TRANSCELL TECHNOLOGY, INC.

NEPTUNE 4500

Digital Indicator

Setup / Operation Manual

Revision 0.3
February 6, 2003

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

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CHAPTER 1:   INTRODUCTION TO THE Neptune 4500 SERIES DIGITAL INDICATORS

The Neptune 4500 Series Digital Indicator is a general purpose, industrial grade weight indicator. All models operate identically, can readout up to 50,000 display divisions and can supply enough current for up to 4-350Ω load cells. All setup parameters may be entered via the front panel keys, including calibration.

If your Neptune Model 4500 Series Digital Indicator is part of a complete floor scale or has been installed for you, you may skip to Chapter 7 for operating instructions. Prior to using the indicator, please read this chapter carefully and completely. Store the manual in a safe and convenient place so it will be available if you have questions concerning the operation of the scale.

If you are an installer, the indicator's installation and wiring instructions are found in Chapter 2. The indicator contains two main setup menus: The Setup ("F") menu, which configures the indicator to your weigh platform and the User ("A") menu, which configures the serial communication port and enables some user options. Chapter 3 gives an overview and explains how to use the two front panel keys to maneuver and save settings in both menus. Chapters 4 and 5 explain the Setup and User Menu options, respectively. Chapter 6 covers system calibration. Prior to installing the indicator, please read this manual carefully and completely. Store the manual in a safe and convenient place so it will be available if you have questions concerning the setup and operation of the scale.

MODEL	DISPLAY TYPE	ENCLOSURE TYPE	POWER SOURCE
Neptune 4500	LED	Stainless Steel	110/220 VAC, 50/60 Hz

TABLE 1-1: Neptune Series Product Matrix
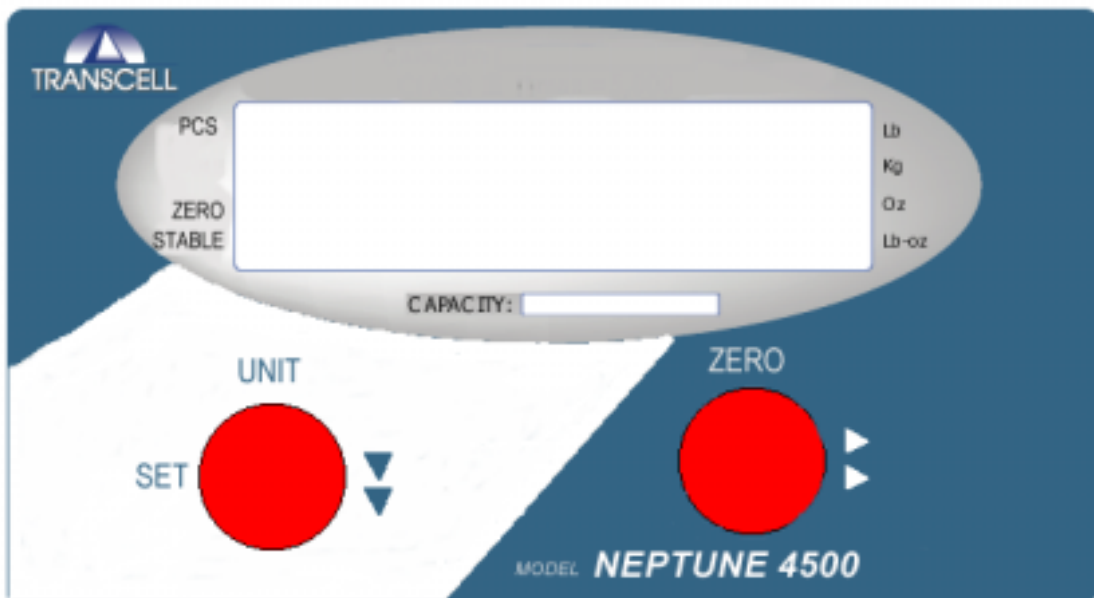
FIGURE 1-1: Neptune 4500 Front Panel

CHAPTER 2: INSTALLATION

2.1   STAINLESS STEEL ENCLOSURE

For indicators contained in a stainless steel enclosure, the rear cover must first be removed to make the appropriate connections to the weigh platform, printer, remote display and power supply. To remove the rear cover, simply remove the screws that secure it to the enclosure and set aside.

NOTE: On earlier units, the rear cover must remain off to access the Setup Menu and calibration procedures.
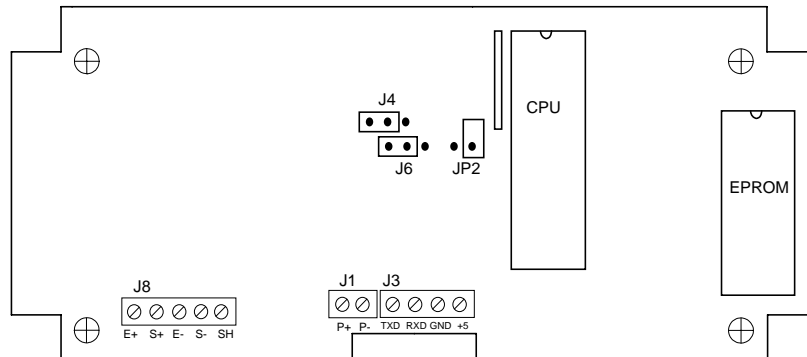
Figure 2-1: Neptune 4500 Main Circuit Board Overview

2.1.1   CONNECTING THE WEIGH PLATFORM

1.   Connect your shielded load cell cable (not included) to the appropriate terminal on the main board. Connection assignments for the Load Cell Terminals are shown in Figure 2-6.
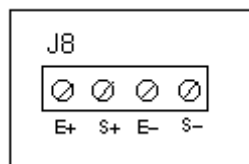
Figure 2-2: Connection assignments for the Load Cell Terminal

2.1.2 CONNECTING THE SERIAL PRINTER, REMOTE DISPLAY OR COMPUTER

The Neptune 4500 Series indicator comes standard with one full duplex RS-232 serial port, designed for connection to either a PC or a serial printer. The same port may be also used as a simplex, RS-232 port designed for connection to a remote display.

Connection assignments for all serial communication terminals are shown in Figure 2-7. **NOTE:** Do not connect any RS-232 equipment to the "+5V" terminal (not shown).

1. Connect your serial printer, remote display or computer communication cable (not included) to the appropriate terminal on the main board.
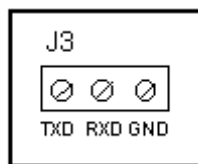
Figure 2-3: Connection assignments for the serial communication terminal

2.1.3 CONNECTING THE POWER SUPPLY

The Neptune 4500 indicator ships with an AC line cord attached to the indicator. Simply plug the unit into a standard wall outlet.

1. Simply plug the AC adapter into the indicator's DC Power Jack first, and then plug into a standard wall outlet. *Make sure that the AC voltage appearing at the wall outlet matches the input voltage marked on the AC adapter.*

CHAPTER 3: CONFIGURATION

3.1   CONFIGURATION OVERVIEW

The indicator contains two main setup menus: The Setup ("F") menu, which configures the indicator to your weigh platform and the User ("A") menu, which configures the serial communication port and enables some user options. The Setup and User menus consist of several menu selections, each with its own sub-menu of choices.

