scale 0: Yes 1: No	Internal Count 0: 500,000 1: 1,000,000	Stability Check When Changing Scale 0: Yes 1: No
39	0010	Set SPEC 39 to 0010			

Table 4-2. DC-190 142 Settings (Continued)

4.4 RS-232 Specifications (143 Settings)

To configure RS-232 specifications, press and hold the REZERO key and enter 143 using the numeric keypad. *SPC40* appears in WEIGHT display and configuration of four bits (for SPEC 40) appears in QUANTITY display. Follow the procedure described in Section 4.1 on page 17 to update the SPEC settings for the 143 access code.

SPECs 40–42 and SPEC 43, bits 0–2, represent the selectable RS-232 output fields.

SPECs 46–59 are not used. All bits for these SPECs must be set to 0.

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
40	Lot Number 0: Yes 1: No	Memo (Part Name) 0: Yes 1: No	Alternative Part Number 0: Yes 1: No	ID Code 0: Yes 1: No
41	Net Weight 0: Yes 1: No	Gross Weight 0: Yes 1: No	Setpoint 0: Yes 1: No	Inventory 0: Yes 1: No
42	Date and Time 0: Yes 1: No	Quantity & Total Quantity 0: Yes 1: No	Unit Weight 0: Yes 1: No	Tare Weight 0: Yes 1: No
43	Autoprint within Setpoints 0: No 1: Yes	Non-stable Ouput 0: No 1: Yes (allow serial output with scale in motion)	Status Output 0: Yes 1: No	Scale Number 0: Yes 1: No
44	Clear Operator Name Each Use (BCP-300) 0: No (operator name held in register for multiple inputs) 1: Yes	Company Name (BCP-300) 0: Default only 1: Input with bar board	Manual Print with Setpoints 0: Yes 1: No	Autoprint Overrange Setpoint 0: No 1: Yes
45	*Not used*	*Not used*	Print with Zero Quantity 0: No 1: Yes	Batch Print Once 0: No 1: Yes
46–59	*Not used: set to 0*	*Not used: set to 0*	*Not used: set to 0*	*Not used: set to 0*

Table 4-3. DC-190 143 Settings

5.0 Calibration

The calibration procedure maintains the scale accuracy within specifications and can serve as a performance test procedure. The DC-190 scale should be turned on for a minimum of 10 minutes and the platform exercised three to four times before attempting to calibrate.

NOTE: *Use the* SCALE *key to select the platform to calibrate. The scale number is displayed on the lower secondary display. For dual-platform scales, the calibration procedure described in must be repeated for each scale.*

Scale Calibration Procedure

Use the following procedure to calibrate the DC-190:

1. Press and hold the REZERO key and enter 8715 on the keypad to enter calibration mode. The QUANTITY displays the raw count.
2. With no weight on scale, press the CODE key to compute the zero point. The QUANTITY display will show a count of approximately *100000*. If the QUANTITY display is not 100,000 ±10,000, use the + or – key to adjust until the display is within range or press the CODE key to automatically recompute zero.
3. Press the REZERO key to zero the weight shown in the WEIGHT display.
4. Place a known test weight on scale.
5. Adjust displayed span weight as close as possible to the known test weight by using TARE key to increase or PIECES key to decrease the load cell sensitivity value.
6. If span adjustment is required in Step 5, remove test weight and repeat Steps 2 through 5.
7. Enter the known calibration weight (including all trailing zeros) using the numeric keypad.
8. Remove the test weight from the scale to verify that the zero value has not shifted. If the value in the WEIGHT display is not zero (has shifted), press the REZERO key.
9. Place the known test weight back onto the scale. If you had to adjust the zero value you will notice that the weight value has also changed and is closer to the true value.
10. Press the * key to start span calibration. After a few seconds, the display shows the counts for the weight on the platter in the WEIGHT display and the internal count (including zero point internal counts) in the QUANTITY display.
11. Remove weight from scale. When the calibration weight is removed, the WEIGHT display should show zero and the QUANTITY display should show the zero starting point. For example, if SPEC 38, bit 1 (Internal Count) is set to 1,000,000, the count should be approximately 200,000. If the zero point is not correct, repeat the calibration procedure.
12. Press the MODE key once to exit maintenance mode.
13. Press the MODE key again to return to the weighing mode.
14. Place the test weight used to calibrate span back on scale and verify proper weight. If the displayed weight value is not equal to the known test weight, repeat the procedure.

NOTE: *If you are using a multiple scale configuration, repeat the procedure above for each scale. Use the* SCALE *key to switch between scales.*

Displaying Internal Counts

To display internal counts, press and hold the REZERO key and enter * * + on the keypad.

Press the MODE key once to exit maintenance mode, press MODE again to return to weighing mode.

6.0 Scale Operations

The following sections contain detailed operator instructions for the DC-190 counting scale. Included are instructions to enter tare weights, toggle between net and gross weight, enter unit weights, perform inventory accumulation and reduction, and toggle between scales. All operator functions are conducted with the scale in the weighing or normal mode. See Section 7.0 on page 30 for information about scale programming.

Counting scale accuracy is primarily determined by the following factors:

- Sample size (number of pieces)
- Total sample size as a percentage of full scale capacity
- Piece-to-piece weight variation

As a general rule when determining sample size of fairly uniform pieces, the larger the sample size the greater the total sample weight, therefore, the better the counting accuracy. Selecting the smallest capacity scale that can obtain the highest counting resolution should be considered, but should not sacrifice the capacity required for the heaviest container of parts. For this specific application, a dual-platform scale may be the best selection.

There is a direct relationship between piece-to-piece weight variation (non-uniformity) and counting accuracy. Therefore, elimination of the piece-to-piece weight variations can be accomplished by:

1. Isolating the sample used to calculate the unit weight and use the same sample to re-check the scale.
2. Recalculating the unit weight from lot-to-lot of parts. Parts manufactured on one machine may vary slightly from another machine relative to weight.
3. Tightening the manufacturing tolerances on the parts reduces piece weight variations and increases count accuracy.

6.1 Entering Tare Weights

Tare weights can be entered in the scale by one of two methods: one-touch tare or digital tare.

NOTES:

- *SPEC 27, bit 2 (Digital Tare Setting) must be a 1 to allow digital tare.*
- *SPEC 27, bits 0 and 1 (Tare Range) must be set to the appropriate tare range value. Default is 00, 100 percent of full scale.*

One-Touch Tare, Tare Weight Unknown

1. If the tare weight value is not known, place the container, box, or item to be tared on the scale and press TARE. The WEIGHT display should now show *0* and the *NET* annunciator should illuminate.
2. Remove the container, box, or item from the scale. The WEIGHT display should show a negative weight value (weight of the tared container, box, or item).
3. Press TARE to reset tare to zero.

Digital Tare, Tare Weight Known

1. If the tare weight value is known, use the numeric keypad to key in the value and then press TARE.
2. Press TARE to reset tare to zero.

NOTE: *For digital tare entry, the decimal must be in the appropriate place as it would be displayed in the* WEIGHT *display. For example, .250 would be entered as 0.250, not .250. The* WEIGHT *display shows weight entered with a negative sign indicating that it is a tare weight.*

6.2 Toggle Between Scales

To switch the displays from Scale 1 through Scale 4, press the SCALE key when in weighing mode. Only scales present are selected. For example, a two-scale system switches between Scale 1 and Scale 2 only. In a four-scale configuration, the SCALE key functions as follows:

1. Press SCALE key to change from Scale 1 to Scale 2.
2. Press SCALE key to change from Scale 2 to Scale 3.
3. Press SCALE key to change from Scale 3 to Scale 4.
4. Press SCALE key to change from Scale 4 to Scale 1.

NOTE: Scale number assignments are set using SPECs 16 and 17.

6.3 Toggling Between Net and Gross Weight

To toggle between net and gross weight, a tare value must be entered into the scale (see Section 6.1). **NOTE:** SPEC 25, bit 0 (Gross Mode Available) must be set to 0 (default) to enable gross mode.

After a tare value is entered into the scale, items placed on the scale will cause the *NET* annunciator to illuminate and allow toggling between net weight and gross weight.

An example of toggling between net weight and gross weight is shown below:

1. Place 0.5 lb weight on the scale and then press TARE once. The WEIGHT display should show *0.000* lb.
2. Place another 0.5 lb weight on the scale. The scale WEIGHT display should now show *0.500* and the *NET* annunciator should be illuminated.
3. Press NET/GROSS. The WEIGHT display should show *1.000* and the *GROSS* weight annunciator is illuminated. The UNIT-WEIGHT and the QUANTITY displays go blank.
4. Press NET/GROSS. The WEIGHT display now shows *0.500* and the *NET* weight annunciator is illuminated.

6.4 Entering Unit Weights

Entering unit weights can be done either by sampling, as described in Section 6.4.1, or by key entry as described in Section 6.4.2.

SPEC 0, bit 0 (Piece Weight Selection) works in conjunction with the UNIT-WEIGHT display. Setting the bit to 0 specifies that the UNIT-WEIGHT value shown is per 1000 pieces and the *UNIT WT PER 1000* annunciator is lit. Setting bit 0 to 1 specifies that the unit weight value shown is per one piece (A.P.W.).

NOTE: *SPEC 4, bits 1 and 2 (Insufficient Sample Level) control unit weight sampling. The default value is 0.1 percent.*

6.4.1 Unit Weight Operation by Sampling

Unit weight operation by sampling is accomplished by placing a known quantity of pieces to be sampled on the scale and then pressing the PIECES key. The scale calculates a unit weight based on the capacity of the scale compared to the weight of the sample.

1. Press REZERO to zero scale.
2. Place 10 pieces of the item to be sampled on the scale.
3. Press PIECES key then wait a few seconds for the computation. If the sample weight is sufficient (*INSUFF* annunciator is off), the WEIGHT display shows the total sample weight; the UNIT-WEIGHT display shows the unit or per 1000 weight for the 10 sample pieces (depending on the value of SPEC 0, bit 0, as described above); the QUANTITY display shows the number of pieces (10).

   If the weight of the sample is insufficient (*INSUFF* annunciator is on), add pieces to the initial sample until the *INSUFF* annunciator goes off.

   - If SPEC 5, bit 2 (unit weight auto-recomputing), is set to 1, place required pieces on the scale. The scale automatically recomputes the unit weight.
   - If SPEC 5, bit 2, is set to 0, use the keyboard to enter the new number of sample pieces then press the PIECES key again to recompute the unit weight.

6.4.2 Unit Weight Operation by Key Entry

Unit weight operation by key entry is accomplished by using the numeric keypad to enter the known value of the unit weight and then pressing the UNIT WEIGHT key. An example of unit weight operation by key entry is shown below:

1. With the display in the weighing mode, use the keyboard to enter the known unit weight, for example, *200.00.*

   NOTE*: The setting for SPEC 0, bit 0, determines whether the value entered is per piece (A.P.W., if set to 1) or per 1000 pieces (if set to 0).*

2. Press UNIT WEIGHT key to enter the unit weight.
3. Place a 2 lb. weight on the scale. The scale displays the quantity for the weight placed on the scale. For example, the WEIGHT display reads *2.000*, the UNIT-WEIGHT display reads *200.00* (per 1000 pieces), and the QUANTITY display reads *10*).

6.4.3 Clearing Unit Weight

To clear a unit weight:

1. Remove weight from scale.
2. Press the CLEAR key.

6.5 Part Accumulation and Reduction–Without Recalling an Item Code

The DC-190 counting scale is capable of part number inventory tracking and maintenance using the stored item code function of the scale software (see Section 7.0 on page 30). Additionally, the scale has the capability to acquire the total number of parts using the accumulation or reduction function of the scale (similar to the add/ subtract functions of a calculator).

6.5.1 Part Accumulation

To find the total accumulated quantity of similar containers filled with parts, use the accumulation procedure detailed below. Six containers are used in this example procedure; it is assumed that all containers are of the same weight.

