

MCS Series

Digital Counting Scale

Operation Manual

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Transcell Technology inc.

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ATTENTION:

To extend the life of your digital scale, do not drop items to be weighed onto the platform or overload the scale beyond its rated capacity. Shock-loading and overloading may damage the load cell and void the warranty.

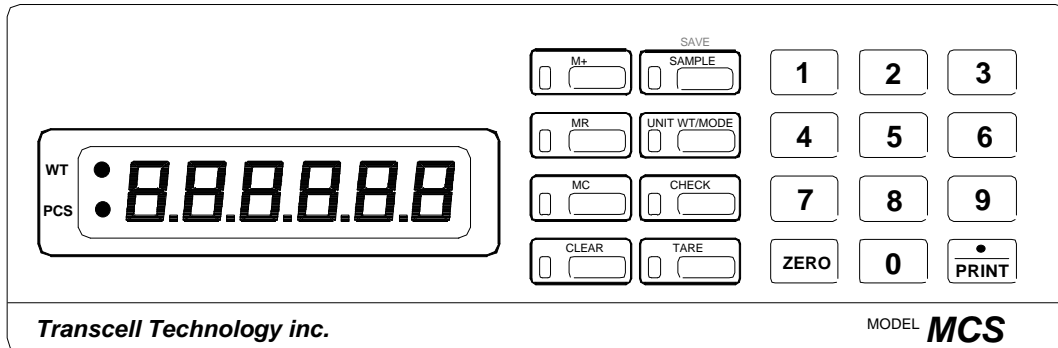
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Introduction

The MCS Series Counting Scale, available in four capacities, is an easy to use, high resolution counting scale featuring keyboard tare and unit weight entry, as well as a memory accumulator. Housed in a durable plastic enclosure, the unit displays its information on a 6-digit LED

display. A 20-key membrane panel contains all of the scale's functions and allows entry of numerical data. A removable 8" x 5 $\frac{3}{4}$ " plastic platform allows for easy cleaning when used to count greasy or dusty items.



MCS Series Front Panel

Getting Started

After unpacking the scale, a small amount of assembly is required:

- Locate the platter and affix to the scale in the holes provided. Be sure to align the end marked "FRONT" with the front of the scale.

Please Do...

- Place the scale on a firm and stable floor or table. Use the adjustable feet if necessary to ensure that the scale is level and does not rock in place.
- Plug the enclosed AC Adapter into the scale first, then into an AC outlet.
- Leave the scale on for at least 20 minutes before using. You will find the ON/OFF switch on the back of the scale. You may leave the scale on at all times, if you wish.
- Press the **ZERO** key before operating the scale.

Continued

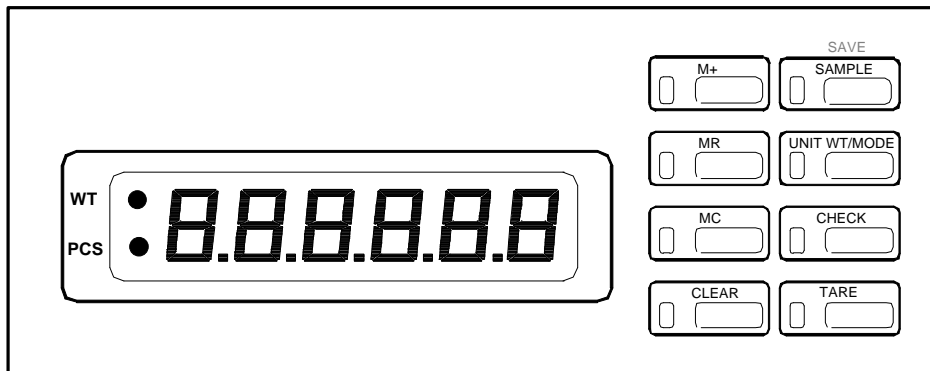
Getting Started / Continued

Please Do *Not*...

- Share an AC outlet with other noise producing products; i.e. anything with an electrical motor or relay.
- Turn the scale ON with an object already on the platform.
- Operate the scale...
 - ...in an area with changing ambient temperature.
 - ...in direct sunlight.
 - ...in an area with high humidity.
 - ...in a dusty environment.
 - ...in a windy area.
 - ...in an area with vibration.