To set up the indicator, you must first enter the appropriate menu mode. Once there, the front panel keys become directional navigators to move around in the menus, and one key is used to save or SET the selections.

3.2   SETUP ("F") MENU

3.2.1   ENTERING THE SETUP MENU – STAINLESS STEEL ENCLOSURE

1.   Power off the indicator.

2.   Locate the slide switch on the rear cover and move it to the right.

     NOTE: A metal plate held on by two drilled-head screws may conceal the slide switch.

3.   Power on the indicator. The indicator shows " F   1" to indicate that you are in Setup Menu mode.

Note 1: Access to the back cover is inhibited if the indicator has been sealed for commercial use. For more information, please refer to Chapter 8.

3.2.2   NAVIGATING IN THE SETUP MENU

Use the directional keys shown in Figure 3-1 to move around in the Setup Menu Chart shown in Figure 3-2 on the following page.

1.   To move to a new "F" heading, use the ZERO (left) key to move in the Setup Menu Chart.

2.   To move to the selection level, press the UNIT/SET (down) key once. The current saved selection is shown.

3.   To view the available selections for the current "F" heading, use the ZERO (left) key to move through the selection field.

4.   To save/exit a new selection, press the UNIT/SET key .To exit without saving, press the UNITS (up) key to return to the current "F" heading.

5.   Repeat Steps 1 through 4 until the Setup Menu is programmed.
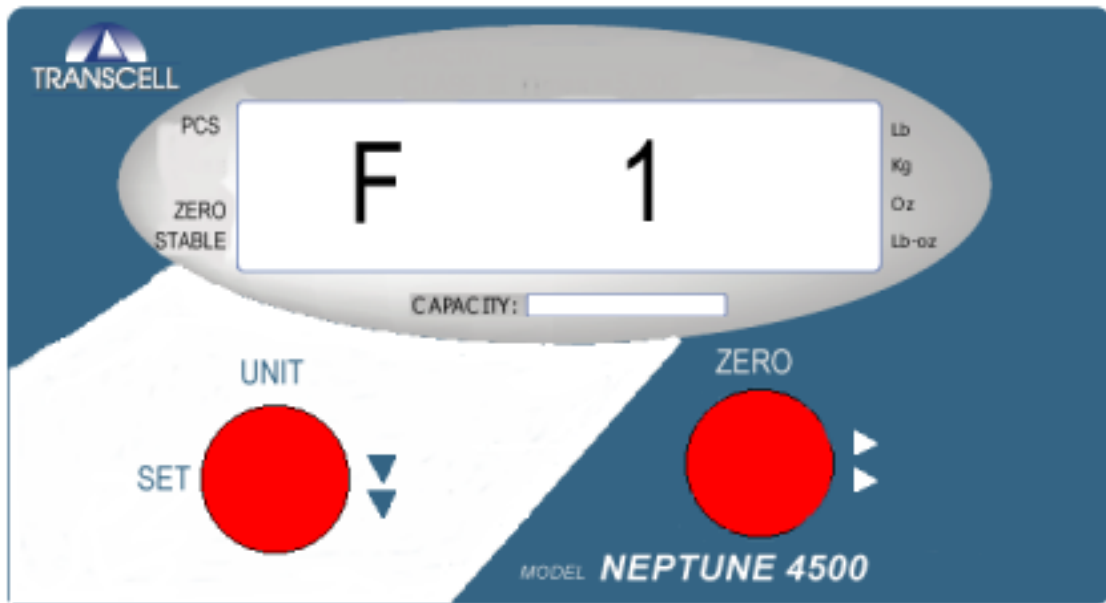
Figure 3-1: Setup Menu Key Assignments

F1 Grads	F2 Span Gn.	F3 Zero Band	F4 Zero Range	F5 Mot. Band	F6 Dig. Filter	F7 Ovld. Limit	F8 Calib. Unit

Zero Band: 0d | 0.5d | 1d | 3d | 5d

Mot. Band: 1d | 3d | 5d | 10d

Ovld. Limit: 0d | 2% | 1d | 9d

Span Gn.: 25 | 50 | 75 | 100 | 150 | 200

Zero Range: 100% | 1.9%

Dig. Filter: 1 | 2 | 4 | 8

Calib. Unit: lb | kg

Grads: 500 | 1000 | 1500 | 2000 | 2500 | 3000 | 4000 | 5000 | 6000 | 8000 | 10000 | 12000 | 20000 | 30000 | 40000 | 50000

F9 Dsp. Div.	F10 Dec. Pt.	F16 Zero Calib.	F17 Span Calib.	F18 Cal. View	F19 Key-in Zero	F20 Key-in Span
		Press UNIT key to begin	Press UNIT key to begin	Press UNIT key to begin	Press UNIT key to begin	Press UNIT key to begin

Dsp. Div.: 1 | 2 | 5

Dec. Pt.: 0 | 0.0 | 0.00 | 0.000 | 0.0000 | 00

F24 Piece Count Enable

Piece Count Enable: 0 | 1

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Figure 3-2: Setup Menu Chart

3.2.3 NOTES ON THE SETUP MENU

1. There is an **F21** sub-menu present that is for FACTORY USE ONLY!

2. Detailed descriptions of the setup menu parameters can be found in Chapter 4 of this manual.

3. The User ("A") menu sub-menus appear when scrolling left or right from the "F" menu.

4. Some selections shown are not available on all models in the series. Likewise, additional selections may be available on other models in the series. See Chapter 4 for more information.

3.2.4 EXITING THE SETUP MENU – STAINLESS STEEL ENCLOSURE

1. Power off the indicator.

2. Move the slide switch on the rear cover back to the left.

3. Power on the indicator. 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.

3.3 USER ("A") MENU

3.3.1 ENTERING THE USER MENU

1. Enter the Setup ("F") menu by following the directions in Section 3.2.1 or 3.2.2.

2. Use the ZERO directional keys shown in Figure 3-3 to move right or left in the Setup ("F") menu until the indicator shows " A   1".

3.3.2 NAVIGATING IN THE USER MENU

Use the directional keys shown in Figure 3-3 to move around in the User Menu Chart shown in Figure 3-4 on the following page.

1. To move to a new "A" heading, use the ZERO (left) or PRINT (right) key to move right or left in the User Menu Chart.

2. To move to the selection level, press the ZERO (down) key once. The current saved selection is shown.

3. To view the available selections for the current "A" heading, use the ZERO (left) or PRINT (right) key to move through the selection field.