1. Conduct a sampling process (see Section 6.4) to determine the unit weight of the pieces.
2. Enter known tare weight, or place empty container on scale to perform tare function (see Section 6.1).
3. Place Container 1 (full of parts) on the scale.
4. Press the + key to store the total in Container 1. The *MEMORY* annunciator lights. The WEIGHT display briefly shows *totAL* and the QUANTITY display shows the total pieces in the first container.
5. Remove Container 1 and place Container 2 (full of parts) on the scale.
6. Press the + key (total is equal to Container 1 plus Container 2).
7. Continue with the remainder of the containers in the same accumulation method. The total number of parts stored in all six containers will then be stored in the accumulation register.
8. To view the total, make sure that the scale platter is empty and press the + or – key.
9. To clear the total, press the * key. The *MEMORY* annunciator is not illuminated.

NOTE: *If SPEC 32, bit 1 (Auto Exit from Part Accumulation and Reduction Mode) is set to 0, the scale will not auto exit from displaying the total amount. To return to the weighing mode, press the* CLEAR *key.*

6.5.2 Part Reduction

Part reduction can be also be done by using the – key while the scale is in the weighing mode and the *MEMORY* annunciator is on.

1. Conduct a sampling process (Section 6.4) to determine the unit weight of the pieces.
2. Place container to be tared on scale and enter the tare weight (Section 6.1).
3. Place Container 1 (full of parts) on the scale.
4. Press the + key to store the total in Container 1. The *MEMORY* annunciator lights. The WEIGHT display briefly shows *totAL* and the QUANTITY display shows the total pieces in the container.
5. Remove a number of parts from the container and press the – key. The *MEMORY* annunciator is

illuminated and the display shows the quantity of parts remaining.

6. Remove a number of parts from the container and press the – key again. The *MEMORY* annunciator is illuminated and the display shows the quantity of parts remaining.

NOTE: *If SPEC 32, bit 1 (Auto Exit from Part Accumulation and Reduction Mode) is set to 0, the scale will not auto exit from displaying the total amount. To return to the weighing mode, press the* CLEAR *key.*

6.5.3 Clearing Accumulated Data

To clear accumulated data, press the * key.

6.6 Other Operations

The following operations, added in software Version 4.02 and 4.04, can all be performed while the DC-190 Ultra Count is in normal mode.

6.6.1 Set New Vendor Name

In software Version 4.02 or later, a new vendor (company) name can be scanned into the DC-190 Ultra Count by doing the following:

1. Scan the *VENDOR NAME* barcode using the bar code board (see Section 10.9 on page 59).
2. Use the alphanumeric bar codes to scan up to 48 characters for the vendor name.
3. When complete, scan the *ENTER* bar code.

SPEC 44, bit 2, (input company name with bar board) must be set to 1 to use this function (see page 24).

6.6.2 Set New Operator Name

In software Version 4.02 or later, a new operator name can be scanned into the DC-190 Ultra Count by doing the following:

1. Scan the *OPERATOR NAME* barcode using the bar code board (see Section 10.9 on page 59).
2. Use the alphanumeric bar codes to scan up to 32 characters for the operator name.
3. When complete, scan the *ENTER* bar code.

SPEC 44, bit 3, specifies whether the operator name is held in memory or is cleared after each use (see page 24).

6.6.3 Set New Batch Print Quantity

In software Version 4.04 or later, the number of labels printed for a batch can be changed by doing the following:

1. Press and hold the REZERO key and enter 111 using the numeric keypad.
2. The display shows the batch print quantity. Use the numeric keypad to enter the number of labels to print.
3. Press the * key to store the batch print quantity, then press MODE to exit programming mode and return to weighing mode.

Batch print quantity can also be set using a scanner and the *BATCH PRINT* barcode (see Section 10.9 on page 59).

6.6.4 Set New Sequence Number

In software Version 4.04 or later, the sequence number can be reset by doing the following:

1. Press and hold the REZERO key and enter 112 using the numeric keypad.
2. The display shows the sequence number. Use the numeric keypad to enter the new sequence number.
3. Press the * key to store the sequence number, then press MODE to exit programming mode and return to weighing mode.

7.0 Scale Programming

7.1 Item Code Storage

Code numbers allow you to store information for the parts that are counted most frequently. This eliminates the need for re-entering data for each of these parts during part count. Up to 200 item code numbers can be programmed in the DC-190 counting scale; with IMS software, the number of item codes is unlimited.

The procedures for storing the unit weight, tare weight, quantity, part number, part name, setpoints, and lot number with an item code are described below. You can enter all of this information for each item code or only the data pertinent to your application. For example, if you only want to store only the unit and tare weights, you can bypass Steps 5 through 13 and go to Step 14.

Program Unit Weight, Tare Weight, Quantity, Part Number, Part Name, Setpoints, and Lot Number

1. Press MODE key to enter program mode. The *MODE* annunciator will light, the WEIGHT display will read *ProG,* and the QUANTITY display will read *C XX* (*XX* represents the number of item codes stored in the DC-190 memory).
2. Enter the item code number (up to 32 digits) then press the CODE key. All displays will show zeros. If you want the item to be alphanumeric then you will need to press the . (decimal) key to enter the characters using the Teraoka Code (see Section 10.8 on page 58). After entering all of the characters, press the CODE key to store the item code.

NOTE: *If the* QUANTITY *display shows CLEAr, the code number is already stored in memory. Press the* CODE *key a second time to modify the stored data or press the* CLEAR *key to delete the item code and stored data.*

3. Enter tare weight (see Section 6.1 on page 26).
4. Enter unit weight value (see Section 6.4 on page 27).
5. Press NET/GROSS key to enter initial quantity in stock for this item. The QUANTITY display will prompt *InVEnt* and UNIT-WEIGHT display will show 0. Using the numeric keypad, enter the number of pieces that the initial inventory will contain and then press the NET/GROSS key a second time to store the information.
6. Press the – key to enter the part number (32 characters maximum).
7. Use the Teraoka Code to enter the part number. Press the * key to store the part number.
8. Press CODE key to enter the part name (32 characters maximum).
9. Use the Teraoka Code to enter the part name. Press the CODE key to store the part number.
10. Press the + key to check Setpoint 1. The WEIGHT display will prompt *SEt 1*; the QUANTITY display shows the value of Setpoint 1.

NOTE: *The* DC-190 *can store up to six setpoints which are determined by SPEC 18, bits 0 through 2.*

11. Enter setpoint value and press + key to save.

NOTES:

- *When entering weight setpoints, be sure that you enter in the weight values with decimal point and trailing zeros.*
- *All percentage values must be rounded to the nearest whole number, fractional percentages are not allowed.*
- *SPEC 7, bits 0 and 1 (Setpoint Type) determine what kind of value you have entered. (See Table 7-1.)*

12. Repeat Steps 10 and 11 for Setpoints 2 through 6.
13. Press the CLEAR key to enter the lot number. Use the Teraoka Code to enter the lot number. Press the * key to store the lot number.
14. Press * key to store all of the data entered with this item code. The display will go back to Step 1 but the number in the QUANTITY display will have been incremented by one.
15. Press MODE key to exit the program mode.

SPEC 7, bits 0,1	Setpoint Type	Setpoint Designation
00	Percent quantity	Setpoint 1: Quantity The quantity value can be no greater than 999999. Setpoint 2: Percent of Setpoint 1 The percentage value can be no greater than 999%. The value for Setpoint 2 is calculated by multiplying the value for Setpoint 1 by the percentage value entered for Setpoint 2. NOTES: • If Setpoint 1 is equal to 999999, then Setpoint 2 must be set less than or equal to 100%. • Setpoints 3–6 are not available when Setpoint 2 is a percent setpoint.
01	Percent weight	Setpoint 1: Weight The quantity value can be no greater than 999999. Setpoint 2: Percent of Setpoint 1 The percentage value can be no greater than 999%. The value for Setpoint 2 is calculated by multiplying the value for Setpoint 1 by the percentage value entered for Setpoint 2. NOTE: • If Setpoint 1 is equal to 999999, then Setpoint 2 must be set less than or equal to 100%. • Setpoints 3–6 are not available when Setpoint 2 is a percent setpoint.
10	Upper and lower quantity limit	Setpoint 1: Quantity Setpoint 2: Quantity Setpoints 3–6: Quantity
11	Upper and lower weight limit	Setpoint 1: Weight Must be a weight value less than or equal to the capacity of the scale. Setpoint 2: Weight Must be a weight value less than or equal to the capacity of the scale, but must be less than Setpoint 1 value. Setpoints 3–6: Weight Must each specify a weight value less than the value of the preceding setpoint.
NOTES: • *All weight-based setpoint values must be entered with a decimal and all trailing zeros. All percentage-based setpoint values must be entered to the nearest whole number (no fractional percentages).* • *The DC-190 can program up to six setpoints by repeating Steps 2 through 6, SPEC 18, bit 0 through 2 (Number of Setpoints) determines the number of setpoints. The six setpoints are TTL output for quantity or weight, but not percent quantity or percent weight. These values may be programmed 1 through 6 low to high or 1 through 6 high to low.*		

Table 7-1. Setpoint Programming for Quantity and Weight

7.2 Item Code Maintenance

Item code maintenance includes viewing item codes in memory and deleting item memory.

View Item Codes in Memory

The following procedure allows viewing all of the item codes stored in memory but will not change any of the information (unit weight, tare weight, part number, quantity, part name, setpoints, and lot number) stored with these codes.

1. Press the MODE key. The WEIGHT display shows *ProG* and the QUANTITY display shows *C XX*.
2. Press the CODE key. The QUANTITY display shows the first item code programmed and stored in memory, example: *Id 123*.
3. Press the + key to view the next item in memory and continue pressing the + key until the DC-190 beeps.

NOTE: *When you hear the beep, the display shows the last item code in memory. Press the – key to review the item codes in reverse order.*

4. Press the MODE key to return to Step 1.
5. Press the MODE key again to return to weighing mode.

Delete Item Memory

The following procedure describes the steps used to delete all information stored within each item code (unit weight, tare weight, part number, quantity, part, setpoints, and lot number) or any specific information stored within each item code. It also explains the keystrokes required for resetting the sequence number, or deleting all setpoints, global to the scale, but not tied to a specific item code.

1. Press the MODE key. The WEIGHT display will show *ProG* and the QUANTITY display shows *C XX*.
2. While pressing the REZERO key, enter the sequence as shown in Table 7-2 to delete the specified information. The table shows the prompting that will take place on the weight and quantity displays to ensure that the proper keystrokes have been performed.

NOTE: *If an error was made entering data and the display is prompting you to clear information that is not to be cleared, press the* MODE *key and return to Step 1.*

3. Press the CLEAR key to delete the information.
4. Press MODE to exit programming mode.

Delete Item Memory	Sequence	WEIGHT Display	QUANTITY Display
Delete all memories	••0	*ALL*	*CLEAr*
All item quantity in stock	••1	*InVEnt*	*CLEAr*
All item unit weights	••2	*Unlt u*	*CLEAr*
All item tare weights	••3	*TArE*	*CLEAr*
All item part numbers	••4	*P-no*	*CLEAr*
All item setpoints	••5	*P-SP*	*CLEAr*
All item names	••6	*P-nAmE*	*CLEAr*
Reset SEQ numbers	••7*	*SEQ no*	*CLEAr*
Delete all setpoints (global)	••+	*SEt P*	*CLEAr*
*Use for BCP-30 printer			

Table 7-2. Deleting Item Codes in Memory

7.3 Using Item Code in Normal Mode

The following paragraphs describe the procedure to recall item codes, recompute item code unit weights, set new item codes, and inventory operations related to the item code quantity. All storage operations are done while the scale is in the normal mode.

Recalling Numeric Item Codes using Item Code Number

1. Enter item code number using numeric keypad.
2. Press the CODE key. The scale will recall all information stored with the item code and automatically return to the normal mode.

Recalling Alphanumeric Item Codes using Teraoka Code

1. Press the . (decimal) key. The WEIGHT display prompts *t-C 01*, the QUANTITY display shows *CodE*, and the UNIT-WEIGHT display prompts *00-*.
2. Enter the values equivalent to the digits to be entered using the Teraoka Code. For example, to recall Item Code 123, enter: [31], [32], [33], [01], [02], [03] = 123ABC.
3. Press the CODE key. The scale will recall all information stored with the item code and automatically return to the normal mode.