Basics of Operation

1. DISPLAY OVERVIEW

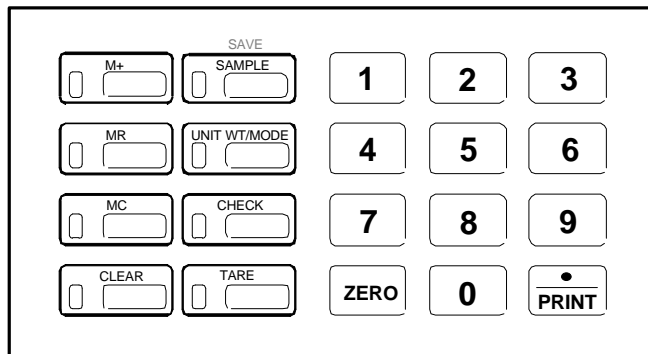


MCS Series Display Indication

Basics of Operation / Continued











INDICATION	MEANING
WT	Indicates the weight either in pounds or kilograms.
PCS	Indicates the number of pieces on the platform. If a tare has been established, the scale will indicate the NET number of pieces.
UNIT WT	Indicates the unit weight of the pieces on the platform.
TARE	Indicates that a TARE has been established either by means of keyboard entry or push button.
CHECK	Indicates that a value for check weighing has been entered.

2. KEYPAD OVERVIEW



MCS Series Keyboard

Basics of Operation / Continued

KEY	FUNCTION
	Sets the scale in the correct zero position for accurate operation.
	Establishes either the weight currently on the platform or the current keyed-in value as the tare weight.
	Establishes the current keyed-in value as the piece count of items currently on platform.
	Establishes the current keyed-in value as unit weight.
	Establishes the current keyed-in value as the number of pieces desired as a target for check weighing.
	Sends the print information out to the serial port if no number has been pressed previously. (See Appendix B for more information.) Otherwise, used as the decimal point key when entering numeric values.
Numeric Keys (0-9)	Allows entry of numeric data.
Unit Wt / MODE	Toggles the scale between the three display modes – weight, pieces, and unit weight. NOTE: If no unit weight has been established, this key does not function.
	Adds the current number of pieces on the platter to the accumulator. (Memory +) If no piece count has been established, does not function.
	Briefly shows the current value in the accumulator. (Memory Recall)
	Clears the contents of the accumulator. (Memory Clear)
	Clears all numeric information entered and returns the scale to normal display mode.

Tare Operation

In order to subtract the weight of the container or vessel from the scale's reading, it is necessary to enter that weight as the tare weight. This value can be entered into the MCS Series Counting Scale by either the **push button tare** method or the **keyboard tare** method.

For greater accuracy, it is suggested that the push button tare method be used.

To use the push button tare method:

1. Place the empty container on the platform.
2. Press the **TARE** key.

The scales turns the TARE indicator on and sets the displayed weight to zero.

To use the keyboard tare method:

1. Enter the known tare weight in pounds into the scale using the numeric and decimal point keys.

This value will appear in the display window.

2. Press the **TARE** key.

The scale turns the TARE indicator on and the display window shows the keyed-in tare weight as a negative value.

To clear the tare weight from the scale:

1. Remove all weight from the platform and press the **ZERO** key.

The scale extinguishes the TARE indication and displays window again shows zero.

Possible Tare Operation Errors:

You cannot enter a tare weight that is greater than the scale's full capacity. For example, for the MCS-10, you cannot enter, say, 12.000 lb.

Also, you cannot key in a decimal point value greater than the resolution of the scale. For ex-

ample, for the MCS-20, you cannot enter 0.001 lb since the resolution is 0.002 lb.

In both cases, the scale will display an error message. See "Displayed Error Codes" for more information.

Piece Counting Operation

In order to determine the number of pieces, the scale must first establish the unit weight of each piece. There are two ways to do this. A unit weight value can be keyed into the MCS Series Counting Scale by using the **keyboard entry** method. Alternatively, the **sampling** method may be used.

For greater accuracy, the sampling method should be used. The accuracy of this operation depends upon part consistency and sample weight. When using the sampling method, al-

ways count the parts in your hand and place them on the platform all at once.

Both the sample weight and the unit weight have limits to assure accuracy. The limits for these are described at the bottom of the page. Please note that the scale will accept weights below these limits, but will flash the UNIT WT indication as a reminder when in PIECES mode.