4. To save/exit a new selection, press the UNIT/SET key .

5. Repeat Steps 2 through 5 until the User Menu is programmed.
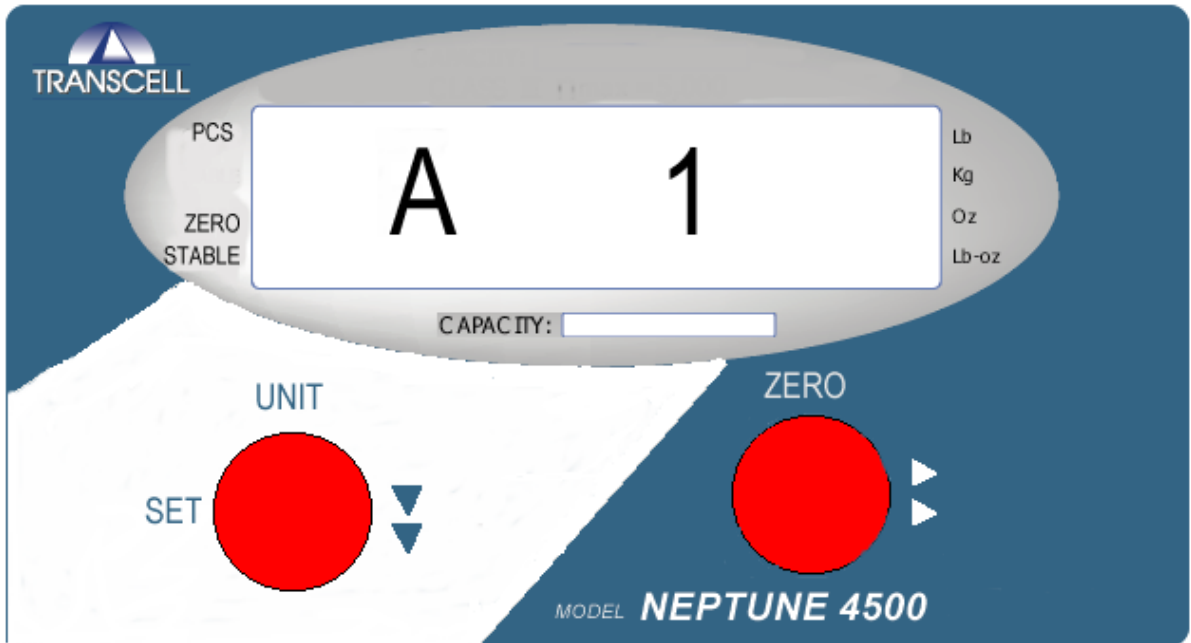
Figure 3-3: User Menu Key Assignments
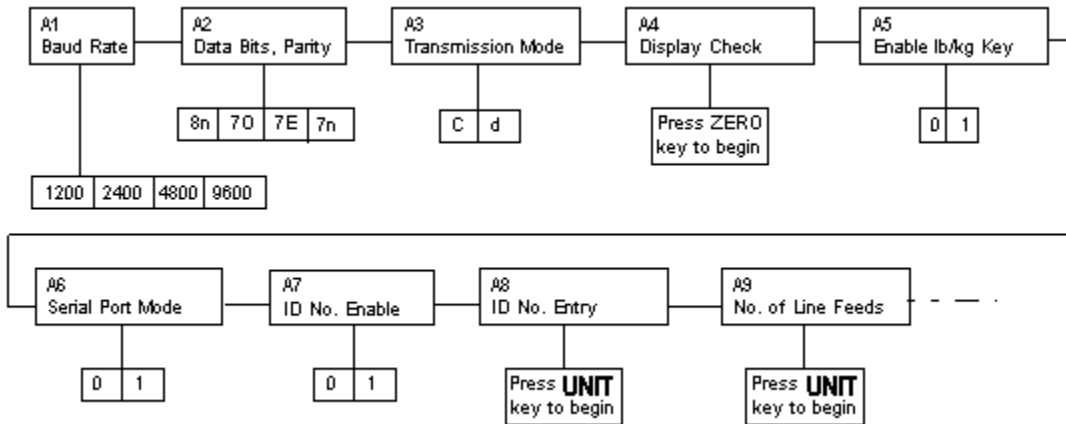
Figure 3-4: User Menu Chart

3.3.3   NOTES ON THE USER MENU

1.   Detailed descriptions of the user menu parameters can be found in Chapter 5 of this manual.

2.   Some selections shown are not available on all models in the series. Likewise, additional selections may be available on other models in the series. See Chapter 5 for more information.

3.3.4   EXITING THE USER MENU

1.   Exit the User ("A") menu by sliding the setup switch to its original position. Replace the metal cover. 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.

CHAPTER 4: SETUP MENU DESCRIPTIONS AND PROCEDURES

4.1 SETUP MENU DESCRIPTIONS

This section provides more detailed descriptions of the selections found in the Setup Menu Chart. Factory-set defaults are shown in bold with a checkmark (√).

Table 4-1 shows the selections that are <u>not</u> allowed for "Legal-for-Trade" applications:

NAME/CODE	DESCRIPTION	CODE/VALUE
F1 Graduations	Specifies number of full-scale graduations. Value should be consistent with legal requirements and environmental limits on the useful system resolution.	500 1,000 1,500 2,000 2,500 3,000 4,000 **5,000√** 6,000 8,000 10,000 12,000 20,000 30,000 40,000 50,000
F2 Span Gain	Span Gain is related to A/D integration time. The larger the span gain, the higher the internal resolution, but the slower the update speed. Note that the scale must be re-calibrated whenever this parameter is altered. See Appendix C for more information.	25 50 **75√** 100 150 200
F3 Zero Track Band	Selects the range within which the scale will automatically zero. Note that the scale must be in standstill to automatically zero. Selections are in Display Divisions.	0d **0.5d√** 1d 3d 5d
F4 Zero Range	Selects the range within which the scale may be zeroed. Note that the indicator must be in standstill to zero the scale.	**100%√** 1.9%
F5 Motion Band	Sets the level at which motion is detected by comparing the present display update with the previous one. If motion is not detected for two seconds or more, scale is in standstill and can process a Print or Zero command. Maximum value varies depending on local regulations.	0.25d (TI-500-SL) **1d√** 3d 5d 10d
F6 Digital Filter	Averages weight readings to produce higher stability. The higher the filter setting, the greater the stability but the slower the indicator's response time. Choose 8 unless a very fast response is needed.	1 2 4 **8√**