Re-Computing Item Code Unit Weight

1. Recall item code from memory (see Section or Section).
2. Place items to be counted on the scale.
3. Press the PIECES key for recomputing the unit weight.
4. Press the UNIT WEIGHT key to store the new unit weight into memory.

Set New Item Code with Tare and Unit Weight

NOTE*: This can only be conducted if SPEC 4, bit 3 is 0 (Yes).*

1. Enter the item code using the numeric keypad or Teraoka Code (see Section , Step 2).
2. If the code is not currently stored in memory and SPEC 19, bit 3 is 0 (Yes), the QUANTITY display shows the message *not F*. If a new item code does not need to be stored into memory, press the CLEAR key to exit to the normal mode. Otherwise, continue by pressing the CODE key. This will set the new item code number into memory.
3. If the code is not currently stored in memory and SPEC 19, bit 3 is 1 (No), the QUANTITY display does not show the *not F* message to alert you that the item code is not stored. Press the CODE key to set the new item code number into memory.
4. Enter tare weight and press the TARE key. Press the TARE key again to store the tare weight into the item code memory.
5. Place sample on the scale and press the PIECES key or use the numeric keypad to enter known weight value (see Section 6.4 on page 27). Press the UNIT WEIGHT key a second time to store the weight value into the item code memory.

7.3.1 Inventory Operations Related to the Item Code Quantity Value

The following procedure is used to add inventory to and remove inventory from an item code memory.

NOTE: *The IN and OUT functions allow you to maintain the inventory (quantity) of a specific item in memory. Pressing the* CODE *key while in the normal mode enables the IN and OUT annunciators.*

If neither annunciator is illuminated, press the CODE *key once to turn the IN annunciator on. Press the* CODE *key again to turn the OUT annunciator on; press the* CODE *key a third time to turn both annunciators off.*

To Add Inventory to an Item Code Memory–IN Mode

1. Press the CODE key one time. The *IN* annunciator illuminates.
2. Recall the item code from memory.
3. Place the container of parts to add to memory on the scale platter.
4. Press the * key to add the quantity shown on the display to the amount already stored under the item code memory.

To Remove Inventory to an Item Code Memory–OUT Mode

1. Press the CODE key two times. The *OUT* annunciator illuminates.
2. Recall the item code from memory.
3. Place the container of parts to remove from memory on the scale platter.
4. Press the * key to remove the quantity shown on the display to the amount already stored under the item code memory.

NOTE: *If at any time you would like to verify the quantity of parts under a specific item code, you can press the* NET/GROSS *key and the inventory amount will be displayed in the* UNIT-WEIGHT *display. However, you must have SPEC 2, bit 0 (Inventory Display by Gross Key) set to 1 (Yes).*

7.4 Global Setpoint Programming– Setpoints Not Tied to an Item Code

The DC-190 provides the flexibility to use the setpoint programming for parts counting applications that are based on weight or quantity. SPEC 7 and SPEC 18 are used for configuring the setpoint type, latching, buzzer, TTL outputs, and the number of setpoints.

The eight-pin DIN connector designation for the setpoint configuration is shown in Table 7-3. See Section 10.3 on page 52 for connector pinout information.

Pin Number	Setpoint Configuration
1	SP-1
2	SP-2
3	SP-3
4	SP-4
5	SP-5
6	SP-6
7	+5 Vdc (external power supply)
8	GND

Table 7-3. Pin Out for Setpoint Configuration

The available setpoint types are quantity, weight, percent quantity, and percent weight. The following procedure is the same for each type; however, the type of setpoint selected determines the values being entered. Table 7-1 details the values for each setpoint and the values they represent.

7.4.1 Procedure

The following steps present the procedure for setpoint programming by percent quantity, percent weight, upper and lower quantity limit, and upper and lower weight limit.

1. Press the MODE key to go into the programming mode. The MODE annunciator illuminates, the WEIGHT display shows *ProG*, and the QUANTITY display shows *C XX*.
2. Press the + key to enter global setpoint values. The WEIGHT display shows *Set 1*, and the QUANTITY display shows the value for Setpoint 1.
3. Enter the setpoint value using numeric keys.
4. Press the + key to store the value and move to the next setpoint.
5. Press the MODE key to exit the programming mode and return to the weighing mode.

NOTES:

- The DC-190 can program up to six setpoints by repeating Steps 2 through 4. SPEC 18, bits 0, 1, and 2 (Number of Setpoints) determine the number of setpoints used. The six setpoints are TTL output for quantity or weight, but not percentage quantity or percentage weight. These six values may be programmed 1 through 6 (low-to-high) or 1 to 6 (high-to-low).
- If you recall an item code, those values stored with the item are used. Item setpoints take priority.

8.0 RS-232 Specifications

8.1 RS-232 Ports

The DC-190 is equipped with three RS-232 ports for connecting devices such as a force balance, bar code laser/pen scanner, PC, or printer (bar code, tape, or ticket). SPEC 0 (bit 1), SPEC 3, and SPEC 8 through SPEC 15 are used when connecting peripheral devices.

SPEC 13, bits 2, 1, and 0 determine which devices are connected to the 9-pin D-sub connector and 8-pin DIN connector 2. Table 8-1 shows the SPEC bit number and the corresponding eight- and nine-pin connector designation.

SPEC 13, Bits 2, 1, 0	9-Pin D-Sub Connector	8-Pin DIN Connector
000	Printer SPEC 10 and 11	Force balance SPEC 8 and 9
001	Force balance SPEC 8 and 9	Printer SPEC 10 and 11
100	PC SPEC 10 and 11	Force balance SPEC 8 and 9
101	Force balance SPEC 8 and 9	PC SPEC 10 and 11
010	Printer SPEC 10 and 11	PC SPEC 8 and 9
011	PC SPEC 8 and 9	Printer SPEC 10 and 11

Table 8-1. SPEC 13 Configuration with Eight- and Nine-Pin Connector Designation

SPEC 8 through SPEC 11 are used to configure the baud rate, data length, parity, and stop bits for each device installed in the system. As shown in Table 8-1, SPEC 8 and SPEC 9 are always configured with a force balance while SPEC 10 and SPEC 11 are configured with a printer. Therefore, if a PC is connected in place of either the force balance or printer, those SPECs that follow the force balance or printer are now used for the PC.

For example, if you wanted to connect a PC on the 9-pin D-Sub connector and a TM-U200 printer to the 8-pin DIN connector, SPEC 13 (bits 2, 1, and 0) would be configured to 011. If the RS-232 settings for the PC are 9600 baud rate, eight-bit data length, no parity and one stop bit, SPEC 8 would be configured to 0111 and SPEC 9 would be configured to 0100. If the RS-232 settings for the printer are 4800 baud rate, seven-bit data length, even parity and one stop bit, SPEC 10 would be configured to 1010 and SPEC 11 would be configured to 0011. SPEC 3 would need to be configured to 0011 or 0010.

See Section 10.3 on page 52 for connector pinout information.

8.2 Eltron Printers

See the Eltron printer manual for baud rate, data bit, and stop bit settings if it desired to change them from the factory defaults. The default settings are 9600 baud rate, eight-bit data length, no parity and one stop bit.

NOTES:

- *The DC-190 downloads some label formats to the printer during power up. Eltron printers must be connected to the DC-190 and powered on* **before** *powering up the DC-190.*
- *Eltron 2722 printer software must be Version 4.00 or higher. Eltron 2742 printer software must be Version 4.02 or higher.*

Table 8-2 shows the Eltron bar code label printer SPEC settings configured for 9600 baud rate, eight data bits, no parity, one stop bit, and connected to the 9-pin D-sub connector.

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	0	0
10	1	1	1	1
11	0	0	0	0
13	0	0	0	0
21	*see below*	—	—	—
SPEC 21: For Eltron 2722 printers, set SPEC 21, bit 3 to 0; for 2742 and 2600 Series printers, set bit 3 to 1.				

Table 8-2. Eltron Printer Setup for 9-Pin D-Sub Connector

Table 8-3 shows the Eltron bar code label printer SPEC settings configured for 9600 baud rate, eight data bits, no parity, one stop bit, and connected to the 8-pin DIN connector.

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	0	0
10	1	1	1	1
11	0	0	0	0
13	0	0	0	1
21	*see below*	—	—	—
SPEC 21: For Eltron 2722 printers, set SPEC 21, bit 3 to 0; for 2742 and 2600 Series printers, set bit 3 to 1.				

Table 8-3. Eltron Printer Setup for 8-Pin DIN Connector

Figure 8-1 shows an example of the Eltron printer format without recalling an item code number from memory. Shown in Figure 8-2 is a label sample recalling an item code number from memory and the scale configured for unit weight equal to A.P.W. Figure 8-3 is a label sample recalling an item code number from memory and with a scale configured for unit weight equal to wt/1000 pieces.

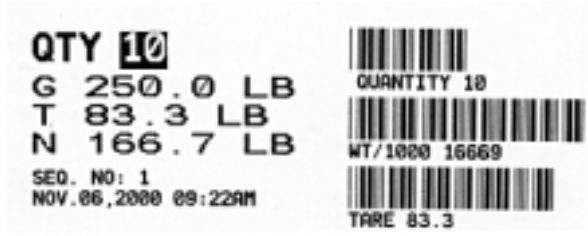


Figure 8-1. Sample Label without Recalling an Item Code from Memory (not to scale)

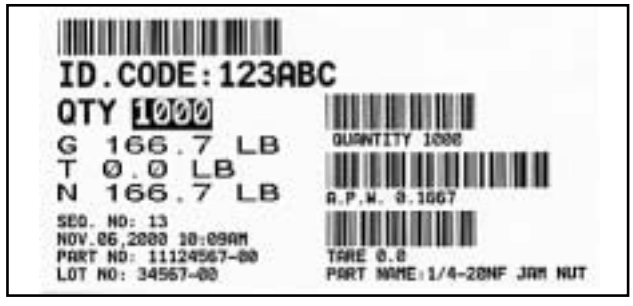


Figure 8-2. Sample Label with Recalling an Item Code from Memory and the Scale Configured for Unit Weight Equal to A.P.W (not to scale)

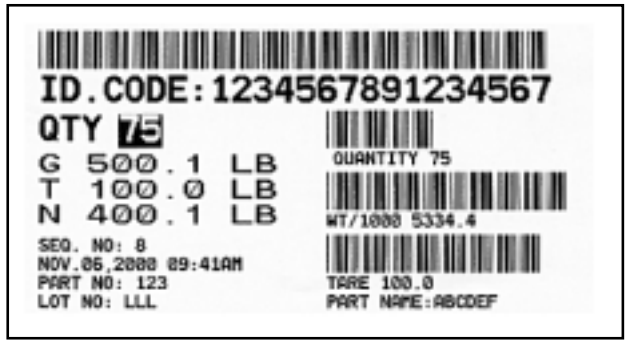


Figure 8-3. Sample Label with Recalling an Item Code from Memory and the Scale Configured for Unit Weight Equal to Wt/1000 Pieces (not to scale)

8.3 Epson Tape Printers

The Epson TM-U200 tape printer default settings (with and without cutter) are 9600 baud rate, eight-bit data length, no parity and one stop bit and connected to either the 9-pin D-sub connector or the 8-pin DIN connector.

NOTE: *Epson printers must be connected to the DC-190 and powered on* **before** *powering up the DC-190.*

Tables 8-4 through 8-7 shows the various TM-U200 printer configuration settings using SPECs 3, 10, 11, and 13. A sample of the printer printout is shown in Figure 8-4.