To use the sampling method:

1. Place a pre-determined number of pieces on the platform.
2. Key in the number of pieces you have placed on the platform. This value will be shown in the display window as it is entered.
3. Press the **SAMPLE** key.

The scale briefly shows “**SET**” then automatically switches to PIECES mode. The display window then shows the actual number of pieces on the platform.

To use the keyboard entry method:

1. Key in the pre-determined unit weight. This value will be shown in the display window.
2. Press the **UNIT WT / MODE** key.

The scale briefly shows “**SET**” then automatically switches to PIECES mode. The display window then shows the actual number of pieces on the platform.

To clear the unit weight from the scale:

1. Press the **CLEAR** key.

The scale briefly shows “**CLR**” then automatically switches to WEIGHT mode.

Piece Counting Operation / Continued

Piece Count Sample Weight Guide:

The scale has both a minimum piece weight and a minimum sample weight to ensure accuracy. If one or both of these weights are less than those shown below, the scale will show an error message. The scale will still allow counting operation, but accuracy cannot be guaranteed. See “Displayed Error Codes” for more information.

MODEL	Capacity / Graduation	Minimum Piece Weight	Minimum Sample Weight
MCS-2	2 lb x 0.0002 lb	0.00016 lb	0.003 lb
MCS-5	5 lb x 0.0005 lb	0.0004 lb	0.0075 lb
MCS-10	10 lb x 0.001 lb	0.0008 lb	0.015 lb
MCS-20	20 lb x 0.002 lb	0.0016 lb	0.03 lb
MCS-1M	1 kg x 0.0001 kg	0.08 g	1.5 g
MCS-2M	2 kg x 0.0002 kg	0.16 g	3.0 g
MCS-5M	5 kg x 0.0005 kg	0.4 g	7.5 g
MCS-10M	10 kg x 0.001 kg	0.8 g	15.0 g

Accumulator Function Operation

The MCS Series Counting Scale comes equipped with a handy accumulator function which works in conjunction with the piece counting operation.

The accumulator uses a memory to store piece counts. Much like a pocket calculator, this memory can be added to, displayed, and cleared at any time.

To use the accumulator function:

1. Establish the Unit Weight of the objects you wish to count by one of the methods listed under "Piece Counting Operation."
2. Press the **MC** key to clear the accumulator memory.

The scale briefly shows "**CLR**".

3. While in PIECES mode, place the objects to count on the platform.
4. Press the **M+** key to add this value to the accumulator's memory.

The scale briefly shows "**SET**".

5. Repeat steps 3 & 4 until all pieces are counted.
6. Press the **MR** to view the contents of the accumulator.

Check Limit Function Operation

The MCS Series Counting Scale comes equipped with a handy check limit function which works in conjunction with the piece counting operation.

The check limit uses a memory to store a target piece value which is entered using the numeric keys. Once set, the scale blinks its display when the current piece count is equal to or greater than the stored value. This function was designed for packing and filling applications.

To enter the check limit value:

2. While in any display mode, key in the target number of pieces. This value will be shown in the display window.
3. Press the **CHECK** key.

The display briefly shows "**SET**" and the scale turns the CHECK indication on.

To use the check limit mode:

1. Establish the Unit Weight of the objects you wish to count by one of the methods listed under "Piece Counting Operation."
2. Add pieces to the platter until the PIECES display begins to flash on and off.

To clear the check limit value:

1. Press the **CHECK** key without first entering a numeric value.

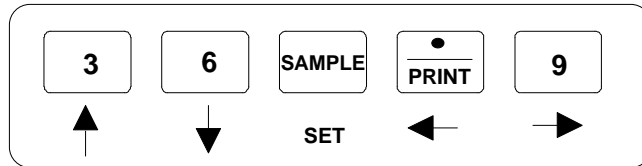
The scale turns the CHECK indication off.