F7 Overload Limit	Selects the desired formula which determines the point at which the indicator shows overload. All selections are based on the primary unit selected in F8. "FS" = Full scale in primary units.	FS **FS + 2%√** FS + 1d FS + 9d
F8 Calib. Unit	Selects the primary base unit to be used in the calibration process. Also the default unit for normal operation. "1" = primary unit is lb. "2" = primary unit is in kg.	**1√** 2
F9 Display Divisions	Determines the desired weight increments. Value should be consistent with legal requirements.	**1√** 2 5
F10 Decimal Pt.	Determines location of the decimal point.	**0√** 0.0 0.00 0.000 0.0000 00
F16 Zero Calibra-tion	Places indicator into the zero calibration routine. Scrolling down with the **UNIT/SET** key one level begins the procedure.	Press **UNIT/SET** key to begin se-quence
F17 Span Calibra-tion	Places indicator into the span calibration routine. Scrolling down with the **UNIT/SET** key one level begins the procedure. NOTE – press and hold the UNIT/SET for three seconds for effect.	Press **UNIT/SET** key to begin se-quence
F18 View Calibra-tion	Actuates the function that allows you to view both the zero and span calibration value. The values displayed in this function are valid only after Calibration (F16 & F17) has been successfully completed. Scrolling down with the **UNIT/SET** key one level begins the proce-dure.	Press **UNIT/SET** key to begin se-quence
F19 Key-in Zero	Allows you to key-in known zero calibration value in case of memory loss in the field. Scrolling down with the **UNIT/SET** key one level be-gins the procedure.	Press **UNIT/SET** key to begin se-quence
F20 Key-in Span	Allows you to key-in a known span calibration value in case of mem-ory loss in the field. Scrolling down with the **UNIT/SET** key one level begins the procedure.	Press **UNIT/SET** key to begin se-quence
F21 Factory Reset	This sub-menu will reset all parameters in the "F" and "A" menu to the default settings. USE WITH CAUTION!	Press the **UNIT/SET** key twice to execute.
F24 Piece Count Enable	Used to enable or disable the piece count feature. This feature must be disabled for commercial applications. "0" = Disable piece count "1" = Enable piece count	**0√** 1

SUB-MENU	TITLE	SELECTIONS	
F1	Graduations	6,000	8,000
		10,000	12,000
		20,000	30,000
		40,000	50,000
F3	Zero Tracking Band (SAZSM)	0d	
		5d	
F5	Motion Band	3d	5d
		10d	15 d
		20d	30d
		40d	50d
F6	Digital Filter	1	
		2	
		4	

Table 4-1: Invalid Setup Menu selections for commercial applications

CHAPTER 5: USER MENU DESCRIPTIONS AND PROCEDURES

5.1   USER MENU DESCRIPTIONS

This section provides more detailed descriptions of the selections found in the User Menu Chart. Factory-set defaults are shown in bold with a checkmark ($\sqrt{}$).

NAME/CODE	DESCRIPTION	CODE/VALUE
A1 Baud Rate	Selects the baud rate for data transmission through the serial port.	1200 2400 4800 **9600**$\sqrt{}$

A2
Data Bits and Parity
	Selects the number of data bits and parity of serial transmission.
	    "8n" = 8 data bits with no parity bit and one stop bit
	    "7O" = 7 data bits with odd parity bit and one stop bit
	    "7E" = 7 data bits with even parity bit and one stop bit
	    "7n" = 7 data bits with no parity bit and two stop bits
		8n$\sqrt{}$
		7O
		7E
		7n

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$\sqrt{}$

A4 Display Check	Actuates the function that illuminates all digit segments, decimal points, and LCD annunciators in a test sequence. Pressing the **UNIT/SET** key to scroll down one level begins the test sequence.	Press **UNIT/SET** key to begin sequence
A5 Disable the lb/kg Key	Allows the lb/kg key to be disabled so that an operator cannot accidentally press the key and change the displayed units. "0" = Disable the lb/kg key "1" = Enable the lb/kg key	0 **1**$\sqrt{}$

A6
Serial Port Mode
	Selects the mode of the RS-232 serial port: Refer to Appendix B for more information.
	          "0" = Full Duplex Mode
	          "1" = Print Ticket Mode
		0$\sqrt{}$
		1

A7 ID No. Enable	Allows the ID number to be disabled in the Print Ticket mode. Valid only when **A6** is set to "1". "0" = Disable the ID No. "1" = Enable the ID No.	**0**$\sqrt{}$ 1
A8 ID No. Entry	Actuates the function that allows entry of a new ID No. Valid only when **A6** is set to "1". Pressing the **UNIT/SET** key to scroll down one level begins the sequence.	**123456**$\sqrt{}$
A9 No. of Line Feeds	Actuates the function that allows entry of the desired number of line feeds to be printed in Print Ticket Mode. Valid only when **A6** is set to "1". Pressing the **UNIT/SET** key to scroll down one level begins the sequence.	0 - 99 **5**$\sqrt{}$

5.2   USER MENU PROCEDURES

This section provides instructions for all of the User Menu procedures.

5.2.1   ID Number Entry (A8)

1.   While in the User Menu mode, scroll to "**A 8**", then scroll down once using the **UNIT/SET** key to enter the ID Number menu.

2.   The display will momentarily show "**ID NO**", followed by a value with one flashing digit. This value will be the current ID number value.

3.   Use the directional keys to adjust the displayed value to the actual ID Number value. Increase the flashing digit by pressing the UNITS key. Pressing the **ZERO** to change the position of the flashing digit.
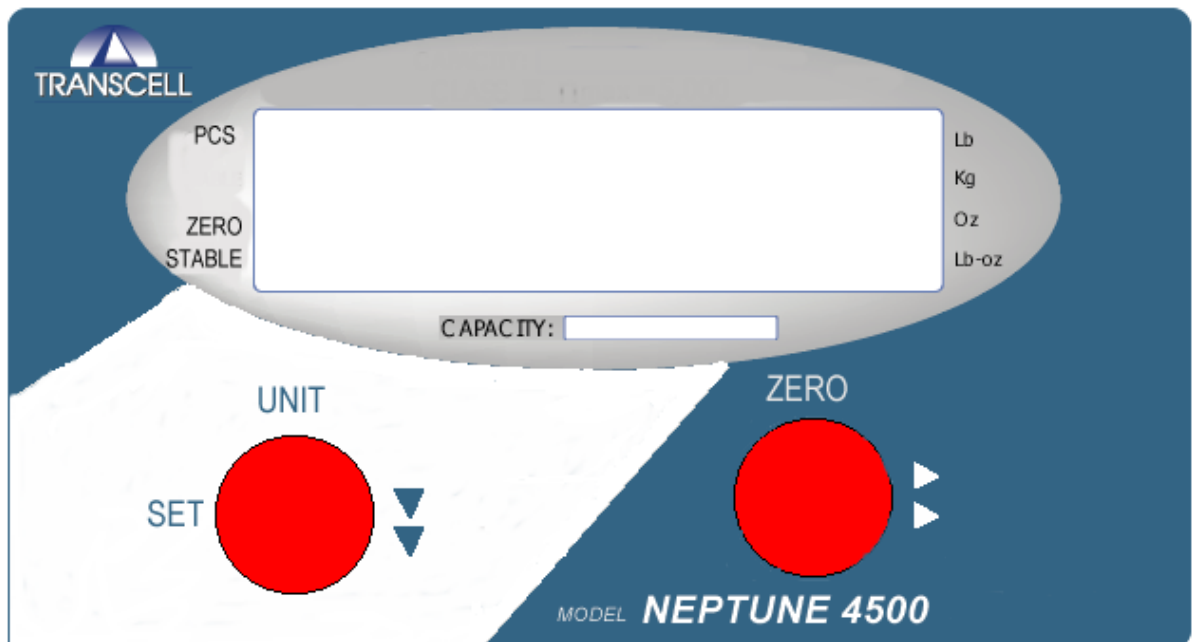
Figure 5-1: User Menu Key Assignments

4.   After setting the exact value, hold the **UNIT/SET** key to save the ID Number value. The display will show "**END**" momentarily, then revert back up to A8.