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	1	1
10	1	1	1	1
11	0	1	0	0
13	0	0	0	0

Table 8-4. Epson TM-U200 Printer Specification (Without Cutter) Connected to 9-Pin D-Sub Connector

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	1	0
10	1	1	1	1
11	0	1	0	0
13	0	0	0	0

Table 8-5. Epson TM-U200 Printer Specification (With Cutter) Connected to 9-Pin D-Sub Connector

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	1	1
10	1	1	1	1
11	0	1	0	0
13	0	0	0	1

Table 8-6. Epson TM-U200 Printer Specification (Without Cutter) Connected to 8-Pin DIN Connector

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	1	0
10	1	1	1	1
11	0	1	0	0
13	0	0	0	1

Table 8-7. Epson TM-U200 Printer Specification (With Cutter) Connected to 8-Pin DIN Connector

Figure 8-4. Sample Epson TM-U200 and TM-U295 Ticket Output (Not to Scale)

8.4 Epson Ticket Printers

The Epson TM-U295 ticket printer default settings are 9600 baud rate, 8-bit data length, no parity and one stop bit. The printer can be connected to either the 9-pin D-sub connector or the 8-pin DIN connector.

NOTE: *Epson printers must be connected to the DC-190 and powered on* **before** *powering up the DC-190.*

Table 8-8 presents the TM-U295 printer configuration settings using SPECs 3, 10, 11, and 13 connected to the 9-pin D-sub connector. Table 8-9 contains the TM-U295 printer configuration settings using SPECs 3, 10, 11, and 13 connected to the 8-pin DIN connector. Shown in Table 8-10 is the printer configuration settings using SPECs 3, 10, 11, and 13 connected to a 9-pin sub-D connector while Table 8-11 is the setting for an 8-pin DIN connector.

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	0	1
10	1	1	1	1
11	0	1	0	0
13	0	0	0	0

Table 8-8. Epson TM-U295 (without Form Feed) Printer Specification Connected to 9-Pin D-Sub Connector

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	0	1
10	1	1	1	1
11	0	1	0	0
13	0	0	0	1

Table 8-9. Epson TM-U295 (without Form Feed) Printer Specification Connected to 8-Pin DIN Connector

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	1	1
10	1	1	1	1
11	0	1	0	0
13	0	0	0	0

Table 8-10. Epson TM-U295 Printer Specification (with Form Feed) Connected to 9-Pin Sub-D Connector

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	1	1
10	1	1	1	1
11	0	1	0	0
13	0	0	0	1

Table 8-11. Epson TM-U295 Printer Specification (with Form Feed) Connected to 8-Pin DIN Connector

8.5 Digi BCP-300 Printer

The Digi BCP-300 bar code printer can be attached only to the 8-pin DIN connector. Use the SPEC settings listed in Table 8-12 to configure the BCP-300. These settings provide a baud rate of 9600, 8-bit data length, no parity, and one stop bit.

SPEC	Bit 3	Bit 2	Bit 1	Bit 0
3	0	0	0	0
10	1	1	1	1
11	0	1	0	0
12	1	0	0	0
13	0	0	— *	1
* SPEC 13, bit 1: Set to 1 if a PC is attached to the D-sub connector; otherwise, set to 0.				

Table 8-12. Digi BCP-300 Specifications

8.6 PC Output Data Formats

8.6.1 PC Output Data Format With Header

The DC-190-to-PC output data format (with header) is specified using SPEC 12, with bit 0 set to 0. The output data format includes a header and data. Each data block consists of a Header, Data and a carriage return (CR). The following illustration shows the output data format.

Header	Data	CR	Header	.....	CR	LF

NOTES:

- CR must be added at the end of each data block.
- LF must be added at the end as a termination code of the transmission.

There are two type of headers: header with header code and header with title. The header code is sent before the data to indicate the type of the data, while the header with title is sent before the data to indicate the type of the data. The header with title can be used only when RS-232 output is set to counting condition, with header and title. Table 8-13 shows the type of data that can be sent.

Header with Header Code			Header with Title	
Header Code	ASCII Code (Hex)	Data	Title	Data
0	30	Net Weight	NET WEIGHT	Net Weight
1	31	Unit Weight	UNIT WEIGHT	Unit Weight
2	32	Quantity	QUANTITY	Quantity
3	33	ID Code	ID CODE	ID Code
4	34	Tare Weight	TARE WEIGHT	Tare Weight
A	41	Gross Weight	GROSS WEIGHT	Gross Weight
B	42	Status	STATUS	Status
C	43	Date and Time	DATE AND TIME	Date and Time
F	46	Setpoint 1 (W)	SETPOINT 1 (W)	Setpoint 1 (W)
G	47	Setpoint 1 (Q)	SETPOINT 1 (Q)	Setpoint 1 (Q)
H	48	Setpoint 2	SETPOINT 2	Setpoint 2
I	49	Total Quantity	TOTAL QUANTITY	Total Quantity
K	4B	Inventory	INVENTORY	Inventory
M	4D	Part No	PART NO	Part No
N	4E	Part Name	PART NAME	Part Name
V	56	Scale No	SCALE NO	Scale No
Q	51	Setpoint 3	SETPOINT 3	Setpoint 3
X	58	Setpoint 4	SETPOINT 4	Setpoint 4
U	55	Setpoint 5	SETPOINT 5	Setpoint 5
6	36	Setpoint 6	SETPOINT 6	Setpoint 6
D	—	Company Name		
O	—	Operator Name		

Table 8-13. DC-190 RS-232 Specification with Header

8.6.2 PC Output Data Format Without Header

The DC-190-to-PC output data format (without header) is specified using SPEC 12, with bit 0 set to 1. The output data format is data-only. Each data block consists of Data and CR. The following is an illustration of the output data format.

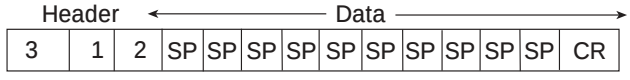
Data	CR	Data	CR	.....	CR	LF

NOTES:

- CR must be added at the end of each data block.
- LF must be added at the end as a termination code of the transmission.

8.7 Data

Parts identification (ID) code is only sent when an ID code is called during the counting mode. The maximum is 32 characters. If the ID code is less than 32 characters, then the rest of the data will be filled with space characters (20H). An example for parts code that equals 12 is shown in the diagram below.



Setpoint data is only sent when an ID code is called during the counting mode. There are six setpoint data to be sent: Setpoint 1 (F or G), Setpoint 2 (H), Setpoint 3 (Q), Setpoint 4 (X), Setpoint 5 (U) and Setpoint 6 (6).

Setpoint 1 (F) is defined as:

- Weight: variable length, maximum of five digits and one decimal point.

Setpoint 1 (G) is defined as:

- Quantity: variable length with a maximum of six digits.

NOTE: *Only one F (Setpoint 1 – Weight) or one G (Setpoint 1 – Quantity) is sent.*

Setpoints 2 through 6 (H, Q, X, U, and 6) are data with a format consisting of:

- Percentage: variable length, maximum of five digits, and one decimal point, or
- Lower weight: variable length, maximum of five digits, and one decimal point, or
- Lower quantity: variable length and a maximum of seven digits.

Four combinations of Setpoint 1 and Setpoint 2 can be sent as shown below:

Setpoint 1	Setpoints 2	Setpoints 3–6
Quantity	Percentage	—
Upper quantity	Lower quantity	Lower quantity
Weight	Percentage	—
Upper weight	Lower weight	Lower weight
NOTE: *Setpoints 2 through 6 must either increase or decrease. The decimal point for weight must be correct.*		

Table 8-14. Setpoint Combinations

Table 8-15 shows the result of printed data detailed above:

Printed Descriptor	Description
GROSS WEIGHT	Variable length, maximum of five digits and one decimal point
NET WEIGHT	Variable length, maximum of five digits and one decimal point
UNIT WEIGHT	Variable length, maximum of five digits and one decimal point
TARE WEIGHT	Variable length, maximum of five digits and one decimal point
QUANTITY	Variable length, maximum of seven digits
TOTAL QUANTITY	Variable length, maximum of seven digits when PRINT key is depressed
NOTE: *Only one of "2" (QUANTITY) or "1" (TOTAL QUANTITY) is sent at one time.*	

Table 8-15. Result of Printed Data

8.8 Status Data Byte

The status data byte for bits 0 through 7 is shown below. Status data byte will be set either to 1 or 0 in bits 0 through 5 or always set to 1 (bit 6) or 0 (bit 7).

Bit	If Set to 1	If Set to 0
0	Positive weight	Negative weight
1	Lb mode	Kg, gram mode
2	Weight stable	Weight unstable
3	Output normally entered data	Others
4	Output by + key	
5	Output by – key	
6	Always set to 1	
7	Always set to 0	

Table 8-16. Status Data Byte Format

When bit 3 (Output Normally Entered Data) is 1, bit 2 (Weight Stable) should be ignored. Table 8-17 shows the printer setup configuration with title descriptors and data lengths.

Title or Descriptor	Data Lengths, digits						
PART NUMBER	32						
INVENTORY	8						
PART NAME	32						
SCALE NUMBER	1						
DATE AND TIME							
Header (C)	Year (two digits)	Month (two digits)	Day (two digits)	Hour (two digits)	Minute (two digits)	Second (two digits)	CR

Table 8-17. Printer Setup with Descriptors and Data Lengths

8.9 Bar Code Scanners

Bar code scanning capabilities are available using either a laser scanner or a wand (or pen) scanner. The laser scanner allows non-contact, instantaneous, and accurate input of unit weight, tare weight, and ID code.

The scanner can become operational by connecting the scanner cable to the DIN-8 connector in the rear of the console. The pen reader is an economical method to use the accuracy and speed of bar code data input when contact scanning is available. Be sure to verify the correct settings on SPECs 14 and 15 (see Section 4.2 on page 18).

Input Data Format

The DC-190 provides two methods to input data; one is with a header and the other, without a header. The format using a header is shown in the diagram below.

Header	Data	CR

The format for without a header is shown below (data identified as an ID code).

Data	CR

Three Lines Bar Code

The DC-190 can read three lines of bar code. The following illustrations show the configuration for Lines 1, 2, and 3.

Line 1:

Header	SP	Data 1	CR

Line 2:

SP	Data 2	CR

Line 3:

Data 3	CR

Communication available in the operation mode include, unit weight, tare weight, part code, and quantity.

Communication available in program mode include, part code, part number, part name, inventory, unit weight, tare weight and setpoints.

8.10 Header

Table 8-18 presents the type of receivable header code including ASCII code number and data description.

Header Code	ASCII Code	Data
1	31	Unit Weight
2	32	Quantity
3	33	ID Code
4	34	Tare Weight
A	41	Gross Weight
F	46	Setpoint 1 (W)
G	47	Setpoint 1 (Q)
H	48	Setpoint 2
I	49	Total Quantity
K	4B	Inventory
M	4D	Part Number
N	4E	Part Name
Q	51	Setpoint 3
X	58	Setpoint 4
U	55	Setpoint 5
6	36	Setpoint 6

Table 8-18. Receivable Header Codes

8.11 Z Commands

Z command functions are usable when SPEC 14 and SPEC 15 are set as noted in the table below allowing as function key and are shown below.

Z Command	Function
Z0	Rezero
Z1	Print
Z2	Unit weight clear
Z3	Plus
Z4	Minus
Z5	Tare
Z6	Clear
ZS1	Scale 1
ZS2	Scale 2
ZS3	Scale 3
ZS4	Scale 4
NOTE: *SPEC 14, bit 3 (RS-232C Connection) must be set to 1 (Yes) and SPEC 15, bit 2 (RS-232C with Header) must be set to 0 (Yes) for the console to recognize the Z commands*.	

Table 8-19. Z Command Functions

9.0 PC Connections and Label Formatting

To connect the DC-190 Ultra Count to a PC for use with the IMS inventory management software, with HyperTerminal or other terminal emulation programs, or for creating and downloading labels, a null modem cable is required. The null modem cable must provide the following connections:

9-pin Female	9-pin Male
1	1
2	3
3	2
4	6
5	5
6	4
7	8
8	7

Table 9-1. Null Modem Cable Connections

The DC-190 must also be configured for connection to the PC (see Section 4.0 on page 17).

9.1 Using HyperTerminal

Once the DC-190 is configured for PC connection and connected to the PC, start the HyperTerminal program.