Configuration

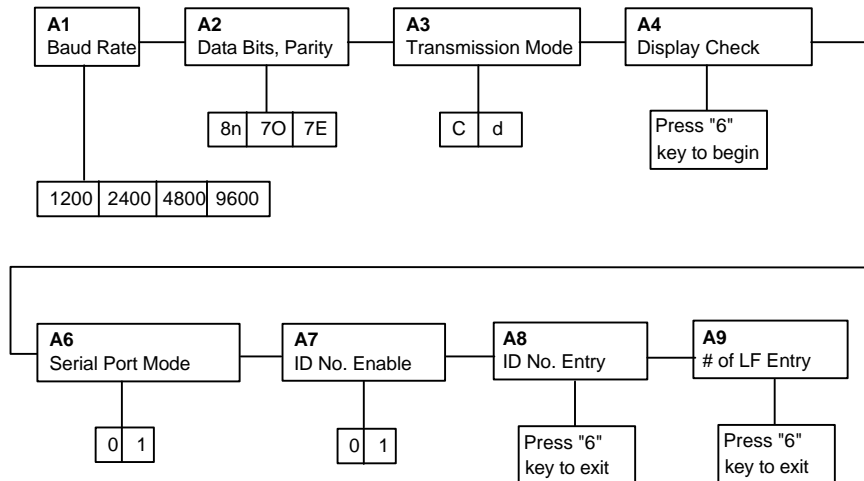
The MCS includes a menu which allows the user to alter the serial port settings. This menu consists of eight separate menu selections, each with its own sub-menu of choices. To make these changes, you must enter the User menu mode. Once there, four of the front panel keys become directional navigators to move around in the menus, and one key is used to save or SET the selections. Complete directions start below.

To place the unit in User menu mode:

1. Turn off the scale.
2. While turning the scale back on, press and hold the "8" key.
3. When the display shows "A1", the unit is in User Menu mode, and you may release the "8" key. Shown at right are the directional and SET key assignments.



USER MENU CHART



To place the unit back into the Normal Operating mode:

1. While in User menu mode, turn the scale off.
2. Turn the scale back on without holding down any keys. The display will go through a digit check, then settle into Normal Operating mode. All front panel keys will now return to their normal mode of operation.

User Menu Descriptions

NAME/CODE	DESCRIPTION	CODE/VALUE
A1 Baud Rate	Selects the baud rate for data transmission through the serial port.	1200 2400 4800 9600
A2 Data Bits and Parity	Selects the number of data bits and parity of serial transmission. "8n" = 8 data bits with no parity bit "7O" = 7 data bits with odd parity bit "7E" = 7 data bits with even parity bit	8n 7O 7E
A3 Mode of Serial Transmission	Selects when data will be sent out of the serial port to a printer or computer: "C" = Continuous mode; send data continuously "d" = Demand mode; send data when a PRINT command is issued from the printer, computer, or indicator.	C d
A4 Display Check	Actuates the function which illuminates all digit segments, decimal points, and LCD annunciators in a test sequence. Pressing the 6 key to scroll down one level begins the test sequence.	Press 6 key to begin sequence
A6 Serial Port Mode	Selects the mode of the RS-232C serial port: "0" = Full Duplex Mode "1" = Print Ticket Mode	0√ 1
A7 ID No. Enable	Allows the ID No. to be disabled in the printout. Valid only when A6 is set to "1". "0" = Disable the ID No. "1" = Enable the ID No.	0 1√
A8 ID No. Entry	Actuates the function which allows entry of a new ID No. Valid only when A6 is set to "1". Pressing the 6 key to scroll down one level begins the sequence.	0√ - 999999
A9 No. of Line Feeds	Actuates the function which allows entry of the desired number of line feeds to be printed after the printout. Valid only when A6 is set to "1". Pressing the 6 key to scroll down one level begins the sequence.	0√ - 99

Calibration

All MCS Series scales may be calibrated with any precision test weight from 1% scale capacity to 100% of scale capacity. Avoirdupois scales must be calibrated in pounds. Metric scales must be calibrated in kilograms. The recommended test weight is about 2/3 of scale capacity, but in general, the larger the test weight, the more accurate the scale will be.