5.2.2 LF (Line Feeds) Number Entry (A9)

1. While in the User Menu mode, scroll to "**A 9**", then scroll down once using the **UNIT/SET** key to enter the Line Feeds menu.

2. The display will momentarily show "**LF**", followed by the current line feeds value.

3. Use the directional keys (shown in Figure 5-1 above) to adjust the displayed value to the actual line feeds value. Increase the flashing digit by pressing the UNITS key. Pressing the **ZERO** key will change the position of the flashing digit.

4. After setting the exact value, hold the **UNIT/SET** key to save the line feeds value. The display will show "**END**" momentarily, then revert back up to A9.

CHAPTER 6: CALIBRATION

6.1   CALIBRATION OVERVIEW

The indicator is calibrated by following the procedures embedded in F16 (Zero) and F17 (Span) of the Setup Menu. Each procedure enters a value into the indicator's non-volatile memory - F16 the zero value (deadweight) and F17 the span value (test weight). The minimum test weight that can be used is 1% of full-scale capacity. After the two calibration procedures are executed successfully, you should record both calibration values in Table 6-1 using the F18 View procedure.

In the unlikely event that either value is lost while in the field, the setup menu makes provisions for re-entering these values via F19 and F20, thus eliminating the need for re-calibration with test weights.

NOTE: This chapter assumes that the indicator is in Setup ("F") Menu mode. If the indicator is not in Setup Menu mode, refer to Chapter 3 for instructions.

6.2   ZERO CALIBRATION (F16)

1. While in the Setup mode, scroll to "**F 16**", then scroll down once using the UNIT/SET key to enter zero calibration menu. The display will momentarily show "**C 0**" followed by a value. This value is the internal A/D count and can prove useful when trying to troubleshoot setup problems.

2. After making sure that there are no test weights on the platform, press the ZERO key again to zero out the displayed value.

3. Press the UNIT/SET key to save the zero point value. The display will show "**EndC0**" momentarily, then revert back up to F16. At this time, proceed to the F17 span calibration to complete indicator calibration.

6.3   SPAN CALIBRATION (F17)

1. While in the Setup mode, scroll to "**F 17**", then scroll down once using the UNIT/SET key to enter span calibration menu.

2. The display will momentarily show "**C 1**" for the span calibration, followed by a value with one flashing digit. This value will be zero with the Decimal Point parameter selected in F10. Place the test weight on the weighing mechanism.

3. Use the directional keys (shown in Figure 6-1 below) to adjust the displayed value to the actual test weight value. Change the flashing digit by pressing the UNIT/SET key. Pressing the ZERO key will change the position of the flashing digit.
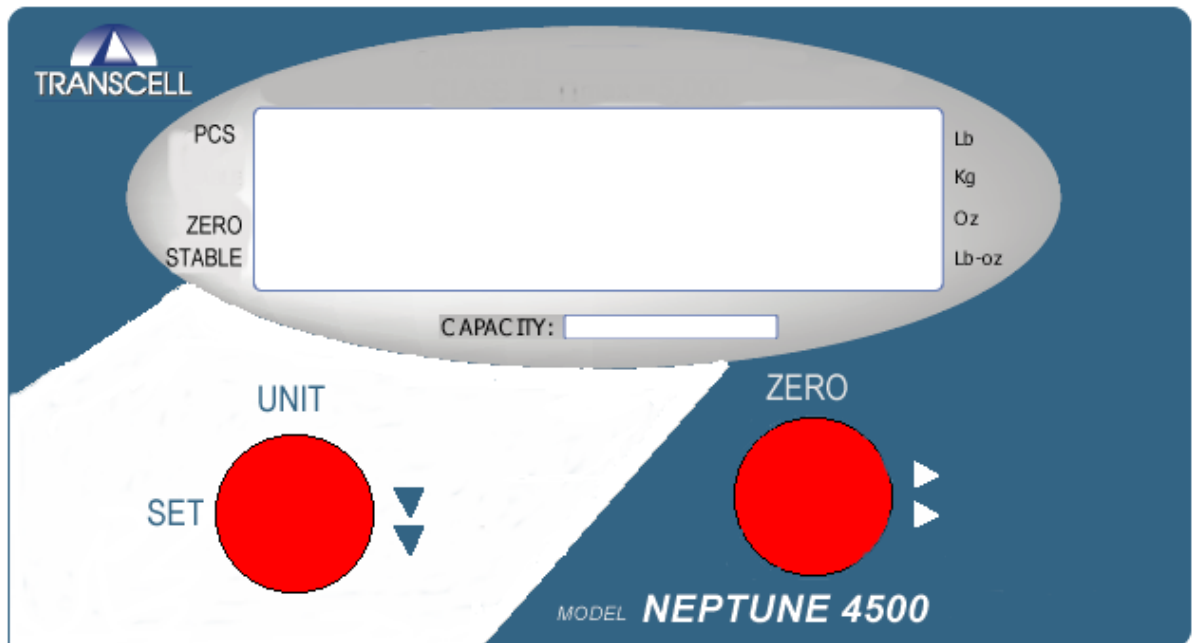
Figure 6-1: Setup Menu Key Assignments

4. After setting the exact value, press and hold the UNIT/SET key for three seconds to save the value.

5. If the calibration was successful, the display will show "**EndC1**" momentarily, then revert back up to F17. At this time it is suggested that the calibration values be recorded for future use (see Section 6.4).

6. 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 adjusted keyed-in weight is larger than the full capacity of the scale. Change the calibration test weight or check the input data.

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

"**Err2**" - The internal resolution of the scale is not high enough to accept the calibration value. Select a larger parameter for the Span Gain (F2). SEE APPENDIX C FOR MORE INFORMATION.

6.4 VIEW CALIBRATION VALUES (F18)

Note: The values displayed in this procedure are valid only after a successful calibration has been performed using F16 and F17.

1. While in the Setup mode, scroll to "**F 18**", then scroll down once using the UNIT/SET key to enter View calibration menu.

2. The display will momentarily show "**CAL 0**" followed by a value. This value is the **zero calibration value** and should be recorded in the table below. Press any key to continue.

3. The display will momentarily show "**CAL 1**" followed by another value. This value is the **span calibration value** and should also be recorded in the table below. Press any key to return to upper level (F18).

INDICATOR	ZERO CALIBRATION VALUE	SPAN CALIBRATION VALUE
S/N:		

Table 6-1: Calibration Value Table

6.5 KEY-IN ZERO CALIBRATION VALUE (F19)

Note: This procedure is intended for emergency use only in the case of non-volatile memory loss. A valid zero calibration value, obtained from a successful F16 calibration procedure, must be used.

1. While in the Setup mode, scroll to "**F 19**", then scroll down once using the **UNIT/SET** key.

2. The display will momentarily show "**CAL 0**", followed by a flashing zero. Use the directional keys (shown in Figure 6-1) to adjust the displayed value to the zero calibration value.