9.1.1 HyperTerminal Setup

Select the name a port to be used for the connection, then set the port properties (see Figure 9-1). **NOTE:** Values specified for the PC port must match the DC-190 configuration for the port used.

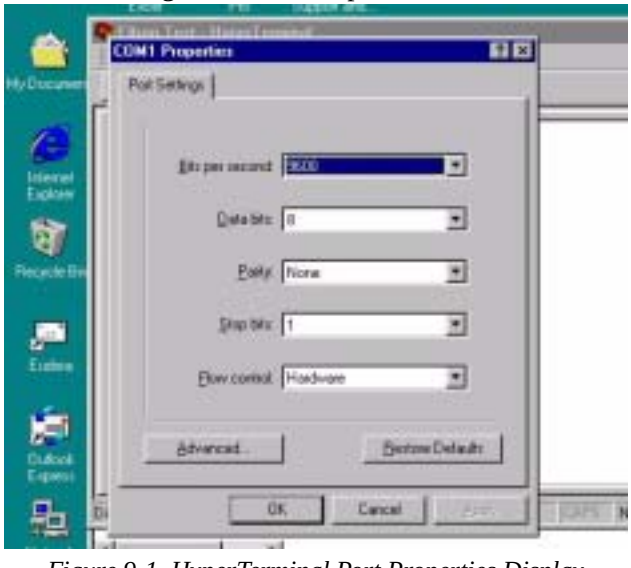


Figure 9-1. HyperTerminal Port Properties Display

Click the *Advanced…* button and choose the type of terminal emulation to use, then click the *ASCII Setup…* button. Click the checkbox to *Append line feeds to incoming line ends* as shown in Figure 9-2. Click *OK* to finish HyperTerminal setup.

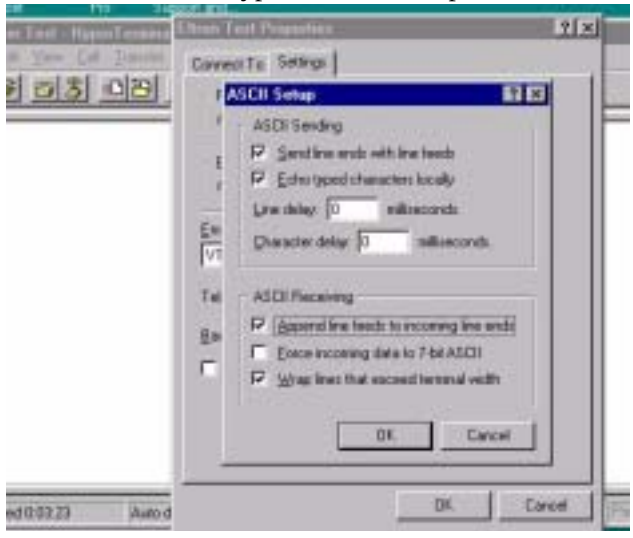


Figure 9-2. HyperTerminal ASCII Setup Display

9.1.2 Using HyperTerminal to Request Data

Once HyperTerminal is configured, scale data can be sent to HyperTerminal by pressing the * key on the DC-190 console. The Z commands (see Section 8.11 on page 43) can also be used.

To request data using the Z commands, type the command into a text editor window (such as Notepad), then press Enter to insert a carriage return after the command. Save the text file into your HyperTerminal folder with a descriptive name such as Z1.txt.

In HyperTerminal, select *Transfer*, specify the name of the file that contains the Z command, then select *Send Text File*. HyperTerminal opens the text file and sends the Z command to the DC-190. The DC-190 responds by returning data to HyperTerminal.

9.1.3 Saving Data Sent to HyperTerminal

To save data sent to HyperTerminal, select *Transfer*, then select *Capture Text*. Highlight *Capture Text* and type the name of the file to store the data, then click *Start*. Press the * key on the DC-190 console or use a Z command (see above) to send scale data to HyperTerminal. When done, click *Transfer* and highlight *Capture Text* then click *Stop.*

9.1.4 Example of HyperTerminal Data

Figure 9-3 shows an example of a HyperTerminal display of data returned from a 25-lb. DC-190 Ultra Count counting scale configured as shown in Table 9-2. Table 9-3 describes the headers and data displayed in Figure 9-3.

SPEC	Value	SPEC	Value
00	0000	10	1111
01	0000	11	0000
02	1000	12	1000
03	0000	13	0011
04	1001	14	1010
05	1011	15	0011
06	1001	16	0001
07	0000	17	1011
08	0111	18	0000
09	0100	19	0000

Table 9-2. Sample DC-190 Configuration

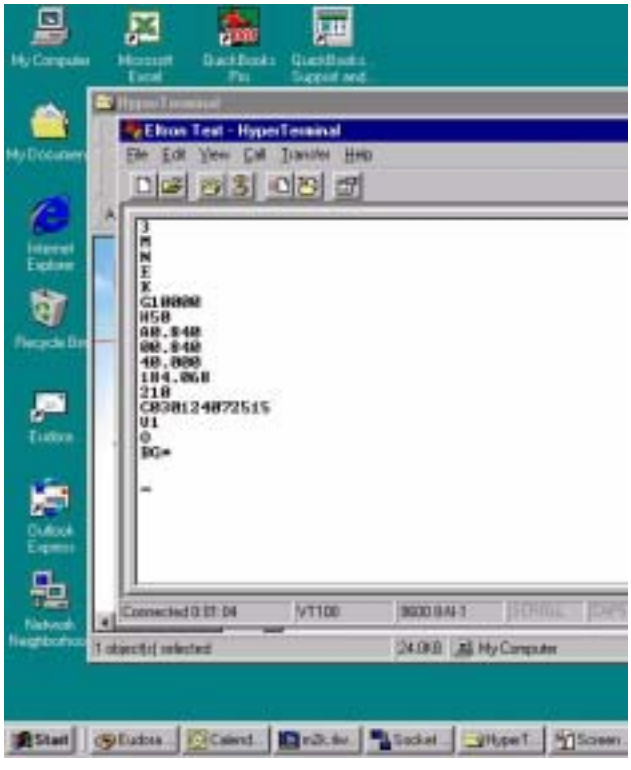


Figure 9-3. HyperTerminal Data Display

Header	Description	Example Data
3	ID code	—
M	Alt part number	—
N	Part name	—
E	Lot number	—
K	Pieces in inventory	—
G	Setpoint 1 (quantity)	10000
H	Setpoint 2	50
A	Gross weight	0.840
0	Net weight	0.840
4	Tare weight	0.000
1	Weight per 1000 pieces	84.068
2	Quantity	10
C	Date and time	030124072515
V	Scale number	1
O	Operator name	—
B	Status	G*

Table 9-3. HyperTerminal Headers and Data

See Section 8.6 on page 39 for more information about headers.

9.2 Creating Labels for Eltron 2700-Series Printers

Zebra Technologies' Create-A-Label (CAL) software, supplied with the Eltron 2700-series printers, can be used to create both bar code and human-readable labels for these printers. CAL supports imported graphics in many formats, including PCX, JPG, TIF, BMP, and GIF.

With Create-A-Label software installed, start the Create-A-Label program. Create a template file or download a template file from www.digiscales.com (see Figure 9-4). Resize as needed, then select *Save As* from the *File* menu to save and rename the file. From the *Edit* menu, select *Label Setup*.

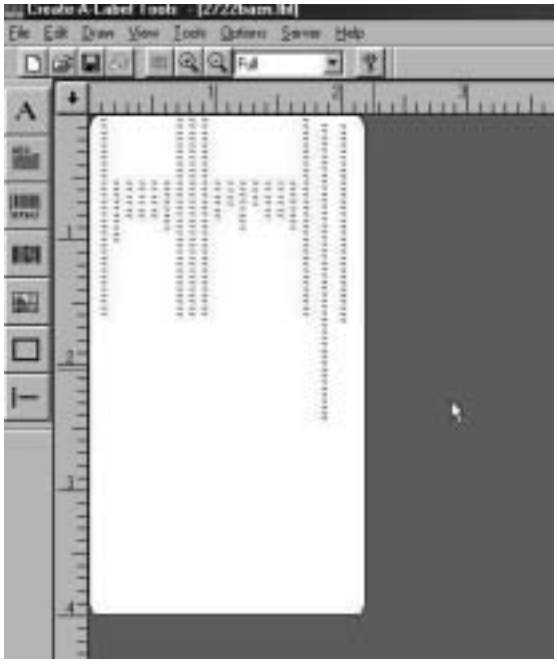


Figure 9-4. Label Template, Showing Hidden Fields

Do not alter the hidden fields on the label template!

The hidden fields, designated V00–V18 and shown as red *rrrrrrrrrr*'s in the label template, are used to link to the DC-190 headers (see Table 9-4).

From the Draw menu, choose the label type.

- Graphics in any supported format can be sized to fit the label.
- Text can be specified as either fixed or linked. Linked text prints the contents of the header field it is linked to.
- Bar code labels are always linked.

9.2.1 Editing Text and Bar Code Fields

To select a linked field, use the Linked Fields pull-down as shown in Figure 9-5.

V#	Variable Name (Character Length)	Header
V00	ID Code (32)	3
V01	Quantity (8)	2
V02	Gross weight (6)	A
V03	Net weight (6)	0
V04	Tare weight (6)	4
V05	Sequence number (8)	*none*
V06	Date and time (32)	*none*
V07	Alt. part number (32)	M
V08	Part name (32)	N
V09	Weight per 1000 pieces (6)	1
V10	Number of transactions (4)	*none*
V11	Quantity in accumulation (6)	I
V12	Lb, Kg, or grams (4)	*none*
V13	Weight per 1000 pieces (6)	1
V14	Tare weight (6)	4
V15	Pieces in inventory (8)	K
V16	Lot number (32)	E
V17	Company name (48)	D
V18	Operator name (32)	O

Table 9-4. Create-A-Label Variable Fields

NOTE: The two tare weight fields (V04 and V14) and the two weight per 1000 pieces fields (V09 and V13) support both bar code and human readable labels. Either field can be used.

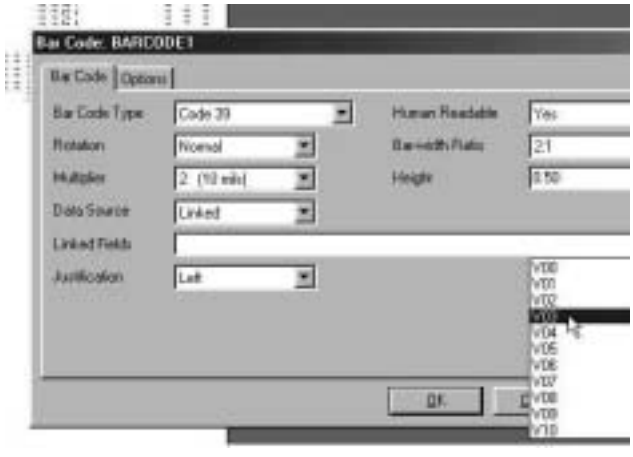


Figure 9-5. Selecting a Linked Field

To insert a header code for a linked field, enter the header code value enclosed in quotation marks (for example, “1”) in front of the linked field identifier, as shown in Figure 9-6

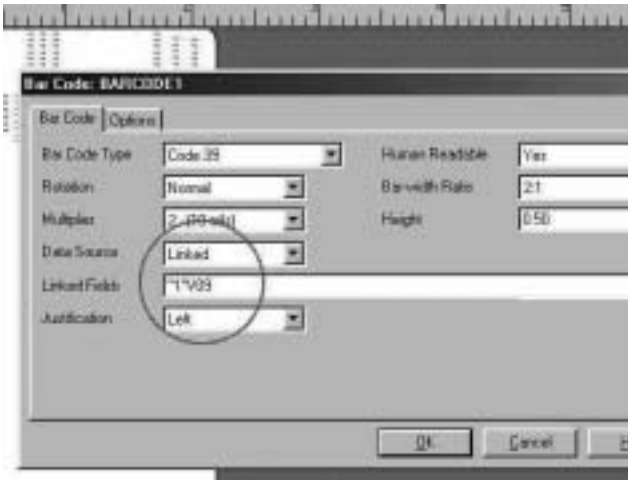


Figure 9-6. Inserting a Header Code for a Linked Field

New text or bar code fields can be placed over the hidden fields of the label template (see Figure 9-7), but take care not to accidentally select a hidden field. Deleting or changing some hidden fields can cause the label to print incorrectly or not at all.