To calibrate the scale:

1. Turn the scale off. Press and hold down the **ZERO** key (*not* the "0" key) while turning the scale back on. When the message "C 0" appears on the display briefly, you may release the **ZERO** key. The scale displays a value which remains on the screen. Allow a 20 minute warm-up period for the load cell and electronic components to become thermally stable.
2. Press **ZERO** to zero the value, then press the **SAMPLE** key to save the zero point value.
3. The display will momentarily prompt "C 1" for the span calibration, followed by "0.0000" or "0.000" depending on scale capacity. Place the test weight on the platform.
4. Use the numeric keys to enter the test weight value. Please note that the decimal point is fixed so that if you are entering, for example, 5 lb, you need to type "5" followed by zeroes until the "5" is to the left of the decimal point.
5. After entering the exact value, press the **SAMPLE** key to save the value.
6. If the calibration was successful, the display will show "ECAL" momentarily, then automatically enter Normal Operating Mode by performing a countdown test. Remove the test weight from the platter.
7. If the calibration was *not* successful, one of the error messages below will appear. Take the indicated action to correct the problem, then perform a new calibration.

"Err0" - The calibration test weight or the keyed-in weight is larger than the scale capacity. Change the calibration test weight or check the keyed-in weight.

"Err1" - The calibration test weight or the adjusted keyed-in weight is smaller than 1% of the scale capacity. Change the calibration test weight or check the keyed-in weight.

"Err2" - Check keyed-in weight with the actual weight placed on platform.

APPENDIX A: Specifications

CAPACITY:

MCS-2: 2 lb x 0.0002 lb
MCS-5: 5 lb x 0.0005 lb
MCS-10: 10 lb x 0.001 lb
MCS-20: 20 lb x 0.002 lb
MCS-1M: 1 kg x 0.0001 kg
MCS-2M: 2 kg x 0.0002 kg
MCS-5M: 5 kg x 0.0005 kg
MCS-10M: 10 kg x 0.001 kg

CONSTRUCTION:

Housing: Ivory ABS
Base & Sub-Platform: Metal
Platform: Ivory ABS
Feet: Non-skid Hard Rubber

DISPLAY:

6 Character, 7-Segment Red LED

KEYPAD:

20-key Silicon Rubber Type

OVER CAPACITY ANNUNCIATION:

102% of Full Scale Capacity

OPERATING TEMPERATURE RANGE:

32°F to 104°F
(0°C to 40°C)

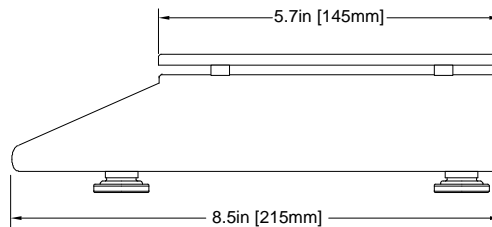
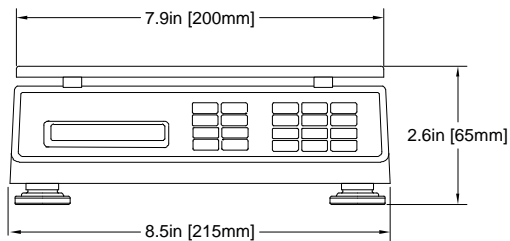
POWER SOURCE:

AC Adapter, 9 VDC, 500 mA

WEIGHT:

Net Weight: 4.0 lb (1.8 kg)
Shipping Weight: 5.6 lb (2.5 kg)

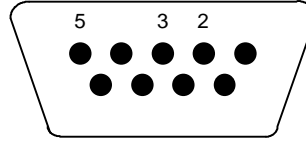
PHYSICAL DIMENSIONS:



APPENDIX B: Serial Port Modes & Cable Diagrams

The MCS is equipped with a full duplex ASCII compatible RS-232 serial communications terminal wired as a female DSUB-9 type connector mounted on the back of the scale. Shown below are the pin assignments for the female 9-pin RS-232 connector.

Pin No.	Pin Name
2	Receive Data
3	Transmit Data
5	Signal Ground



9-pin RS-232 connector (female)

As shown in **A6** of the User Menu, there are two modes of operation – Full Duplex Mode and Print Ticket Mode.

Full Duplex Mode

The Full Duplex Mode provides both Continuous and Demand serial transmission modes. The Continuous mode is used to interface to computers, scoreboards, and other remote devices requiring constant data updating. The transmission occurs at the end of each display update. The Demand mode allows control from a host device, usually a PC, and can be activated by pressing the PRINT key on the MCS front panel. Figure 1 shows a suggested cable diagram for interface to a PC. Figure 2 shows the serial data format for Continuous Mode while Figure 3 shows the serial data format for the Demand Mode.