3. After setting the exact value, press and hold the UNIT/SET key to save the value.

4. The display will show "**E CAL 0**" momentarily, then revert back up to F19.

6.6 KEY-IN SPAN CALIBRATION VALUE (F20)

Note: This procedure is intended for emergency use only in the case of non-volatile memory loss. A valid span calibration value, obtained from a successful F17 calibration procedure, must be used.

1. While in the Setup mode, scroll to "**F 20**", then scroll down once using the **UNIT/SET** key.

2. The display will momentarily show "**CAL 1**", followed by a flashing zero. Use the directional keys (shown in Figure 6-1) to adjust the displayed value to the span calibration value.

3. After setting the exact value, press and hold the **UNIT/SET** key to save the value.

4. If the entered value is greater than zero, the display will show "**E CAL 1**" momentarily, then revert back up to F20. If a value of zero is entered, the indicator will briefly show "**Err 5**", then revert back to the screen described above in Step # 2.

CHAPTER 7: OPERATION

7.1 DISPLAY

As mentioned in Chapter 1, some models utilize a 6 digit LCD (Liquid Crystal Display) while others utilize a 6-digit LED (Light Emitting Diode) display. Typically, LCD's are used for outdoor applications while LED's are used indoors where brightness is needed. Table 7-1 summarizes both types of display annunciators.

7.1.1 LIGHT EMITTING DIODE (LED) DISPLAY

Figure 7-1 shows the display detail of the LED display indicators.

FIGURE 7-1: Neptune 4500 Series LED Display Detail

LCD Annun-ciator	LED Annun-ciator	MEANING
→0←	ZERO	Better known as the "Center of Zero" annunciator, this light is active whenever the displayed weight is within ± 0.25 divisions of true zero.
N	NET	Indicates that the indicator is displaying net weight.
G	GROSS	Indicates that the indicator is displaying gross weight.
T	TARE	Indicates that a tare weight has been established in the system.
Lb, Kg	Lb, Kg, Lb-Oz, Oz, PCS	Indicates the unit of the displayed weight. PCS stands for "pieces".
�	STABLE	This light is on whenever the scale is stable.

TABLE 7-1: NEPTUNE 4500 Series Annunciator Definitions

7.2   KEYBOARD

The keyboard is composed of TWO function keys. Refer to Figures 7-2 for the overall layout and key locations.

FIGURE 7-2: Function Keys Layout

7.2.1   FUNCTION KEYS

Unit/Set – This key toggles the indicator among the available weight units if enabled in the User ("A") menu. Available weight units include lb, kg and pieces[1]. See Chapter 5 for more information. *Hold the key for three seconds for value to be accepted.*

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[1] Newer units only.

Zero - This key sets the indicator to display zero provided the following conditions are met:
1. The indicator is displaying Gross weight.
2. The displayed weight is within the zero reset range that is programmed in F4 of the Setup ("F") Menu.
3. The scale is not in motion.
4. The scale is not in overload (see Appendix D for error codes).

1. The scale is not in overload (see Appendix D for error codes).

7.3 GENERAL SCALE OPERATION

7.3.1 WEIGHING AN ITEM

1. Select the desired weighing unit by pressing the **UNIT** key until that unit is indicated on the display.

2. If necessary, press the ZERO key to obtain a weight reading of zero.

3. Place the object to be weighed on the scale's platter and allow the weight indication to stabilize. If the item weight exceeds the scale's weight capacity, it displays "⬜⬜⬜⬜⬜".

4. Read the weight shown on the display.

7.3.2 ZEROING THE WEIGHT OF AN ITEM

To weigh an item in a container, the weight of that container must first be subtracted from the overall weight to obtain an accurate weight reading.

1. Select the desired weighing unit by pressing the **UNIT** key until that unit is indicated on the display.

2. Place the empty container on the scale's platter and allow the weight indication to stabilize.

3. Press the ZERO key. The display shows zero weight.

4. Place the material to be weighed in the container and allow the weight indication to stabilize.

5. Read the weight shown on the display.

7.3.3 PIECE COUNTING

IMPORTANT NOTE: The piece counting function cannot be used in commercial (NTEP) applications.

This mode is used to indicate the number of pieces of an item you have placed on the scale's platform and is accessed by pressing the UNITS key. To ensure accuracy, the parts you are counting must be consistent in weight.

The indicator uses the sampling method to determine the average piece weight (APW) of the items you wish to count. When sampling items, always count the parts in your hand and place them on the platform all at once. If the APW of the items is too light or the total weight of the sample is too light, accuracy cannot be guaranteed. You will get an error message, but piece counting will still be allowed.

1. If the items you will be counting require a container, you must first tare the container off by pressing the ZERO key.

2. Press the UNITS key until "5   0" is indicated on the display. If the screen does not show "5   0", press the ZERO key once. The indicator is prompting you to place five identical items on the platform.

    NOTE: If you wish to change the sample number, simply press the UNITS key repeatedly until the desired sample number appears. Available choices are 5, 10, 20, 50 and 100. If you continue to push the UNITS key, the indicator will resort back to weighing mode and you must start again from Step 2.

3. Place the sample items on the platform all at once and allow the weight indication to stabilize. Once this is done, press and hold the **UNIT/SET** for three seconds. If the sample size is large enough, the indicator now displays the number of pieces on the platform and the "PCS" annunciator is lit. If not, the indicator briefly displays "Lo" and automatically increments the sample size. Repeat step 3.

    NOTE: If the indicator continues to display "Lo" even after sampling 100 pieces, the unit weight of the items you wish to count is too light for your scale to process accurately.

4. To exit the piece count mode, press the **UNIT/SET** key.

    NOTE: The APW will NOT remain in scale memory when you exit piece counting mode.

CHAPTER 8: LEGAL FOR TRADE SEALING

8.1   STAINLESS STEEL ENCLOSURE

Indicators in the stainless steel enclosure can be sealed for commercial (Legal for Trade) applications as follows.

1. Power off the indicator.

2. On the rear cover of the indicator, locate the calibration switch cover.

3. Thread a wire security seal through both drilled head screws securing the calibration switch cover as well as the two drilled head screws holding on the rear panel.