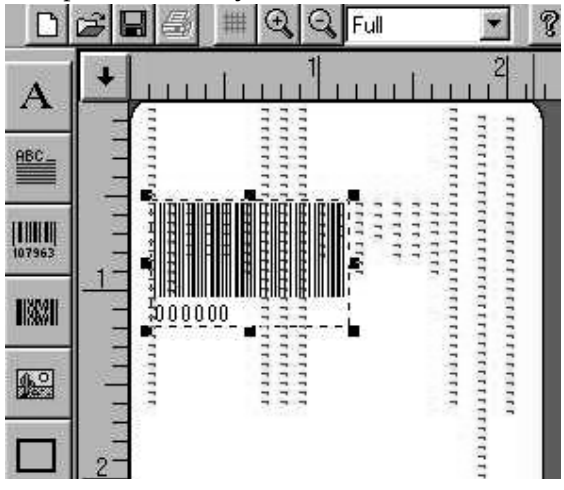


Figure 9-7. Bar Code Label Positioned on Label Template

If the length of some of the 32- or 48-character fields is not needed or is too long for your bar code label stock, you can reduce the length of the bar code by shortening these fields.

To edit a hidden field, left-click once on the field, then right-click and select *Edit.* (See Figure 9-8.)

DO NOT CHANGE THE DEFAULT LENGTH OF THE GROSS, NET, OR TARE WEIGHT FIELDS!

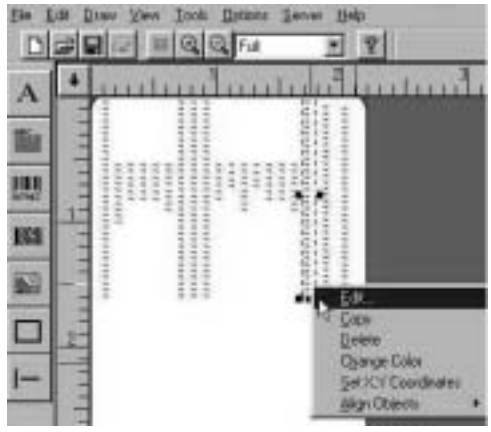


Figure 9-8. Selecting a Hidden Field (V16)

9.2.2 Adding and Downloading Label Graphics

Graphics and logos can be added to a label and downloaded to the printer using the Create-A-Label program.

To add a graphic to a label, open label in the Create-A-Label program. From the label screen, click the graphics button to show the *Pictures* dialog box; select the graphic to add from the pull-down menu then click *OK*. Drag and drop the graphic into the label and resize as needed.

Once label design is complete, use the Create-A-Label program to download the label graphic to the printer. With the printer attached and the label format open in Create-A-Label, select *Download Label to Printer* from the *File* menu. In the dialog box, use the *Add* button to move the selected graphic to the *Selected Labels* side of the dialog box, then click *Download (see* Figure 9-9*)*.

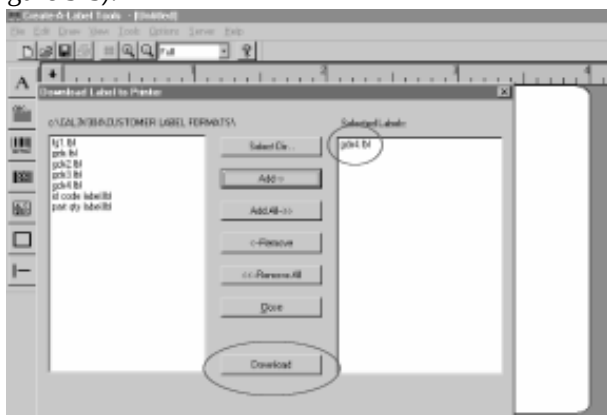


Figure 9-9. Selecting Label Graphic for Download

The label format itself must be edited then downloaded using the ELTRTERM.EXE program. See the following sections for more information.

9.2.3 Generating the EPL and EJF Files

When the label design is complete, save the label, then select *Generate EPL Source File* (see Figure 9-10 on page 48). When the *Print to File* pop-up menu appears with the selected file with a .BIN extension, click *OK* to save the file.

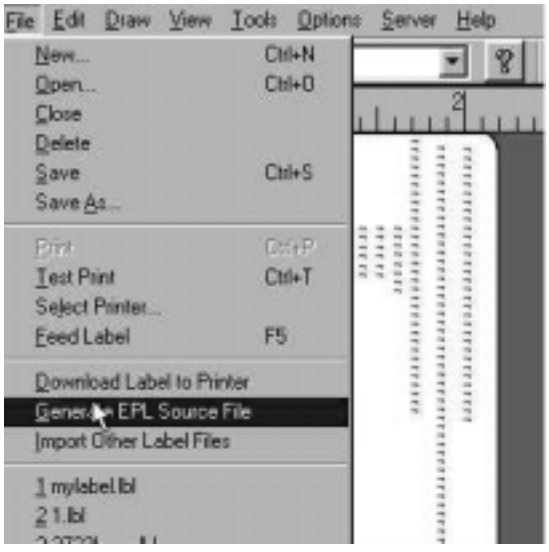


Figure 9-10. Generate EPL Source File

Another pop-up menu appears, this time showing an .EJF extension. Click *OK* to save the file.

9.2.4 Editing the EJF File

Before downloading the EJF file, several fields must be edited. Open the file in WordPad or NotePad, then do the following:

- Change the “O” in the first line to an “N”.
- In all listed variables (V00–V18), change the “L” (left justification) to an “N” (no justification.

See Figure 9-11 for the location of these fields.

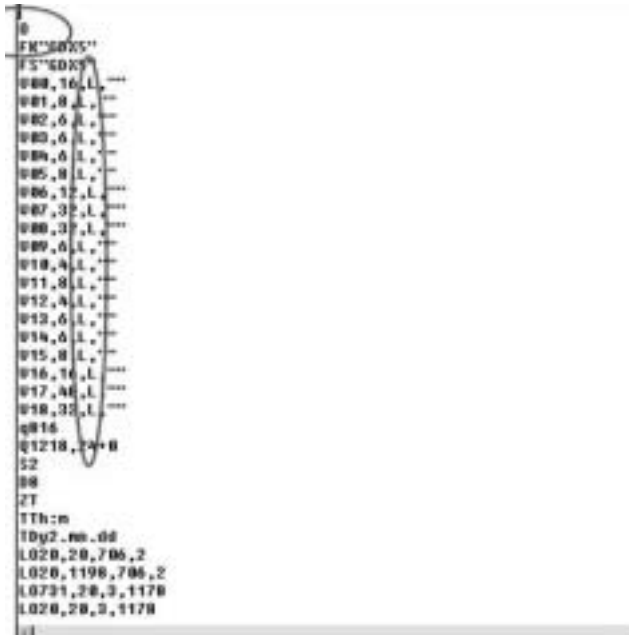


Figure 9-11. Editing the EJF File

After editing the file (see Figure 9-12), select *Save* or *Save As* to save the EJF file.

Figure 9-12. Edited EJF File

9.2.5 Downloading the EJF File

To download the EJF file to the printer, install the download program, ELTRTERM.EXE. Start the program, then select *CommPort Properties* from the *CommPort* menu. Select the port and printer type, then set the communications properties as follows:

Property	Setting
Maximum Speed	9600
Data Bits	8
Parity	None
Stop Bits	1
Echo	Off
Flow Control	RTS

Table 9-5. ELTRTERM CommPort Properties Settings

From the *File* menu, select *Open File to Send*. Locate the EJF file you wish to download and click the *Open* button.

In the download dialog, click on the pull down menu to select the type of label (see Figure 9-13).

Figure 9-13. Selecting Download Label Type

The valid types of labels are:

- *Individual Label:* Prints a label when the *, +, or – key is pressed. An ID code *must* be present in the scale.
- *Total Label:* Prints a label when a total is accumulated. An ID code *must* be present in the scale.
- *No ID Individual Label:* Prints a label when the *, +, or – key is pressed. An ID code *must not* be present in the scale.
- *No ID Total Label:* Prints a label when a total is accumulated. An ID code *must not* be present in the scale.

Once the label has been downloaded the printer, quit the ELTRTERM program.

9.2.6 Scale Configuration

Verify correct configuration for the attached printer *before* connecting to the scale:

- SPEC 11, bit 2, must be set to 0 (Eltron printer driver)
- SPEC 12, bit 1, must be set to 1(custom download format)

If SPEC 12, bit 1, is set incorrectly, the scale will download the standard label format to an attached printer on power-up.

Once configuration is verified, and with the scale powered off, connect cable from printer to scale port. Power-on scale. Enter any necessary ID code or count data information into the scale, then press the print key to test the label.

10.0 Appendix

The following sections contain additional technical information for the DC-190 counting scale.

10.1 SPEC Code Worksheets

The following worksheets can be used to record or plan configuration values for the DC-190 Ultra Count.

See Section 4.2 on page 18 for information about the SPEC 141 group. See also the following:

- SPECs 8–11: Section 3.2.2 on page 16
- SPEC 13: Section 3.2.1 on page 15
- SPECs 16–17: Section 3.1.1 on page 12 and Section 3.1.3 on page 14

SPEC	Default	Bit 3	Bit 2	Bit1	Bit 0
0	0000				
1	0000				
2	1000				
3	0000				
4	1001				
5	1011				
6	1001				
7	0000				
8	0010				
9	0111				
10	0111				
11	0100				
12	1000				
13	0001				
14	1010				
15	0011				
16*	0001				
17*	1011				
18	0000				
19	1000				

Table 10-1. SPEC 141 Worksheet

See Section 4.3 on page 21 for information about the SPEC 142 group. See Section 10.2 on page 51 for more information about weight display and resolution SPECs (20–23, 33, and 36).

SPEC	Default	Bit 3	Bit 2	Bit1	Bit 0
20	*none*				
21	*none*				
22	*none*				
23	0000				
24	0000				
25	00_0				
26	0000				
27	0100				
28	0000				
29	0000				
30	*none*				
31	*none*				
32	1010				
33	0___				
34	0000				
35	0000				
36	__00				
37	1001				
38	0010				
39	0010				

Table 10-2. SPEC 142 Worksheet

See Section 4.4 on page 24 for information about the SPEC 143 group.

SPEC	Bit 3	Bit 2	Bit1	Bit 0
40				
41				
42				
43				
44				
45				

Table 10-3. SPEC 143 Worksheet

10.2 Scale Capacity and Display Resolution

The weight display resolution of a scale can be determined by dividing the scale capacity by the display, or "count-by", increments:

Resolution = Scale_Capacity / Display_Increments

For example, to configure a 50-lb scale to display weights in 0.01-lb increments, the required resolution would be 5000:

Resolution = 50 / 0.01 = 5000

Table 10-4 shows display increment values for typical DC-190 scale bases. The display increment values shown are calculated by dividing the scale capacity by display resolution values that can be configured with SPEC 23 (1/2500, 1/5000, 1/10000).

Nominal Capacity	Display Resolution (SPEC 23)	Display Increments
0.5	2500	0.0002
	5000	0.0001
1.0	5000	0.0002
	10000	0.0001
2.5	2500	0.001
	5000	0.0005
5.0	2500	0.002
	5000	0.001
	10000	0.0005
10	5000	0.002
	10000	0.001
25	2500	0.01
	5000	0.005
50	2500	0.02
	5000	0.01
	10000	0.005
100	5000	0.02
	10000	0.01
250	2500	0.1
	5000	0.05
500	2500	0.2
	5000	0.1
	10000	0.05
1000	5000	0.2
	10000	0.1

Table 10-4. Displayed Increments Based on Scale Capacity and Display Resolution

Once the display resolution is selected, the minimum display increment value (1, 2, or 5) and the decimal position can be chosen. Table 10-5 lists the SPECs used to configure display resolution, minimum display increment, and decimal position for scales 1–3.