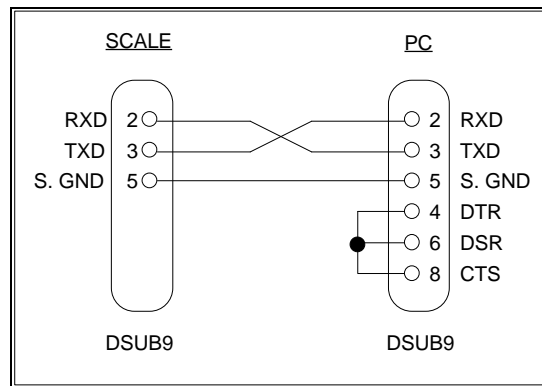


FIGURE 1. Cable Diagram for Indicator to IBM PC

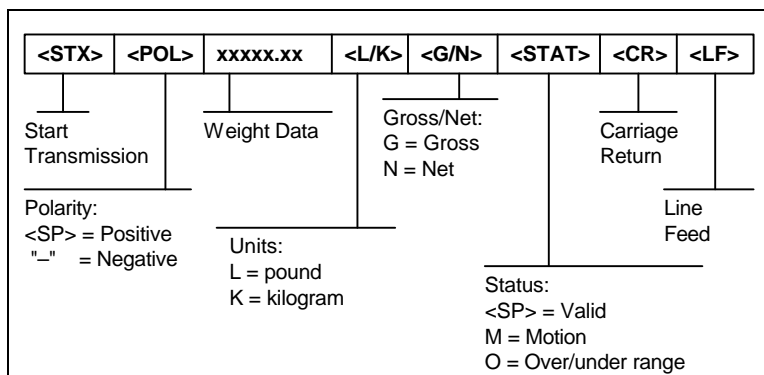


FIGURE 2. Consolidated Controls Continuous Mode

APPENDIX B: Serial Port Modes & Cable Diagrams / Continued

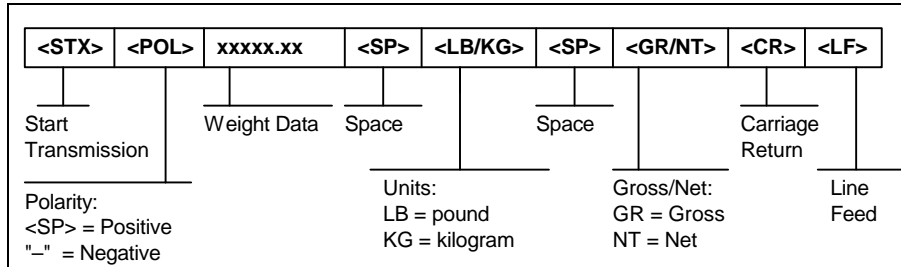


FIGURE 3. Consolidated Controls Demand Mode

Full Duplex Mode / Continued

1. Recognized host command(s):

"P" for Print

"Z" to Zero the scale

"T" to Tare the scale

2. Restrictions for transmission:

"P" Command:

Will not respond if scale is in motion or in overload.

"Z" Command:

Will not respond if scale is in motion

Print Ticket Mode

The Print Ticket Mode is designed specifically for a printer. Figure 4 shows the fixed format of the print ticket. This mode also allows printout of a 6-digit ID number which can be entered via the User Menu. Figure 5 shows a suggested cable diagram for interfacing to a serial printer. Consult printer manual for proper pinout.

ID. NO.	123456
GROSS	5. 000 LB
TARE	1. 480 LB
NET	3. 520 LB
PCS	3520

FIGURE 4. Print Ticket

NOTE: The TARE and NET fields are blank when a tare has not been established in the system. The PCS field is blank when a unit weight has not been established in the system.