APPENDIX A: SPECIFICATIONS

ANALOG SPECIFICATIONS

Full Scale Input Signal	30mV, including dead load
Minimum Sensitivity - Non H-44	0.4 μV / grad
Minimum Sensitivity - H-44	1.0 μV / grad
Input Impedance	30MΩ, typical
Internal Resolution – Neptune 4500	
	Approximately 260,000 counts
Display Resolution	50,000 display division max
Measurement Rate	10 Meas/sec, nominal
System Linearity	Within 0.02% of FS
Calibration Method	Software Calibration, with long term storage in EEPROM
Excitation Voltage – Neptune 4500	
	+10 VDC, 4 x 350Ω load cells

SERIAL COMMUNICATIONS

Serial Port	Full Duplex, 1200, 2400, 4800, 9600 Baud
	8 data bits, no parity, 1 stop bit
	7 data bits, odd parity, 1 stop bit
	7 data bits, even parity, 1 stop bit
	7 data bits, no parity, 2 stop bits

OPERATOR INTERFACE

Display – LED Indicators	0.56" (14 mm) 7-segment, LED, 6 Digit
Additional Symbols	Stable, Zero, lb, kg, lb/oz, oz, Zero, PCS
Keyboard	2-key water proof buttons

POWER

DC Power Consumption – Neptune 4500	80mA + 30mA/350Ω Load Cell

ENVIRONMENTAL

Operating Temperature	–10° to +40° C
Storage Temperature	-25° to +70° C

MECHANICAL

Overall Dimensions (L x W x H) – Neptune 4500	8.75" x 3.0" x 4.6" (215mm x 75mm x 117mm)

APPENDIX B: SERIAL PORT INFORMATION

B.1   SERIAL PORT MODES

B.1.1 FULL DUPLEX MODE

The Full Duplex Mode provides a Demand serial transmission mode and is selected by setting A3 to "d" and A6 to "0". The Demand mode allows control from a host device, usually a PC. Figure B-1 shows a suggested cable diagram for interface to a PC. Figure B-2 shows the serial data format for the Demand Mode.
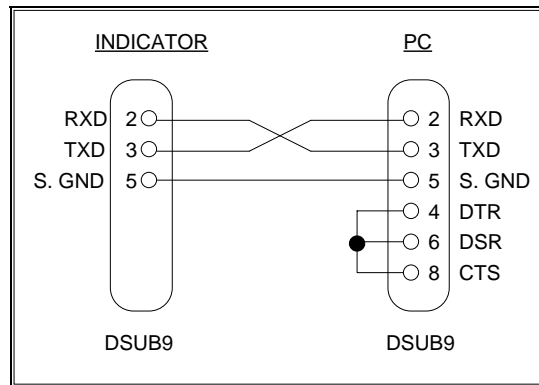

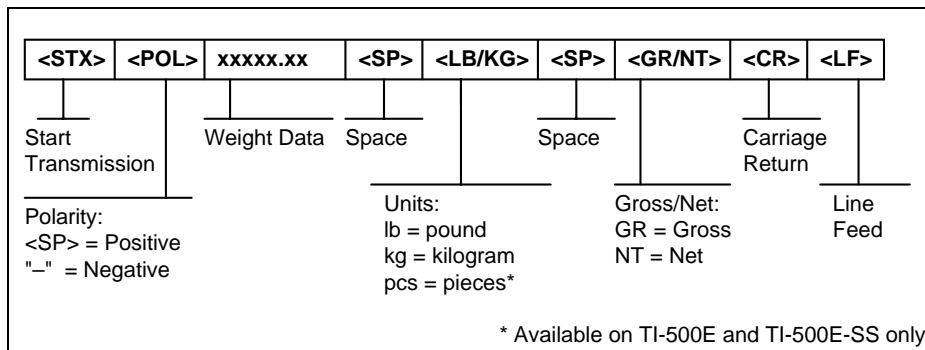**FIGURE B-1. Cable Diagram for Indicator to IBM PC**

FIGURE B-2. Consolidated Controls Demand Mode

B.1.1.1 RECOGNIZED HOST COMMANDS

"P" - This command is sent to the indicator to print the indicated display. The indicator will not respond if the scale is in motion, positive overload or negative overload.

"Z" - This command is sent to the indicator to zero the scale. The indicator will not respond if the scale is in motion, positive overload or negative overload. The indicator will also not respond if it is not in gross mode or within the zero range specified in F4 of the Setup Menu.

"T" - This command is sent to the indicator to tare the scale. The indicator will not respond if the scale is in motion, positive overload or negative overload. The indicator will also not respond if it displaying a negative gross value.

"G" - This command is sent to the indicator to revert to gross mode. The indicator will not respond if the scale is in motion, positive overload or negative overload. The indicator will also not respond if it is not in net mode.

"N" - This command is sent to the indicator to revert to net. The indicator will not respond if the scale is in motion, positive overload or negative overload. The indicator will also not respond if it is not in gross mode or a tare has yet to be established.

"C" - This command is sent to the indicator to toggle among the configured units.

B.1.2 PRINT TICKET MODE (NOT AVAILABLE)

The Print Ticket Mode is designed specifically for a serial printer and is selected by setting A6 to "1". Figure B-3 shows the fixed format of the print ticket.

For printers with limited buffers, this mode supports DTR pin handshaking. The DTR pin from the serial printer is wired to the indicator's RXD pin which then functions as a CTS pin. Figure B-4 shows a suggested cable diagram for interfacing to a serial printer. Refer to the printer's user manual to confirm which pin is the DTR pin.

NOTES:

1. The TARE and NET fields are not printed unless a tare has been established in the system.

2. The ID number field is not printed if it is disabled in A7 of the User Menu.

```
ID. NO.    123456
GROSS       25.00 LB
TARE         1.48 LB
NET         23.52 LB
```


FIGURE B-3. Print Ticket
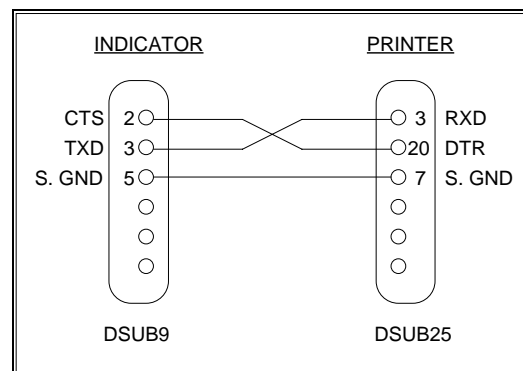
FIGURE B-4. Cable Diagram for Indicator to Printer

B.1.3 SIMPLEX MODE

The Simplex Mode provides a continuous serial transmission mode and is selected by setting A3 to "C" and A6 to "0". 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. Figure B-5 shows the serial data format for Continuous Mode.