Specification	Scale Number	SPEC Number
Display Resolution	All	SPEC 23, bits 3–2
Minimum Display	1	SPEC 20, bits 3–2
	2	SPEC 20, bits 1–0
	3	SPEC 36, bits 3–2
Decimal Position	1	SPEC 21, bits 2–0
	2	SPEC 22, bits 2–0
	3	SPEC 33, bits 2–0
NOTE: *Scale number refers to the physical scale number, not the displayed scale number shown when switching between scales.*		

Table 10-5. Weight Display Configuration SPECs

10.3 Connector Pinouts

The DC-190 provides CTS/RTS hardware handshaking lines on both the 8-pin DIN and 9-pin D-Sub connectors. For devices that do not require hardware handshaking, short the CTS/RTS lines on the scale side of the cable.

8-Pin DIN Female

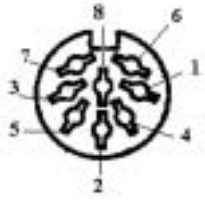


Figure 10-1. 8-Pin DIN Female

Pin Number	Scanner DIN Connector	Force Balance DIN Connector
1	DTR	DTR
2	SIGNAL GND	SIGNAL GND
3	DSR	DSR
4	RXD	RXD
5	TXD	TXD
6	CTS	CTS
7	RTS	RTS
8	Vcc (5 V)	*N/C*

Table 10-6. Eight-Pin DIN Connector Pin Assignments

14-Pin Amphenol

Figure 10-2. 14-Pin Amphenol Female

Pin Number	Remote Platform Connector Description
1	*Not used*
2	
3	+EXCITATION
4	–EXCITATION
5	SHIELD*
6	+SIGNAL
7	–SIGNAL
8	GROUND*
9 through 14	*Not used*
* When using the Y cable, use pin 5 instead of pin 8 as ground.	

Table 10-7. Remote Platform Pin Assignments

9-Pin D-Sub Female

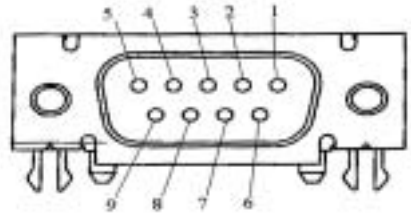


Figure 10-3. 9-Pin D-Sub Female

Pin Number	Description
1	DCD
2	RXD
3	TXD
4	DTR
5	SIGNAL GND
6	DSR
7	RTS
8	CTS
9	RI

Table 10-8. 9-Pin D-Sub Connector Pin Assignments

Setpoint Mini DIN

Figure 10-4. Setpoint Mini DIN Female

Pin Number	Setpoint Configuration
1	SP-1
2	SP-2
3	SP-3
4	SP-4
5	SP-5
6	SP-6
7	+5V
8	GND

Table 10-9. Setpoint Configuration Pin Assignments

Figure 10-5 shows how the DC-190 can be attached to output relays for setpoint control of external equipment. Components shown include a four-channel relay rack (PN 19365) with four output relays (PN 15971).

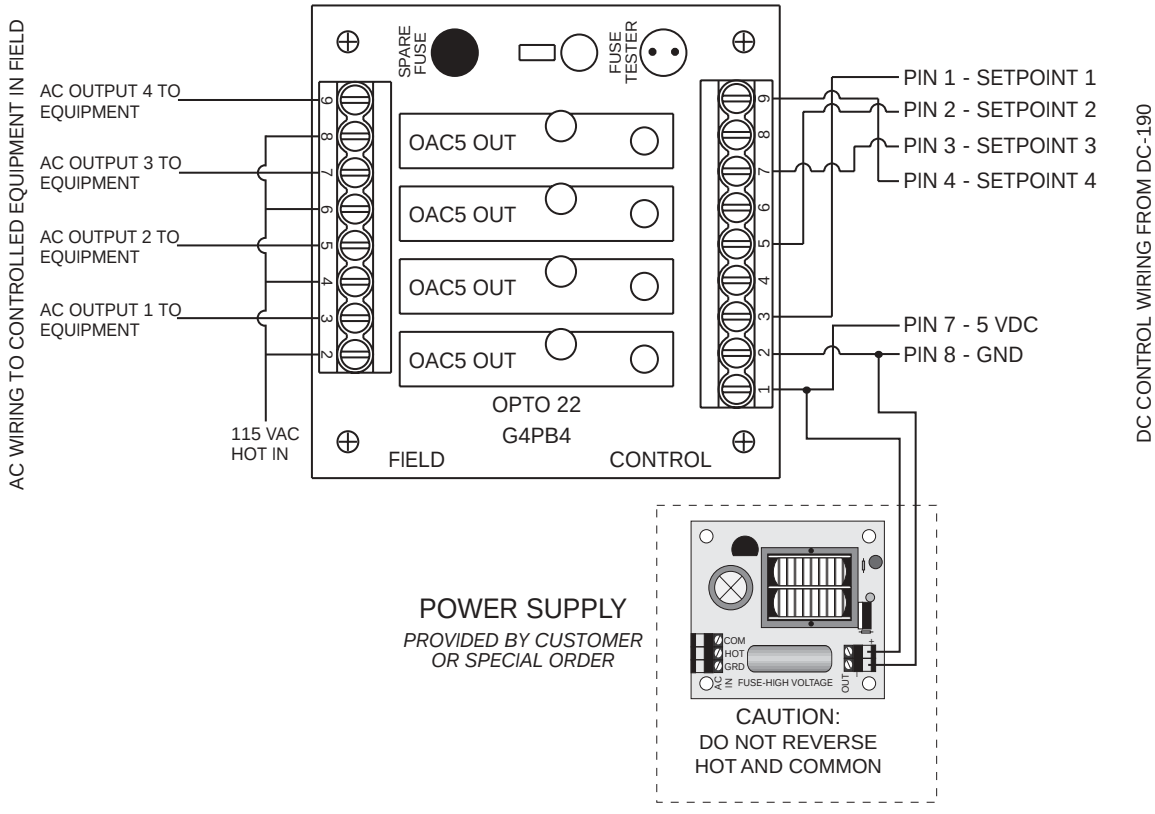


Figure 10-5. Typical Wiring for 4 AC Output Relays to Control Equipment

10.4 Cable Wiring

The following tables show wiring specifications for cables used with the Epson TM-U295/TM-U200, Eltron 2722/2742, and Digi BCP-300 printers.

10.4.1 TM-U295/TM-U200 Cables

Cable PN 41279

TM-U295/TM-U200 25-pin D-Sub Male		DC-190 9-pin D-Sub Male	
Function	Pin	Pin	Function
TxD	2	2	RxD
RxD	3	3	TxD
GND	7	5	GND
NOTE: When making your own cable, short the following pins: 25-pin D-Sub: Pin 6 (DSR) to 20 (DTR), 4 (RTS) to 5 (CTS) 9-pin D-Sub: Pin 4 (DTR) to 6 (DSR), 7 (RTS) to 8 (CTS)			

Table 10-10. Wiring for Cable PN 41279, TM-U295/TM-U200

Cable PN 32810

TM-U295/TM-U200 25-pin D-Sub Male		DC-190 8-pin DIN Male	
Function	Pin	Pin	Function
TxD	2	4	RxD
RxD	3	5	TxD
GND	7	2	GND
NOTE: When making your own cable, short the following pins: 25-pin D-Sub: Pin 6 (DSR) to 20 (DTR), 4 (RTS) to 5 (CTS) 8-pin DIN: Pin 1 (DTR) to 3 (DSR), 6 (CTS) to 7 (RTS)			

Table 10-11. Wiring for Cable PN 32810, TM-U295/TM-U200

10.4.2 Eltron 2722/2742 Cables

Cable PN 64660

Eltron 2722/2742 9-pin D-Sub Male		DC-190 9-pin D-Sub Male	
Function	Pin	Pin	Function
RxD	3	3	TxD
GND	5	5	GND
RTS	7	7	RTS
CTS	8	8	CTS

Table 10-12. Wiring for Cable PN 64660, Eltron 2722/2742

Cable PN 64661

Eltron 2722/2742 9-pin D-Sub Male		DC-190 8-pin DIN Male	
Function	Pin	Pin	Function
RxD	3	5	TxD
GND	5	2	GND
RTS	7	7	RTS
CTS	8	6	CTS

Table 10-13. Wiring for Cable PN 64661, Eltron 2722/2742

10.4.3 BCP-300 Cable

Cable PN 73106

BCP-300 RJ-11		DC-190 8-pin DIN Male
Pin	Wire Color	Pin
1	White	1
2	Black	2
3	Red	3
4	Green	4
5	Yellow	5
6	Blue	6
—	—	7
—	—	8

Table 10-14. Wiring for Cable PN 73106, Digi BCP-300

10.5 Y-Cable Wiring Diagram

Figure 10-6 shows a wiring diagram for the Y-cable used to attach a separate remote platform as interna.l scale 2 (Port 1 connector).