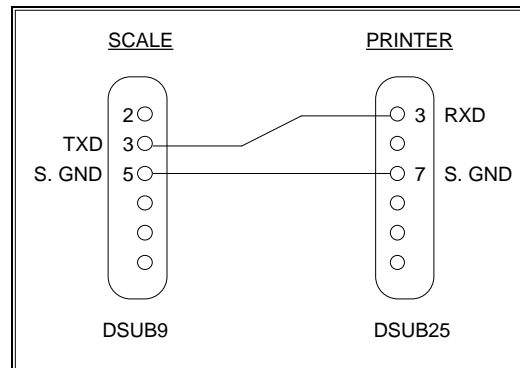


FIGURE 5. Cable Diagram for Indicator to Printer

APPENDIX B: Serial Port Modes & Cable Diagrams / Continued

To enter a new ID NO. using the A8 ID No. Entry procedure:

1. While in the User Menu mode, scroll to "**A 8**", then scroll down once using the **6** key to enter ID No. menu.
2. The display will momentarily show "**ID NO**", followed by the current value with one flashing digit.
3. Use the numeric keys to enter the desired ID number (up to six digits).
4. After setting the exact value, press the **SAMPLE** key to save the value.
5. If the ID NO. entry was successful, the display will show "**SET**" momentarily, then revert back up to A8.

To enter Line Feeds using the A9 Line Feed Entry procedure:

1. While in the User Menu mode, scroll to "**A 9**", then scroll down once using the **ZERO** key to enter Line Feed menu.
2. The display will momentarily show "**LF**", followed by the current value with one flashing digit.
3. Use the numeric keys to enter the desired number of line feeds (up to 99).
4. After setting the exact value, press the **SAMPLE** key to save the value.
5. If the Line Feed entry was successful, the display will show "**SET**" momentarily, then revert back up to A9.

APPENDIX C: Displayed Error Codes

CODE	MODE	MEANING / POSSIBLE SOLUTION
□□□□□□	Normal Operating Mode	A weight greater than the rated capacity has been applied to the scale. Remove the weight from the platter. Try recalibrating the scale if this doesn't solve the problem. Otherwise, possible load cell damage due to overloading.
Err 0	Calibration Mode	Keyed-in weight value in Calibration Mode is less than 1% of full scale capacity. Use a larger test weight or re-adjust value.
Err 1	Calibration Mode	Keyed-in weight value in Calibration Mode is larger than full scale capacity. Use a smaller test weight or re-adjust value.
Err 2	Calibration Mode	Internal resolution is not high enough to process keyed-in weight value in Calibration Mode. Verify test weight and value.
Err 9	Normal Operating Mode	Span calibration value has been lost. Re-calibrate scale.
Err 10	Normal Operating Mode	Sample weight is equal to or less than zero. Press the ZERO key then placed items to sampled onto the platter.
Err 11	Normal Operating Mode	Keyed-in sample value is equal to zero. Key-in a valid sample value.
Err 12	Normal Operating Mode	The unit weight of the items you wish to count is less than that listed in the table under "Piece Counting Operation".
Err 13	Normal Operating Mode	The total sample weight of the items you wish to count is less than that listed in the table under "Piece Counting Operation".
Err 14	Normal Operating Mode	The keyed-in value for unit weight is equal to zero. Key-in a valid unit weight value.
tErr 1	Normal Operating Mode	You have attempted to key-in a tare weight that is greater than the scale's full capacity. For example, for a 5 lb scale you cannot enter a value over 5 lb.
tErr 6	Normal Operating Mode	You have attempted to key in a tare weight whose resolution is greater than the resolution of the scale. See "Tare Operation" for more information.

Warranty and Service Information

Seller warrants that the MCS Series Counting Scale will conform to written specifications, drawings, and other descriptions made by the manufacturer, including any modifications thereof. The Seller warrants the goods against faulty workmanship and defective materials. If any goods fail to conform to these warranties, Seller will, as its sole and exclusive liability hereunder, repair or replace such goods if they are returned within the following warranty period:

Twelve (12) months from date of shipment from manufacturer.

These warranties are made upon the express condition that:

- 1) Transcell Technology, Inc. is given prompt written notice upon discovery by Buyer of such non-conformity, with a detailed explanation of the alleged deficiencies;
- 2) Such goods are returned to the Seller at the expense of the Buyer;
- 3) Examination of such goods by Seller discloses that the nonconformity actually exists and was not caused by accident, misuse, neglect, alteration, improper installation improper or unauthorized repair, or improper testing, and
- 4) Such goods have not been modified, altered, or changed by any person other than the Seller or its duly authorized repair agents.
- 5) Transcell Technology, Inc. will have a reasonable time to repair or replace such goods.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ORAL OR WRITTEN, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SELLER WILL NOT IN ANY EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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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 the Seller.

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