\<STX>	\<POL>	xxxxx.xx	\<L/K>	\<G/N>	\<STAT>	\<CR>	\<LF>

Start Transmission

Weight Data

Gross/Net:
G = Gross
N = Net

Carriage Return

Polarity:
\<SP> = Positive
 "–"   = Negative

Units:
L = pound
K = kilogram
PCS = pieces*

Line Feed

Status:
\<SP> = Valid
M = Motion
O = Over/under range

* Available on TI-500E and TI-500E-SS only
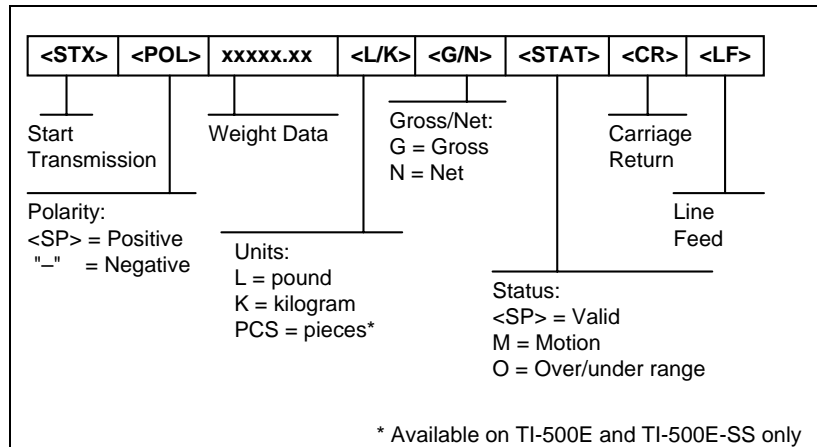
FIGURE B-5. Consolidated Controls Continuous Mode

APPENDIX C: DETERMINING PROPER SPAN GAIN (F2)

C.1   SPAN GAIN OVERVIEW

The Span Gain parameter found in F2 of the Setup Menu is directly related to the ADC (Analog to Digital Converter) integration time. This means that the lower the setting, the higher the number of measurements per second. A span gain setting of **25** produces about 25 to 30 measurements per second, while a span gain of **200** produces only about 3 or 4 measurements per second.

There is really no wrong setting for span gain – except in two cases. Using a low setting for a high resolution, low output system could yield instability. Using a high setting in a high output system could yield non-linearity.

C.2   SETTING THE INITIAL VALUE FOR SPAN GAIN

1. Determine the number of desired external graduations and choose the corresponding value listed in Table C-1 or Table C-1a under the number closest to your full-scale input range in millivolts.

2. Enter the Setup Menu and save this number for the Span Gain parameter in F2.

3. Perform a system calibration. If the calibration proves unsuccessful, or you wish to view the internal counts, proceed to the next set of instructions.

C.3   VIEWING THE INTERNAL COUNTS

1. Enter the zero calibration menu (F16) and follow steps 1 to 3, ***but do not save the zero point.***

2. After pressing **ZERO** to zero the offset, place the test weight(s) on the platform. The displayed count is the internal count. If the count remains on zero, check your load cell connections.

3. At full scale, the displayed count should be a minimum of 2 times the desired external graduations. However, for maximum stability, a ratio of 6:1 or higher is recommended.

4. If the displayed count is large enough, remove the test weight(s), re-zero the indicator if necessary, and proceed with the calibration. If the displayed number is *not* large enough, increase the Span Gain to the next highest choice in the Setup Menu and re-calibrate.

Neptune 4500

# of External Grads	Full Scale Input Range (mV/V)														
	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
500	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
1,000	50	25	25	25	25	25	25	25	25	25	25	25	25	25	25
1,500	75	50	25	25	25	25	25	25	25	25	25	25	25	25	25
2,000	100	50	50	25	25	25	25	25	25	25	25	25	25	25	25
2,500	150	75	50	50	25	25	25	25	25	25	25	25	25	25	25
3,000	150	75	50	50	50	25	25	25	25	25	25	25	25	25	25
4,000	200	100	75	50	50	50	50	25	25	25	25	25	25	25	25
5,000	**–**	**150**	**100**	**75**	**50**	**50**	**50**	**50**	**50**	**25**	**25**	**25**	**25**	**25**	**25**
6,000	–	150	100	75	75	50	50	50	50	50	25	25	25	25	25
8,000	–	200	150	100	75	75	75	50	50	50	50	50	50	50	25
10,000	–	–	200	150	100	100	75	75	75	50	50	50	50	50	50
12,000	–	–	200	150	150	100	100	75	75	75	50	50	50	50	50
15,000	–	–	–	200	150	150	100	100	100	75	75	75	75	50	50
20,000	–	–	–	–	200	200	150	150	150	100	100	100	75	75	75
30,000	–	–	–	–	–	–	200	200	200	150	150	150	150	100	100
40,000	–	–	–	–	–	–	–	–	–	200	–	–	150	150	–

Table C-1: Minimum Recommended (6:1) Span Gain Table

APPENDIX D: DISPLAYED ERROR CODES

CODE	MODE	MEANING / POSSIBLE SOLUTION
□□□□□□	Normal Operating Mode	Gross Overload. A weight greater than the rated capacity has been applied to the scale. Remove the weight from the platter or try re-calibrating the scale. Otherwise, check for a bad load cell connection or possible load cell damage due to overloading.
Err 0	Span Calibration Mode (F17)	Keyed-in weight value is larger than full-scale capacity. Use a smaller test weight or check keyed-in value.
Err 1	Span Calibration Mode (F17)	Keyed-in weight value is less than 1% of full-scale capacity. Use a larger test weight or check keyed-in value.
Err 2	Span Calibration Mode (F17)	There is not enough load cell signal to produce the internal counts necessary to properly calibrate the scale. First check all load connections. Use F16 mode to view internal counts. See Appendix C for more information.
Err 3	All Modes	Non-volatile memory read error. One or more setup parameters have been lost.
Err 4	All Modes	Non-volatile memory write error. Indicator needs service.
Err 5	Key-in Span Calibration Mode (F20)	You have attempted to enter a zero value for C1. Enter a known calibration value greater than zero.
Err 7	Initialization	No reading from the ADC. Make sure there is a load cell(s) connected to the indicator at start-up.
Err 9	Normal Operating Mode	Span calibration value has been lost. Re-calibrate the scale.

LIMITED WARRANTY

Seller warrants that the NEPTUNE Series Digital Indicator line 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 following TERMS and CONDITIONS:

This warranty is limited to the original equipment manufactured by TRANSCELL TECHNOLOGY, INC. Items not covered under this warranty are batteries and normal wear items like connectors, shrouds, front panels and fuses.
For the first sixty (60) days from the date of installation, the warranty covers parts, on-site labor, and limited travel time and mileage. (3 hrs/150 miles maximum per occurrence).
After sixty (60) days, the warranty covers the cost of replacement parts only.
However, at the discretion and prior approval of TRANSCELL, certain equipment may be returned , freight pre-paid, for repair, free of any parts or labor charges.

TRANSCELL's responsibility is confined to repair, replacement or credit of equipment of parts. The warranty does not extend coverage to labor, material, freight or service charges involved in removal, shipping or reinstallation of equipment or parts.

CONDITIONS WHICH VOID LIMITED WARRANTY:
This warranty shall not apply to equipment which:
A. Examination of such goods discloses that the nonconformity exists and was caused by accident, misuse, neglect, alteration, improper installation improper or unauthorized repair, improper testing, or an act of GOD including lightning and such goods have not been modified, altered, or changed by any person other than the Seller or its duly authorized repair agents.

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.

IN ACCEPTING THIS WARRANTY, THE PURCHASER OR BUYER AGREES TO WAIVE ANY AND ALL OTHER CLAIMS FOR RIGHT TO WARRANTY FROM TRANSCELL TECHNOLOGY, INC. SHOULD THE SELLER BE OTHER THAN TRANSCELL TECHNOLOGY, INC., THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIM OR 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 the Seller.