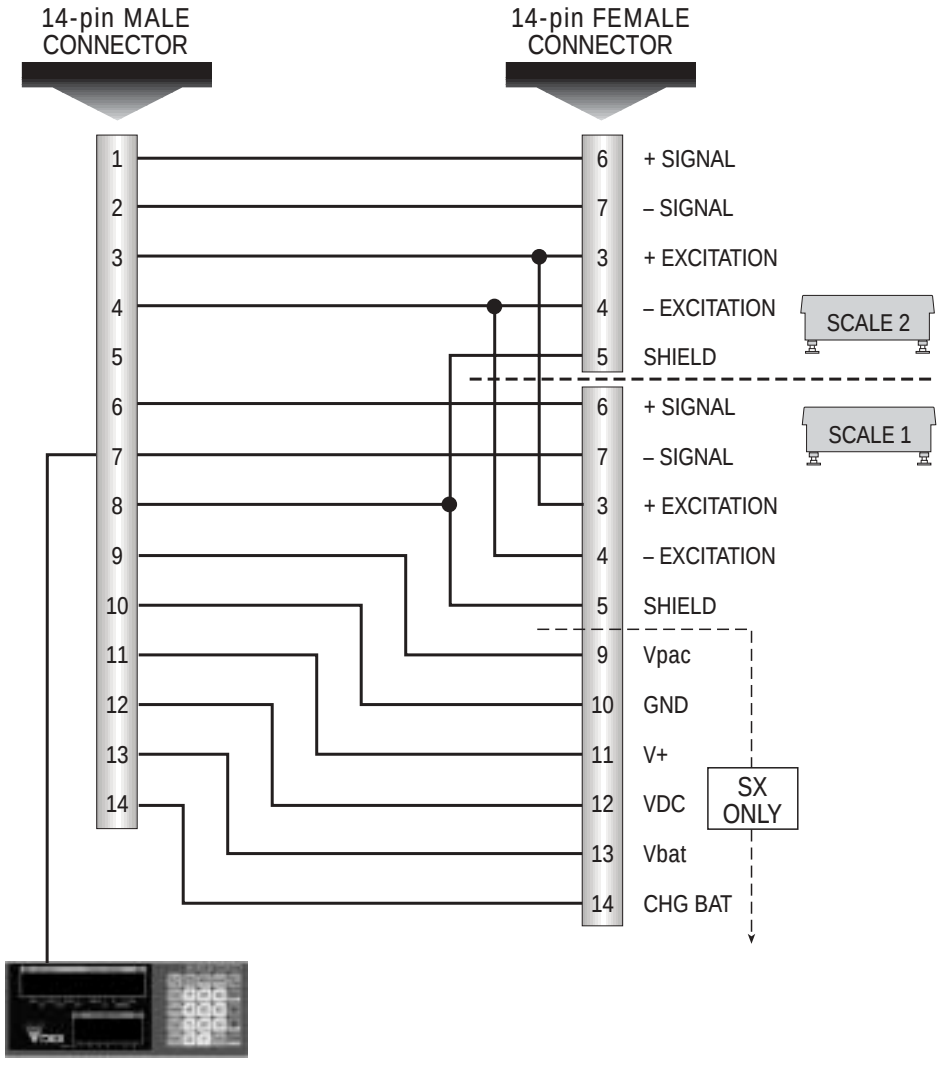


Figure 10-6. Y-Cable Wiring Diagram

10.6 DC-190 Messages

Message	Contents
ACC	Accuracy
---Add XX	Sampling quantity is insufficient
ALL	All memory
C XX	Number of items in memory
CH XXX	Checking item code
ALL CLEAr	Clear memory
dFt SPC	Default spec
EntEr tIñE	Enter time from 0000 to 2400
EntEr y-ñ-d	Enter year, month, and day
Fb CoñErr	Force balance communication error
Frl	Friday
FULL	Memory full
InVEnt	Inventory
Lo-Err	Span is out of range (on the low side)
Lot-no	Lot number
ñon	Monday
ñon-SUn 0-6	Mon=0, Tue=1, Wed=2, Thu=3, Fri=4, Sat=5, Sun=6
not F	Item not found
OF	Overflow
P-nAñE	Part name
P-no	Part number
PrESS CodE	Calibration mode: Press code key to auto find zero number
ProG	Programming mode
P-SP	Item setpoint
rS232 CoñErr	RS232 communication error (PC/printer)
S-on	Span switch is ON
Sat	Saturday
SEt P	Setpoint
SEt X	Setpoint number
SPCXX	Specification number
SUn	Sunday
TArE	Tare
tArE oFF LoAd	Tare is not allowed because weight is greater than zero
t-C XX XX-XX	Teraoka Code I Character Position I Character Code Character - Character
THU	Thursday
TotAL XXXXXXX	Accumulation or subtraction operation
TUE	Tuesday
UF	Underflow
Unit u	Unit weight
UP-Err	Span out of range (on the high side)
VEr X.XX	Version number
UED	Wednesday

Table 10-15. DC-190 Messages

10.7 Clearing Locked-Up Scale (888888 Error)

Several configuration errors can result in the scale locking up with a display that shows all *888888*s. These errors include the following:

- If no force balance is connected to the DC-190, SPEC 8, bit 3, must be set to 0 (0xxx).
- If a force balance *is* attached, SPEC 8, bit 3 must be set to 1 (1xxx) and SPEC 9, bit 2 (force balance type), must be set to 1 (x1xx, Ohaus Explorer).
- If no printer is attached to the DC-190, SPEC 10, bit 3, must be set to 0 (0xxx).
- SPEC 16 and SPEC 17 must assign a different location for each scale, whether it is present or not. These bits must be configured to show scale assignments for *Internal Scale 1*, *Internal Scale 2*, *External Scale*, and *Force Balance*. See example below.

Caution *The following configuration for SPECs 16 and 17 contains duplicate entries for both* Internal Scale 1 *and* External Scale*. Do NOT set SPECs 16 and 17 to a configuration such as that shown below: a lockup condition will result if this configuration is selected.*

SPEC	Setting	Bits 2 and 3	Bits 0 and 1
16	0010	Scale 1 00: Internal Scale 1	Scale 2 10: External scale
17	1000	Scale 3 10: External scale	Scale 4 00: Internal Scale 1

Should the DC-190 become locked up in all *888888*s as a result of invalid specification settings, an authorized service technician can perform the following procedure:

1. Unplug scale from AC outlet.
2. Press and hold the 3 and 9 keys while plugging AC cord into outlet.
3. The display shows *S-on*. Release the 3 and 9 keys.
4. Press and hold REZERO key while keying access code 141 (display will show *SPC00*). Use the + key to advance to the incorrect SPEC and edit its value.
5. When done, press the * key to store the new values, then press the MODE key to return to weighing mode.

10.8 DC-190 Character Code List (Teraoka Code)

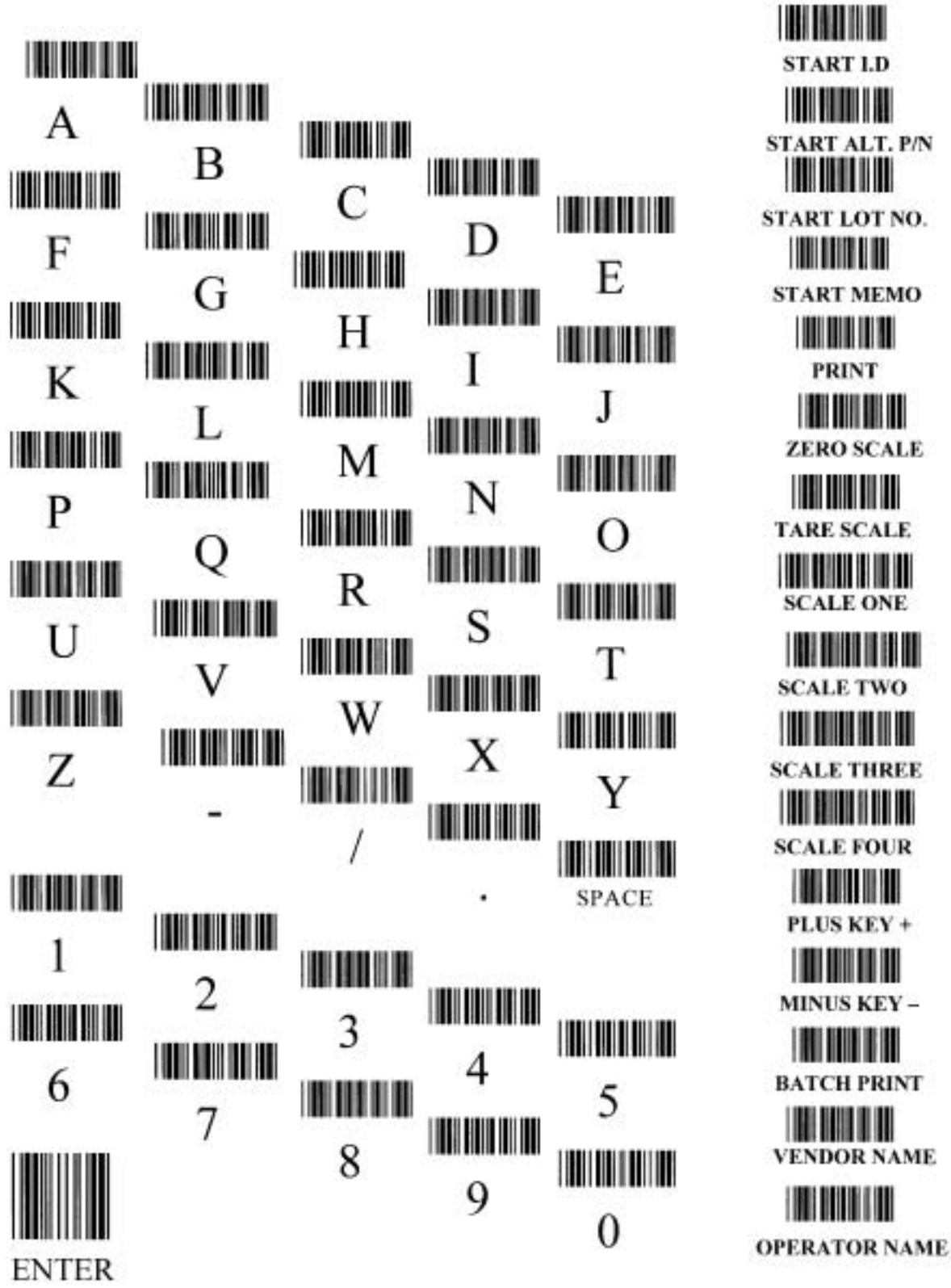
The DC-190 is not equipped with a full alphanumeric keyboard, but the Teraoka Code listed in Table 10-16 can be used to enter a code number representing the character you want entered. For example, if you want to enter the letter A, you would enter the Code 01.

The Teraoka Code can be used in the programming mode (see Section 7.0 on page 30) to enter an alphanumeric item code number, part number, part name, and lot number. You will know that you are in the Teraoka mode because the WEIGHT display will always prompt *t-C 01* and the UNIT-WEIGHT display will show *00-*. The QUANTITY display will prompt *CodE*, *PArt-no*, *P-nAme*, or *Lot-no* depending on the data you are entering. The display will show *t-C* and *00-* and will prompt you to enter the first character. Once you enter the character, using the code equivalent, the displays will read *t-C 02* and *00-*. Pressing the **+** key allows you to move to the next character or leave a space between characters, and pressing the **–** key allows you to review characters already entered.

Character	Code	Character	Code	Character	Code	Character	Code
Space	00	M	13	Z	26	9	39
A	01	N	14	,	27	@	40
B	02	O	15	.	28	!	41
C	03	P	16	–	29	"	42
D	04	Q	17	0	30	#	43
E	05	R	18	1	31	$	44
F	06	S	19	2	32	%	45
G	07	T	20	3	33	&	46
H	08	U	21	4	34	/	47
I	09	V	22	5	35	(	48
J	10	W	23	6	36	)	49
K	11	X	24	7	37	‘	50
L	12	Y	25	8	38		

Table 10-16. DC-190 Character Code List (Teraoka Code)

10.9 Bar Code Board



10.10 PSC QuickScan 6000 Setup

Figures 10-7 and 10-8 (see page 61) provide setup scans for the PSC® QuickScan® 6000. See also SPECs 14 and 15 in Table 4-1 on page 50.

Figure 10-7. Scan Sheet for PSC QuickScan 6000 (Part 1)

SCAN SET

SET SUFFIX

SUFFIX 0

SUFFIX D

SCAN END

SET

END

SCAN SET

DISABLE I.D. CONTROL

SCAN END

SCAN SET

DON'T COMPUTE

DON'T TRANSMIT

ENABLE FULL ASCII 39

SCAN END

SCAN SET

SET MINIMUM LENGTH

SET "0"

SET "0"

SCAN END

Figure 10-8. Scan Sheet for PSC QuickScan 6000 (Part 2)

10.11 DC-190 Ultra Count Specifications

Power

Power source	100–120VAC or 220–240 VAC at 50/60 Hz
Power consumption	20 W

Analog Specifications

Input sensitivity	0.40–4.00 mV/V
Zero adjustment range	100% FS
A/D conversion rate	10/sec
Load cell excitiation	12V DC
Load cells per scale	4 x 350Ω
Load cell connectors	2 x 14-pin Amphenol
Scale channels	Up to four: three analog (load cell) scales, plus one force balance
Weightdisplay resolution	1/10000, 1/5000, 1/2500
Counting resolution	1/1000000

Digital Specifications

Weight display	5 digits
Unit weight display	5 digits
Quantity display	7 digits
Item memory	200 items, expandable with IMS software

Serial Communications and Setpoint Connectors

SCANNER port	8-pin DIN, RS-232C
FORCE BALANCE port	8-pin DIN, RS-232C
232C/PRINTER port	9-pin D-Sub, RS-232C
Setpoint output	8-pin mini-DIN, 24V open collector

Environmental

Operating temperature	14°F to 104°F (–10°C ° to 40°C)
Operating humidity	10% – 80% relative humidity

Physical

Bench type	16.4 in (W) x 17.1 in (D) x 4.9 in (H) 41.7 cm (W) x 43.4 cm (D) x 12.4 cm (H) 17.6 lb (8.0 Kg)
Pole type	16.4 in (W) x 16.5 in (D) x 17.9 in (H) 41.7 cm (W) x 41.9 cm (D) x 45.5 cm (H) 19.4 lb (8.8 Kg)

DC-190 Ultra Count Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for two (2) years.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

RLWS AND BUYER AGREE THAT RLWS'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

NO TERMS, CONDITIONS, UNDERSTANDING, OR AGREEMENTS PURPORTING TO MODIFY THE TERMS OF THIS WARRANTY SHALL HAVE ANY LEGAL EFFECT UNLESS MADE IN WRITING AND SIGNED BY A CORPORATE OFFICER OF RLWS AND THE BUYER.

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